



ThinkSystem SR950 Setup Guide



Machine Types: 7X12, 7X11, and 7X13

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



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

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>

Twenty-first Edition (April 2022)

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Chapter 1. Introduction

The ThinkSystem SR950 server is a high performance 4U rack server that supports up to eight Intel Xeon processors. It is an enterprise-class server designed for customers requiring four or more processors, large amounts of memory, and numerous I/O connections.



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

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

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:

- ThinkSystem SR950 server
- Rail installation kit (optional). Detailed instructions for installing the server in a rack using these rails are in the *Rack Installation Instructions* document packaged with your server.
- Material box, including items such as the power cords, printed documentation, and an accessory kit.

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

Features

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

Your server implements the following features and technologies:

- **Lenovo XClarity Controller (XCC)**

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

Some of the features that are unique to the Lenovo XClarity Controller are enhanced performance, higher-resolution remote video, and expanded security options. For additional information about the Lenovo XClarity Controller, refer to the XCC documentation compatible with your server at:

https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html

Important: Lenovo XClarity Controller (XCC) supported version varies by product. All versions of Lenovo XClarity Controller are referred to as Lenovo XClarity Controller and XCC in this document, unless specified otherwise. To see the XCC version supported by your server, go to https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html.

- **UEFI-compliant server firmware**

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

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

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

- **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). The server also supports Intel Optane DC persistent memory modules (DCPMMs).

For more information about the specific types and maximum amount of memory, see “Specifications” on page 3.

- **Integrated network support**

The server comes with one of several types of LOM adapter, which supports connection to one of the following network types: 10GBASE-T (2-port or 4-port), 1GBASE-T (2-port or 4-port), or 2x 10Gb SFP+ (2-port or 4-port). An ML2 form factor network adapter is also supported.

- **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 Chinese Mainland, TPM is not supported. However, customers in Chinese Mainland can install a Trusted Cryptographic Module (TCM) adapter or a Lenovo-qualified TPM adapter (sometimes called a daughter card).

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

The server models support a maximum of 24 2.5-inch hard disk drives that are of the hot-swap Serial Attached SCSI (SAS) or hot add/remove NVMe types (depending on system configuration).

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 and an LCD information display panel that provides additional diagnostic information. For more information about the light path diagnostics, see [“Front operator panel with LCD display” on page 28](#) and [“Light path diagnostics” in ThinkSystem SR950 Maintenance Manual](#).

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

The server provides a QR code on each system board that you can scan using a QR code reader and scanner with a mobile device to get quick access to the Lenovo Service Information website. The Lenovo Service Information website provides additional information for parts installation, replacement videos, and error codes for server support. See [“QR code” on page 23](#) for information about accessing the QR code label.

- **Active Energy Manager**

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

- **Redundant networking connection**

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

- **Redundant cooling and optional power capabilities**

The server supports a maximum of four 1100-watt (110V or 220V ac), 1600-watt (220V ac), or 2000-watt (220V ac) hot-swap power supplies and six or twelve hot-swap fans, depending on the server configuration. The redundant cooling by the fans in the server enables continued operation if a fan fails.

Note: You cannot mix power supply types in the server.

Two types of fans are supported:

- 60 mm x 38mm, 16K internal hot-swap fans (01CX965)
- 60 mm x 38mm, 19K internal hot-swap fans (01PG490)

Notes:

- Different fan types cannot be mixed within a system. All fans must be either 16K fans or 19K fans.
- Before upgrading fans from 16K to 19K, you must make sure that the system has version 2 of the ThinkSystem 2-CPU, 24-DIMM, Compute System Board (01CV978) installed in each compute tray.

- **ThinkSystem 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. Server Specifications

Specification	Description
Size	<p>4U server</p> <ul style="list-style-type: none"> • Height: 175.3 mm (6.90 in.) • Depth: 851 mm (33.50 in.) • Width: 447.0 mm (17.6 in.)
Weight	<p>Approximately 32.6 kg (71.9 lbs.) to 58.7 kg (129.4 lbs.) depending on your configuration.</p>
Processor (depending on the model)	<p>Supports multi-core Intel Xeon processors, with integrated memory controller and Ultra Path Interconnect (UPI)</p> <ul style="list-style-type: none"> • Two processors, minimum (expandable up to eight). • Designed for the LGA 3647-0 socket • Scalable up to 224 cores (with eight processors installed) <p>For a list of supported processors, see https://static.lenovo.com/us/en/serverproven/index.shtml and the “Processor Options” section of the <i>ThinkSystem SR950 Product Guide</i> at http://lenovopress.com/LP0647.</p> <p>Note: If 82xx processors are installed, 60 mm x 38mm, 19K internal hot-swap fans (01PG490) must also be installed to meet CPU cooling requirements at 35°C. If 16K internal hot-swap fans are currently installed, you must validate that the system has version 2 of the ThinkSystem 2-CPU, 24-DIMM, Compute System Board (01CV978) installed in each compute tray before upgrading the fans from 16K to 19K.</p>
Memory	<p>See “Memory module installation rules and order” on page 58 for detailed information about memory configuration and setup.</p> <ul style="list-style-type: none"> • Minimum: 32 GB • Maximum: <ul style="list-style-type: none"> – 6.2 TB using registered DIMMs (RDIMMs) or load reduction DIMMs (LRDIMMs) – 24.6 TB using three-dimensional-stacking registered DIMMs (3DS RDIMMs) – 36.9 TB using Intel® Optane™ DC persistent memory modules (PMMs) • Type: <ul style="list-style-type: none"> – PC4-21300 (DDR4-2666), operating speed depends on processor model and UEFI settings – Single-rank or dual-rank – Registered DIMM (RDIMM), load reduced DIMM (LRDIMM), or three-dimensional-stacking registered DIMM (3DS RDIMM) • Slots: 24 dual inline in each compute tray (96 DIMMs, maximum) • Supports (depending on the model): <ul style="list-style-type: none"> – 16 GB, 32 GB, 64 GB RDIMMs – 64 GB LRDIMMs – 64 GB, 128 GB, 256 GB 3DS RDIMMs – 128 GB, 256 GB, and 512 GB Intel® Optane™ DC persistent memory modules (DCPMMs) <p>Note: When Windows Server 2016 or 2019 is installed on the ThinkSystem SR950, the server cannot have greater than 20 TB of system memory installed unless Credential Guard and the Hyper-V role are both disabled. This issue will be addressed on Windows Server 2019 within a Microsoft Update at a future date. Note that Optane DIMMs are only supported on Windows Server 2019 and later.</p>

Table 1. Server Specifications (continued)

Specification	Description
Drive expansion	<ul style="list-style-type: none"> • Up to six SAS/SATA/NVMe drive backplanes: • Up to 24 2.5-inch hot-swap drive bays: <ul style="list-style-type: none"> – Up to 24 SATA/SAS drives (dependent on installed drive backplanes) – Up to 12 NVMe drives (dependent on installed drive backplanes) <p>See “Configurations” on page 11 for more details.</p>
Expansion slots	<p>Up to seventeen expansion slots (dependent on server configuration):</p> <ul style="list-style-type: none"> • Slot 1 - 4: PCI Express 3.0 for PCIe riser-card with the following slots available depending on the riser installed: <ol style="list-style-type: none"> 1. x8/x8/x8/x8 PCIe full-height riser kit provides: <ul style="list-style-type: none"> – Slot 1: PCI Express 3.0 x8 – Slot 2: PCI Express 3.0 x8 – Slot 3: PCI Express 3.0 x8 – Slot 4: PCI Express 3.0 x8 2. x16/x16 PCIe full-height riser kit provides: <ul style="list-style-type: none"> – Slot 3: PCI Express 3.0 x16 – Slot 4: PCI Express 3.0 x16 3. x16/x16/x16/x16 PCIe full-height riser kit (8-processor systems only) provides: <ul style="list-style-type: none"> – Slot 1: PCI Express 3.0 x16 – Slot 2: PCI Express 3.0 x16 – Slot 3: PCI Express 3.0 x16 – Slot 4: PCI Express 3.0 x16 • Slot 5: PCI Express 3.0 x16 (low profile) • Slot 6: PCI Express 3.0 x16 (low profile) • Slot 7: PCI Express 3.0 x8 (low profile) <p>Note: You should not install a RAID or Host Bus Adapter card in this slot.</p> <ul style="list-style-type: none"> • Slot 8: ML2 x16 network adapter (with NC-SI support) • Slot 9: LOM adapter • Slot 10 - 15: PCI Express 3.0 for PCIe riser-card with the following slots available depending on the riser-card installed: <ol style="list-style-type: none"> 1. x8/x8/x8/x8 PCIe full-height riser kit provides: <ul style="list-style-type: none"> – Slot 10: PCI Express 3.0 x8 – Slot 11: PCI Express 3.0 x8 – Slot 12: PCI Express 3.0 x8 – Slot 13: PCI Express 3.0 x8 2. x16/x16 PCIe full-height riser kit provides: <ul style="list-style-type: none"> – Slot 12: PCI Express 3.0 x16 – Slot 13: PCI Express 3.0 x16 3. x16/x16/x16/x16 PCIe and ML2 x16 full-height riser kit (8-processor systems only) provides: <ul style="list-style-type: none"> – Slot 10: PCI Express 3.0 x16

Table 1. Server Specifications (continued)

Specification	Description
	<ul style="list-style-type: none"> - Slot 11: PCI Express 3.0 x16 - Slot 12: PCI Express 3.0 x16 - Slot 13: PCI Express 3.0 x16 - Slot 14: PCI Express 3.0 x16 - Slot 15: ML2 x16 network adapter (no NC-SI support) <ul style="list-style-type: none"> • Slot 16 - 17: x8/x8 PCIe low-profile riser kit (processor-rich systems only) provides: <ul style="list-style-type: none"> - Slot 16: PCI Express 3.0 x8 - Slot 17: PCI Express 3.0 x8 <p>See “Configurations” on page 11 for more details.</p>
Integrated functions	<ul style="list-style-type: none"> • Lenovo XClarity Controller, which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote drive capabilities. • Light-path diagnostics • Standard connectors (front of server): <ul style="list-style-type: none"> - DB-15 VGA port - USB 2.0 ports (two): <ul style="list-style-type: none"> - USB 2.0 for Lenovo XClarity Controller management - USB 2.0 • Standard connectors (rear of server): <ul style="list-style-type: none"> - DB-15 VGA port - DB-9 serial port - RJ-45 system-management network port. This connector is dedicated for Lenovo XClarity Controller functions and runs at 1 gigabit (Gb) speed. - USB 3.0 ports (two)
RAID controller (depending on the model)	<p>The following RAID options are available for this server:</p> <ul style="list-style-type: none"> • ThinkSystem 430-8i Basic Hardware RAID PCIe Adapter, supports RAID levels 0/1/10/5 cacheless • ThinkSystem 430-16i Basic Hardware RAID PCIe Adapter, supports RAID levels 0/1/10/5 cacheless • ThinkSystem 530-8i Basic Hardware RAID PCIe Adapter, supports RAID levels 0/1/10/5 cacheless • ThinkSystem 730-8i Value Advanced Hardware RAID 1 GB Cache PCIe Adapter, supports JBOD mode and RAID levels 0/1/5/10/50 (for Chinese Mainland only) • ThinkSystem 730-8i Value Advanced Hardware RAID 2 GB Cache PCIe Adapter, supports JBOD mode and RAID levels 0/1/5/10/50 (for Chinese Mainland only and Asian-Pacific area only) • ThinkSystem RAID 930-8i Advanced Hardware 2 GB Flash Cache PCIe Adapter, supports RAID levels 0/1/5/6/10/50/60 • ThinkSystem RAID 930-16i Advanced Hardware 4 GB Flash Cache PCIe Adapter, supports RAID levels 0/1/5/6/10/50/60

Table 1. Server Specifications (continued)

Specification	Description
Fans	<p>Up to twelve (60 mm x 38 mm) internal hot-swap system fans (dependent on server configuration)</p> <ul style="list-style-type: none"> • The six upper fans are not installed for the four-processor-limited server configuration. • Only three upper fans are installed for the storage-rich configuration. <p>Two types of fans are supported:</p> <ul style="list-style-type: none"> • 60 mm x 38mm, 16K internal hot-swap fans (01CX965) • 60 mm x 38mm, 19K internal hot-swap fans (01PG490) <p>Notes:</p> <ul style="list-style-type: none"> • Different fan types cannot be mixed within a system. All fans must be either 16K fans or 19K fans. • Before upgrading fans from 16K to 19K, you must make sure that the system has version 2 of the ThinkSystem 2-CPU, 24DIMM, Compute System Board (01CV978) installed in each compute tray.
Power supplies	<ul style="list-style-type: none"> • This server supports three types of hot-swap power supply units: <ul style="list-style-type: none"> – 1100-watt power supply <ul style="list-style-type: none"> – input voltage 110V, 220V, or 240V ac – 1600-watt power supply <ul style="list-style-type: none"> – input voltage 220V or 240V ac – 2000-watt power supply <ul style="list-style-type: none"> – input voltage 220V ac • The power subsystem supports balanced N+N redundancy operation, where N = 1 or 2. <p>CAUTION:</p> <ol style="list-style-type: none"> 1. 240 V dc input (input range: 180-300 V dc) is ONLY supported in Chinese Mainland. 2. Power supplies with 240 V dc are not hot-swappable. To remove the power cord, ensure you have turned off the server or disconnected the dc power sources at the breaker panel. 3. In order for the ThinkSystem products to operate error free in both a DC or AC electrical environment, a TN-S earthing system which complies to 60364-1 IEC 2005 standard has to be present or installed.
Minimal configuration for debugging	<ul style="list-style-type: none"> • Two processors in processor socket 1 and 2 • Two DRAM DIMMs in slot 8 and 20 • One power supply in slot 1 • One drive with RAID adapter and backplane (If OS is required for debugging) • Six system fans (fan 1 to 6)

Table 1. Server Specifications (continued)

Specification	Description
Acoustical noise emissions (base configuration)	<ul style="list-style-type: none"> • Sound power level, idling: <ul style="list-style-type: none"> – Minimum configuration: 7.0 bels – Typical configuration: 7.0 bels – Maximum configuration: 7.8 bels • Sound power level, operating: <ul style="list-style-type: none"> – Minimum configuration: 7.0 bels – Typical configuration: 7.2 bels – Maximum configuration: 8.0 bels <p>Notes:</p> <ol style="list-style-type: none"> 1. These levels were measured in controlled acoustical environments according to procedures specified by ISO 7779 and are reported in accordance with ISO 9296. 2. The options supported in this server vary in function, power consumption, and required cooling. Any increase in cooling required by these options will increase the fan speed and generated sound level. The actual sound pressure levels measured in your installation depend upon a variety of factors, including: the number of racks in the installation; the size, materials, and configuration of the room; the noise levels of other equipment; the room ambient temperature and barometric pressure; and the location of employees in relation to the equipment.
Heat output	<p>Approximate heat output:</p> <ul style="list-style-type: none"> • Minimum configuration: 935 BTU, 275 W (in BTU per hour and watts) <ul style="list-style-type: none"> – Minimum configuration of two microprocessors, two memory modules, one M.2 adapter, and no PCIe adapters. • Maximum configuration: 21837 BTU, 6400 W (in BTU per hour and watts) <ul style="list-style-type: none"> – Maximum configuration with four 1600-watt power supplies configured for non-redundant operation under maximum loading.

Table 1. Server Specifications (continued)

Specification	Description
Environment	<ul style="list-style-type: none"> • Air temperature: <ul style="list-style-type: none"> – Server on: 5° to 45°C (41° to 113°F); altitude: 0 to 3050 m (10,006 ft) derate maximum dry bulb temperature 1°C (33°F) per 125 m (410 ft) above 950 m (3,117 ft). Maximum rate of change 20°C (68°F) per hour – Server off: 5° to 45°C (41° to 113°F) – Shipment: -40°C to 60°C (-40°F to 140°F) • Humidity range (noncondensing): <ul style="list-style-type: none"> – Server on: Minimum = higher (more moisture) of -12°C (10°F) dew point and 8% to 90% relative humidity; maximum dew point: 24°C (75°F) – Server off: 8% to 90% relative humidity; maximum dew point: 27°C (80°F) – Shipment: 5% to 100% <p>Notes:</p> <ul style="list-style-type: none"> • 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 SR950 Maintenance Manual</i>.</p> • ASHRAE compliance information (see the “Operating Environment” section of the ThinkSystem SR950 Product Guide at http://lenovopress.com/LP0647 for specific ASHRAE compliance levels for each server configuration): <ul style="list-style-type: none"> – The server is designed for thermal compliance in ASHRAE A4 ambient environments. Certain processor and adapter configurations will limit product environmental support to ASHRAE A2 ambient conditions. – If 82xx processors are installed, 60 mm x 38mm, 19K internal hot-swap fans (01PG490) must also be installed to meet CPU cooling requirements at 35°C. – 205W processors used in an eight-socket configuration might experience a slight drop in performance under extreme workloads when the ambient temperature is above 30°C. – NVMe devices are supported up to an ambient temperature of 35°C.
Operating systems	<p>Supported and certified operating systems:</p> <ul style="list-style-type: none"> • Microsoft Windows Server • VMware ESXi • Red Hat Enterprise Linux • SUSE Linux Enterprise Server <p>References:</p> <ul style="list-style-type: none"> • Complete list of available operating systems: https://lenovopress.com/osig. • OS deployment instructions: “Deploy the operating system” on page 266.

Particulate contamination

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

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

Table 2. Limits for particulates and gases

Contaminant	Limits
Reactive gases	Severity level G1 as per ANSI/ISA 71.04-1985 ¹ : <ul style="list-style-type: none"> The copper reactivity level shall be less than 300 Angstroms per month ($\text{\AA}/\text{month} \approx 0.0039 \mu\text{g}/\text{cm}^2\text{-hour}$ weight gain).² The silver reactivity level shall be less than 200 $\text{\AA}/\text{month}$ ($\text{\AA}/\text{month} \approx 0.0035 \mu\text{g}/\text{cm}^2\text{-hour}$ weight gain).³ The reactive monitoring of gaseous corrosivity must be conducted approximately 5 cm (2 in.) in front of the rack on the air inlet side at one-quarter and three-quarter frame height off the floor or where the air velocity is much higher.
Airborne particulates	Data centers must meet the cleanliness level of ISO 14644-1 class 8. For data centers without airside economizer, the ISO 14644-1 class 8 cleanliness might be met by choosing one of the following filtration methods: <ul style="list-style-type: none"> The room air might be continuously filtered with MERV 8 filters. Air entering a data center might be filtered with MERV 11 or preferably MERV 13 filters. For data centers with airside economizers, the choice of filters to achieve ISO class 8 cleanliness depends on the specific conditions present at that data center. <ul style="list-style-type: none"> The deliquescent relative humidity of the particulate contamination should be more than 60% RH.⁴ Data centers must be free of zinc whiskers.⁵
<p>¹ ANSI/ISA-71.04-1985. <i>Environmental conditions for process measurement and control systems: Airborne contaminants</i>. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.</p> <p>² The derivation of the equivalence between the rate of copper corrosion growth in the thickness of the corrosion product in $\text{\AA}/\text{month}$ and the rate of weight gain assumes that Cu_2S and Cu_2O grow in equal proportions.</p> <p>³ The derivation of the equivalence between the rate of silver corrosion growth in the thickness of the corrosion product in $\text{\AA}/\text{month}$ and the rate of weight gain assumes that Ag_2S is the only corrosion product.</p> <p>⁴ The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.</p> <p>⁵ Surface debris is randomly collected from 10 areas of the data center on a 1.5 cm diameter disk of sticky electrically conductive tape on a metal stub. If examination of the sticky tape in a scanning electron microscope reveals no zinc whiskers, the data center is considered free of zinc whiskers.</p>	

PCIe slot-to-processor mapping

The following table shows the connectivity between processors and PCIe slots in the server. In situations where multiple risers can be installed (such as for PCIe adapter slots 1 and 2, the table shows the processor connectivity based on each of the riser options.

Table 3. PCIe slot-to-processor mapping

PCIe Slot	Processor (Riser if the mapping changes for different risers)
1, 2	<ul style="list-style-type: none"> • 4 (4 x8) • 8 (6 x16)
3, 4	<ul style="list-style-type: none"> • 4 (4 x8) • 4 (2 x16) • 6 (6 x16)
5, 6	2
7, 8, 9	1
10, 11	<ul style="list-style-type: none"> • 3 (4 x8) • 7 (6 x16)
12, 13	<ul style="list-style-type: none"> • 3 (4 x8) • 5 (6 x16)
14, 15, 16	3
17	1

Configurations

The ThinkSystem SR950 is available in several configurations.

Four-socket performance

These configurations meet the expectations of high-performance and low costs, while support up to 12 drives and 15 rear PCIe slots.

The four-socket performance configurations support two to four processors with the following requirements/capabilities:

- Fan 1 to 6 are required to be installed.
- The upper tray filler is installed in the upper tray slot.
- Up to 12 drives (bay 0 - 11) are supported.

See the following for the support variations depending on number of processors that are installed:

- [“Four-socket performance, two processors” on page 12](#)
- [“Four-socket performance, three processors” on page 12](#)
- [“Four-socket performance, four processors” on page 13](#)

Notes:

- 5100 series processors are only supported in four-processor configuration in this category.
- For optimal performance, configure four processors in mesh topology.
- These configuration require the upper tray filler, and could be upgraded to eight-socket ones, but it requires the 4S-to-8S Upgrade Option kit, additional components, and Lenovo hardware installation.

Consider “[Four-socket upgradable](#)” on page 15 or “[Four-socket upgradable / storage rich](#)” on page 17 for an easier potential upgrade in the future.

For more information about upgrading to the eight-socket configuration, see the following topic:

http://thinksystem.lenovofiles.com/help/topic/7X12/installing_the_4S-to-8S_upgrade_option.html

Four-socket performance, two processors

This configuration comes with two processors, requires at least one 1100/1600-watt PSU, and supports up to:

- 24 memory modules.
- six rear PCIe slots.

See the following tables for the location of the supported components.

Table 4. Location of the two processors and 24 supported memory module slots (viewed from the front)

Upper tray filler	
Not populated	Not populated
CPU 1 and DIMM 1-12	CPU 2 and DIMM 13-24

Table 5. Location of the six supported PCIe slots (viewed from the rear)

		PCIe 5	PCIe 6	PCIe 7	PCIe 8 (ML2)	PCIe 9 (LOM)		PCIe 17

Four-socket performance, three processors

This configuration comes with three processors, requires at least two 1100/1600-watt PSUs, and supports up to:

- 36 memory modules.
- Ten rear PCIe slots.

See the following tables for the location of the supported components.

Table 6. Location of the three processors and 36 supported memory module slots (viewed from the front)

Upper tray filler	
Not populated	CPU 4 and DIMM 37-48
CPU 1 and DIMM 1-12	CPU 2 and DIMM 13-24

Table 7. Location of ten supported PCIe slots (viewed from the rear)

		PCIe 11 (P4)			
--	--	--------------	--	--	--

1. This slot is blank if a 2 x16 riser is installed.

Table 7. Location of ten supported PCIe slots (viewed from the rear) (continued)

		PCIe 2 ² (P4)						
		PCIe 3 (P4)						
		PCIe 4 (P4)						
		PCIe 5	PCIe 6	PCIe 7	PCIe 8 (ML2)	PCIe 9 (LOM)		PCIe 17

Four-socket performance, four processors

This configuration comes with four processors, requires at least two 1100/1600-watt PSUs, and supports up to:

- 48 memory modules.
- 15 rear PCIe slots.

See the following tables for the location of the supported components.

Table 8. Location of the four processors and 48 supported memory module slots (viewed from the front)

Upper tray filler	
CPU 3 and DIMM 25-36	CPU 4 and DIMM 37-48
CPU 1 and DIMM 1-12	CPU 2 and DIMM 13-24

Table 9. Location of the 15 supported PCIe slots (viewed from the rear)

		PCIe 1 ²					PCIe 10 ²	PCIe 16
		PCIe 2 ²					PCIe 11 ²	
		PCIe 3					PCIe 12	
		PCIe 4					PCIe 13	
		PCIe 5	PCIe 6	PCIe 7	PCIe 8 (ML2)	PCIe 9 (LOM)		PCIe 17

Four-socket performance / storage rich

These configurations meet the expectations of high-performance and low costs, while support up to 24 drives and 13 rear PCIe slots.

The four-socket performance / storage configurations support two to four processors with the following requirements/capabilities:

- Fan 1 to 6, 7, 9, and 11 are required to be installed.
- The upper storage tray is installed in the upper tray slot.
- Up to 24 drives are supported.

See the following for the support variations depending on number of processors that are installed:

2. This slot is blank if a 2 x16 riser is installed.

- “Four-socket performance / storage rich, two processors” on page 14
- “Four-socket performance / storage rich, three processors” on page 14
- “Four-socket performance / storage rich, four processors” on page 15

Notes:

- 5100 series processors are only supported in four-processor configuration in this category.
- For optimal performance, configure four processors in mesh topology.
- These configuration require the upper storage tray, and could be upgraded to eight-socket ones, but it requires the 4S-to-8S Upgrade Option kit, additional components, and Lenovo hardware installation. Consider “Four-socket upgradable” on page 15 or “Four-socket upgradable / storage rich” on page 17 for an easier potential upgrade in the future.

For more information about upgrading to the eight-socket configuration, see the following topic:

http://thinksystem.lenovofiles.com/help/topic/7X12/installing_the_4S-to-8S_upgrade_option.html

Four-socket performance / storage rich, two processors

This configuration comes with two processors, requires at least one 1100/1600-watt PSU, and supports up to:

- 24 memory modules.
- five rear PCIe slots.

See the following tables for the location of the supported components.

Table 10. Location of the two processors and 24 supported memory module slots (viewed from the front)

Upper tray filler	
Not populated	Not populated
CPU 1 and DIMM 1-12	CPU 2 and DIMM 13-24

Table 11. Location of the five supported PCIe slots (viewed from the rear)

		PCIe 5	PCIe 6	PCIe 7	PCIe 8 (ML2)	PCIe 9 (LOM)			

Four-socket performance / storage rich, three processors

This configuration comes with three processors, requires at least two 1100/1600-watt PSUs, and supports up to:

- 36 memory modules.
- nine rear PCIe slots.

This configuration comes with three processors, requires nine fans, and supports up to:

See the following tables for the location of the supported components.

Table 12. Location of the three processors and 36 supported memory module slots (viewed from the front)

Upper tray filler	
Not populated	CPU 4 and DIMM 37-48
CPU 1 and DIMM 1-12	CPU 2 and DIMM 13-24

Table 13. Location of the nine supported PCIe slots (viewed from the rear)

		PCIe 1 ³						
		PCIe 2 ³						
		PCIe 3						
		PCIe 4						
		PCIe 5	PCIe 6	PCIe 7	PCIe 8 (ML2)	PCIe 9 (LOM)		

Four-socket performance / storage rich, four processors

This configuration comes with four processors, requires at least two 1100/1600-watt PSUs, and supports up to:

- 48 memory modules.
- 13 rear PCIe slots.

See the following tables for the location of the supported components.

Table 14. Location of the four processors and 48 supported memory module slots (viewed from the front)

Upper tray filler	
CPU 3 and DIMM 25-36	CPU 4 and DIMM 37-48
CPU 1 and DIMM 1-12	CPU 2 and DIMM 13-24

Table 15. Location of the 13 supported PCIe slots (viewed from the rear)

		PCIe 1 ³						PCIe 10
		PCIe 2 ³						PCIe 11
		PCIe 3						PCIe 12
		PCIe 4						PCIe 13
		PCIe 5	PCIe 6	PCIe 7	PCIe 8 (ML2)	PCIe 9 (LOM)		

Four-socket upgradable

These configurations allow a simple upgrade to eight-socket configurations in the future, while support up to 12 drives and 15 rear PCIe slots. The upper tray slot requires an upper tray filler.

3. This slot is blank if a 2 x16 riser is installed.

The four-socket upgradable configurations support two or four processors with the following requirements/capabilities:

- Only 8100 series processors are supported.
- Fan 1 to 6 are required to be installed.
- The upper tray filler is installed in the upper tray slot.
- Up to 12 drives (bay 0 - 11) are supported.

See the following for the support variations depending on number of processors that are installed:

- [“Four-socket upgradable, two processors” on page 16](#)
- [“Four-socket upgradable, four processors” on page 16](#)

Notes:

- When four processors are installed, they must be configured in a ring topology.
- These configurations allow a simple upgrade to 8-socket ones. See [“Eight-socket storage rich” on page 18](#) for details about 8-socket configurations.

Four-socket upgradable, two processors

This configuration comes with two processors, requires at least one 1100/1600-watt PSU, and supports up to:

- 24 memory modules.
- six rear PCIe slots.

See the following tables for the location of the supported components.

Table 16. Location of the two processors and 24 supported memory module slots (viewed from the front)

Upper tray filler	
Not populated	Not populated
CPU 1 and DIMM 1-12	CPU 2 and DIMM 13-24

Table 17. Location of the six supported PCIe slots (viewed from the rear)

		PCIe 5	PCIe 6	PCIe 7	PCIe 8 (ML2)	PCIe 9 (LOM)		PCIe 17

Four-socket upgradable, four processors

This configuration comes with four processors, requires at least two 1100/1600-watt PSUs, and supports up to:

- 48 memory modules.
- 15 rear PCIe slots.

See the following tables for the location of the supported components.

Table 18. Location of the four processors and 48 supported memory module slots (viewed from the front)

Upper tray filler	
CPU 3 and DIMM 25-36	CPU 4 and DIMM 37-48
CPU 1 and DIMM 1-12	CPU 2 and DIMM 13-24

Table 19. Location of the 15 supported PCIe slots (viewed from the rear)

	PCIe 14						PCIe 10 ⁴		PCIe 16
	PCIe 2 ⁴						PCIe 11 ⁴		
	PCIe 3						PCIe 12		
	PCIe 4						PCIe 13		
		PCIe 5	PCIe 6	PCIe 7	PCIe 8 (ML2)	PCIe 9 (LOM)			PCIe 17

Four-socket upgradable / storage rich

This configuration allows a simple upgrade to eight-socket configurations in the future, while supports up to 24 drives and ten rear PCIe slots.

The four-socket upgradable / storage rich configurations only supports four processors with the following requirements/capabilities:

- Only 8100 series processors are supported, and they must be configured in a ring topology.
- The upper compute tray is installed in the upper tray slot.
- All 12 fans are required to be installed.
- Up to 24 drives are supported.

Note: This configuration allows a simple upgrade to 8-socket ones. See [“Eight-socket storage rich” on page 18](#) for details about 8-socket configurations.

This configuration comes with four processors, requires at least two 1100/1600-watt PSUs, and supports up to:

- 48 memory modules.
- Ten rear PCIe slots.

See the following tables for the location of the supported components.

Table 20. Location of the four processors and 48 supported memory module slots (viewed from the front)

Not populated		Not populated	
CPU 5 and DIMM 49-60		CPU 6 and DIMM 61-72	
Not populated		Not populated	
CPU 1 and DIMM 1-12		CPU 2 and DIMM 13-24	

4. This slot is blank if a 2 x16 riser is installed.

Table 21. Location of the ten supported PCIe slots (viewed from the rear)

		PCIe 3 (P6)					PCIe 12	
		PCIe 4 (P6)					PCIe 13	
		PCIe 5	PCIe 6	PCIe 7	PCIe 8 (ML2)	PCIe 9 (LOM)		PCIe 17

Eight-socket storage rich

These configurations support up to eight processors, 24 drives and 17 rear PCIe slots.

The eight-socket storage rich configurations support six or eight processors with the following requirements/capabilities:

- Only 8100 series processors are supported.
- Fan 1 to 6 are required to be installed.
- The upper compute tray is installed in the upper tray slot.
- Up to 24 drives are supported.

See the following for the support variations depending on number of processors that are installed:

- [“Eight-socket storage rich, six processors” on page 18](#)
- [“Eight-socket storage rich, eight processors” on page 19](#)

Eight-socket storage rich, six processors

This configuration comes with six processors, requires at least four 1100-watt or two 1600-watt PSUs, and supports up to:

- 72 memory modules.
- 13 rear PCIe slots.

See the following tables for the location of the supported components.

Table 22. Location of the six processors and 72 supported memory module slots (viewed from the front)

	CPU 7 and DIMM 73-84	Not populated
	CPU 5 and DIMM 49-60	Not populated
	CPU 3 and DIMM 25-36	CPU 4 and DIMM 37-48
	CPU 1 and DIMM 1-12	CPU 2 and DIMM 13-24

Table 23. Location of the 13 supported PCIe slots (viewed from the rear)

							PCIe 10	PCIe 16
							PCIe 11	
							PCIe 12	
							PCIe 13	
		PCIe 5	PCIe 6	PCIe 7	PCIe 8 (ML2)	PCIe 9 (LOM)	PCIe 14	PCIe 17

Table 23. Location of the 13 supported PCIe slots (viewed from the rear) (continued)

								PCIe 15 (ML2)		

Eight-socket storage rich, eight processors

This configuration comes with eight processors, requires at least four 1100-watt or two 1600-watt PSUs, and supports up to:

- 96 memory modules.
- 17 rear PCIe slots.

See the following tables for the location of the supported components.

Table 24. Location of the eight processors and 96 supported memory module slots (viewed from the front)

	CPU 7 and DIMM 73-84	CPU 8 and DIMM 85-96
	CPU 5 and DIMM 49-60	CPU 6 and DIMM 61-72
	CPU 3 and DIMM 25-36	CPU 4 and DIMM 37-48
	CPU 1 and DIMM 1-12	CPU 2 and DIMM 13-24

Table 25. Location of the 17 supported PCIe slots (viewed from the rear)

		PCIe 1						PCIe 10	PCIe 16
		PCIe 2						PCIe 11	
		PCIe 3						PCIe 12	
		PCIe 4						PCIe 13	
		PCIe 5	PCIe 6	PCIe 7	PCIe 8 (ML2)	PCIe 9 (LOM)	PCIe 14	PCIe 17	
							PCIe 15 (ML2)		

Management options

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

Overview

Options	Description
Lenovo XClarity Controller	<p>Baseboard management controller. (BMC)</p> <p>Consolidates the service processor functionality, Super I/O, video controller, and remote presence capabilities into a single chip on the server system board.</p> <p>Interface</p> <ul style="list-style-type: none"> • CLI application • Web GUI interface • Mobile application • REST API <p>Usage and downloads</p> <p>https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html</p>
Lenovo XClarity Administrator	<p>Centralized interface for multi-server management.</p> <p>Interface</p> <ul style="list-style-type: none"> • Web GUI interface • Mobile application • REST API <p>Usage and downloads</p> <p>http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/aug_product_page.html</p>
Lenovo XClarity Essentials toolset	<p>Portable and light toolset for server configuration, data collection, and firmware updates. Suitable both for single-server or multi-server management contexts.</p> <p>Interface</p> <ul style="list-style-type: none"> • OneCLI: CLI application • Bootable Media Creator: CLI application, GUI application • UpdateXpress: GUI application <p>Usage and downloads</p> <p>http://sysmgt.lenovofiles.com/help/topic/xclarity_essentials/overview.html</p>

Options	Description
Lenovo XClarity Provisioning Manager	<p>UEFI-based embedded GUI tool on a single server that can simplify management tasks.</p> <p>Interface</p> <ul style="list-style-type: none"> • Web interface (BMC remote access) • GUI application <p>Usage and downloads</p> <p>https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html</p> <p>Important: Lenovo XClarity Provisioning Manager (LXPM) supported version varies by product. All versions of Lenovo XClarity Provisioning Manager are referred to as Lenovo XClarity Provisioning Manager and LXPM in this document, unless specified otherwise. To see the LXPM version supported by your server, go to https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.</p>
Lenovo XClarity Integrator	<p>Series of applications that integrate the management and monitoring functionalities of the Lenovo physical servers with the software used in a certain deployment infrastructure, such as VMware vCenter, Microsoft Admin Center, or Microsoft System Center while delivering additional workload resiliency.</p> <p>Interface</p> <p>GUI application</p> <p>Usage and downloads</p> <p>https://sysmgt.lenovofiles.com/help/topic/lxci/lxci_product_page.html</p>
Lenovo XClarity Energy Manager	<p>Application that can manage and monitor server power and temperature.</p> <p>Interface</p> <ul style="list-style-type: none"> • Web GUI Interface <p>Usage and downloads</p> <p>https://datacentersupport.lenovo.com/solutions/Invo-lxem</p>
Lenovo Capacity Planner	<p>Application that supports power consumption planning for a server or rack.</p> <p>Interface</p> <ul style="list-style-type: none"> • Web GUI Interface <p>Usage and downloads</p> <p>https://datacentersupport.lenovo.com/solutions/Invo-lcp</p>

Functions

Options		Functions							
		Multi-system mgmt	OS deployment	System configuration	Firmware updates ¹	Event/alert monitoring	Inventory/logs	Power mgmt	Power planning
Lenovo XClarity Controller				√	√ ²	√	√ ⁴		
Lenovo XClarity Administrator		√	√	√	√ ²	√	√ ⁴		
Lenovo XClarity Essentials toolset	OneCLI	√		√	√ ²	√	√ ⁴		
	Bootable Media Creator			√	√ ²		√ ⁴		
	UpdateXpress			√	√ ²				
Lenovo XClarity Provisioning Manager			√	√	√ ³		√ ⁵		
Lenovo XClarity Integrator		√	√ ⁶	√	√	√	√	√ ⁷	
Lenovo XClarity Energy Manager		√				√		√	
Lenovo Capacity Planner									√ ⁸

Notes:

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

Chapter 2. Server components

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 1 “Location of the ID label for the ThinkSystem SR950” on page 23 shows the location of the label containing the machine type, model, and serial number.

The model number, serial number, and a barcode of this server identification information are on the ID label on the front of the server, as shown in the following illustration. You can also add other system information labels to the front of the server in the customer label spaces (1 in the following illustration).

Note: If any customer labels are placed on the removable front cover, make sure that the cover is installed on the same server where the labels were originally added.

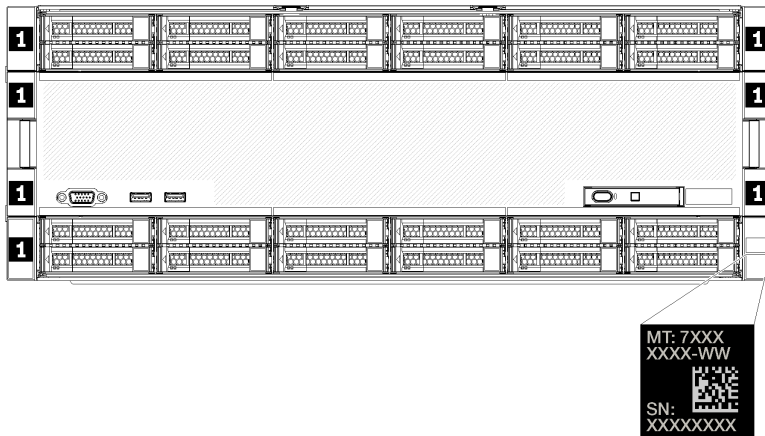


Figure 1. Location of the ID label for the ThinkSystem SR950

QR code

In addition, the service label that is located at the top rear of the system board inside the server provides a quick reference (QR) code for mobile access to service information (You must disconnect all server power cords before attempting to access the system board). You can scan the QR code with a mobile device using a QR code reader application and get quick access to the Service Information web page (<https://support.lenovo.com/p/servers/sr950>). The Service Information web page provides additional information for parts installation and replacement videos, and error codes for server support.

Service Information
 Scan this QR code to access information about memory configuration, option installation, and servicing of the system.
<https://support.lenovo.com/p/servers/sr950>


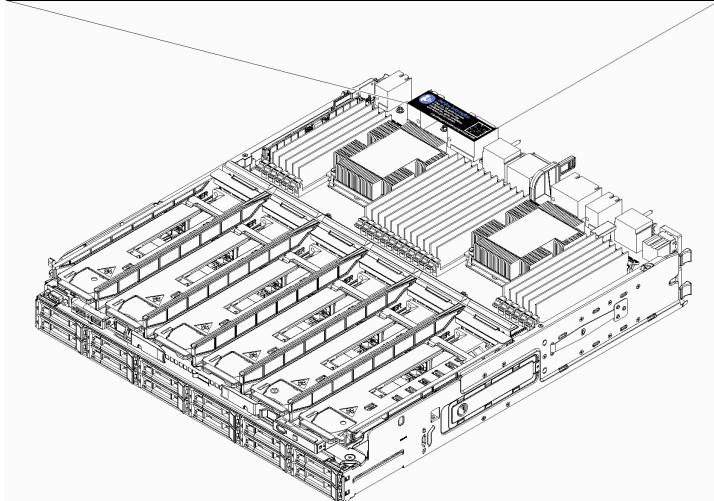



Figure 2. Service label and QR code

Network access label

The xClarity Controller (XCC) network access label is on the front of the server and must be removed before operating the system. The label provides the default IPv4 host name and default IPv6 link local address of the XCC.


XCC

xClarity Controller Network Access

IPv4: The default XCC hostname is: "XCC", MT and SN separated by hyphens "-". Example: XCC-9999-23L12345

XCC MAC Address:

IPv6: Link Local Address:

Remove this tag to place labels on the pull-out tab. Save this tag for future reference.  SL17A03968

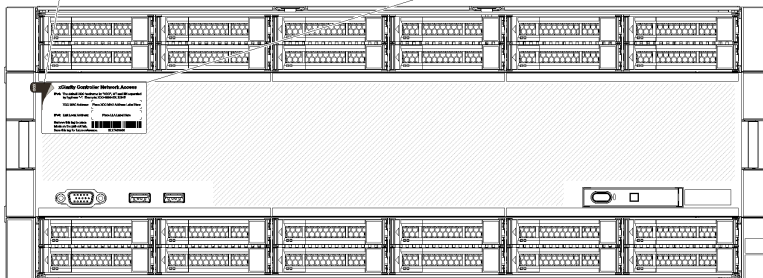


Figure 3. Network access tag

Front view

The front view of the server varies slightly by the model. In some models, components are replaced by fillers.

Front view of server

Figure 4 “Front view of the server (front cover installed)” on page 25 illustrates the front view of the server, with the front cover installed, identifying the drive bays.

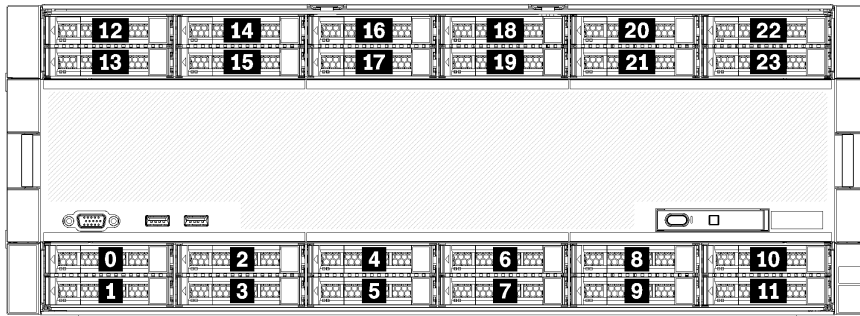


Figure 4. Front view of the server (front cover installed)

Figure 5 “Front view of the server (front cover removed)” on page 25 illustrates the front view of the server.

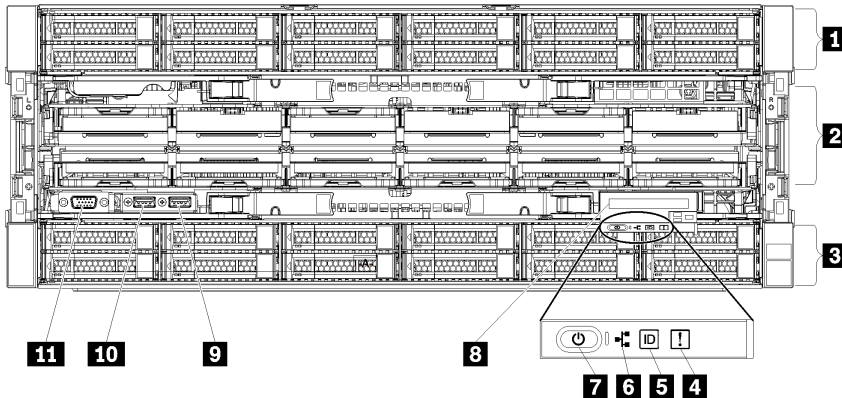


Figure 5. Front view of the server (front cover removed)

Table 26. Components on the front of the server

Callout	Callout
1 2.5-inch-drive bays (12-23) (on some models)	7 Power button and power LED
2 Fan slots (1-12)	8 Front operator panel with pull-out LCD display
3 2.5-inch-drive bays (0-11)	9 USB 2.0 port
4 System-error LED	10 USB 2.0 Lenovo XClarity Controller management port
5 System ID button/LED	11 VGA Video port
6 Network activity LED	

1 2.5-inch-drive bays (12-23) (on some models)

The drive bays are used to install 2.5-inch drives. When you install drives, follow the order of the drive bay numbers. The EMI integrity and cooling of the server are protected by having all drive bays occupied. The vacant drive bays must be occupied by drive bay fillers or drive fillers.

2 Fan slots (1-12)

Install fans to these slots.

3 2.5-inch-drive bays (0-11)

The drive bays are used to install 2.5-inch drives. When you install drives, follow the order of the drive bay numbers. The EMI integrity and cooling of the server are protected by having all drive bays occupied. The vacant drive bays must be occupied by drive bay fillers or drive fillers.

4 System-error LED

For information about the system-error LED, see [“Front operator panel” on page 27](#).

5 System ID button/LED

For information about the system ID button/LED, see [“Front operator panel” on page 27](#).

6 Network activity LED

For information about the network activity LED, see [“Front operator panel” on page 27](#).

7 Power button and power LED

For information about the power button and power LED, see [“Front operator panel” on page 27](#).

8 Front operator panel with pull-out LCD display

For information about the front operator panel with pull-out LCD display, see [“LCD system information display panel” on page 28](#).

9 USB 2.0 port

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

10 USB 2.0 Lenovo XClarity Controller management port

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 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.

11 VGA Video port

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.

Drive LEDs

Figure 6 “Drive LEDs” on page 27 illustrates the LEDs on each drive.

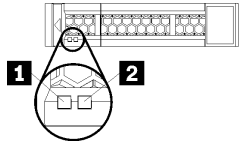


Figure 6. Drive LEDs

Table 27. Drive LEDs

Callout	Callout
1 Drive activity LED (green)	2 Drive status LED (yellow)

1 Drive activity LED (green):

Each hot-swap drive comes with an activity LED. If the LED is lit, it indicates that the drive is powered, but not actively reading or writing data. If the LED is flashing, the drive is being accessed.

2 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.

Front operator panel

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

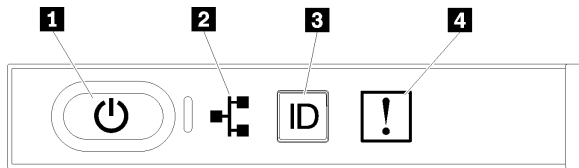


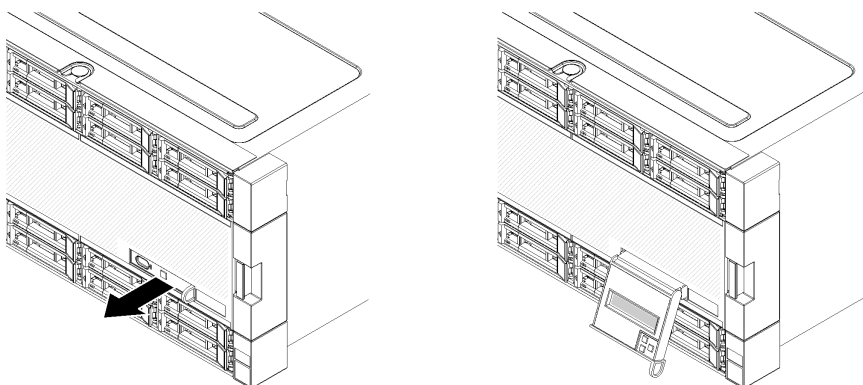
Table 28. Operator panel front controls and indicators

Callout	Callout
1 Power button and power LED	3 System ID button/LED
2 Network activity LED	4 System-error LED

- **1 Power button and power LED:** Press this button to turn the server on and off manually. The states of the power LED are as follows:
 - Off:** Power is not present or the power supply has failed.
 - Flashing rapidly (4 times per second):** The server is turned off and is not ready to be turned on. The power button is disabled. This will last approximately 5 to 10 seconds.
 - Flashing slowly (once per second):** The server is turned off and is ready to be turned on. You can press the power button to turn on the server.
 - On:** The server is turned on.
- **2 Network activity LED:** When this LED flickers, it indicates that the server is transmitting to or receiving signals from the Ethernet LAN.
- **3 System ID button/LED:** 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:** When this yellow LED is lit, it indicates that a system error has occurred. A system-error LED is also on the rear of the server. Messages on the LCD system information display panel and LEDs on other server components might also be lit to help isolate the error. This LED is controlled by the Lenovo XClarity Controller.

LCD system information display panel

The front operator panel comes with a tab, which can be pulled to access the LCD system information display panel. See [“LCD system information display panel” on page 28](#) for more information.



LCD system information display panel

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

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

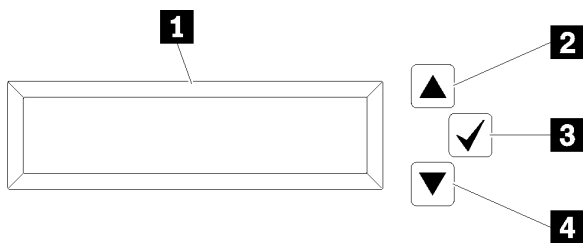


Table 29. LCD system information display panel

Callout	Callout
1 Information display panel	3 Select button
2 Scroll up button	4 Scroll down button

Note: Press the scroll-up and scroll-down buttons at the same time to refresh the LCD system information display panel.

- **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.
- **3 Select button:** Press this button to make your selection from the menu options.
- **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.

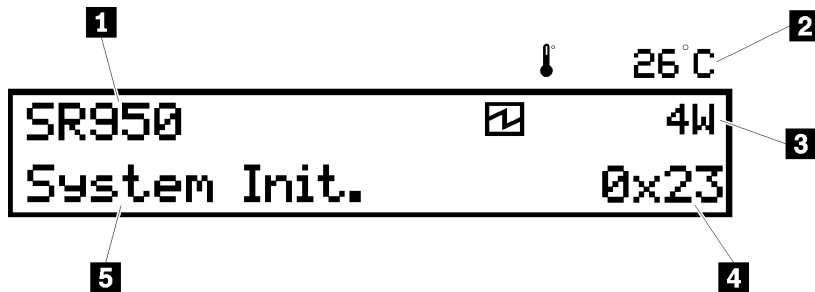
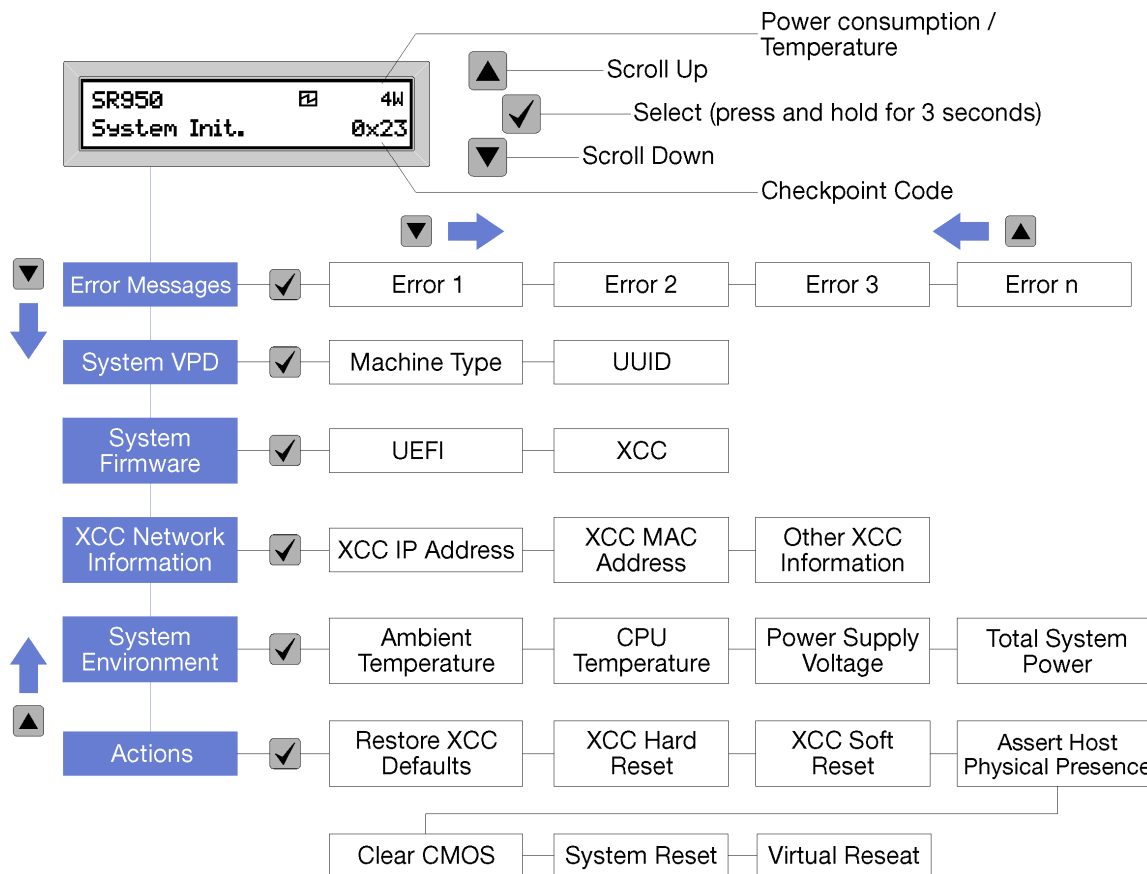


Table 30. LCD system information display information

Callout	Callout
1 System name	4 UEFI/POST code
2 Ambient temperature	5 System status
3 Estimated power consumption	

Following is an illustration of the LCD system information display panel menu options flow.



When you navigate through the hierarchy of the menu options, the LCD display panel shows information for that option with the up and down arrows. At the bottom of the hierarchy, only the up arrow is left, while at the top of the hierarchy, only the down arrow is left.

For the errors submenu set, when only one error occurs, the LCD display panel displays that error. When more than one error occurs, the LCD display panel displays the number of errors that have occurred. If no errors occur, the no error menu will be available for navigation.

To move within the menu options, use the **Scroll up** or **Scroll down** buttons, then the **Select** button to enter a submenu set.

The LCD system information display panel displays the following types of information about the server:

- Lenovo XClarity Controller (LXCC) system error log
 - Note:** The **Scroll Down** button will only function for this menu option when errors occur. A list of current errors reported by the system will be displayed.
- System VPD information
 - Machine type and serial number
 - Universal Unique Identifier (UUID) string
- System firmware levels:
 - UEFI code level
 - LXCC code level
- LXCC network information:

- LXCC hostname
- LXCC dedicated MAC address

Note: Only the MAC address that is currently in use is displayed (dedicated or shared).

- LXCC shared MAC address
- IP v4 information
- System environmental information:
 - Ambient temperature
 - Processor temperature
 - AC input voltage
 - Estimated power consumption

Rear view

The rear of the server provides access to several components, including the power supplies, PCIe adapters, serial port, and Ethernet ports.

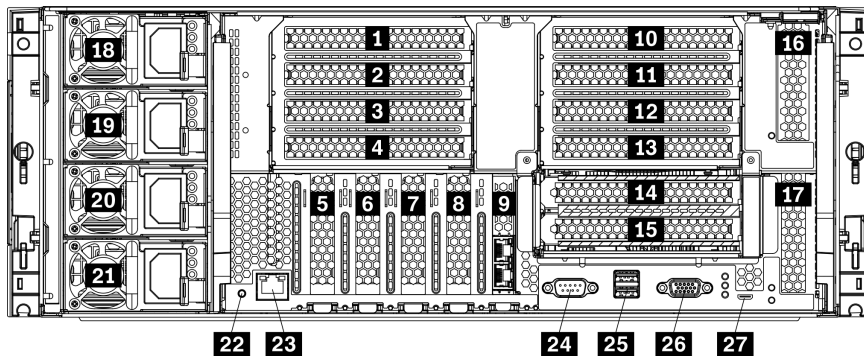


Figure 7. Rear view of the server

Table 31. Components on the rear of the server

Callout	Callout
1 PCIe slot 1 (on riser 1)	15 PCIe slot 15 (on riser 2) for ML2 x16 network adapter
2 PCIe slot 2 (on riser 1)	16 PCIe slot 16 (on riser 3)
3 PCIe slot 3 (on riser 1)	17 PCIe slot 17 (on riser 3)
4 PCIe slot 4 (on riser 1)	18 Power supply 4 (optional)
5 PCIe slot 5	19 Power supply 3 (optional)
6 PCIe slot 6	20 Power supply 2 (optional)
7 PCIe slot 7	21 Power supply 1
8 ML2 x16 network adapter slot	22 NMI button
9 LOM adapter slot	23 XClarity Controller network connector (RJ45)
10 PCIe slot 10 (on riser 2)	24 Serial connector
11 PCIe slot 11 (on riser 2)	25 USB 3.0 connectors (2)

Table 31. Components on the rear of the server (continued)

Callout	Callout
12 PCIe slot 12 (on riser 2)	26 VGA video port
13 PCIe slot 13 (on riser 2)	27 Service only connector
14 PCIe slot 14 (on riser 2)	

Notes: The following PCIe “slots” are assigned to components elsewhere in the server:

- PCIe slot 18 is assigned to the RAID card in the lower tray.
- PCIe slot 19 is assigned to the RAID card in the upper tray.
- PCIe slot 20 is assigned to the M.2 backplane inside the I/O tray.

1 2 3 4 PCIe slot 1-4 (on riser 1)

Install PCIe adapters into these slots.

5 6 7 PCIe slot 5-7

Install PCIe adapters into these slots.

8 ML2 x16 network adapter slot

Install ML2 x16 network adapter into this slot.

9 LOM adapter slot

Install LOM adapter into this slot.

10 11 12 13 14 15 PCIe slot 10-15 (on riser 2)

Install PCIe adapters into these slots.

Note: Install ML2 x16 network adapter into PCIe slot 15 (on riser 2).

16 17 PCIe slot 16-17 (on riser 3)

Install PCIe adapters into these slots.

18 19 20 21 Power supply 1-4

Note: Power supply 2-4 are optional.

The hot-swap redundant power supplies help you avoid significant interruption to the operation of the system when a power supply or an input power source fails. A failed power supply can be replaced without turning off the server. You can purchase a power supply option from Lenovo and install the power supply to provide power redundancy or additional power capacity without turning off the server.

For information about minimum power supply requirements and power redundancy, see [“power supply criteria in the “Install a power supply” topic” on page 245.](#)

Each hot-swap power supply has three status LEDs. See [“Rear view LEDs” on page 33](#) for information.

22 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.

23 XClarity Controller network connector (RJ45)

Used to attach an Ethernet cable to manage the system using XClarity Controller.

24 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).

25 USB 3.0 connectors (2)

Used to attach a device that requires a USB 2.0 or USB 3.0 connection, such as a keyboard, a mouse, or a USB flash drive.

26 VGA video port

Used to attach a VGA-compatible video device, such as a VGA monitor.

27 Service only connector

This connector is reserved for service only.

Rear view LEDs

The illustration in this section shows the LEDs on the rear the server.

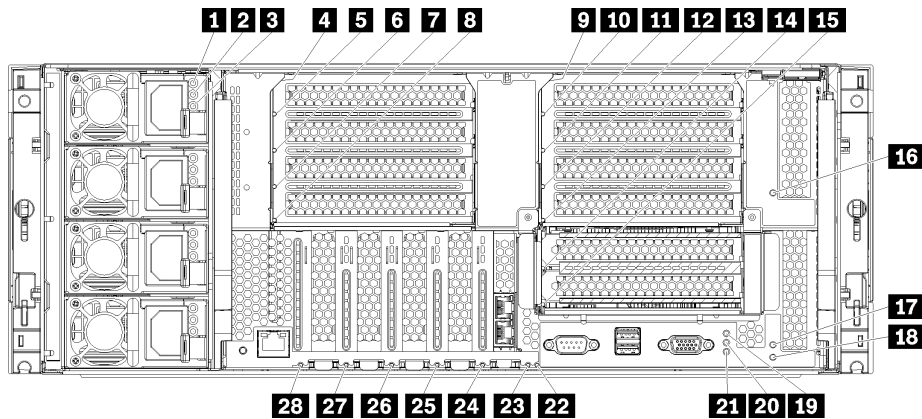


Figure 8. Rear LEDs

Table 32. Power supply LEDs

LED	Description
1 Input status (AC) (green)	<p>The input status LED can be in one of the following states:</p> <ul style="list-style-type: none"> Off: The power supply is not receiving the correct input power: either the power supply is not correctly connected to the power source, the power source is not outputting power, or the power source output does not meet the power supply input requirements (for example, a 1600-watt power supply will not run off of 120 vac input). On: The power supply is receiving the correct input power and the power supply is operating normally.
2 Output status (DC) (green)	<p>The output status LED can be in one of the following states:</p> <ul style="list-style-type: none"> Off: The server is powered off (not connected to input power), the power supply is not working correctly (Fault LED is on), or the system has overloaded the power supply (Fault LED is Off). On: The server is connected to input power (server powered on or in standby) and the power supply is working normally.
3 Fault LED (yellow)	<ul style="list-style-type: none"> Off: The power supply is working correctly. If the Output status (DC) LED is also off and the system will not power on, the system is overloading the power supply. On: The power supply has failed. Replace the power supply.

Table 33. Status LEDs

LED	Description
19 Power LED (green)	<p>The states of the power LED are as follows:</p> <p>Off: Power is not present or the power supply, or the LED itself has failed.</p> <p>Flashing rapidly (4 times per second): The server is turned off and is not ready to be turned on. The power button is disabled. This will last approximately 5 to 10 seconds.</p> <p>Flashing slowly (once per second): The server is turned off and is ready to be turned on. You can press the power button to turn on the server.</p> <p>On: The server is turned on.</p>
20 System ID LED (blue)	Use this blue LED to visually locate the server among other servers. You can use Lenovo XClarity Administrator to light this LED remotely.
21 System error LED (yellow)	When this yellow LED is lit, it indicates that a system error has occurred. A system-error LED is also on the front operator information panel. Messages on the LCD system information display panel and LEDs on other server components might also be lit to help isolate the error. This LED is controlled by the Lenovo XClarity Controller.

Table 34. Adapter LEDs

Callout	Callout
4 Riser 1 to 4 fault LED	15 Adapter 15 fault LED
5 Adapter 1 fault LED	16 Adapter 16 fault LED
6 Adapter 2 fault LED	17 Adapter 17 fault LED
7 Adapter 3 fault LED	18 Riser 16 through 17 fault LED
8 Adapter 4 fault LED	22 3v fault (system battery) LED
9 Riser 10 to 15 fault LED	23 I/O-board fault LED
10 Adapter 10 fault LED	24 LOM adapter fault LED

Table 34. Adapter LEDs (continued)

Callout	Callout
11 Adapter 11 fault LED	25 ML2 x16 network adapter fault LED
12 Adapter 12 fault LED	26 Adapter 7 fault LED
13 Adapter 13 fault LED	27 Adapter 6 fault LED
14 Adapter 14 fault LED	28 Adapter 5 fault LED

Internal cable routing

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

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

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 guides

Make sure that all the cables go through the cable guides, as shown in each cabling section.

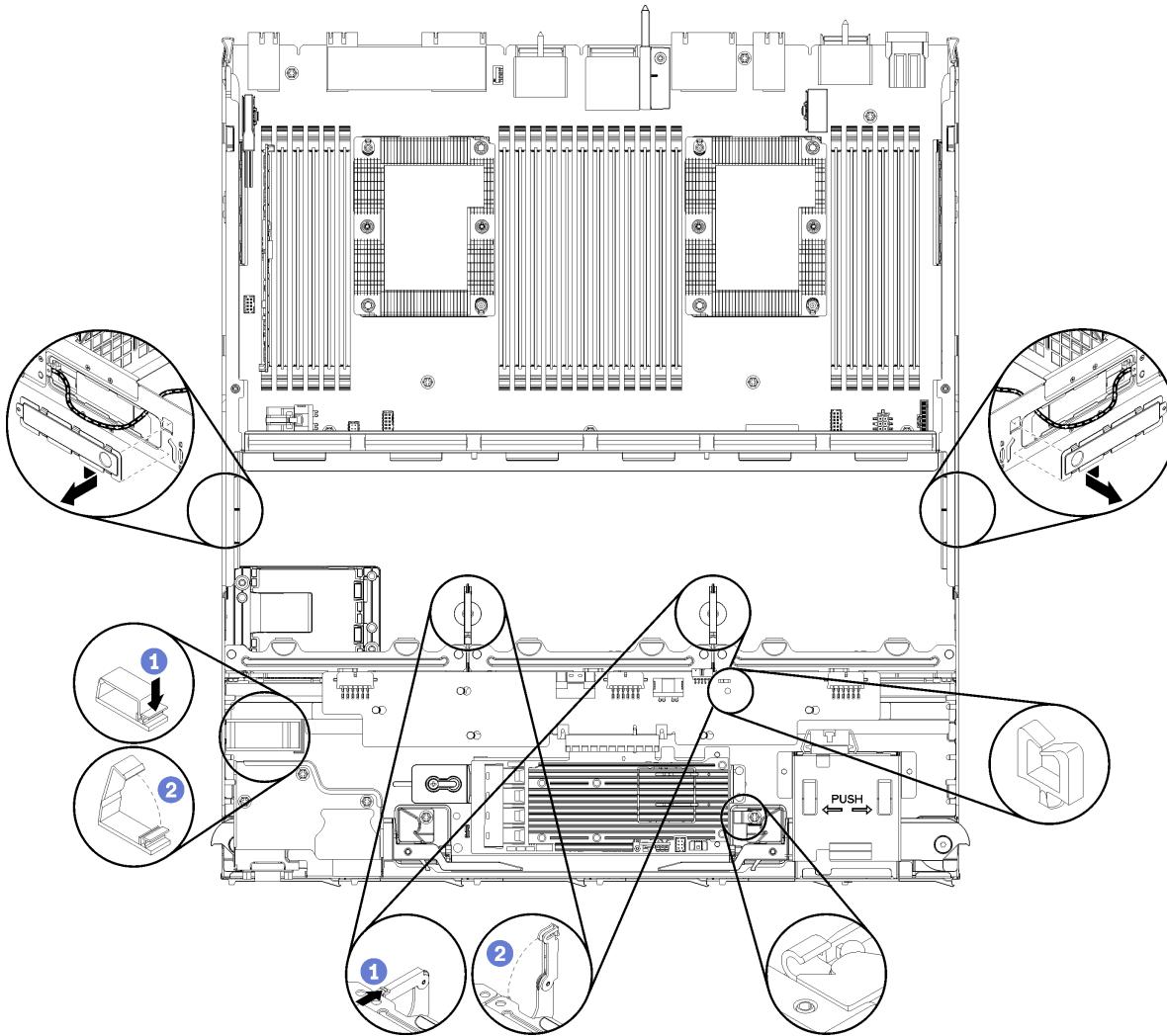


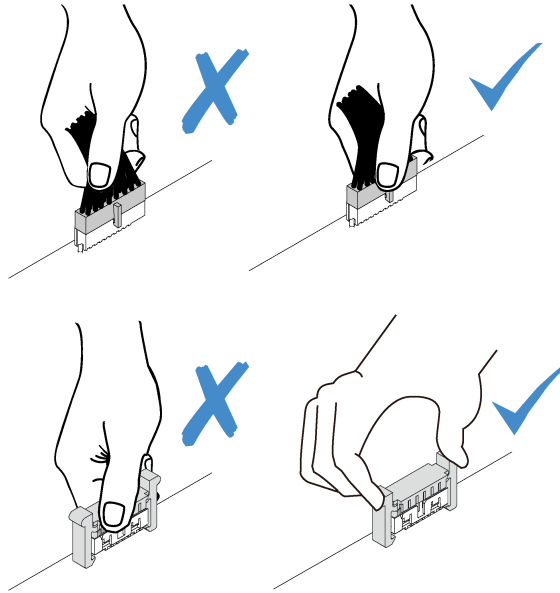
Figure 9. Cable guide locations

Connecting cables

To connect cables, observe the following guidelines:

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

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.



Cable routing for common components

Use this section to understand how to route cables for common server components.

Cable routing for common components is different for the lower and upper trays:

- [“Common cable routing \(lower tray\)” on page 37](#)
- [“Common cable routing \(upper tray\)” on page 39](#)

Notes:

- Make sure that all the cables go through the cable guides, as shown in the illustrations. See [“Cable guides” on page 35](#) for cable guide locations and descriptions.
- Some cable connectors have locks or latches that must be disengaged to disconnect the cable.

Common cable routing (lower tray)

The following illustration shows cable routing for common components in the lower tray.

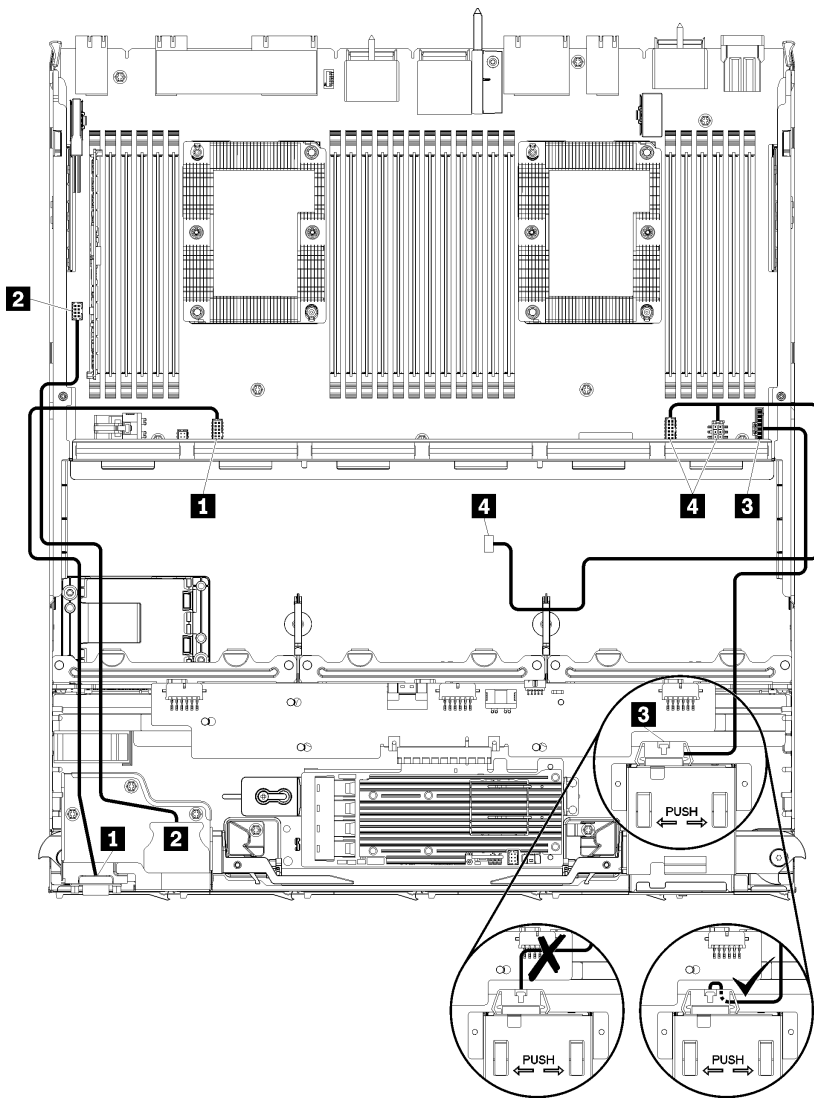


Figure 10. Cable routing, common cables (lower tray)

Table 35. Cable routing, common cables (lower tray)

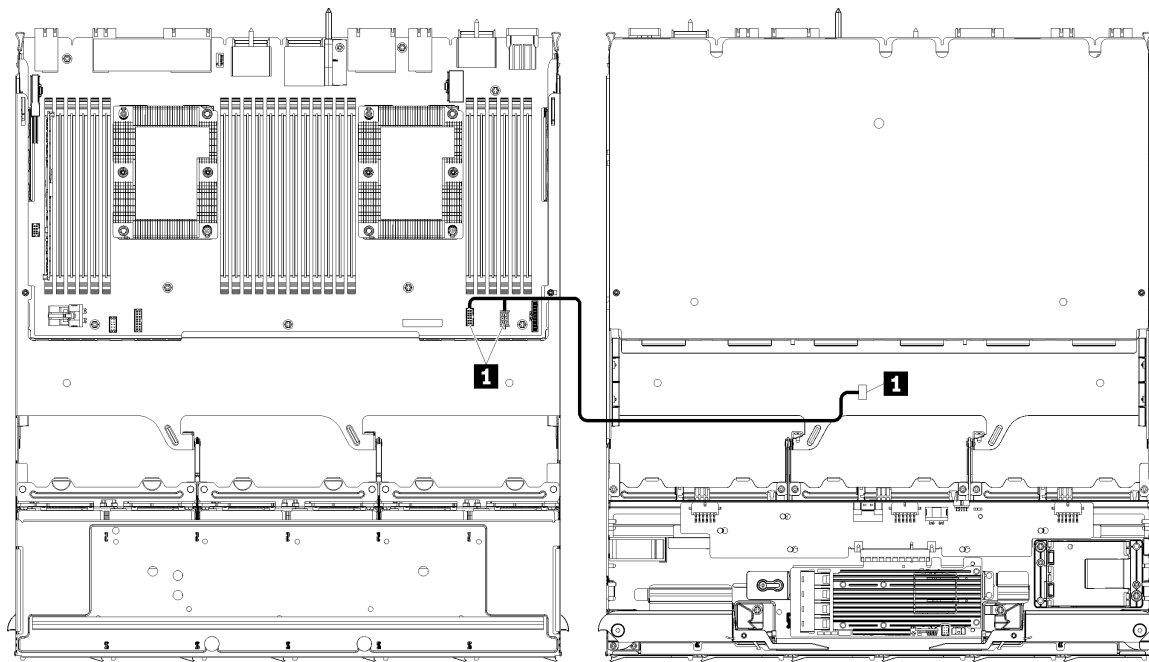
Cable	Routing
1 Front panel video port	<ul style="list-style-type: none"> • From: Front panel video port • To: Lower system board in lower compute tray, “Front video” connector (see “System-board connectors” on page 283)
2 Front panel USB ports	<ul style="list-style-type: none"> • From: Front USB ports • To: Lower system board in lower compute tray, “USB” connector (see “System-board connectors” on page 283)

Table 35. Cable routing, common cables (lower tray) (continued)

Cable	Routing
3 Control panel cable	<ul style="list-style-type: none"> • From: Control panel connector • To: Lower system board in lower compute tray, “Front panel” connector (see “System-board connectors” on page 283) <p>Attention: Make sure the operator panel cable is folded beneath the connector, as shown in Figure 10 “Cable routing, common cables (lower tray)” on page 38 to prevent the cable from pinching when the compute tray is fully assembled.</p>
4 Fan cage cable	<ul style="list-style-type: none"> • From: Fan cage connector (underside of fan cage) • To: Lower system board in lower compute tray, “Fan board” power (J56) and signal (J40) connectors (see “System-board connectors” on page 283)

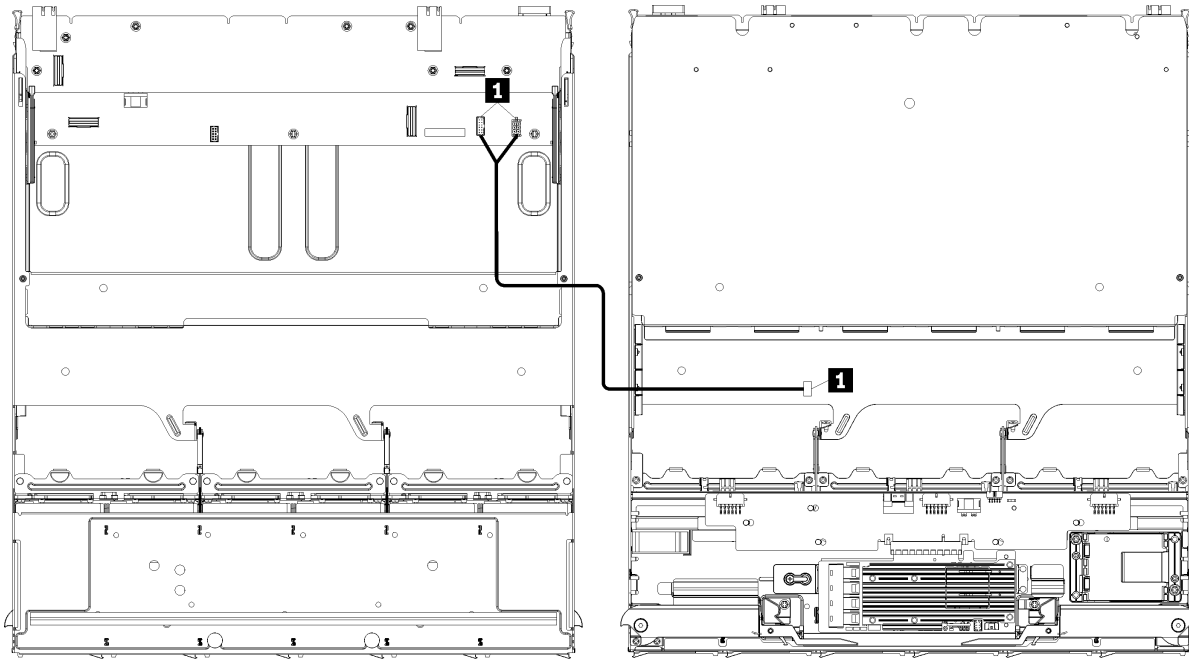
Common cable routing (upper tray)

The following illustration shows cable routing for common components in the upper tray.



Note: In this illustration, the image on the left shows the tray right-side up and the image on the right shows the tray upside down.

Figure 11. Cable routing, common cables (upper tray with system board)



Note: In this illustration, the image on the left shows the tray right-side up and the image on the right shows the tray upside down.

Figure 12. Cable routing, common cables (upper tray with storage-board assembly)

Table 36. Cable routing, common cables (upper tray)

Cable	Routing
1 Fan cage cable	<ul style="list-style-type: none"> • From: Fan cage connector (underside of fan cage) • To: <ul style="list-style-type: none"> – Lower system board in upper compute tray, “Fan board” power (J56) and signal (J40) connectors (see “System-board connectors” on page 283) – Storage-board assembly in upper tray, fan power (J3) and signal (J5) connectors (see “Storage-board-assembly connectors” on page 284) <p>Note: Do not route the fan cage cable in the upper tray through any cable guides.</p>

Cable routing for drives

Use this section to understand how to route cables for drives and related components.

Cable routing for drive components is different for the lower and upper trays:

- [“Drive cable routing \(lower tray\)” on page 41:](#)
 - [Common drive cables \(lower tray\)](#)
 - [SAS drive cables \(lower tray\)](#)
 - [NVMe drive cables \(lower tray\)](#)
- [“Drive cable routing \(upper tray\)” on page 44:](#)
 - [Common drive cables \(upper tray\)](#)
 - [SAS drive cables \(upper tray\)](#)
 - [NVMe drive cables \(upper tray\)](#)

Notes:

- Make sure that all the cables go through the cable guides, as shown in the illustrations. See “[Cable guides](#)” on [page 35](#) for cable guide locations and descriptions.
- Some cable connectors have locks or latches that must be disengaged to disconnect the cable.

Drive cable routing (lower tray)

Cable routing for drive components is different for SAS and NVMe drives:

- [Common drive cables \(lower tray\)](#)
- [SAS drive cables \(lower tray\)](#)
- [NVMe drive cables \(lower tray\)](#)

Common drive cables (lower tray)

Common drive cables are used by both SAS and NVMe drives.

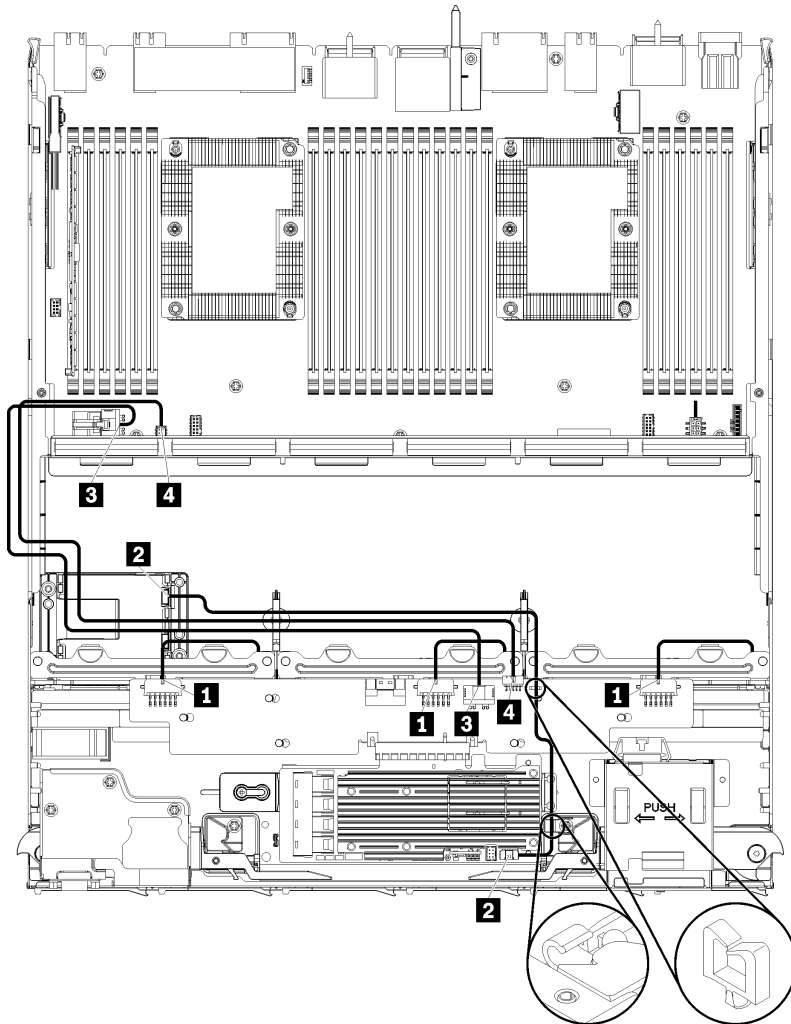


Figure 13. Cable routing, common drive cables (lower tray)

Table 37. Cable routing, common drive cables (lower tray)

Cable	Routing
1 Power to drive backplanes 1, 2, and 3	<ul style="list-style-type: none"> • From: Storage interposer (see “Storage interposer connectors” on page 289) <ul style="list-style-type: none"> – For drive backplane 1, use interposer “BP 1/6” connector – For drive backplane 2, use interposer “BP 2/5” connector – For drive backplane 3, use interposer “BP 3/4” connector • To: Drive backplane, “Power” connector (see “Drive backplane connectors” on page 291)
2 RAID flash power module	<ul style="list-style-type: none"> • From: RAID flash power module connector • To: RAID card, flash power module (J14) connector (see “RAID card connectors” on page 290)
3 Drive power	<ul style="list-style-type: none"> • From: Lower system board in lower compute tray, “POWER” connector (see “System-board connectors” on page 283) • To: Storage interposer, “POWER” connector (see “Storage interposer connectors” on page 289)
4 Drive signal	<ul style="list-style-type: none"> • From: Lower system board in lower compute tray, “Signal” connector (see “System-board connectors” on page 283) • To: Storage interposer, “SIDE BAND” connector (see “Storage interposer connectors” on page 289)

SAS drive cables (lower tray)

Common drive cables are used by only SAS drives.

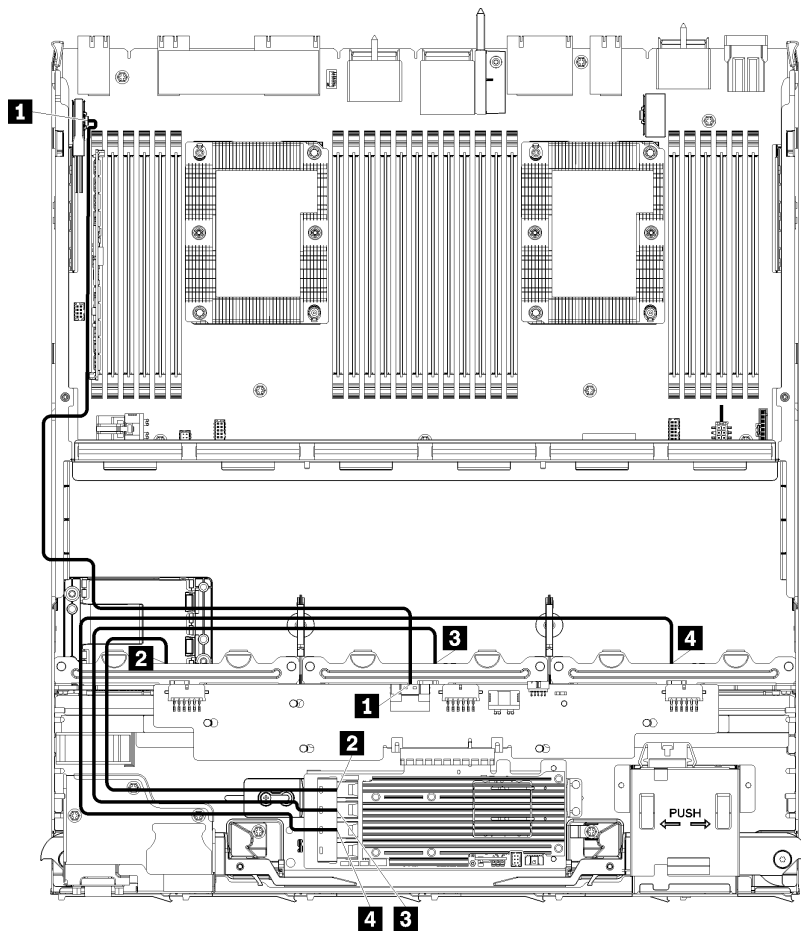


Figure 14. Cable routing, SAS drive cables (lower tray)

Table 38. Cable routing, SAS drive cables (lower tray)

Cable	Routing
1 PCIe SAS interface	<ul style="list-style-type: none"> From: Lower system board in lower compute tray, “PCIe/NVMe” connector (see “System-board connectors” on page 283) To: Storage interposer, connector “PCIe” (see “Storage interposer connectors” on page 289)
2 RAID interface for drive backplane 1	<ul style="list-style-type: none"> From: RAID card, “C3” connector (see “RAID card connectors” on page 290) To: Drive backplane, connector “SAS” (see “Drive backplane connectors” on page 291)
3 RAID interface for drive backplane 2	<ul style="list-style-type: none"> From: RAID card, “C2” connector (see “RAID card connectors” on page 290) To: Drive backplane, connector “SAS” (see “Drive backplane connectors” on page 291)
4 RAID interface for drive backplane 3	<ul style="list-style-type: none"> From: RAID card, “C1” connector (see “RAID card connectors” on page 290) To: Drive backplane, connector “SAS” (see “Drive backplane connectors” on page 291)

NVMe drive cables (lower tray)

Common drive cables are used by only NVMe drives.

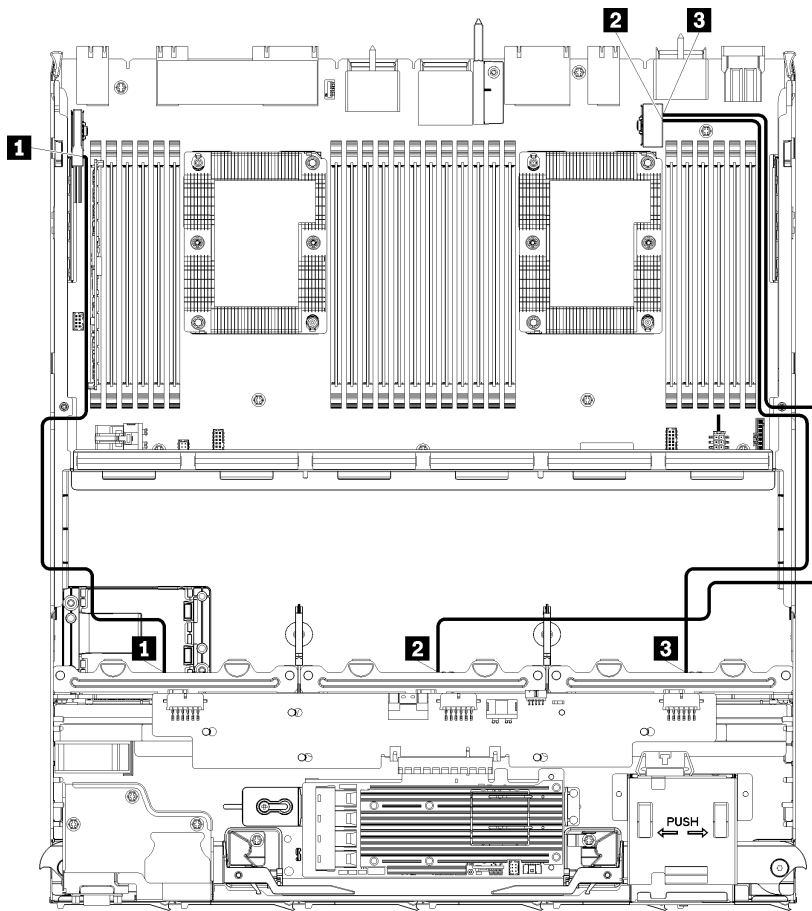


Figure 15. Cable routing, NVMe drive cables (lower tray)

Table 39. Cable routing, NVMe drive cables (lower tray)

Cable	Routing
1 Drive backplane 1 NVMe	<ul style="list-style-type: none"> • From: Upper system board in lower compute tray, “PCIe/NVMe” connector (see “System-board connectors” on page 283) • To: Drive backplane 1, connector “NVMe” (see “Drive backplane connectors” on page 291)
2 Drive backplane 2 NVMe	<ul style="list-style-type: none"> • From: Upper system board in lower compute tray, “NVMe” connector (see “System-board connectors” on page 283) • To: Drive backplane 2, connector “NVMe” (see “Drive backplane connectors” on page 291)
3 Drive backplane 3 NVMe	<ul style="list-style-type: none"> • From: Lower system board in lower compute tray, “NVMe” connector (see “System-board connectors” on page 283) • To: Drive backplane 3, connector “NVMe” (see “Drive backplane connectors” on page 291)

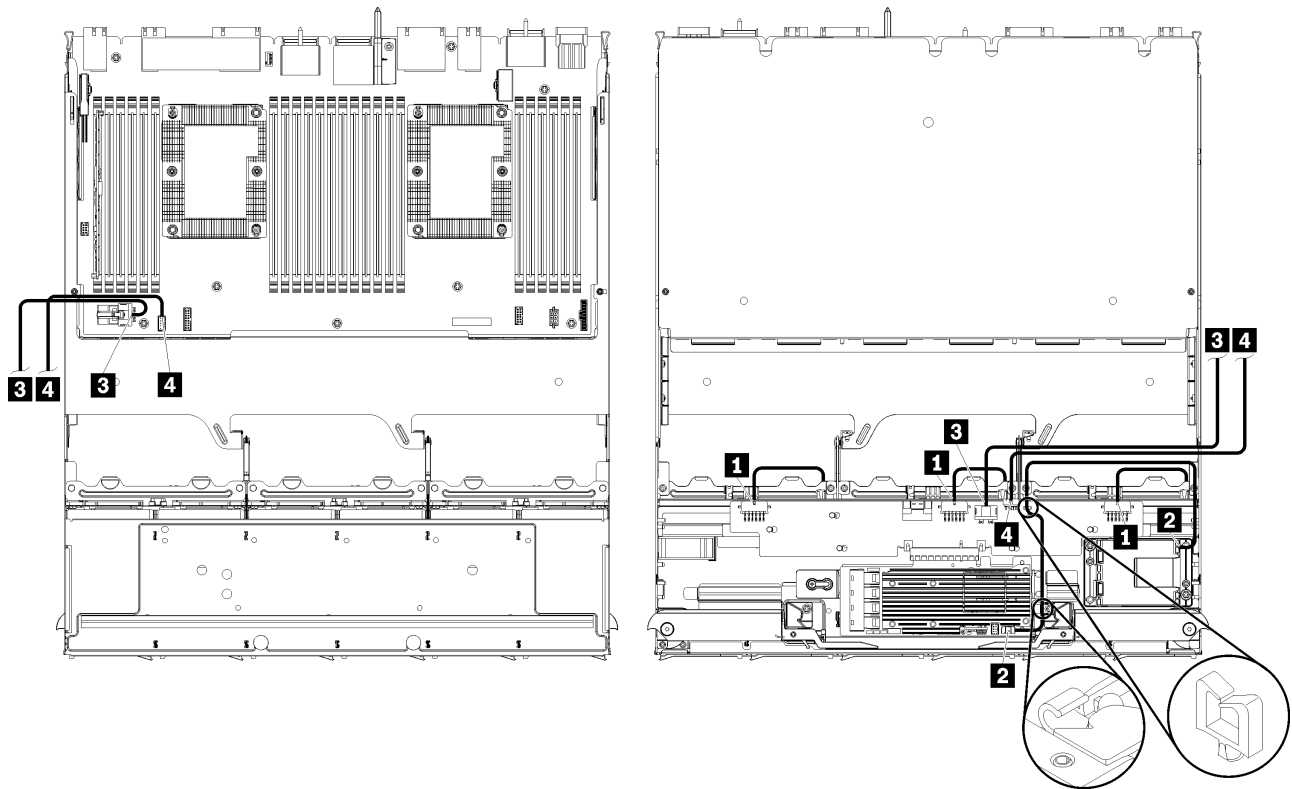
Drive cable routing (upper tray)

Cable routing for drive components is different for SAS and NVMe drives:

- Common drive cables (upper tray)
- SAS drive cables (upper tray)
- NVMe drive cables (upper tray)

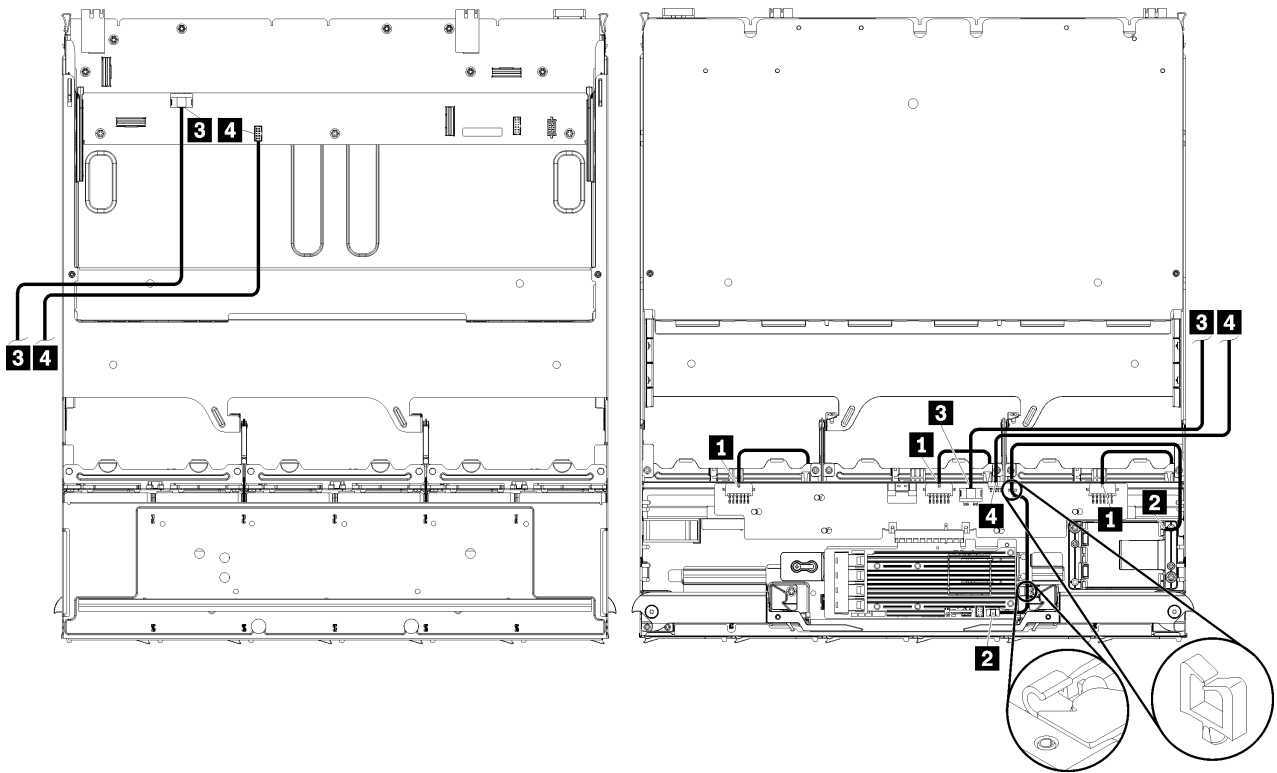
Common drive cables (upper tray)

Common drive cables are used by both SAS and NVMe drives.



Note: In this illustration, the image on the left shows the tray right-side up and the image on the right shows the tray upside down.

Figure 16. Cable routing, common drive cables (upper tray with compute system board)



Note: In this illustration, the image on the left shows the tray right-side up and the image on the right shows the tray upside down.

Figure 17. Cable routing, common drive cables (upper tray with storage-board assembly)

Table 40. Cable routing, common drive cables (upper tray)

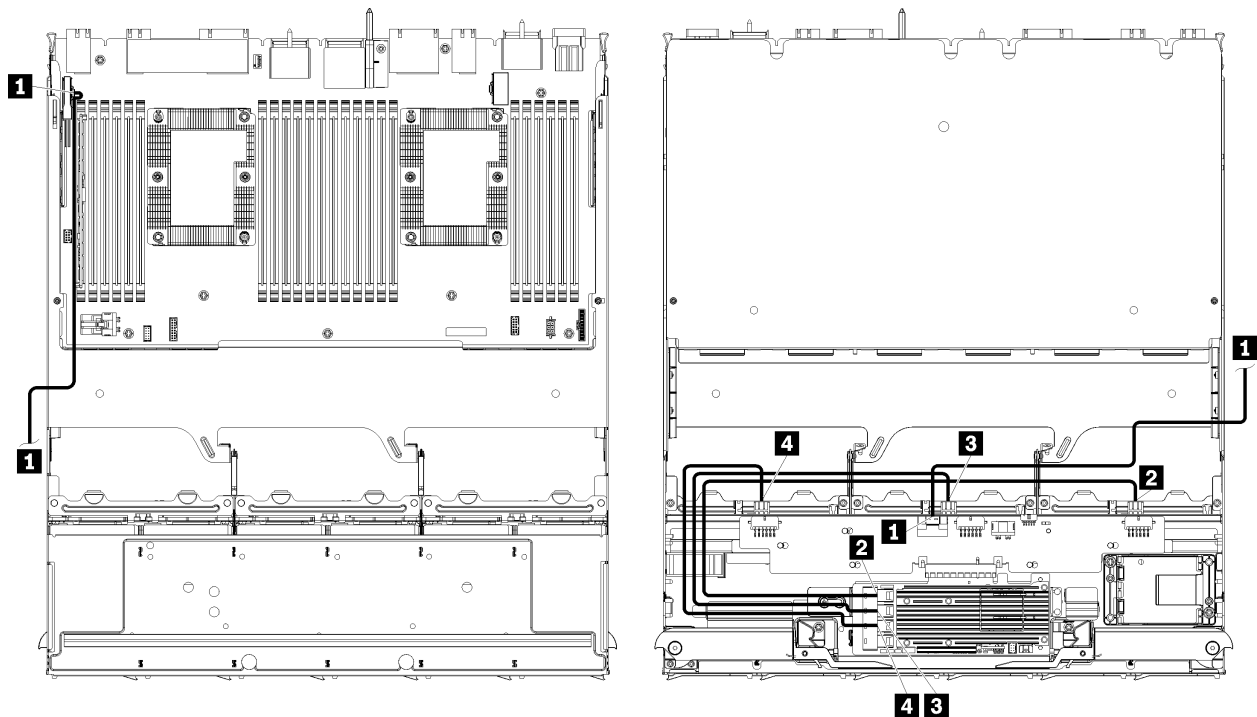
Cable	Routing
1 Power to drive backplanes 4, 5, and 6	<ul style="list-style-type: none"> • From: Storage interposer (see “Storage interposer connectors” on page 289) <ul style="list-style-type: none"> – For drive backplane 4, use interposer “BP 3/4” connector – For drive backplane 5, use interposer “BP 2/5” connector – For drive backplane 6, use interposer “BP 1/6” connector • To: Drive backplane, connector “Power” (see “Drive backplane connectors” on page 291)
2 RAID flash power module	<ul style="list-style-type: none"> • From: RAID flash power module connector • To: RAID card, flash power module (J14) connector (see “RAID card connectors” on page 290)

Table 40. Cable routing, common drive cables (upper tray) (continued)

Cable	Routing
3 Drive power	<ul style="list-style-type: none"> • From: <ul style="list-style-type: none"> – Lower system board in upper compute tray, “POWER” connector (see “System-board connectors” on page 283) – Storage-board assembly in upper tray, hard disk drive power (J2) connector (see “Storage-board-assembly connectors” on page 284) • To: Storage interposer, “POWER” connector (see “Storage interposer connectors” on page 289)
4 Drive signal	<ul style="list-style-type: none"> • From: <ul style="list-style-type: none"> – Lower system board in upper compute tray, “Signal” connector (see “System-board connectors” on page 283) – Storage-board assembly in upper tray, hard disk drive signal (J13) connector (see “Storage-board-assembly connectors” on page 284) • To: Storage interposer, “SIDEBAND” connector (see “Storage interposer connectors” on page 289)

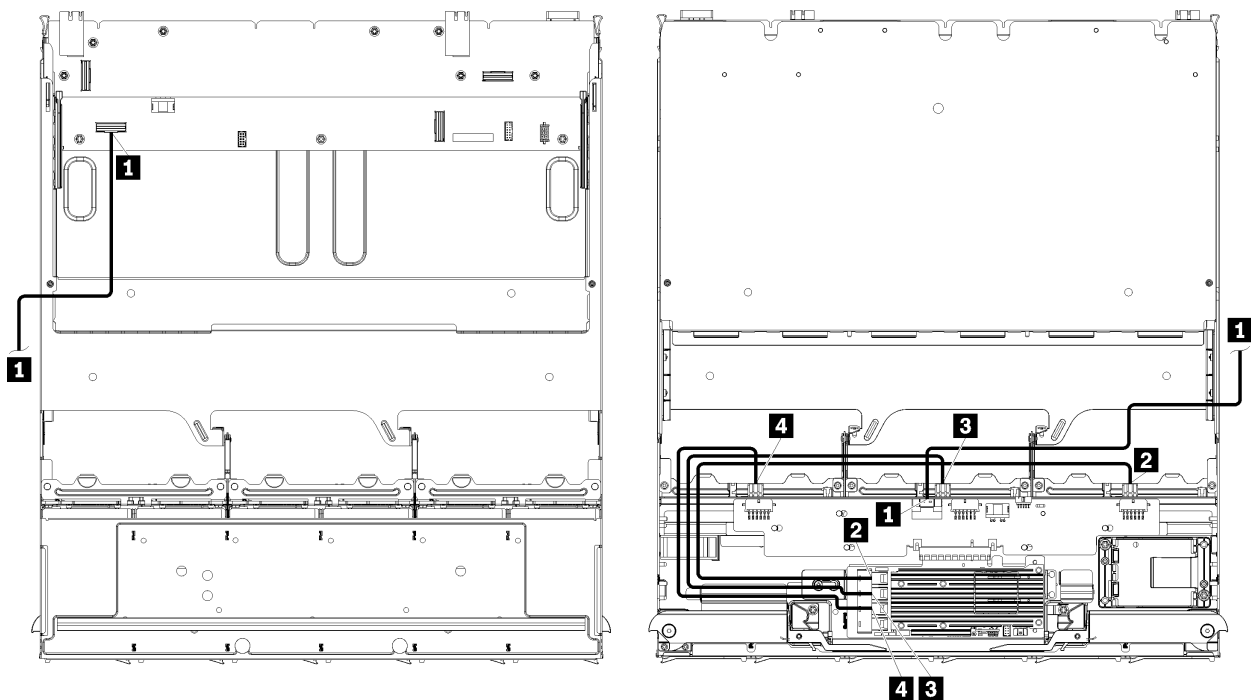
SAS drive cables (upper tray)

Common drive cables are used by only SAS drives.



Note: In this illustration, the image on the left shows the tray right-side up and the image on the right shows the tray upside down.

Figure 18. Cable routing, SAS drive cables (upper tray with system board)



Note: In this illustration, the image on the left shows the tray right-side up and the image on the right shows the tray upside down.

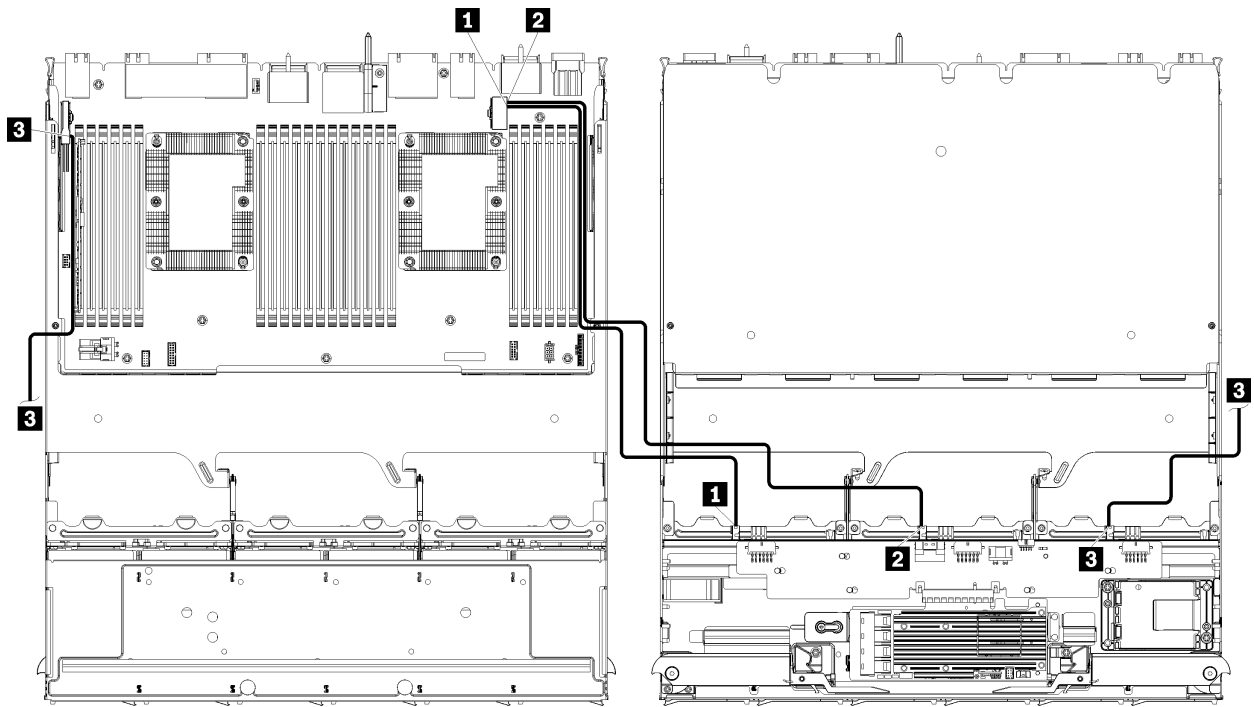
Figure 19. Cable routing, SAS drive cables (upper tray with storage-board assembly)

Table 41. Cable routing, SAS drive cables (upper tray)

Cable	Routing
1 PCIe SAS interface	<ul style="list-style-type: none"> • From: <ul style="list-style-type: none"> – Lower system board in upper compute tray, “PCIe/NVMe” connector (see “System-board connectors” on page 283) – Storage-board assembly in upper tray, “PCIe” connector (see “Storage-board-assembly connectors” on page 284) • To: Storage interposer, “PCIe” connector (see “Storage interposer connectors” on page 289)
2 RAID interface for drive backplane 4	<ul style="list-style-type: none"> • From: RAID card, “C3” connector (see “RAID card connectors” on page 290) • To: Drive backplane, connector “SAS” (see “Drive backplane connectors” on page 291)
3 RAID interface for drive backplane 5	<ul style="list-style-type: none"> • From: RAID card, “C2” connector (see “RAID card connectors” on page 290) • To: Drive backplane, connector “SAS” (see “Drive backplane connectors” on page 291)
4 RAID interface for drive backplane 6	<ul style="list-style-type: none"> • From: RAID card, “C1” connector (see “RAID card connectors” on page 290) • To: Drive backplane, connector “SAS” (see “Drive backplane connectors” on page 291)

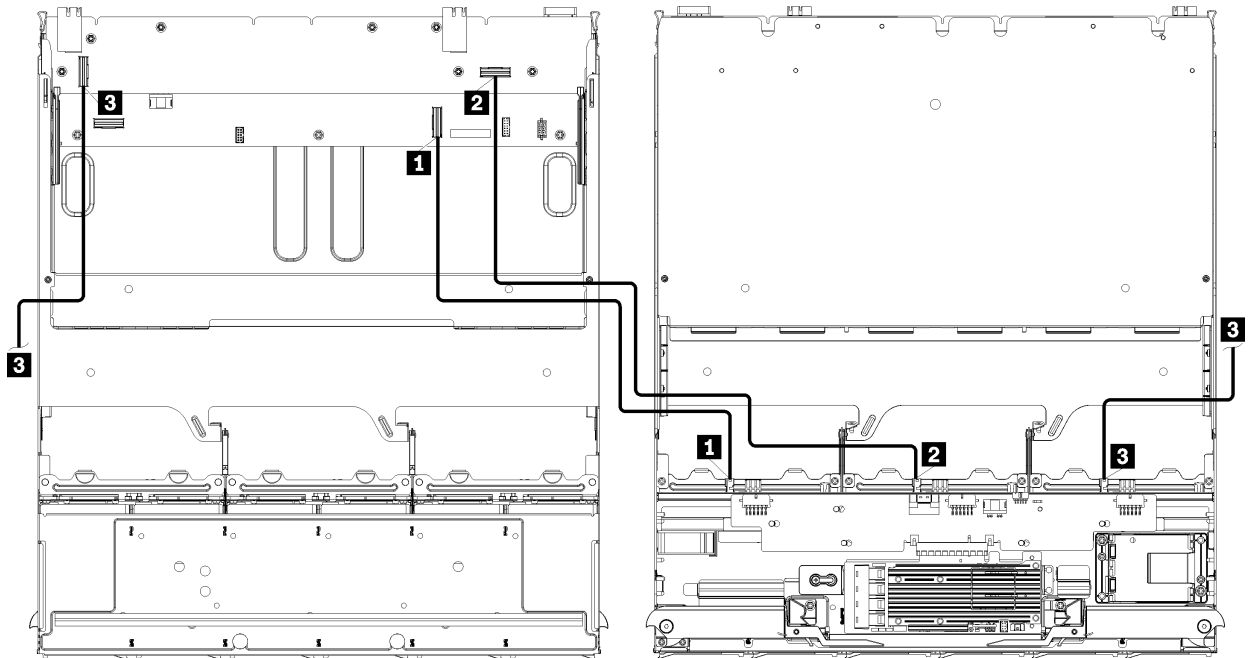
NVMe drive cables (upper tray)

Common drive cables are used by only NVMe drives.



Note: In this illustration, the image on the left shows the tray right-side up and the image on the right shows the tray upside down.

Figure 20. Cable routing, NVMe drive cables (upper tray with system board)



Note: In this illustration, the image on the left shows the tray right-side up and the image on the right shows the tray upside down.

Figure 21. Cable routing, NVMe drive cables (upper tray with storage-board assembly)

Table 42. Cable routing, NVMe drive cables (upper tray)

Cable	Routing
1 Drive backplane 6 NVMe	<ul style="list-style-type: none"> • From: <ul style="list-style-type: none"> – Lower system board in upper compute tray, “PCIe/NVMe” connector (see “System-board connectors” on page 283) – Storage-board assembly in upper tray, “NVMe” connector (see “Storage-board-assembly connectors” on page 284) • To: Drive backplane 6, connector “NVMe” (see “Drive backplane connectors” on page 291)
2 Drive backplane 5 NVMe	<ul style="list-style-type: none"> • From: <ul style="list-style-type: none"> – Upper system board in upper compute tray, “NVMe” connector (see “System-board connectors” on page 283) – Storage-board assembly in upper tray, “NVMe” connector (see “Storage-board-assembly connectors” on page 284) • To: Drive backplane 5, connector “NVMe” (see “Drive backplane connectors” on page 291)
3 Drive backplane 4 NVMe	<ul style="list-style-type: none"> • From: <ul style="list-style-type: none"> – Upper system board in upper compute tray, “NVMe” connector (see “System-board connectors” on page 283) – Storage-board assembly in upper tray, “NVMe” connector (see “Storage-board-assembly connectors” on page 284) • To: Drive backplane 4, connector “NVMe” (see “Drive backplane connectors” on page 291)

Parts list

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

For more information about ordering the parts shown in Figure 22 “Server components” on page 51:

<http://datacentersupport.lenovo.com/us/en/products/servers/thinksystem/sr950/7X12/parts>

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

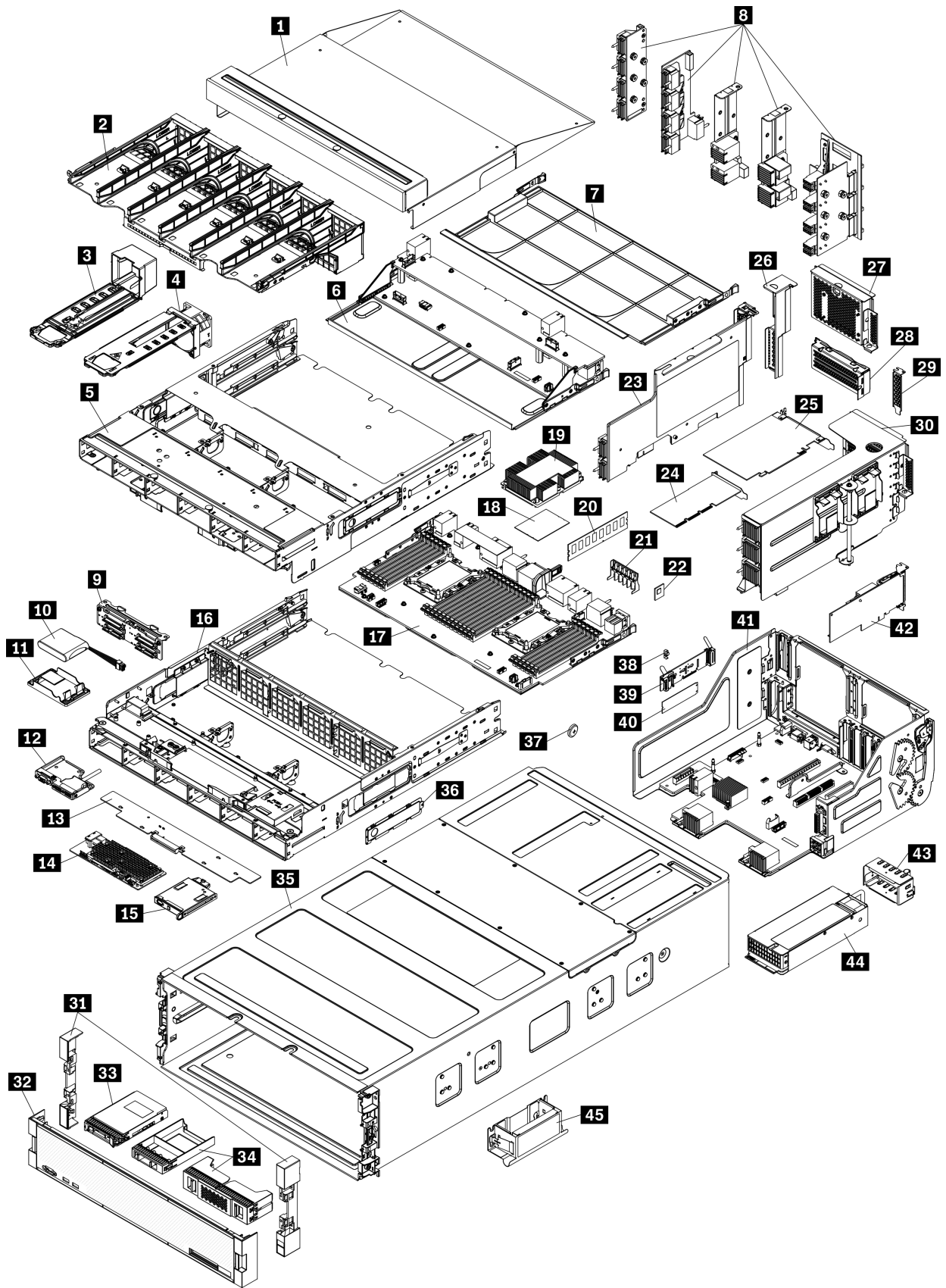


Figure 22. Server components

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

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

Table 43. Parts listing

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 22 “Server components” on page 51: http://datacentersupport.lenovo.com/us/en/products/servers/thinksystem/sr950/7X12/parts It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.					
1	Upper tray filler	√			
2	Fan cage (upper/lower)	√			
3	Fan filler	√			
4	Fan	√			
5	Upper tray	√			
6	Storage board assembly	√			
7	System board filler	√			
8	Midplanes (five types)		√		
9	Drive backplane	√			
10	RAID flash power module	√			
11	RAID flash power module bracket	√			
12	Front USB/VGA assembly	√			
13	Storage interposer	√			
14	RAID adapter	√			
15	Front operator panel	√			
16	Lower tray	√			
17	System board	√			
18	Processor			√	
19	Processor and heat sink (PHM)			√	
19	Heat sink			√	

Table 43. Parts listing (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
20	Memory module (DIMM)	√			
20	DC Persistent Memory Module (DCPMM)	√			
20	Memory module filler	√			
21	Memory air baffle	√			
22	TCM module	√			
23	Riser (slot 16 to 17)	√			
24	Adapter (PCIe), low profile	√			
25	Adapter (PCIe), full height	√			
26	Riser filler (slot 16 to 17)	√			
27	PCIe filler (four-slot)	√			
28	Riser bracket (slot 14 to 15)	√			
28	PCIe filler (two-slot)	√			
28	Riser bracket filler (slot 14 to 15)		√		
29	PCIe filler (single-slot)	√			
30	Riser 1 (slot 1 to 4)Riser 2 (slot 10 to 13)	√			
31	Bezel, front	√			
32	Cover, front	√			
33	Storage drive	√			
34	Drive filler (single bay or four bay)	√			
35	Chassis		√		
36	Cable covers	√			
37	System battery (CR2032)				√
38	M.2 retainer	√			
39	M.2 backplane	√			
40	M.2 drive	√			
41	I/O tray	√			
42	Adapter (LOM or ML2 x16 network)	√			
43	Power supply filler	√			
44	Power supply unit	√			
45	Chassis lift handle	√			

Power cords

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

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

1. Go to:
<http://dcsc.lenovo.com/#/>
2. Click **Preconfigured Model** or **Configure to order**.
3. Enter the machine type and model for your server to display the configurator page.
4. Click **Power** → **Power Cables** to see all line cords.

Notes:

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

Chapter 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 input 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 210](#).
 - 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 came with the optional rail kit.
 - c. Connect the Ethernet cables and power cords to the server. See [“Rear view” on page 31](#) to locate the connectors. See [“Cable the server” on page 253](#) for cabling best practices.
 - d. Power on the server. See [“Power on the server \(connect input power\)” on page 253](#).

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

“Opening and Using the XClarity Controller Web Interface” section in the XCC documentation version compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html.

- e. Validate that the server hardware was set up successfully. See [“Validate server setup” on page 253](#).
3. Configure the system.
 - a. Connect the Lenovo XClarity Controller to the management network. See [“Set the network connection for the Lenovo XClarity Controller” on page 255](#).
 - b. Update the firmware for the server, if necessary. See [“Update the firmware” on page 256](#).
 - c. Configure the firmware for the server. See [“Configure the firmware” on page 259](#).

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 [“Deploy the operating system” on page 266](#).
 - e. Back up the server configuration. See [“Back up the server configuration” on page 267](#).
 - 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 your safety at work:
 - 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 58 and “[Working inside the server with the power on](#)” on page 57.
- Make sure the components you are installing are supported by your server. For a list of supported optional components for the server, see <https://static.lenovo.com/us/en/serverproven/index.shtml>.
- When you install a new server, download and apply the latest firmware. This will help ensure that any known issues are addressed, and that your server is ready to work with optimal performance. Go to [ThinkSystem SR950 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.
- Terra-cotta 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:

- A power supply or filler 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 front bezel before you connect power to the server. Do not operate the server with the front bezel removed.
- 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.

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.
- While the device is still in its static-protective package, touch it to an unpainted metal surface on the outside of the server for at least two seconds. This drains static electricity from the package and from your body.
- Remove the device from the package and install it directly into the server without putting it down. If it is necessary to put the device down, put it back into the static-protective package. Never place the device on the server or on any metal surface.
- When handling a device, carefully hold it by the edges or the frame.
- Do not touch solder joints, pins, or exposed circuitry.
- Keep the device from others' reach to prevent possible damages.

Memory module installation rules and order

Memory modules must be installed in a specific order based on the memory configuration that you implement and the number of processors and memory modules installed in the server.

The following memory configurations and population sequences are supported for the ThinkSystem SR950 server:

- [“Independent memory mode” on page 63](#)
 - [“Installation order: independent memory mode with two processors” on page 64](#)
 - [“Installation order: independent memory mode with three processors” on page 65](#)
 - [“Installation order: independent memory mode with four processors” on page 69](#)
 - [“Installation order: independent memory mode with six processors” on page 73](#)
 - [“Installation order: independent memory mode with eight processors” on page 83](#)
- [“Memory mirroring” on page 100](#)
 - [“Installation order: memory mirroring with two processors” on page 101](#)
 - [“Installation order: memory mirroring with three processors” on page 102](#)
 - [“Installation order: memory mirroring with four processors” on page 106](#)
 - [“Installation order: memory mirroring with six processors” on page 110](#)
 - [“Installation order: memory mirroring with eight processors” on page 122](#)
- [“Memory sparing” on page 139](#)
 - [“Installation order: memory sparing with two processors” on page 140](#)
 - [“Installation order: memory sparing with three processors” on page 141](#)
 - [“Installation order: memory sparing with four processors” on page 145](#)
 - [“Installation order: memory sparing with six processors” on page 149](#)
 - [“Installation order: memory sparing with eight processors” on page 161](#)

For information about criteria that must be followed when selecting and installing memory modules in your server, see [“Memory guidelines” on page 59](#).

For information about configuring memory settings, see “Memory configuration” in the *ThinkSystem SR950 Setup Guide*.

Memory guidelines

There are a number of criteria that must be followed when selecting and installing memory modules in your server.

The DIMM population sequences in this document show all memory population combinations that are supported by your server. Some of these combinations will perform better than others because they balance the distribution of memory across processors, memory controllers, and memory channels. Balanced memory configurations enable optimal interleaving across all populated memory channels of a processor to boost memory performance.

See the “[Install a memory module \(option\)](#)” in the *ThinkSystem SR950 Setup Guide* for important information about installing and removing memory. This guide will help with memory selection and planning. 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 tool, which is available at the following site:

http://1config.lenovo.com/#/memory_configuration

Memory module selection

The following memory modules (DIMMs) are supported for use in the ThinkSystem SR950 server. See <https://static.lenovo.com/us/en/serverproven/index.shtml> for specific memory module part numbers and ordering information.

A label on each DIMM identifies the DIMM type. This information is in the format **xxxxx nRxxx PC4-xxxxx-xx-xx-xxx**. Where *n* indicates if the DIMM is single-rank (*n*=1) or dual-rank (*n*=2).

Notes:

- Installing or removing DIMMs changes the server configuration. When you restart the server, it displays a message that indicates that the memory configuration has changed. There are multiple ways to view the server configuration. See “[Management options](#)” on page 19 for a description of each management method and how each method applies to various deployment situations.
- When you replace a DIMM, the server provides automatic DIMM enablement capability without requiring you to use the Lenovo XClarity Provisioning Manager to enable the new DIMM manually.

Memory architecture

The relationship between memory controllers, channels, and connectors on each system board is shown in the following illustration and each memory channel has two DIMM slots (0, furthest from the processor, and 1, closest to the processor).

- Each processor in your server has two memory controllers: IMC1 and IMC2.
- Each memory controller has three memory channels:
 - Processor 1:
 - IMC1 has memory channels A, B, and C.
 - IMC2 has memory channels D, E, and F.
 - Processor 2:
 - IMC1 has memory channels G, H, and J.
 - IMC2 has memory channels K, L, and M.

- Each memory channel has two DIMM slots: slot 0 (furthest from the processor) and slot 1 (closest to the processor).

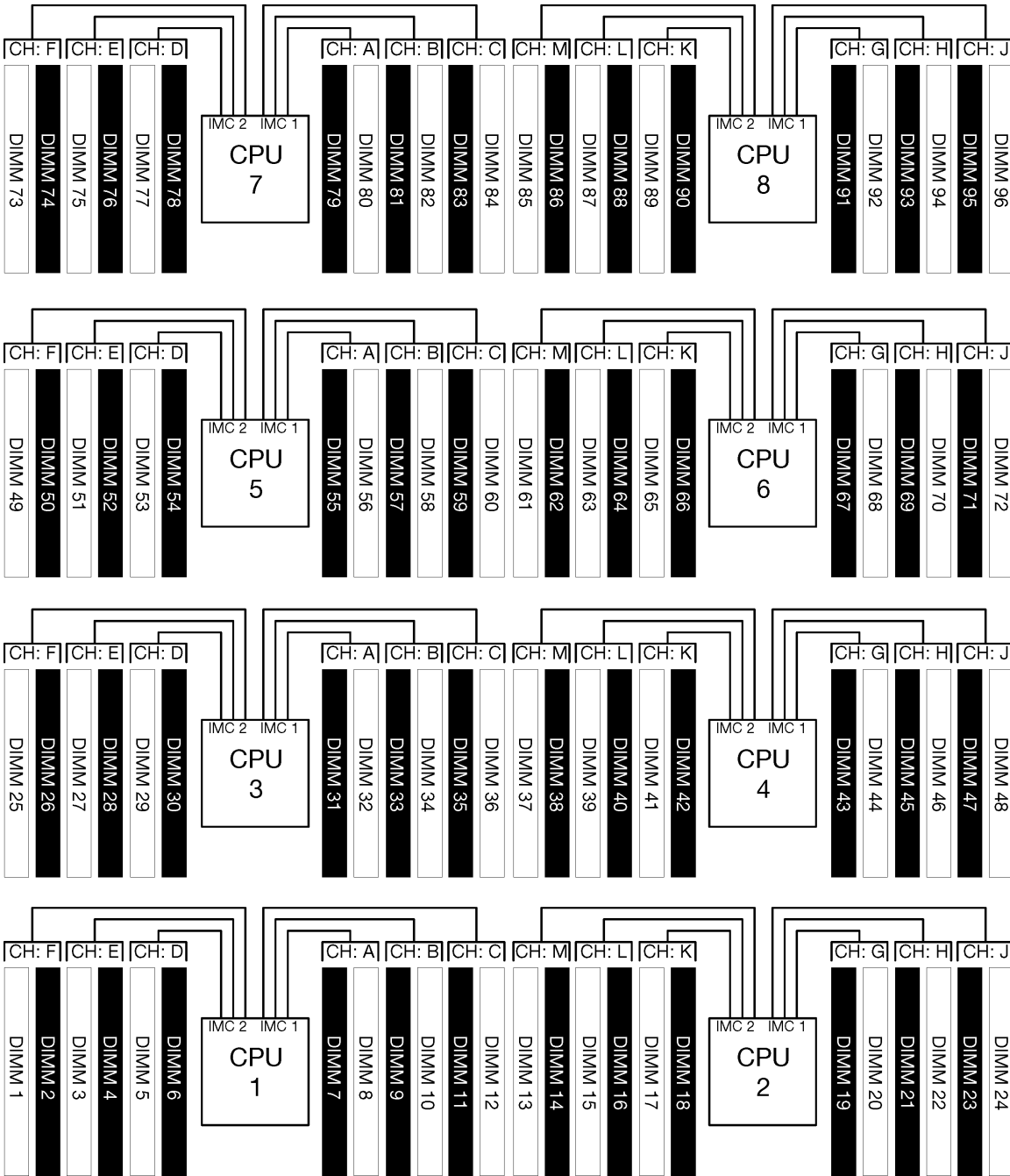


Figure 23. Memory architecture

Memory modules population requirements

Observe the following rules when populating memory modules for all memory modes.

Note: The following guidelines discuss the memory architecture related to system board processor 1. For system board processor 2, substitute memory channels G/H/J/K/L/M for processor 1 memory channels A/B/C/D/E/F in the discussion.

- Install memory modules following only the sequences shown in [“Memory module installation rules and order” on page 58](#).
- Do not mix R-DIMMs, LR-DIMMs, and 3DS DIMMs in a server.
- At least one DIMM is required for each processor. Install at least six DIMMs per processor for good performance.
- An “M” SKU processor is required for processors with more than six 128GB DIMMs installed.
- Within a memory controller:
 - Populate channel A/D first. Channel B/E will be either empty or must be identically populated as channel A/D. Channel C/F will be either empty or must be identically populated as channel B/E.

Note: Five DIMM configurations is a supported exception to these population rules. Five DIMMs are populated so channels 0 and 1 each have two DIMMs and channel 2 has one DIMM.

 - Populate the memory connector in each channel that is physically furthest from the processor (slot 0) first.
 - If a memory channel has two DIMMs installed and these DIMMs have different numbers of ranks, populate the DIMM with higher number of ranks in the memory connector that is physically furthest from the processor (slot 0).
 - If two DIMMs on a channel have identical ranks, populate the DIMM with higher capacity in the memory connector that is physically furthest from the processor (slot 0).

Populating memory modules for best system performance

To populate memory configurations for the best memory performance, observe the following general guidelines for all memory modes.

Note: The following guidelines discuss the memory architecture related to system board processor 1. For system board processor 2, substitute memory channels G/H/J/K/L/M for processor 1 memory channels A/B/C/D/E/F in the discussion.

- When multiple processors are installed, all processors within the server must have identical memory population.
- Populate all memory channels for optimal performance.
- If a processor has only three DIMMs that are identical (same Lenovo part number), populate all of them in memory controller 1 (IMC1).

Additional requirements for memory mirroring

The following rules apply for memory mirroring.

Note: The following guidelines discuss the memory architecture related to system board processor 1. For system board processor 2, substitute memory channels G/H/J/K/L/M for processor 1 memory channels A/B/C/D/E/F in the discussion.

- The server supports only two, three, four, or six DIMMs per memory controller (one or five DIMMs per memory controller is not supported).
- As with independent memory mode, equal DIMM sizes must be installed for the populated memory channels. DIMM slot population within a channel does not have to be identical; however, the same DIMM slot locations across channel A/B/C or channels D/E/F must be populated identically.
- If DIMMs are installed in only two memory channels, mirroring occurs across two DIMMs. Channels A/D and B/E hold the primary and secondary cache lines.
- If DIMMs are installed in all three memory channels, mirroring occurs across all three DIMM channels. Channels A/D and B/E, Channels B/E and C/F, and Channels C/F and A/D hold the primary and secondary cache lines.

- Do not mix 2-channel and 3-channel DDR mirroring in a memory controller.

Additional requirements for memory sparing

The following rules apply for memory sparing:

- As with independent memory mode, all memory channels must have at least two ranks.
- Every populated memory channel must have at least two ranks of DIMMs.
- If a memory channel has only single rank DIMMs, populate both single rank DIMMs on one channel.
- Single DIMM-per-channel systems do not support single-rank DIMMs in sparing mode.

DRAM DIMM installation order

This section contains information of how to install DRAM DIMMs properly.

Independent memory mode

Independent memory mode, the default memory configuration for your server, provides the highest level of memory performance, but lacks failover protection. The DIMM installation order for independent memory mode varies based on the number of processors and memory modules installed in the server.

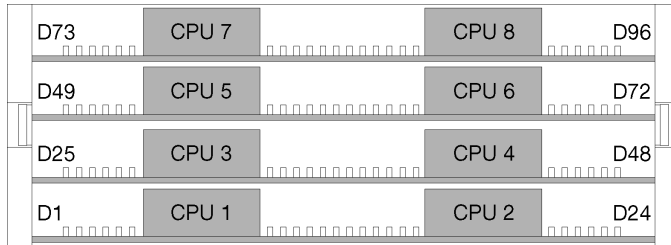


Figure 24. Processor and memory module layout

Independent memory mode guidelines:

- Individual memory channels can run at different DIMM timings, but all channels must run at the same interface frequency.
- Populate memory channel 0 first.
- Memory channel 1 is empty or identically populated as memory channel 0.
- Memory channel 2 is empty or identically populated as memory channel 1
- In each memory channel, populate slot 0 first.
- If a memory channel has two DIMMs installed, populate the DIMM with a higher number of ranks in slot 0.

The independent memory mode DIMM population sequences for each supported processor configuration are:

- [“Installation order: independent memory mode with two processors” on page 64](#)
- [“Installation order: independent memory mode with three processors” on page 65](#)
- [“Installation order: independent memory mode with four processors” on page 69](#)
- [“Installation order: independent memory mode with six processors” on page 73](#)
- [“Installation order: independent memory mode with eight processors” on page 83](#)

For information about configuring memory settings, including how to enable independent memory mode, see “Memory configuration” in the *ThinkSystem SR950 Setup Guide*.

Note: Independent memory mode is the default memory configuration of the ThinkSystem SR950 server.

Installation order: independent memory mode with two processors

Memory module installation order for independent (non-mirroring) memory mode with two processors installed in the server.

The following table shows the DIMM population sequence for independent memory mode when two processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.

Note: When adding one or more DIMMs during a memory upgrade, you might need to move other DIMMs that are already installed to new locations.

Table 44. Independent mode with two processors, 2 to 24 total DIMMs installed in server

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
2							8												20					2	
3					5		8												20					3	
4					5		8									17			20					4	
5					5		8		10							17			20					5	
6					5		8		10							17			20		22			6	
7			3		5		8		10							17			20		22			7	
8			3		5		8		10						15		17		20		22			8	
9			3		5		8		10		12				15		17		20		22			9	
10			3		5		8		10		12				15		17		20		22		24	10	
11	1		3		5		8		10		12				15		17		20		22		24	11	
12	1		3		5		8		10		12	13		15		17		20		22		24		12	
13	1		3		5		7	8	9	10			13		15		17		20		22		24	13	
14	1		3		5		7	8	9	10			13		15		17		19	20	21	22		14	
15			3	4	5	6	7	8	9	10			13		15		17		19	20	21	22		15	
16			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22		16	
17	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22		17	
18	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	18
19			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	19
20			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	20
21	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	21
22	1		3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	22
23	1	2	3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	23
24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	24

Installation order: independent memory mode with three processors

Memory module installation order for independent (non-mirroring) memory mode with three processors installed in the server.

The following tables show the DIMM population sequence for independent memory mode when three processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processor 3 is installed in the upper system board of the lower compute tray or in the upper compute tray.

Note: When adding one or more DIMMs during a memory upgrade, you might need to move other DIMMs that are already installed to new locations.

Table 45. Independent mode with three processors (Processors 1 and 2, 3 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
3							8												20					3	
4					5		8												20					4	
5					5		8									17			20					5	
6					5		8									17			20					6	
7					5		8		10							17			20					7	
8					5		8		10							17			20		22			8	
9					5		8		10							17			20		22			9	
10			3		5		8		10							17			20		22			10	
11			3		5		8		10						15	17			20		22			11	
12			3		5		8		10						15	17			20		22			12	
13			3		5		8		10		12				15	17			20		22			13	
14			3		5		8		10		12				15	17			20		22		24	14	
15			3		5		8		10		12				15	17			20		22		24	15	
16	1		3		5		8		10		12				15	17			20		22		24	16	
17	1		3		5		8		10		12		13		15	17			20		22		24	17	
18	1		3		5		8		10		12		13		15	17			20		22		24	18	
19	1		3		5		7	8	9	10			13		15	17			20		22		24	19	
20	1		3		5		7	8	9	10			13		15	17		19	20	21	22			20	
21	1		3		5		7	8	9	10			13		15	17		19	20	21	22			21	
22			3	4	5	6	7	8	9	10			13		15	17		19	20	21	22			22	
23			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			23
24			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			24

Related DIMM population sequences for three processor systems:

- Processor 1 and 2 DIMM population sequences for 25 to 36 DIMMs, see [Table 46 “Independent mode with three processors \(Processors 1 and 2, 25 to 36 total DIMMs installed in server\)”](#) on page 66.
- To continue populating processor 3 DIMMs for a system with 3 to 24 DIMMs, see [Table 47 “Independent mode with three processors \(Processor 3, 3 to 24 total DIMMs installed in server\)”](#) on page 67.

Table 46. Independent mode with three processors (Processors 1 and 2, 25 to 36 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			25
26	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	26
27	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	27
28			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	28
29			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	29
30			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	30
31	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	31
32	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	32
33	1		3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	33
34	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	34
35	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	35
36	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	36

Related DIMM population sequences for three processor systems:

- Processor 1 and 2 DIMM population sequences for 3 to 24 DIMMs, see [Table 45 “Independent mode with three processors \(Processors 1 and 2, 3 to 24 total DIMMs installed in server\)”](#) on page 65.
- To continue populating processor 3 DIMMs for a system with 25 to 36 DIMMs, see [Table 48 “Independent mode with three processors \(Processors 3, 25 to 36 total DIMMs installed in server\)”](#) on page 68.

Table 48. Independent mode with three processors (Processors 3, 25 to 36 total DIMMs installed in server)

Total DIMMs	Processor 3																								Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12													
25			3	4	5	6	7	8	9	10															25
26			3	4	5	6	7	8	9	10															26
27	1		3		5		7	8	9	10	11	12													27
28	1		3		5		7	8	9	10	11	12													28
29	1		3		5		7	8	9	10	11	12													29
30			3	4	5	6	7	8	9	10	11	12													30
31	1		3		5		7	8	9	10	11	12													31
32			3	4	5	6	7	8	9	10	11	12													32
33	1		3	4	5	6	7	8	9	10	11	12													33
34			3	4	5	6	7	8	9	10	11	12													34
35	1		3	4	5	6	7	8	9	10	11	12													35
36	1	2	3	4	5	6	7	8	9	10	11	12													36

Related DIMM population sequences for three processor systems:

- Processor 3 DIMM population sequences for 3 to 24 DIMMs, see [Table 47 “Independent mode with three processors \(Processor 3, 3 to 24 total DIMMs installed in server\)”](#) on page 67.
- To continue populating processor 1 and 2 DIMMs for a system with 25 to 36 DIMMs, see [Table 46 “Independent mode with three processors \(Processors 1 and 2, 25 to 36 total DIMMs installed in server\)”](#) on page 66.

Installation order: independent memory mode with four processors

Memory module installation order for independent (non-mirroring) memory mode with four processors installed in the server.

The following tables show the DIMM population sequence for independent memory mode when four processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray or in the upper compute tray.

Note: When adding one or more DIMMs during a memory upgrade, you might need to move other DIMMs that are already installed to new locations.

Table 49. Independent mode with four processors (Processors 1 and 2, 4 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
4							8												20					4	
5					5		8												20					5	
6					5		8									17			20					6	
7					5		8									17			20					7	
8					5		8									17			20					8	
9					5		8	10								17			20					9	
10					5		8	10								17			20		22			10	
11					5		8	10								17			20		22			11	
12					5		8	10								17			20		22			12	
13			3		5		8	10								17			20		22			13	
14			3		5		8	10							15	17			20		22			14	
15			3		5		8	10							15	17			20		22			15	
16			3		5		8	10							15	17			20		22			16	
17			3		5		8	10	12						15	17			20		22			17	
18			3		5		8	10	12						15	17			20		22		24	18	
19			3		5		8	10	12						15	17			20		22		24	19	
20			3		5		8	10	12						15	17			20		22		24	20	
21	1		3		5		8	10	12						15	17			20		22		24	21	
22	1		3		5		8	10	12	13					15	17			20		22		24	22	
23	1		3		5		8	10	12	13					15	17			20		22		24	23	
24	1		3		5		8	10	12	13					15	17			20		22		24	24	

Related DIMM population sequences for four processor systems:

- Processor 1 and 2 DIMM population sequences for 25 to 48 DIMMs, see [Table 50 “Independent mode with four processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)”](#) on page 70.
- To continue populating processor 3 and 4 DIMMs for a system with 4 to 24 DIMMs, see [Table 51 “Independent mode with four processors \(Processors 3 and 4, 4 to 24 total DIMMs installed in server\)”](#) on page 71.

Table 50. Independent mode with four processors (Processors 1 and 2, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25	1		3		5		7	8	9	10			13		15		17			20		22		24	25
26	1		3		5		7	8	9	10			13		15		17		19	20	21	22			26
27	1		3		5		7	8	9	10			13		15		17		19	20	21	22			27
28	1		3		5		7	8	9	10			13		15		17		19	20	21	22			28
29			3	4	5	6	7	8	9	10			13		15		17		19	20	21	22			29
30			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			30
31			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			31
32			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			32
33	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			33
34	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	34
35	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	35
36	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	36
37			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	37
38			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	38
39			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	39
40			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	40
41	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	41
42	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	42
43	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	43
44	1		3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	44
45	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	45
46	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	46
47	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	47
48	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	48

Related DIMM population sequences for four processor systems:

- Processor 1 and 2 DIMM population sequences for 4 to 24 DIMMs, see [Table 49 “Independent mode with four processors \(Processors 1 and 2, 4 to 24 total DIMMs installed in server\)”](#) on page 69.
- To continue populating processor 3 and 4 DIMMs for a system with 25 to 48 DIMMs, see [Table 52 “Independent mode with four processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)”](#) on page 72.

Table 51. Independent mode with four processors (Processors 3 and 4, 4 to 24 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
4							8												20					4	
5							8												20					5	
6							8												20					6	
7					5		8												20					7	
8					5		8									17			20					8	
9					5		8								17			20						9	
10					5		8								17			20						10	
11					5		8		10						17			20						11	
12					5		8		10						17			20			22			12	
13					5		8		10						17			20			22			13	
14					5		8		10						17			20			22			14	
15			3		5		8		10						17			20			22			15	
16			3		5		8		10					15	17			20			22			16	
17			3		5		8		10					15	17			20			22			17	
18			3		5		8		10					15	17			20			22			18	
19			3		5		8		10		12			15	17			20			22			19	
20			3		5		8		10		12			15	17			20			22		24	20	
21			3		5		8		10		12			15	17			20			22		24	21	
22			3		5		8		10		12			15	17			20			22		24	22	
23	1		3		5		8		10		12			15	17			20			22		24	23	
24	1		3		5		8		10		12	13		15	17			20			22		24	24	

Related DIMM population sequences for four processor systems:

- Processor 3 and 4 DIMM population sequences for systems with 25 to 48 DIMMs, see [Table 52](#) “Independent mode with four processors (Processors 3 and 4, 25 to 48 total DIMMs installed in server)” on page 72.
- To continue populating processor 1 and 2 DIMMs for a system with 4 to 24 DIMMs, see [Table 49](#) “Independent mode with four processors (Processors 1 and 2, 4 to 24 total DIMMs installed in server)” on page 69.

Table 52. Independent mode with four processors (Processors 3 and 4, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25	1		3		5			8		10		12	13		15		17			20		22		24	25
26	1		3		5			8		10		12	13		15		17			20		22		24	26
27	1		3		5		7	8	9	10			13		15		17			20		22		24	27
28	1		3		5		7	8	9	10			13		15		17		19	20	21	22			28
29	1		3		5		7	8	9	10			13		15		17		19	20	21	22			29
30	1		3		5		7	8	9	10			13		15		17		19	20	21	22			30
31			3	4	5	6	7	8	9	10			13		15		17		19	20	21	22			31
32			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			32
33			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			33
34			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			34
35	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			35
36	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	36
37	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	37
38	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	38
39			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	39
40			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	40
41			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	41
42	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	42
43			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	43
44	1		3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	44
45	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	45
46	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	46
47	1	2	3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	47
48	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	48

Related DIMM population sequences for four processor systems:

- Processor 3 and 4 DIMM population sequences for 4 to 24 DIMMs, see [Table 51 “Independent mode with four processors \(Processors 3 and 4, 4 to 24 total DIMMs installed in server\)”](#) on page 71.
- To continue populating processor 1 and 2 DIMMs for a system with 25 to 48 DIMMs, see [Table 50 “Independent mode with four processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)”](#) on page 70.

Installation order: independent memory mode with six processors

Memory module installation order for independent (non-mirroring) memory mode with six processors installed in the server.

The following tables show the DIMM population sequence for independent memory mode when six processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processors 5 and 6 are installed in the lower system board of the upper compute tray.

Note: When adding one or more DIMMs during a memory upgrade, you might need to move other DIMMs that are already installed to new locations.

Table 53. Independent mode with six processors (Processors 1 and 2, 6 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
6							8												20					6	
7					5		8												20					7	
8					5		8									17			20					8	
9					5		8									17			20					9	
10					5		8									17			20					10	
11					5		8									17			20					11	
12					5		8	10								17			20					12	
13					5		8	10								17			20		22			13	
14					5		8	10								17			20		22			14	
15					5		8	10								17			20		22			15	
16					5		8	10								17			20		22			16	
17					5		8	10								17			20		22			17	
18			3		5		8	10								17			20		22			18	
19			3		5		8	10							15	17			20		22			19	
20			3		5		8	10							15	17			20		22			20	
21			3		5		8	10							15	17			20		22			21	
22			3		5		8	10							15	17			20		22			22	
23			3		5		8	10							15	17			20		22			23	
24			3		5		8	10							15	17			20		22			24	

Related DIMM population sequences for six processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 53 “Independent mode with six processors \(Processors 1 and 2, 6 to 24 total DIMMs installed in server\)” on page 73](#)
 - [Table 54 “Independent mode with six processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 75](#)
 - [Table 55 “Independent mode with six processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 76](#)
- To continue populating DIMMs for a system with 6 to 24 DIMMs:

- Table 56 “Independent mode with six processors (Processors 3 and 4, 6 to 24 total DIMMs installed in server)” on page 77
- Table 59 “Independent mode with six processors (Processors 5 and 6, 6 to 24 total DIMMs installed in server)” on page 80

Table 54. Independent mode with six processors (Processors 1 and 2, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25			3		5			8		10		12			15		17			20		22			25
26			3		5			8		10		12			15		17			20		22		24	26
27			3		5			8		10		12			15		17			20		22		24	27
28			3		5			8		10		12			15		17			20		22		24	28
29			3		5			8		10		12			15		17			20		22		24	29
30			3		5			8		10		12			15		17			20		22		24	30
31	1		3		5			8		10		12			15		17			20		22		24	31
32	1		3		5			8		10		12	13		15		17			20		22		24	32
33	1		3		5			8		10		12	13		15		17			20		22		24	33
34	1		3		5			8		10		12	13		15		17			20		22		24	34
35	1		3		5			8		10		12	13		15		17			20		22		24	35
36	1		3		5			8		10		12	13		15		17			20		22		24	36
37	1		3		5		7	8	9	10			13		15		17			20		22		24	37
38	1		3		5		7	8	9	10			13		15		17		19	20	21	22			38
39	1		3		5		7	8	9	10			13		15		17		19	20	21	22			39
40	1		3		5		7	8	9	10			13		15		17		19	20	21	22			40
41	1		3		5		7	8	9	10			13		15		17		19	20	21	22			41
42	1		3		5		7	8	9	10			13		15		17		19	20	21	22			42
43			3	4	5	6	7	8	9	10			13		15		17		19	20	21	22			43
44			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			44
45			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			45
46			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			46
47			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			47
48			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			48

Related DIMM population sequences for six processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 53 “Independent mode with six processors \(Processors 1 and 2, 6 to 24 total DIMMs installed in server\)” on page 73](#)
 - [Table 54 “Independent mode with six processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 75](#)
 - [Table 55 “Independent mode with six processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 76](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 57 “Independent mode with six processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 78](#)
 - [Table 60 “Independent mode with six processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 81](#)

Table 55. Independent mode with six processors (Processors 1 and 2, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			49
50	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	50
51	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	51
52	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	52
53	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	53
54	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	54
55			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	55
56			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	56
57			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	57
58			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	58
59			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	59
60			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	60
61	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	61
62	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	62
63	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	63
64	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	64
65	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	65
66	1		3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	66
67	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	67
68	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	68
69	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	69
70	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	70
71	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	71
72	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	72

Related DIMM population sequences for six processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 53 “Independent mode with six processors \(Processors 1 and 2, 6 to 24 total DIMMs installed in server\)” on page 73](#)
 - [Table 54 “Independent mode with six processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 75](#)
 - [Table 55 “Independent mode with six processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 76](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 58 “Independent mode with six processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 79](#)
 - [Table 61 “Independent mode with six processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 82](#)

Table 56. Independent mode with six processors (Processors 3 and 4, 6 to 24 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
6							8												20					6	
7							8												20					7	
8							8												20					8	
9					5		8												20					9	
10					5		8									17			20					10	
11					5		8									17			20					11	
12					5		8									17			20					12	
13					5		8									17			20					13	
14					5		8		10							17			20					14	
15					5		8		10							17			20		22			15	
16					5		8		10							17			20		22			16	
17					5		8		10							17			20		22			17	
18					5		8		10							17			20		22			18	
19					5		8		10							17			20		22			19	
20					5		8		10							17			20		22			20	
21			3		5		8		10							17			20		22			21	
22			3		5		8		10							15			17		20		22	22	
23			3		5		8		10							15			17		20		22	23	
24			3		5		8		10							15			17		20		22	24	

Related DIMM population sequences for six processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 56 “Independent mode with six processors \(Processors 3 and 4, 6 to 24 total DIMMs installed in server\)” on page 77](#)
 - [Table 57 “Independent mode with six processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 78](#)
 - [Table 58 “Independent mode with six processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 79](#)
- To continue populating DIMMs for a system with 6 to 24 DIMMs:
 - [Table 53 “Independent mode with six processors \(Processors 1 and 2, 6 to 24 total DIMMs installed in server\)” on page 73](#)
 - [Table 59 “Independent mode with six processors \(Processors 5 and 6, 6 to 24 total DIMMs installed in server\)” on page 80](#)

Table 57. Independent mode with six processors (Processors 3 and 4, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25			3		5			8		10					15		17			20		22			25
26			3		5			8		10					15		17			20		22			26
27			3		5			8		10		12			15		17			20		22			27
28			3		5			8		10		12			15		17			20		22		24	28
29			3		5			8		10		12			15		17			20		22		24	29
30			3		5			8		10		12			15		17			20		22		24	30
31			3		5			8		10		12			15		17			20		22		24	31
32			3		5			8		10		12			15		17			20		22		24	32
33	1		3		5			8		10		12			15		17			20		22		24	33
34	1		3		5			8		10		12	13		15		17			20		22		24	34
35	1		3		5			8		10		12	13		15		17			20		22		24	35
36	1		3		5			8		10		12	13		15		17			20		22		24	36
37	1		3		5			8		10		12	13		15		17			20		22		24	37
38	1		3		5			8		10		12	13		15		17			20		22		24	38
39	1		3		5		7	8	9	10			13		15		17			20		22		24	39
40	1		3		5		7	8	9	10			13		15		17		19	20	21	22			40
41	1		3		5		7	8	9	10			13		15		17		19	20	21	22			41
42	1		3		5		7	8	9	10			13		15		17		19	20	21	22			42
43	1		3		5		7	8	9	10			13		15		17		19	20	21	22			43
44	1		3		5		7	8	9	10			13		15		17		19	20	21	22			44
45			3	4	5	6	7	8	9	10			13		15		17		19	20	21	22			45
46			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			46
47			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			47
48			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			48

Related DIMM population sequences for six processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 56 “Independent mode with six processors \(Processors 3 and 4, 6 to 24 total DIMMs installed in server\)” on page 77](#)
 - [Table 57 “Independent mode with six processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 78](#)
 - [Table 58 “Independent mode with six processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 79](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 54 “Independent mode with six processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 75](#)
 - [Table 60 “Independent mode with six processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 81](#)

Table 58. Independent mode with six processors (Processors 3 and 4, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			49
50			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			50
51	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			51
52	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	52
53	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	53
54	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	54
55	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	55
56	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	56
57			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	57
58			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	58
59			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	59
60			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	60
61			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	61
62			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	62
63			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	63
64			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	64
65	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	65
66	1		3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	66
67	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	67
68	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	68
69	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	69
70	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	70
71	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	71
72	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	72

Related DIMM population sequences for six processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 56 “Independent mode with six processors \(Processors 3 and 4, 6 to 24 total DIMMs installed in server\)” on page 77](#)
 - [Table 57 “Independent mode with six processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 78](#)
 - [Table 58 “Independent mode with six processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 79](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 55 “Independent mode with six processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 76](#)
 - [Table 61 “Independent mode with six processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 82](#)

Table 59. Independent mode with six processors (Processors 5 and 6, 6 to 24 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
6							8												20					6	
7							8												20					7	
8							8												20					8	
9							8												20					9	
10							8												20					10	
11					5		8												20					11	
12					5		8									17			20					12	
13					5		8									17			20					13	
14					5		8									17			20					14	
15					5		8									17			20					15	
16					5		8	10								17			20					16	
17					5		8	10								17			20		22			17	
18					5		8	10								17			20		22			18	
19					5		8	10								17			20		22			19	
20					5		8	10								17			20		22			20	
21					5		8	10								17			20		22			21	
22					5		8	10								17			20		22			22	
23			3		5		8	10								17			20		22			23	
24			3		5		8	10								15			17		20		22	24	

Related DIMM population sequences for six processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 60 “Independent mode with six processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 81](#)
 - [Table 61 “Independent mode with six processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 82](#)
- To continue populating DIMMs for a system with 6 to 24 DIMMs:
 - [Table 53 “Independent mode with six processors \(Processors 1 and 2, 6 to 24 total DIMMs installed in server\)” on page 73](#)
 - [Table 56 “Independent mode with six processors \(Processors 3 and 4, 6 to 24 total DIMMs installed in server\)” on page 77](#)

Table 60. Independent mode with six processors (Processors 5 and 6, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25			3		5			8		10					15		17			20		22			25
26			3		5			8		10					15		17			20		22			26
27			3		5			8		10					15		17			20		22			27
28			3		5			8		10					15		17			20		22			28
29			3		5			8		10		12			15		17			20		22			29
30			3		5			8		10		12			15		17			20		22		24	30
31			3		5			8		10		12			15		17			20		22		24	31
32			3		5			8		10		12			15		17			20		22		24	32
33			3		5			8		10		12			15		17			20		22		24	33
34			3		5			8		10		12			15		17			20		22		24	34
35	1		3		5			8		10		12			15		17			20		22		24	35
36	1		3		5			8		10		12	13		15		17			20		22		24	36
37	1		3		5			8		10		12	13		15		17			20		22		24	37
38	1		3		5			8		10		12	13		15		17			20		22		24	38
39	1		3		5			8		10		12	13		15		17			20		22		24	39
40	1		3		5			8		10		12	13		15		17			20		22		24	40
41	1		3		5		7	8	9	10			13		15		17			20		22		24	41
42	1		3		5		7	8	9	10			13		15		17		19	20	21	22			42
43	1		3		5		7	8	9	10			13		15		17		19	20	21	22			43
44	1		3		5		7	8	9	10			13		15		17		19	20	21	22			44
45	1		3		5		7	8	9	10			13		15		17		19	20	21	22			45
46	1		3		5		7	8	9	10			13		15		17		19	20	21	22			46
47			3	4	5	6	7	8	9	10			13		15		17		19	20	21	22			47
48			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			48

Related DIMM population sequences for six processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 59 “Independent mode with six processors \(Processors 5 and 6, 6 to 24 total DIMMs installed in server\)” on page 80](#)
 - [Table 61 “Independent mode with six processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 82](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 54 “Independent mode with six processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 75](#)
 - [Table 57 “Independent mode with six processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 78](#)

Table 61. Independent mode with six processors (Processors 5 and 6, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			49
50			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			50
51			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			51
52			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			52
53	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			53
54	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	54
55	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	55
56	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	56
57	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	57
58	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	58
59			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	59
60			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	60
61			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	61
62			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	62
63			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	63
64			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	64
65			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	65
66	1		3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	66
67			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	67
68			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	68
69	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	69
70	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	70
71	1	2	3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	71
72	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	72

Related DIMM population sequences for six processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 59 “Independent mode with six processors \(Processors 5 and 6, 6 to 24 total DIMMs installed in server\)” on page 80](#)
 - [Table 60 “Independent mode with six processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 81](#)
 - [Table 61 “Independent mode with six processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 82](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 55 “Independent mode with six processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 76](#)
 - [Table 58 “Independent mode with six processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 79](#)

Installation order: independent memory mode with eight processors

Memory module installation order for independent (non-mirroring) memory mode with eight processors installed in the server.

The following tables show the DIMM population sequence for independent memory mode when eight processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processors 5 and 6 are installed in the lower system board of the upper compute tray.
- Processors 7 and 8 are installed in the upper system board of the upper compute tray.

Note: When adding one or more DIMMs during a memory upgrade, you might need to move other DIMMs that are already installed to new locations.

Table 62. Independent mode with eight processors (Processors 1 and 2, 8 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
8							8												20					8	
9					5		8												20					9	
10					5		8									17			20					10	
11					5		8									17			20					11	
12					5		8									17			20					12	
13					5		8									17			20					13	
14					5		8									17			20					14	
15					5		8									17			20					15	
16					5		8									17			20					16	
17					5		8		10							17			20					17	
18					5		8		10							17			20		22			18	
19					5		8		10							17			20		22			19	
20					5		8		10							17			20		22			20	
21					5		8		10							17			20		22			21	
22					5		8		10							17			20		22			22	
23					5		8		10							17			20		22			23	
24					5		8		10							17			20		22			24	

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 63 “Independent mode with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 85](#)
 - [Table 64 “Independent mode with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 86](#)
 - [Table 65 “Independent mode with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 87](#)
- To continue populating DIMMs for a system with 8 to 24 DIMMs:
 - [Table 66 “Independent mode with eight processors \(Processors 3 and 4, 8 to 24 total DIMMs installed in server\)” on page 88](#)

- Table 70 “Independent mode with eight processors (Processors 5 and 6, 8 to 24 total DIMMs installed in server)” on page 92
- Table 74 “Independent mode with eight processors (Processors 7 and 8, 8 to 24 total DIMMs installed in server)” on page 96

Table 63. Independent mode with eight processors (Processors 1 and 2, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25			3		5			8		10							17			20		22			25
26			3		5			8		10					15		17			20		22			26
27			3		5			8		10					15		17			20		22			27
28			3		5			8		10					15		17			20		22			28
29			3		5			8		10					15		17			20		22			29
30			3		5			8		10					15		17			20		22			30
31			3		5			8		10					15		17			20		22			31
32			3		5			8		10					15		17			20		22			32
33			3		5			8		10		12			15		17			20		22			33
34			3		5			8		10		12			15		17			20		22		24	34
35			3		5			8		10		12			15		17			20		22		24	35
36			3		5			8		10		12			15		17			20		22		24	36
37			3		5			8		10		12			15		17			20		22		24	37
38			3		5			8		10		12			15		17			20		22		24	38
39			3		5			8		10		12			15		17			20		22		24	39
40			3		5			8		10		12			15		17			20		22		24	40
41	1		3		5			8		10		12			15		17			20		22		24	41
42	1		3		5			8		10		12	13		15		17			20		22		24	42
43	1		3		5			8		10		12	13		15		17			20		22		24	43
44	1		3		5			8		10		12	13		15		17			20		22		24	44
45	1		3		5			8		10		12	13		15		17			20		22		24	45
46	1		3		5			8		10		12	13		15		17			20		22		24	46
47	1		3		5			8		10		12	13		15		17			20		22		24	47
48	1		3		5			8		10		12	13		15		17			20		22		24	48

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 62 “Independent mode with eight processors \(Processors 1 and 2, 8 to 24 total DIMMs installed in server\)” on page 83](#)
 - [Table 64 “Independent mode with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 86](#)
 - [Table 65 “Independent mode with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 87](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 67 “Independent mode with eight processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 89](#)
 - [Table 71 “Independent mode with eight processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 93](#)
 - [Table 75 “Independent mode with eight processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 97](#)

Table 64. Independent mode with eight processors (Processors 1 and 2, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49	1		3		5		7	8	9	10			13		15		17			20		22		24	49
50	1		3		5		7	8	9	10			13		15		17		19	20	21	22			50
51	1		3		5		7	8	9	10			13		15		17		19	20	21	22			51
52	1		3		5		7	8	9	10			13		15		17		19	20	21	22			52
53	1		3		5		7	8	9	10			13		15		17		19	20	21	22			53
54	1		3		5		7	8	9	10			13		15		17		19	20	21	22			54
55	1		3		5		7	8	9	10			13		15		17		19	20	21	22			55
56	1		3		5		7	8	9	10			13		15		17		19	20	21	22			56
57			3	4	5	6	7	8	9	10			13		15		17		19	20	21	22			57
58			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			58
59			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			59
60			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			60
61			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			61
62			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			62
63			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			63
64			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			64
65	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			65
66	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	66
67	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	67
68	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	68
69	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	69
70	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	70
71	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	71
72	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	72

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 62 “Independent mode with eight processors \(Processors 1 and 2, 8 to 24 total DIMMs installed in server\)” on page 83](#)
 - [Table 63 “Independent mode with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 85](#)
 - [Table 65 “Independent mode with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 87](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 68 “Independent mode with eight processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 90](#)
 - [Table 72 “Independent mode with eight processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 94](#)
 - [Table 76 “Independent mode with eight processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 98](#)

Table 65. Independent mode with eight processors (Processors 1 and 2, 73 to 96 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
73			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	73
74			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	74
75			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	75
76			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	76
77			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	77
78			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	78
79			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	79
80			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	80
81	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	81
82	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	82
83	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	83
84	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	84
85	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	85
86	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	86
87	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	87
88	1		3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	88
89	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	89
90	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	90
91	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	91
92	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	92
93	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	93
94	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	94
95	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	95
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 62 “Independent mode with eight processors \(Processors 1 and 2, 8 to 24 total DIMMs installed in server\)” on page 83](#)
 - [Table 63 “Independent mode with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 85](#)
 - [Table 64 “Independent mode with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 86](#)
- To continue populating DIMMs for a system with 73 to 96 DIMMs:
 - [Table 69 “Independent mode with eight processors \(Processors 3 and 4, 73 to 96 total DIMMs installed in server\)” on page 91](#)
 - [Table 73 “Independent mode with eight processors \(Processors 5 and 6, 73 to 96 total DIMMs installed in server\)” on page 95](#)
 - [Table 77 “Independent mode with eight processors \(Processors 7 and 8, 73 to 96 total DIMMs installed in server\)” on page 99](#)

Table 66. Independent mode with eight processors (Processors 3 and 4, 8 to 24 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
8							8												20					8	
9							8												20					9	
10							8												20					10	
11					5		8												20					11	
12					5		8									17			20					12	
13					5		8									17			20					13	
14					5		8									17			20					14	
15					5		8									17			20					15	
16					5		8									17			20					16	
17					5		8									17			20					17	
18					5		8									17			20					18	
19					5		8		10							17			20					19	
20					5		8		10							17			20		22			20	
21					5		8		10							17			20		22			21	
22					5		8		10							17			20		22			22	
23					5		8		10							17			20		22			23	
24					5		8		10							17			20		22			24	

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 67 “Independent mode with eight processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 89](#)
 - [Table 68 “Independent mode with eight processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 90](#)
 - [Table 69 “Independent mode with eight processors \(Processors 3 and 4, 73 to 96 total DIMMs installed in server\)” on page 91](#)
- To continue populating DIMMs for a system with 8 to 24 DIMMs:
 - [Table 62 “Independent mode with eight processors \(Processors 1 and 2, 8 to 24 total DIMMs installed in server\)” on page 83](#)
 - [Table 70 “Independent mode with eight processors \(Processors 5 and 6, 8 to 24 total DIMMs installed in server\)” on page 92](#)
 - [Table 74 “Independent mode with eight processors \(Processors 7 and 8, 8 to 24 total DIMMs installed in server\)” on page 96](#)

Table 67. Independent mode with eight processors (Processors 3 and 4, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25					5			8		10							17			20		22			25
26					5			8		10							17			20		22			26
27			3		5			8		10							17			20		22			27
28			3		5			8		10					15		17			20		22			28
29			3		5			8		10					15		17			20		22			29
30			3		5			8		10					15		17			20		22			30
31			3		5			8		10					15		17			20		22			31
32			3		5			8		10					15		17			20		22			32
33			3		5			8		10					15		17			20		22			33
34			3		5			8		10					15		17			20		22			34
35			3		5			8		10		12			15		17			20		22			35
36			3		5			8		10		12			15		17			20		22		24	36
37			3		5			8		10		12			15		17			20		22		24	37
38			3		5			8		10		12			15		17			20		22		24	38
39			3		5			8		10		12			15		17			20		22		24	39
40			3		5			8		10		12			15		17			20		22		24	40
41			3		5			8		10		12			15		17			20		22		24	41
42			3		5			8		10		12			15		17			20		22		24	42
43	1		3		5			8		10		12			15		17			20		22		24	43
44	1		3		5			8		10		12	13		15		17			20		22		24	44
45	1		3		5			8		10		12	13		15		17			20		22		24	45
46	1		3		5			8		10		12	13		15		17			20		22		24	46
47	1		3		5			8		10		12	13		15		17			20		22		24	47
48	1		3		5			8		10		12	13		15		17			20		22		24	48

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 66 “Independent mode with eight processors \(Processors 3 and 4, 8 to 24 total DIMMs installed in server\)” on page 88](#)
 - [Table 68 “Independent mode with eight processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 90](#)
 - [Table 69 “Independent mode with eight processors \(Processors 3 and 4, 73 to 96 total DIMMs installed in server\)” on page 91](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 63 “Independent mode with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 85](#)
 - [Table 71 “Independent mode with eight processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 93](#)
 - [Table 75 “Independent mode with eight processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 97](#)

Table 68. Independent mode with eight processors (Processors 3 and 4, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49	1		3		5			8		10		12	13		15		17			20		22		24	49
50	1		3		5			8		10		12	13		15		17			20		22		24	50
51	1		3		5		7	8	9	10			13		15		17			20		22		24	51
52	1		3		5		7	8	9	10			13		15		17		19	20	21	22			52
53	1		3		5		7	8	9	10			13		15		17		19	20	21	22			53
54	1		3		5		7	8	9	10			13		15		17		19	20	21	22			54
55	1		3		5		7	8	9	10			13		15		17		19	20	21	22			55
56	1		3		5		7	8	9	10			13		15		17		19	20	21	22			56
57	1		3		5		7	8	9	10			13		15		17		19	20	21	22			57
58	1		3		5		7	8	9	10			13		15		17		19	20	21	22			58
59			3	4	5	6	7	8	9	10			13		15		17		19	20	21	22			59
60			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			60
61			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			61
62			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			62
63			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			63
64			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			64
65			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			65
66			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			66
67	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			67
68	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	68
69	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	69
70	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	70
71	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	71
72	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	72

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 66 “Independent mode with eight processors \(Processors 3 and 4, 8 to 24 total DIMMs installed in server\)” on page 88](#)
 - [Table 67 “Independent mode with eight processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 89](#)
 - [Table 69 “Independent mode with eight processors \(Processors 3 and 4, 73 to 96 total DIMMs installed in server\)” on page 91](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 64 “Independent mode with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 86](#)
 - [Table 72 “Independent mode with eight processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 94](#)
 - [Table 76 “Independent mode with eight processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 98](#)

Table 69. Independent mode with eight processors (Processors 3 and 4, 73 to 96 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
73	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	73
74	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	74
75			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	75
76			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	76
77			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	77
78			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	78
79			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	79
80			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	80
81			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	81
82			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	82
83			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	83
84			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	84
85	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	85
86	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	86
87	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	87
88	1		3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	88
89	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	89
90	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	90
91	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	91
92	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	92
93	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	93
94	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	94
95	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	95
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 66 “Independent mode with eight processors \(Processors 3 and 4, 8 to 24 total DIMMs installed in server\)” on page 88](#)
 - [Table 67 “Independent mode with eight processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 89](#)
 - [Table 68 “Independent mode with eight processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 90](#)
- To continue populating DIMMs for a system with 73 to 96 DIMMs:
 - [Table 65 “Independent mode with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 87](#)
 - [Table 73 “Independent mode with eight processors \(Processors 5 and 6, 73 to 96 total DIMMs installed in server\)” on page 95](#)
 - [Table 77 “Independent mode with eight processors \(Processors 7 and 8, 73 to 96 total DIMMs installed in server\)” on page 99](#)

Table 70. Independent mode with eight processors (Processors 5 and 6, 8 to 24 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
8							8												20					8	
9							8												20					9	
10							8												20					10	
11							8												20					11	
12							8												20					12	
13					5		8												20					13	
14					5		8								17				20					14	
15					5		8								17				20					15	
16					5		8								17				20					16	
17					5		8								17				20					17	
18					5		8								17				20					18	
19					5		8								17				20					19	
20					5		8								17				20					20	
21					5		8		10						17				20					21	
22					5		8		10						17				20		22			22	
23					5		8		10						17				20		22			23	
24					5		8		10						17				20		22			24	

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 71 “Independent mode with eight processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 93](#)
 - [Table 72 “Independent mode with eight processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 94](#)
 - [Table 73 “Independent mode with eight processors \(Processors 5 and 6, 73 to 96 total DIMMs installed in server\)” on page 95](#)
- To continue populating DIMMs for a system with 8 to 24 DIMMs:
 - [Table 62 “Independent mode with eight processors \(Processors 1 and 2, 8 to 24 total DIMMs installed in server\)” on page 83](#)
 - [Table 66 “Independent mode with eight processors \(Processors 3 and 4, 8 to 24 total DIMMs installed in server\)” on page 88](#)
 - [Table 74 “Independent mode with eight processors \(Processors 7 and 8, 8 to 24 total DIMMs installed in server\)” on page 96](#)

Table 71. Independent mode with eight processors (Processors 5 and 6, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25					5			8		10							17			20		22			25
26					5			8		10							17			20		22			26
27					5			8		10							17			20		22			27
28					5			8		10							17			20		22			28
29			3		5			8		10							17			20		22			29
30			3		5			8		10					15		17			20		22			30
31			3		5			8		10					15		17			20		22			31
32			3		5			8		10					15		17			20		22			32
33			3		5			8		10					15		17			20		22			33
34			3		5			8		10					15		17			20		22			34
35			3		5			8		10					15		17			20		22			35
36			3		5			8		10					15		17			20		22			36
37			3		5			8		10		12			15		17			20		22			37
38			3		5			8		10		12			15		17			20		22		24	38
39			3		5			8		10		12			15		17			20		22		24	39
40			3		5			8		10		12			15		17			20		22		24	40
41			3		5			8		10		12			15		17			20		22		24	41
42			3		5			8		10		12			15		17			20		22		24	42
43			3		5			8		10		12			15		17			20		22		24	43
44			3		5			8		10		12			15		17			20		22		24	44
45	1		3		5			8		10		12			15		17			20		22		24	45
46	1		3		5			8		10		12	13		15		17			20		22		24	46
47	1		3		5			8		10		12	13		15		17			20		22		24	47
48	1		3		5			8		10		12	13		15		17			20		22		24	48

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 70 “Independent mode with eight processors \(Processors 5 and 6, 8 to 24 total DIMMs installed in server\)” on page 92](#)
 - [Table 72 “Independent mode with eight processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 94](#)
 - [Table 73 “Independent mode with eight processors \(Processors 5 and 6, 73 to 96 total DIMMs installed in server\)” on page 95](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 63 “Independent mode with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 85](#)
 - [Table 67 “Independent mode with eight processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 89](#)
 - [Table 75 “Independent mode with eight processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 97](#)

Table 72. Independent mode with eight processors (Processors 5 and 6, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49	1		3		5			8		10		12	13		15		17			20		22		24	49
50	1		3		5			8		10		12	13		15		17			20		22		24	50
51	1		3		5			8		10		12	13		15		17			20		22		24	51
52	1		3		5			8		10		12	13		15		17			20		22		24	52
53	1		3		5		7	8	9	10			13		15		17			20		22		24	53
54	1		3		5		7	8	9	10			13		15		17		19	20	21	22			54
55	1		3		5		7	8	9	10			13		15		17		19	20	21	22			55
56	1		3		5		7	8	9	10			13		15		17		19	20	21	22			56
57	1		3		5		7	8	9	10			13		15		17		19	20	21	22			57
58	1		3		5		7	8	9	10			13		15		17		19	20	21	22			58
59	1		3		5		7	8	9	10			13		15		17		19	20	21	22			59
60	1		3		5		7	8	9	10			13		15		17		19	20	21	22			60
61			3	4	5	6	7	8	9	10			13		15		17		19	20	21	22			61
62			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			62
63			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			63
64			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			64
65			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			65
66			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			66
67			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			67
68			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			68
69	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			69
70	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	70
71	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	71
72	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	72

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 70 “Independent mode with eight processors \(Processors 5 and 6, 8 to 24 total DIMMs installed in server\)” on page 92](#)
 - [Table 71 “Independent mode with eight processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 93](#)
 - [Table 73 “Independent mode with eight processors \(Processors 5 and 6, 73 to 96 total DIMMs installed in server\)” on page 95](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 64 “Independent mode with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 86](#)
 - [Table 68 “Independent mode with eight processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 90](#)
 - [Table 76 “Independent mode with eight processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 98](#)

Table 73. Independent mode with eight processors (Processors 5 and 6, 73 to 96 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
73	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	73
74	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	74
75	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	75
76	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	76
77			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	77
78			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	78
79			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	79
80			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	80
81			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	81
82			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	82
83			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	83
84			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	84
85			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	85
86			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	86
87			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	87
88	1		3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	88
89	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	89
90	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	90
91	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	91
92	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	92
93	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	93
94	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	94
95	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	95
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 70 “Independent mode with eight processors \(Processors 5 and 6, 8 to 24 total DIMMs installed in server\)” on page 92](#)
 - [Table 71 “Independent mode with eight processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 93](#)
 - [Table 72 “Independent mode with eight processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 94](#)
- To continue populating DIMMs for a system with 73 to 96 DIMMs:
 - [Table 65 “Independent mode with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 87](#)
 - [Table 69 “Independent mode with eight processors \(Processors 3 and 4, 73 to 96 total DIMMs installed in server\)” on page 91](#)
 - [Table 77 “Independent mode with eight processors \(Processors 7 and 8, 73 to 96 total DIMMs installed in server\)” on page 99](#)

Table 74. Independent mode with eight processors (Processors 7 and 8, 8 to 24 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
8							8												20					8	
9							8												20					9	
10							8												20					10	
11							8												20					11	
12							8												20					12	
13							8												20					13	
14							8												20					14	
15					5		8												20					15	
16					5		8									17			20					16	
17					5		8									17			20					17	
18					5		8									17			20					18	
19					5		8									17			20					19	
20					5		8									17			20					20	
21					5		8									17			20					21	
22					5		8									17			20					22	
23					5		8		10							17			20					23	
24					5		8		10							17			20		22			24	

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 75 “Independent mode with eight processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 97](#)
 - [Table 76 “Independent mode with eight processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 98](#)
 - [Table 77 “Independent mode with eight processors \(Processors 7 and 8, 73 to 96 total DIMMs installed in server\)” on page 99](#)
- To continue populating DIMMs for a system with 8 to 24 DIMMs:
 - [Table 62 “Independent mode with eight processors \(Processors 1 and 2, 8 to 24 total DIMMs installed in server\)” on page 83](#)
 - [Table 66 “Independent mode with eight processors \(Processors 3 and 4, 8 to 24 total DIMMs installed in server\)” on page 88](#)
 - [Table 70 “Independent mode with eight processors \(Processors 5 and 6, 8 to 24 total DIMMs installed in server\)” on page 92](#)

Table 75. Independent mode with eight processors (Processors 7 and 8, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25					5			8		10							17			20		22			25
26					5			8		10							17			20		22			26
27					5			8		10							17			20		22			27
28					5			8		10							17			20		22			28
29					5			8		10							17			20		22			29
30					5			8		10							17			20		22			30
31			3		5			8		10							17			20		22			31
32			3		5			8		10					15		17			20		22			32
33			3		5			8		10					15		17			20		22			33
34			3		5			8		10					15		17			20		22			34
35			3		5			8		10					15		17			20		22			35
36			3		5			8		10					15		17			20		22			36
37			3		5			8		10					15		17			20		22			37
38			3		5			8		10					15		17			20		22			38
39			3		5			8		10		12			15		17			20		22			39
40			3		5			8		10		12			15		17			20		22		24	40
41			3		5			8		10		12			15		17			20		22		24	41
42			3		5			8		10		12			15		17			20		22		24	42
43			3		5			8		10		12			15		17			20		22		24	43
44			3		5			8		10		12			15		17			20		22		24	44
45			3		5			8		10		12			15		17			20		22		24	45
46			3		5			8		10		12			15		17			20		22		24	46
47	1		3		5			8		10		12			15		17			20		22		24	47
48	1		3		5			8		10		12	13		15		17			20		22		24	48

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 74 “Independent mode with eight processors \(Processors 7 and 8, 8 to 24 total DIMMs installed in server\)” on page 96](#)
 - [Table 76 “Independent mode with eight processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 98](#)
 - [Table 77 “Independent mode with eight processors \(Processors 7 and 8, 73 to 96 total DIMMs installed in server\)” on page 99](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 63 “Independent mode with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 85](#)
 - [Table 67 “Independent mode with eight processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 89](#)
 - [Table 71 “Independent mode with eight processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 93](#)

Table 76. Independent mode with eight processors (Processors 7 and 8, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49	1		3		5			8		10		12	13		15		17			20		22		24	49
50	1		3		5			8		10		12	13		15		17			20		22		24	50
51	1		3		5			8		10		12	13		15		17			20		22		24	51
52	1		3		5			8		10		12	13		15		17			20		22		24	52
53	1		3		5			8		10		12	13		15		17			20		22		24	53
54	1		3		5			8		10		12	13		15		17			20		22		24	54
55	1		3		5		7	8	9	10			13		15		17			20		22		24	55
56	1		3		5		7	8	9	10			13		15		17		19	20	21	22			56
57	1		3		5		7	8	9	10			13		15		17		19	20	21	22			57
58	1		3		5		7	8	9	10			13		15		17		19	20	21	22			58
59	1		3		5		7	8	9	10			13		15		17		19	20	21	22			59
60	1		3		5		7	8	9	10			13		15		17		19	20	21	22			60
61	1		3		5		7	8	9	10			13		15		17		19	20	21	22			61
62	1		3		5		7	8	9	10			13		15		17		19	20	21	22			62
63			3	4	5	6	7	8	9	10			13		15		17		19	20	21	22			63
64			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			64
65			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			65
66			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			66
67			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			67
68			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			68
69			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			69
70			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			70
71	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			71
72	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	72

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 74 “Independent mode with eight processors \(Processors 7 and 8, 8 to 24 total DIMMs installed in server\)” on page 96](#)
 - [Table 75 “Independent mode with eight processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 97](#)
 - [Table 77 “Independent mode with eight processors \(Processors 7 and 8, 73 to 96 total DIMMs installed in server\)” on page 99](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 64 “Independent mode with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 86](#)
 - [Table 68 “Independent mode with eight processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 90](#)
 - [Table 72 “Independent mode with eight processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 94](#)

Table 77. Independent mode with eight processors (Processors 7 and 8, 73 to 96 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
73	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	73
74	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	74
75	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	75
76	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	76
77	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	77
78	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	78
79			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	79
80			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	80
81			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	81
82			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	82
83			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	83
84			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	84
85			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	85
86			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	86
87			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	87
88	1		3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	88
89			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	89
90			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	90
91			3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	91
92			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	92
93	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	93
94	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	94
95	1	2	3	4	5	6	7	8	9	10	11	12	13		15	16	17	18	19	20	21	22	23	24	95
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 74 “Independent mode with eight processors \(Processors 7 and 8, 8 to 24 total DIMMs installed in server\)” on page 96](#)
 - [Table 75 “Independent mode with eight processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 97](#)
 - [Table 76 “Independent mode with eight processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 98](#)
- To continue populating DIMMs for a system with 73 to 96 DIMMs:
 - [Table 65 “Independent mode with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 87](#)
 - [Table 69 “Independent mode with eight processors \(Processors 3 and 4, 73 to 96 total DIMMs installed in server\)” on page 91](#)
 - [Table 73 “Independent mode with eight processors \(Processors 5 and 6, 73 to 96 total DIMMs installed in server\)” on page 95](#)

Memory mirroring

Memory-mirroring mode provides full memory redundancy while reducing the total system memory capacity in half. Memory channels are grouped in pairs with each channel receiving the same data. If a failure occurs, the memory controller switches from the DIMMs on the primary channel to the DIMMs on the backup channel. The DIMM installation order for memory mirroring varies based on the number of processors and DIMMs installed in the server.

Memory mirroring guidelines:

- Memory mirroring reduces the maximum available memory by half of the installed memory. For example, if the server has 64 GB of installed memory, only 32 GB of addressable memory is available when memory mirroring is enabled.
- DIMMs are installed in pairs for each processor. Each DIMM in a pair must be identical in size and architecture.
- DIMMs on each memory channel must be of equal density.
- If two memory channels have DIMMs, mirroring occurs across two DIMMs (channels 0/1 will both contain the primary/secondary memory caches).
- If three memory channels have DIMMs, mirroring occurs across all three DIMMs (channels 0/1, channels 1/2, and channels 2/0 will all contain primary/secondary memory caches).

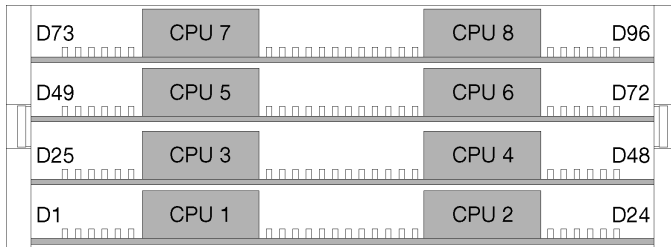


Figure 25. Processor and memory module layout

Memory mirroring DIMM population sequences for each of the supported processor configurations is shown by one of the following topics:

- [“Installation order: memory mirroring with two processors” on page 101](#)
- [“Installation order: memory mirroring with three processors” on page 102](#)
- [“Installation order: memory mirroring with four processors” on page 106](#)
- [“Installation order: memory mirroring with six processors” on page 110](#)
- [“Installation order: memory mirroring with eight processors” on page 122](#)

For information about configuring memory settings, including how to enable memory mirroring, see “Memory configuration” in the *ThinkSystem SR950 Setup Guide*.

Installation order: memory mirroring with two processors

Memory module installation order for memory mirroring with two processors installed in the server.

The following table shows the DIMM population sequence for memory mirroring when two processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.

Note: When adding one or more DIMMs during a memory upgrade, you might need to move other DIMMs that are already installed to new locations.

Table 78. Memory mirroring with two processors, 4 to 24 total DIMMs installed in server

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
4								8		10										20		22			4
5								8		10		12								20		22			5
6								8		10		12								20		22		24	6
7			3		5			8		10										20		22		24	7
8			3		5			8		10					15		17			20		22			8
9	1		3		5			8		10		12								20		22		24	9
10	1		3		5			8		10		12			15		17			20		22			10
11	11 DIMM memory mirroring configuration is not supported.												11 DIMM memory mirroring configuration is not supported.												11
12	1		3		5			8		10		12	13		15		17			20		22		24	12
13	1		3		5		7	8	9	10	11	12			15		17			20		22			13
14	1		3		5			8		10		12			15	16	17	18	19	20	21	22			14
15	1		3		5		7	8	9	10	11	12	13		15		17			20		22		24	15
16			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			16
17	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			17
18	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	18
19	19 DIMM memory mirroring configuration is not supported.												19 DIMM memory mirroring configuration is not supported.												19
20	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			20
21	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	21
22	22 DIMM memory mirroring configuration is not supported.												22 DIMM memory mirroring configuration is not supported.												22
23	23 DIMM memory mirroring configuration is not supported.												23 DIMM memory mirroring configuration is not supported.												23
24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	24

Installation order: memory mirroring with three processors

Memory module installation order for memory mirroring with three processors installed in the server.

The following tables show the DIMM population sequence for memory mirroring when three processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processor 3 is installed in the upper system board of the lower compute tray or in the upper compute tray (processor slot 4 or processor slot 6).

Note: When adding one or more DIMMs during a memory upgrade, you might need to move other DIMMs that are already installed to new locations.

Table 79. Memory mirroring with three processors (Processors 1 and 2, 6 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
6								8		10										20		22			6
7								8		10		12								20		22			7
8								8		10		12								20		22		24	8
9								8		10		12								20		22		24	9
10			3		5			8		10										20		22		24	10
11			3		5			8		10					15		17			20		22			11
12			3		5			8		10					15		17			20		22			12
13	13 DIMM memory mirroring configuration is not supported												13 DIMM memory mirroring configuration is not supported												13
14	1		3		5			8		10		12			15		17			20		22			14
15	1		3		5			8		10		12	13		15		17			20		22		24	15
16	1		3		5			8		10		12	13		15		17			20		22			16
17	17 DIMM memory mirroring configuration is not supported.												17 DIMM memory mirroring configuration is not supported.												17
18	1		3		5			8		10		12	13		15		17			20		22		24	18
19	19 DIMM memory mirroring configuration is not supported.												19 DIMM memory mirroring configuration is not supported.												19
20			3	4	5	6		7	8	9	10		13		15		17			20		22		24	20
21	21 DIMM memory mirroring configuration is not supported.												21 DIMM memory mirroring configuration is not supported.												21
22			3	4	5	6		7	8	9	10				15	16	17	18		19	20	21	22		22
23	23 DIMM memory mirroring configuration is not supported.												23 DIMM memory mirroring configuration is not supported.												23
24			3	4	5	6		7	8	9	10				15	16	17	18		19	20	21	22		24

Related DIMM population sequences for three processor systems:

- Processor 1 and 2 DIMM population sequences for 25 to 36 DIMMs, see [Table 80 “Memory mirroring with three processors \(Processors 1 and 2, 25 to 36 total DIMMs installed in server\)”](#) on page 103.
- To continue populating processor 3 for a system with 6 to 24 DIMMs, see [Table 81 “Memory mirroring with three processors \(Processor 3, 6 to 24 total DIMMs installed in server\)”](#) on page 104.

Table 80. Memory mirroring with three processors (Processors 1 and 2, 25 to 36 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25	1		3		5		7	8	9	10	11	12			15	16	17	28	19	20	21	22			25
26	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	26
27	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	27
28	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			28
29	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	29
30	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	30
31	31 DIMM memory mirroring configuration is not supported.												31 DIMM memory mirroring configuration is not supported.												31
32	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	32
33	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	33
34	34 DIMM memory mirroring configuration is not supported.												34 DIMM memory mirroring configuration is not supported.												34
35	35 DIMM memory mirroring configuration is not supported.												35 DIMM memory mirroring configuration is not supported.												35
36	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	36

Related DIMM population sequences for three processor systems:

- Processor 1 and 2 DIMM population sequences for 6 to 24 DIMMs, see [Table 79 “Memory mirroring with three processors \(Processors 1 and 2, 6 to 24 total DIMMs installed in server\)”](#) on page 102.
- To continue populating processor 3 for a system with 25 to 36 DIMMs, see [Table 82 “Memory mirroring with three processors \(Processor 3, 25 to 36 total DIMMs installed in server\)”](#) on page 105.

Table 81. Memory mirroring with three processors (Processor 3, 6 to 24 total DIMMs installed in server)

Note: Processor 3 is actually installed in the processor 4 or processor 6 slot.

Total DIMMs	Processor 3 slot is empty												Processor 4/6 slot (Processor 3)												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
6																				20	22			6	
7																				20	22			7	
8																				20	22			8	
9																				20	22		24	9	
10																				20	22		24	10	
11																				20	22		24	11	
12															15	17				20	22			12	
13													13 DIMM memory mirroring configuration is not supported.												13
14															15	17				20	22			14	
15															15	17				20	22		24	15	
16															15	17				20	22			16	
17													17 DIMM memory mirroring configuration is not supported.												17
18													13		15	17				20	22		24	18	
19													19 DIMM memory mirroring configuration is not supported.												19
20													13		15	17				20	22		24	20	
21													21 DIMM memory mirroring configuration is not supported.												21
22													13		15	17				20	22		24	22	
23													23 DIMM memory mirroring configuration is not supported.												23
24															15	16	17	18	19	20	21	22			24

Related DIMM population sequences for three processor systems:

- Processor 3 DIMM population sequences for systems with 25 to 36 DIMMs, see [Table 82 “Memory mirroring with three processors \(Processor 3, 25 to 36 total DIMMs installed in server\)”](#) on page 105.
- To continue populating processor 1 and 2 DIMMs for a system with 6 to 24 DIMMs, see [Table 79 “Memory mirroring with three processors \(Processors 1 and 2, 6 to 24 total DIMMs installed in server\)”](#) on page 102.

Table 82. Memory mirroring with three processors (Processor 3, 25 to 36 total DIMMs installed in server)

Note: Processor 3 is actually installed in the processor 4 or processor 6 slot.

Total DIMMs	Processor 3 slot is empty												Processor 4/6 slot (Processor 3)												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25															15	16	17	18	19	20	21	22			25
26															15	16	17	18	19	20	21	22			26
27													13		15		17		19	20	21	22	23	24	27
28															15	16	17	18	19	20	21	22			28
29															15	16	17	18	19	20	21	22			29
30													13		15		17		19	20	21	22	23	24	30
31	31 DIMM memory mirroring configuration is not supported.																								31
32															15	16	17	18	19	20					32
33													13		15		17		19	20	21	22	23	24	33
34	34 DIMM memory mirroring configuration is not supported.																								34
35	35 DIMM memory mirroring configuration is not supported.																								35
36													13	14	15	16	17	18	19	20	21	22	23	24	36

Related DIMM population sequences for three processor systems:

- Processor 3 population sequences for 6 to 24 DIMMs, see [Table 81 “Memory mirroring with three processors \(Processor 3, 6 to 24 total DIMMs installed in server\)” on page 104.](#)
- To continue populating processor 1 and 2 DIMMs for a system with 25 to 36 DIMMs, see [Table 80 “Memory mirroring with three processors \(Processors 1 and 2, 25 to 36 total DIMMs installed in server\)” on page 103.](#)

Installation order: memory mirroring with four processors

Memory module installation order for memory mirroring with four processors installed in the server.

The following tables show the DIMM population sequence for memory mirroring when four processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray or in the upper compute tray.

Note: When adding one or more DIMMs during a memory upgrade, you might need to move other DIMMs that are already installed to new locations.

Table 83. Memory mirroring with four processors (Processors 1 and 2, 8 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
8							8		10											20		22			8
9							8		10		12									20		22			9
10							8		10		12									20		22			10
11							8		10		12									20		22		24	11
12							8		10		12									20		22		24	12
13			3		5		8		10											20		22		24	13
14			3		5		8		10											20		22		24	14
15			3		5		8		10						15		17			20		22			15
16			3		5		8		10						15		17			20		22			16
17	17 DIMM memory mirroring configuration is not supported.												17 DIMM memory mirroring configuration is not supported.												17
18	1		3		5		8		10		12				15		17			20		22			18
19	19 DIMM memory mirroring configuration is not supported.												19 DIMM memory mirroring configuration is not supported.												19
20	1		3		5		8		10		12				15		17			20		22			20
21	1		3		5		8		10		12		13		15		17			20		22		24	21
22	1		3		5		8		10		12		13		15		17			20		22		24	22
23	23 DIMM memory mirroring configuration is not supported.												23 DIMM memory mirroring configuration is not supported.												23
24	1		3		5		8		10		12		13		15		17			20		22		24	24

Related DIMM population sequences for four processor systems:

- Processor 1 and 2 DIMM population sequences for 25 to 48 DIMMs, see [Table 84 “Memory mirroring with four processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 107.](#)
- To continue populating processor 3 and 4 DIMMs for a system with 8 to 24 DIMMs, see [Table 85 “Memory mirroring with four processors \(Processors 3 and 4, 8 to 24 total DIMMs installed in server\)” on page 108.](#)

Table 84. Memory mirroring with four processors (Processors 1 and 2, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25	25 DIMM memory mirroring configuration is not supported.												25 DIMM memory mirroring configuration is not supported.												25
26			3	4	5	6	7	8	9	10			13		15		17			20		22		24	26
27			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			27
28			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			28
29	29 DIMM memory mirroring configuration is not supported.												29 DIMM memory mirroring configuration is not supported.												29
30			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			30
31	31 DIMM memory mirroring configuration is not supported.												31 DIMM memory mirroring configuration is not supported.												31
32			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			32
33	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			33
34	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			34
35	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	35
36	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	36
37	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			37
38	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	38
39	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	39
40	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	40
41	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	41
42	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	42
43	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	43
44	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	44
45	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	45
46	46 DIMM memory mirroring configuration is not supported.												46 DIMM memory mirroring configuration is not supported.												46
47	47 DIMM memory mirroring configuration is not supported.												47 DIMM memory mirroring configuration is not supported.												47
48	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	48

Related DIMM population sequences for four processor systems:

- Processor 1 and 2 DIMM population sequences for 8 to 24 DIMMs, see [Table 83 “Memory mirroring with four processors \(Processors 1 and 2, 8 to 24 total DIMMs installed in server\)”](#) on page 106.
- To continue populating processor 3 and 4 DIMMs for a system with 25 to 48 DIMMs, see [Table 86 “Memory mirroring with four processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)”](#) on page 109.

Table 85. Memory mirroring with four processors (Processors 3 and 4, 8 to 24 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
8							8		10											20		22			8
9							8		10											20		22			9
10							8		10		12									20		22			10
11							8		10		12									20		22			11
12							8		10		12									20		22		24	12
13							8		10		12									20		22		24	13
14			3		5		8		10											20		22		24	14
15			3		5		8		10											20		22		24	15
16			3		5		8		10						15		17			20		22			16
17	17 DIMM memory mirroring configuration is not supported.												17 DIMM memory mirroring configuration is not supported.												17
18			3		5		8		10						15		17			20		22			18
19	19 DIMM memory mirroring configuration is not supported.												19 DIMM memory mirroring configuration is not supported.												19
20	1		3		5		8		10		12				15		17			20		22			20
21	1		3		5		8		10		12									20		22		24	21
22	1		3		5		8		10		12				15		17			20		22			22
23	23 DIMM memory mirroring configuration is not supported.												23 DIMM memory mirroring configuration is not supported.												23
24	1		3		5		8		10		12		13		15		17			20		22		24	24

Related DIMM population sequences for four processor systems:

- Processor 3 and 4 DIMM population sequences for systems with 25 to 48 DIMMs, see [Table 86 “Memory mirroring with four processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)”](#) on page 109.
- To continue populating processor 1 and 2 DIMMs for a system with 8 to 24 DIMMs, see [Table 83 “Memory mirroring with four processors \(Processors 1 and 2, 8 to 24 total DIMMs installed in server\)”](#) on page 106.

Table 86. Memory mirroring with four processors (Processors 3 and 4, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25	25 DIMM memory mirroring configuration is not supported.												25 DIMM memory mirroring configuration is not supported.												25
26	1		3		5		8		10		12	13		15		17		20		22		24	26		
27			3	4	5	6	7	8	9	10									20		22		24	27	
28	1		3		5		8		10		12	13		15		17		20		22		24	28		
29	29 DIMM memory mirroring configuration is not supported.												29 DIMM memory mirroring configuration is not supported.												29
30			3	4	5	6	7	8	9	10			13		15		17		20		22		24	30	
31	31 DIMM memory mirroring configuration is not supported.												31 DIMM memory mirroring configuration is not supported.												31
32			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			32
33			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			33
34	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			34
35	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			35
36	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	36
37	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			37
38			3	4	5	6	7	8	9	10			13		15		17		20		22		24	38	
39	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	39
40			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			40
41	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			41
42	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		20		22		24	42	
43	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	43
44	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			44
45	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	45
46	46 DIMM memory mirroring configuration is not supported.												46 DIMM memory mirroring configuration is not supported.												46
47	47 DIMM memory mirroring configuration is not supported.												47 DIMM memory mirroring configuration is not supported.												47
48	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	48

Related DIMM population sequences for four processor systems:

- Processor 3 and 4 DIMM population sequences for 8 to 24 DIMMs, see [Table 85 “Memory mirroring with four processors \(Processors 3 and 4, 8 to 24 total DIMMs installed in server\)”](#) on page 108.
- To continue populating processor 1 and 2 DIMMs for a system with 25 to 48 DIMMs, see [Table 84 “Memory mirroring with four processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)”](#) on page 107.

Installation order: memory mirroring with six processors

Memory module installation order for memory mirroring with six processors installed in the server.

The following tables show the DIMM population sequence for memory mirroring when six processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processors 5 is in the lower system board of the upper compute tray.
- Processors 6 is installed in the upper system board of the upper compute tray (processor slot 7).

Note: When adding one or more DIMMs during a memory upgrade, you might need to move other DIMMs that are already installed to new locations.

Table 87. Memory mirroring with six processors (Processors 1 and 2, 12 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
12								8		10										20		22			12
13								8		10		12								20		22			13
14								8		10		12								20		22		24	14
15								8		10		12								20		22		24	15
16								8		10		12								20		22		24	16
17								8		10		12								20		22		24	17
18								8		10		12								20		22		24	18
19			3		5			8		10										20		22		24	19
20			3		5			8		10					15		17			20		22			20
21			3		5			8		10					15		17			20		22			21
22			3		5			8		10					15		17			20		22			22
23			3		5			8		10					15		17			20		22			23
24			3		5			8		10					15		17			20		22			24

Related DIMM population sequences for six processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 88 “Memory mirroring with six processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 111](#)
 - [Table 89 “Memory mirroring with six processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 112](#)
- To continue populating DIMMs for a system with 12 to 24 DIMMs:
 - [Table 90 “Memory mirroring with six processors \(Processors 3 and 4, 12 to 24 total DIMMs installed in server\)” on page 113](#)
 - [Table 93 “Memory mirroring with six processors \(Processors 5 and 6, 12 to 24 total DIMMs installed in server\)” on page 116](#)
 - [Table 96 “Memory mirroring with six processors \(Processors 7 and 8, 12 to 24 total DIMMs installed in server\)” on page 119](#)

Table 88. Memory mirroring with six processors (Processors 1 and 2, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25	1		3		5			8		10		12			15		17			20		22			25
26	1		3		5			8		10		12			15		17			20		22			26
27	1		3		5			8		10		12	13		15		17			20		22		24	27
28	1		3		5			8		10		12	13		15		17			20		22		24	28
29	1		3		5			8		10		12	13		15		17			20		22		24	29
30	1		3		5			8		10		12	13		15		17			20		22		24	30
31	1		3		5			8		10		12	13		15		17			20		22		24	31
32	1		3		5			8		10		12	13		15		17			20		22		24	32
33	1		3		5			8		10		12	13		15		17			20		22		24	33
34	1		3		5			8		10		12	13		15		17			20		22		24	34
35	1		3		5		7	8	9	10	11	12	13		15		17			20		22		24	35
36	1		3		5			8		10		12	13		15		17			20		22		24	36
37	1		3		5		7	8	9	10	11	12	13		15		17			20		22		24	37
38	1		3		5			8		10		12	13		15		17			20		22		24	38
39	1		3		5		7	8	9	10	11	12	13		15		17			20		22		24	39
40			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			40
41	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			41
42			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			42
43	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			43
44			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			44
45	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			45
46			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			46
47	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			47
48			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			48

Related DIMM population sequences for six processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 87 “Memory mirroring with six processors \(Processors 1 and 2, 12 to 24 total DIMMs installed in server\)” on page 110](#)
 - [Table 89 “Memory mirroring with six processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 112](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 91 “Memory mirroring with six processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 114](#)
 - [Table 94 “Memory mirroring with six processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 117](#)
 - [Table 97 “Memory mirroring with six processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 120](#)

Table 89. Memory mirroring with six processors (Processors 1 and 2, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			49
50	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	50
51	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	51
52	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	52
53	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	53
54	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	54
55	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	55
56	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	56
57	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	57
58	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	58
59	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	59
60	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	60
61	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	61
62	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	62
63	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	63
64	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	64
65	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	65
66	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	66
67	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	67
68	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	68
69	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	69
70	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	70
71	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	71
72	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	72

Related DIMM population sequences for six processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 87 “Memory mirroring with six processors \(Processors 1 and 2, 12 to 24 total DIMMs installed in server\)” on page 110](#)
 - [Table 88 “Memory mirroring with six processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 111](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 92 “Memory mirroring with six processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 115](#)
 - [Table 95 “Memory mirroring with six processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 118](#)
 - [Table 98 “Memory mirroring with six processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 121](#)

Table 90. Memory mirroring with six processors (Processors 3 and 4, 12 to 24 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
12							8		10										20		22			12	
13							8		10										20		22			13	
14							8		10										20		22			14	
15							8		10		12								20		22			15	
16							8		10		12								20		22		24	16	
17							8		10		12								20		22		24	17	
18							8		10		12								20		22		24	18	
19							8		10		12								20		22		24	19	
20							8		10		12								20		22		24	20	
21			3		5		8		10										20		22		24	21	
22			3		5		8		10					15		17			20		22			22	
23			3		5		8		10					15		17			20		22			23	
24			3		5		8		10					15		17			20		22			24	

Related DIMM population sequences for six processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 91 “Memory mirroring with six processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 114](#)
 - [Table 92 “Memory mirroring with six processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 115](#)
- To continue populating DIMMs for a system with 12 to 24 DIMMs:
 - [Table 87 “Memory mirroring with six processors \(Processors 1 and 2, 12 to 24 total DIMMs installed in server\)” on page 110](#)
 - [Table 93 “Memory mirroring with six processors \(Processors 5 and 6, 12 to 24 total DIMMs installed in server\)” on page 116](#)
 - [Table 96 “Memory mirroring with six processors \(Processors 7 and 8, 12 to 24 total DIMMs installed in server\)” on page 119](#)

Table 91. Memory mirroring with six processors (Processors 3 and 4, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25			3		5			8		10					15		17			20		22			25
26			3		5			8		10					15		17			20		22			26
27	1		3		5			8		10		12								20		22		24	27
28			3		5			8		10					15		17			20		22			28
29	29 DIMM memory mirroring configuration is not supported.																								29
30	1		3		5			8		10		12	13		15		17			20		22		24	30
31			3		5			8		10			13		15		17			20		22		24	31
32	1		3		5			8		10		12	13		15		17			20		22		24	32
33	1		3		5			8		10		12	13		15		17			20		22		24	33
34	1		3		5			8		10		12	13		15		17			20		22		24	34
35	1		3		5			8		10		12	13		15		17			20		22		24	35
36	1		3		5			8		10		12	13		15		17			20		22		24	36
37	1		3		5			8		10		12	13		15		17			20		22		24	37
38	1		3		5			8		10		12	13		15		17			20		22		24	38
39	1		3		5			8		10		12	13		15		17			20		22		24	39
40	1		3		5			8		10		12	13		15		17			20		22		24	40
41	1		3		5			8		10		12	13		15		17			20		22		24	41
42			3	4	5	6	7	8	9	10			13		15		17			20		22		24	42
43			3	4	5	6	7	8	9	10			13		15		17			20		22		24	43
44			3	4	5	6	7	8	9	10				15	16	17	18	19	20	21	22				44
45			3	4	5	6	7	8	9	10				15	16	17	18	19	20	21	22				45
46			3	4	5	6	7	8	9	10				15	16	17	18	19	20	21	22				46
47			3	4	5	6	7	8	9	10				15	16	17	18	19	20	21	22				47
48			3	4	5	6	7	8	9	10				15	16	17	18	19	20	21	22				48

Related DIMM population sequences for six processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 90 “Memory mirroring with six processors \(Processors 3 and 4, 12 to 24 total DIMMs installed in server\)” on page 113](#)
 - [Table 92 “Memory mirroring with six processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 115](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 88 “Memory mirroring with six processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 111](#)
 - [Table 94 “Memory mirroring with six processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 117](#)
 - [Table 97 “Memory mirroring with six processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 120](#)

Table 92. Memory mirroring with six processors (Processors 3 and 4, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			49
50			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			50
51	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			51
52	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	52
53	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	53
54	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	54
55	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	55
56	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	56
57	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	57
58	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	58
59	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	59
60	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	60
61	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	61
62	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	62
63	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	63
64	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	64
65	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	65
66	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	66
67	67 DIMM memory mirroring configuration is not supported.																								67
68	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	68
69	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	69
70	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	70
71	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	71
72	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	72

Related DIMM population sequences for six processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 90 “Memory mirroring with six processors \(Processors 3 and 4, 12 to 24 total DIMMs installed in server\)” on page 113](#)
 - [Table 91 “Memory mirroring with six processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 114](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 89 “Memory mirroring with six processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 112](#)
 - [Table 95 “Memory mirroring with six processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 118](#)
 - [Table 98 “Memory mirroring with six processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 121](#)

Table 93. Memory mirroring with six processors (Processors 5 and 6, 12 to 24 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6 slot is empty												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
12							8		10															12	
13							8		10															13	
14							8		10															14	
15							8		10															15	
16							8		10															16	
17							8		10	12														17	
18							8		10	12														18	
19							8		10	12														19	
20							8		10	12														20	
21							8		10	12														21	
22							8		10	12														22	
23			3		5		8		10															23	
24			3		5		8		10															24	

Related DIMM population sequences for six processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 94 “Memory mirroring with six processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 117](#)
 - [Table 95 “Memory mirroring with six processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 118](#)
- To continue populating DIMMs for a system with 12 to 24 DIMMs:
 - [Table 87 “Memory mirroring with six processors \(Processors 1 and 2, 12 to 24 total DIMMs installed in server\)” on page 110](#)
 - [Table 90 “Memory mirroring with six processors \(Processors 3 and 4, 12 to 24 total DIMMs installed in server\)” on page 113](#)
 - [Table 96 “Memory mirroring with six processors \(Processors 7 and 8, 12 to 24 total DIMMs installed in server\)” on page 119](#)

Table 94. Memory mirroring with six processors (Processors 5 and 6, 25 to 48 total DIMMs installed in server)

Note: Processor 6 is actually installed in the processor 7 slot.

Total DIMMs	Processor 5												Processor 6 slot is empty												Total DIMMs						
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24							
25			3		5			8		10															25						
26			3		5			8		10															26						
27								8		10		12													27						
28			3		5			8		10															28						
29	29 DIMM memory mirroring configuration is not supported.																														29
30								8		10		12													30						
31			3		5			8		10															31						
32			3		5			8		10															32						
33	1		3		5			8		10		12													33						
34	1		3		5			8		10		12													34						
35			3		5			8		10															35						
36	1		3		5			8		10		12													36						
37	1		3		5			8		10		12													37						
38	1		3		5			8		10		12													38						
39	1		3		5			8		10		12													39						
40	1		3		5			8		10		12													40						
41	1		3		5			8		10		12													41						
42	1		3		5			8		10		12													42						
43	1		3		5			8		10		12													43						
44	1		3		5			8		10		12													44						
45	1		3		5			8		10		12													45						
46			3	4	5	6	7	8	9	10															46						
47			3	4	5	6	7	8	9	10															47						
48			3	4	5	6	7	8	9	10															48						

Related DIMM population sequences for six processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 93 “Memory mirroring with six processors \(Processors 5 and 6, 12 to 24 total DIMMs installed in server\)” on page 116](#)
 - [Table 95 “Memory mirroring with six processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 118](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 88 “Memory mirroring with six processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 111](#)
 - [Table 91 “Memory mirroring with six processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 114](#)
 - [Table 97 “Memory mirroring with six processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 120](#)

Table 95. Memory mirroring with six processors (Processors 5 and 6, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6 slot is empty												Total DIMMs				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24					
49			3	4	5	6	7	8	9	10														49					
50			3	4	5	6	7	8	9	10														50					
51			3	4	5	6	7	8	9	10														51					
52			3	4	5	6	7	8	9	10														52					
53	1		3		5			8		10		12												53					
54	1		3		5		7	8	9	10	11	12												54					
55			3	4	5	6	7	8	9	10														55					
56	1		3		5		7	8	9	10	11	12												56					
57	1		3		5		7	8	9	10	11	12												57					
58			3	4	5	6	7	8	9	10														58					
59	1		3		5		7	8	9	10	11	12												59					
60	1		3		5		7	8	9	10	11	12												60					
61			3	4	5	6	7	8	9	10														61					
62	1		3		5		7	8	9	10	11	12												62					
63	1		3		5		7	8	9	10	11	12												63					
64			3	4	5	6	7	8	9	10														64					
65	1		3		5		7	8	9	10	11	12												65					
66	1		3		5		7	8	9	10	11	12												66					
67	67 DIMM memory mirroring configuration is not supported.																										67		
68	1	2	3	4	5	6	7	8	9	10	11	12												68					
69	1	2	3	4	5	6	7	8	9	10	11	12												69					
70	70 DIMM memory mirroring configuration is not supported.																											70	
71	71 DIMM memory mirroring configuration is not supported.																												71
72	1	2	3	4	5	6	7	8	9	10	11	12												72					

Related DIMM population sequences for six processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 93 “Memory mirroring with six processors \(Processors 5 and 6, 12 to 24 total DIMMs installed in server\)” on page 116](#)
 - [Table 94 “Memory mirroring with six processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 117](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 89 “Memory mirroring with six processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 112](#)
 - [Table 92 “Memory mirroring with six processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 115](#)

- [Table 98 “Memory mirroring with six processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 121](#)

Table 96. Memory mirroring with six processors (Processors 7 and 8, 12 to 24 total DIMMs installed in server)

Note: Processor 6 is actually installed in the processor 7 slot.

Total DIMMs	Processor 7 slot (Processor 6)												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
12							8		10																12
13							8		10																13
14							8		10																14
15							8		10																15
16							8		10																16
17							8		10																17
18							8		10		12														18
19							8		10		12														19
20							8		10		12														20
21							8		10		12														21
22							8		10		12														22
23							8		10		12														23
24			3		5		8		10																24

Related DIMM population sequences for six processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 97 “Memory mirroring with six processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 120](#)
 - [Table 98 “Memory mirroring with six processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 121](#)
- To continue populating DIMMs for a system with 12 to 24 DIMMs:
 - [Table 87 “Memory mirroring with six processors \(Processors 1 and 2, 12 to 24 total DIMMs installed in server\)” on page 110](#)
 - [Table 90 “Memory mirroring with six processors \(Processors 3 and 4, 12 to 24 total DIMMs installed in server\)” on page 113](#)
 - [Table 93 “Memory mirroring with six processors \(Processors 5 and 6, 12 to 24 total DIMMs installed in server\)” on page 116](#)

Table 97. Memory mirroring with six processors (Processors 7 and 8, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 7 slot (Processor 6)												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25								8		10		12													25
26			3		5			8		10															26
27								8		10		12													27
28			3		5			8		10															28
29	29 DIMM memory mirroring configuration is not supported.																								29
30								8		10		12													30
31								8		10		12													31
32			3		5			8		10															32
33								8		10		12													33
34			3		5			8		10															34
35			3		5			8		10															35
36	1		3		5			8		10		12													36
37			3		5			8		10															37
38			3		5			8		10															38
39	1		3		5			8		10		12													39
40	1		3		5			8		10		12													40
41	1		3		5			8		10		12													41
42	1		3		5			8		10		12													42
43	1		3		5			8		10		12													43
44	1		3		5			8		10		12													44
45	1		3		5			8		10		12													45
46	1		3		5			8		10		12													46
47	1		3		5			8		10		12													47
48			3	4	5	6	7	8	9	10															48

Related DIMM population sequences for six processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 96 “Memory mirroring with six processors \(Processors 7 and 8, 12 to 24 total DIMMs installed in server\)” on page 119](#)
 - [Table 98 “Memory mirroring with six processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 121](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 88 “Memory mirroring with six processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 111](#)
 - [Table 91 “Memory mirroring with six processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 114](#)
 - [Table 94 “Memory mirroring with six processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 117](#)

Table 98. Memory mirroring with six processors (Processors 7 and 8, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 7 slot (Processor 6)												Processor 8												Total DIMMs							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24								
49			3	4	5	6	7	8	9	10															49							
50			3	4	5	6	7	8	9	10															50							
51			3	4	5	6	7	8	9	10															51							
52			3	4	5	6	7	8	9	10															52							
53			3	4	5	6	7	8	9	10															53							
54	1		3		5		7	8	9	10	11	12													54							
55			3	4	5	6	7	8	9	10															55							
56			3	4	5	6	7	8	9	10															56							
57	1		3		5		7	8	9	10	11	12													57							
58			3	4	5	6	7	8	9	10															58							
59			3	4	5	6	7	8	9	10															59							
60	1		3		5		7	8	9	10	11	12													60							
61			3	4	5	6	7	8	9	10															61							
62			3	4	5	6	7	8	9	10															62							
63	1		3		5		7	8	9	10	11	12													63							
64			3	4	5	6	7	8	9	10															64							
65			3	4	5	6	7	8	9	10															65							
66	1		3		5		7	8	9	10	11	12													66							
67	67 DIMM memory mirroring configuration is not supported.																												67			
68			3	4	5	6	7	8	9	10															68							
69	1		3				7	8	9	10	11	12													69							
70	70 DIMM memory mirroring configuration is not supported.																														70	
71	71 DIMM memory mirroring configuration is not supported.																															71
72	1	2	3	4	5	6	7	8	9	10	11	12													72							

Related DIMM population sequences for six processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 96 “Memory mirroring with six processors \(Processors 7 and 8, 12 to 24 total DIMMs installed in server\)” on page 119](#)
 - [Table 97 “Memory mirroring with six processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 120](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 89 “Memory mirroring with six processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 112](#)
 - [Table 92 “Memory mirroring with six processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 115](#)
 - [Table 95 “Memory mirroring with six processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 118](#)

Installation order: memory mirroring with eight processors

Memory module installation order for memory mirroring with eight processors installed in the server.

The following tables show the DIMM population sequence for memory mirroring when eight processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processors 5 and 6 are installed in the lower system board of the upper compute tray.
- Processors 7 and 8 are installed in the upper system board of the upper compute tray.

Note: When adding one or more DIMMs during a memory upgrade, you might need to move other DIMMs that are already installed to new locations.

Table 99. Memory mirroring with eight processors (Processors 1 and 2, 16 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
16								8		10										20		22			16
17								8		10		12								20		22			17
18								8		10		12								20		22		24	18
19								8		10		12								20		22		24	19
20								8		10		12								20		22		24	20
21								8		10		12								20		22		24	21
22								8		10		12								20		22		24	22
23								8		10		12								20		22		24	23
24								8		10		12								20		22		24	24

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 100 “Memory mirroring with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 123](#)
 - [Table 101 “Memory mirroring with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 124](#)
 - [Table 102 “Memory mirroring with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 125](#)
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - [Table 103 “Memory mirroring with eight processors \(Processors 3 and 4, 16 to 24 total DIMMs installed in server\)” on page 126](#)
 - [Table 107 “Memory mirroring with eight processors \(Processors 5 and 6, 16 to 24 total DIMMs installed in server\)” on page 130](#)
 - [Table 111 “Memory mirroring with eight processors \(Processors 7 and 8, 16 to 24 total DIMMs installed in server\)” on page 134](#)

Table 100. Memory mirroring with eight processors (Processors 1 and 2, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25			3		5			8		10									20		22		24	25	
26			3		5			8		10					15		17		20		22			26	
27			3		5			8		10					15		17		20		22			27	
28			3		5			8		10					15		17		20		22			28	
29			3		5			8		10					15		17		20		22			29	
30			3		5			8		10					15		17		20		22			30	
31			3		5			8		10					15		17		20		22			31	
32			3		5			8		10					15		17		20		22			32	
33	1		3		5			8		10		12			15		17		20		22			33	
34	1		3		5			8		10		12			15		17		20		22			34	
35	1		3		5			8		10		12	13		15		17		20		22		24	35	
36	1		3		5			8		10		12	13		15		17		20		22		24	36	
37	1		3		5		7	8	9	10	11	12			15		17		20		22		24	37	
38	1		3		5			8		10		12	13		15		17		20		22		24	38	
39	1		3		5		7	8	9	10	11	12	13		15		17		20		22		24	39	
40	1		3		5			8		10		12	13		15		17		20		22		24	40	
41	1		3		5		7	8	9	10	11	12	13		15		17		20		22		24	41	
42	1		3		5			8		10		12	13		15		17		20		22		24	42	
43	1		3		5		7	8	9	10	11	12	13		15		17		20		22		24	43	
44	1		3		5			8		10		12	13		15		17		20		22		24	44	
45	1		3		5		7	8	9	10	11	12	13		15		17		20		22		24	45	
46	1		3		5			8		10		12	13		15		17		20		22		24	46	
47	1		3		5		7	8	9	10	11	12	13		15		17		20		22		24	47	
48	1		3		5			8		10		12	13		15		17		20		22		24	48	

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 99 “Memory mirroring with eight processors \(Processors 1 and 2, 16 to 24 total DIMMs installed in server\)” on page 122](#)
 - [Table 101 “Memory mirroring with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 124](#)
 - [Table 102 “Memory mirroring with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 125](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 104 “Memory mirroring with eight processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 127](#)
 - [Table 108 “Memory mirroring with eight processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 131](#)
 - [Table 112 “Memory mirroring with eight processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 135](#)

Table 101. Memory mirroring with eight processors (Processors 1 and 2, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49	1		3		5		7	8	9	10	11	12	13		15		17			20		22		24	49
50			3	4	5	6	7	8	9	10			13		15		17			20		22		24	50
51	1		3		5		7	8	9	10	11	12	13		15		17			20		22		24	51
52			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			52
53	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			53
54			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			54
55	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			55
56			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			56
57	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			57
58			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			58
59	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			59
60			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			60
61	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			61
62			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			62
63	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			63
64			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			64
65	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			65
66	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			66
67	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	67
68	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			68
69	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	69
70	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	70
71	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	71
72	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	72

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 99 “Memory mirroring with eight processors \(Processors 1 and 2, 16 to 24 total DIMMs installed in server\)” on page 122](#)
 - [Table 100 “Memory mirroring with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 123](#)
 - [Table 102 “Memory mirroring with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 125](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 105 “Memory mirroring with eight processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 128](#)
 - [Table 109 “Memory mirroring with eight processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 132](#)
 - [Table 113 “Memory mirroring with eight processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 136](#)

Table 102. Memory mirroring with eight processors (Processors 1 and 2, 73 to 96 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
73	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	73
74	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	74
75	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	75
76	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	76
77	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	77
78	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	78
79	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	79
80	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	80
81	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	81
82	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	82
83	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	83
84	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	84
85	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	85
86	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	86
87	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	87
88	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	88
89	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	89
90	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	90
91	91 DIMM memory mirroring configuration is not supported.												91 DIMM memory mirroring configuration is not supported.												91
92	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	92
93	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	93
94	94 DIMM memory mirroring configuration is not supported.												94 DIMM memory mirroring configuration is not supported.												94
95	95 DIMM memory mirroring configuration is not supported.												95 DIMM memory mirroring configuration is not supported.												95
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 99 “Memory mirroring with eight processors \(Processors 1 and 2, 16 to 24 total DIMMs installed in server\)” on page 122](#)
 - [Table 100 “Memory mirroring with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 123](#)
 - [Table 101 “Memory mirroring with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 124](#)
- To continue populating DIMMs for a system with 73 to 96 DIMMs:
 - [Table 106 “Memory mirroring with eight processors \(Processors 3 and 4, 73 to 96 total DIMMs installed in server\)” on page 129](#)
 - [Table 110 “Memory mirroring with eight processors \(Processors 5 and 6, 73 to 96 total DIMMs installed in server\)” on page 133](#)

- Table 114 “Memory mirroring with eight processors (Processors 7 and 8, 73 to 96 total DIMMs installed in server)” on page 137

Table 103. Memory mirroring with eight processors (Processors 3 and 4, 16 to 24 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
16								8		10										20		22			16
17								8		10										20		22			17
18								8		10										20		22			18
19								8		10		12								20		22			19
20								8		10		12								20		22		24	20
21								8		10		12								20		22		24	21
22								8		10		12								20		22		24	22
23								8		10		12								20		22		24	23
24								8		10		12								20		22		24	24

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - Table 104 “Memory mirroring with eight processors (Processors 3 and 4, 25 to 48 total DIMMs installed in server)” on page 127
 - Table 105 “Memory mirroring with eight processors (Processors 3 and 4, 49 to 72 total DIMMs installed in server)” on page 128
 - Table 106 “Memory mirroring with eight processors (Processors 3 and 4, 73 to 96 total DIMMs installed in server)” on page 129
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - Table 99 “Memory mirroring with eight processors (Processors 1 and 2, 16 to 24 total DIMMs installed in server)” on page 122
 - Table 107 “Memory mirroring with eight processors (Processors 5 and 6, 16 to 24 total DIMMs installed in server)” on page 130
 - Table 111 “Memory mirroring with eight processors (Processors 7 and 8, 16 to 24 total DIMMs installed in server)” on page 134

Table 104. Memory mirroring with eight processors (Processors 3 and 4, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25							8		10		12								20		22		24	25	
26							8		10		12								20		22		24	26	
27			3		5		8		10										20		22		24	27	
28			3		5		8		10					15		17			20		22			28	
29			3		5		8		10					15		17			20		22			29	
30			3		5		8		10					15		17			20		22			30	
31			3		5		8		10					15		17			20		22			31	
32			3		5		8		10					15		17			20		22			32	
33			3		5		8		10					15		17			20		22			33	
34			3		5		8		10					15		17			20		22			34	
35			3		5		8		10					15		17			20		22			35	
36			3		5		8		10					15		17			20		22			36	
37			3		5		8		10					15		17			20		22			37	
38	1		3		5		8		10		12			15		17			20		22			38	
39			3		5		8		10					15		17			20		22			39	
40	1		3		5		8		10		12	13		15		17			20		22		24	40	
41	1		3		5		8		10		12			15		17			20		22			41	
42	1		3		5		8		10		12	13		15		17			20		22		24	42	
43	1		3		5		8		10		12	13		15		17			20		22		24	43	
44	1		3		5		8		10		12	13		15		17			20		22		24	44	
45	1		3		5		8		10		12	13		15		17			20		22		24	45	
46	1		3		5		8		10		12	13		15		17			20		22		24	46	
47	1		3		5		8		10		12	13		15		17			20		22		24	47	
48	1		3		5		8		10		12	13		15		17			20		22		24	48	

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 103 “Memory mirroring with eight processors \(Processors 3 and 4, 16 to 24 total DIMMs installed in server\)” on page 126](#)
 - [Table 105 “Memory mirroring with eight processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 128](#)
 - [Table 106 “Memory mirroring with eight processors \(Processors 3 and 4, 73 to 96 total DIMMs installed in server\)” on page 129](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 100 “Memory mirroring with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 123](#)
 - [Table 108 “Memory mirroring with eight processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 131](#)
 - [Table 112 “Memory mirroring with eight processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 135](#)

Table 105. Memory mirroring with eight processors (Processors 3 and 4, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49	1		3		5			8		10		12	13		15		17			20		22		24	49
50	1		3		5			8		10		12	13		15		17			20		22		24	50
51	1		3		5			8		10		12	13		15		17			20		22		24	51
52	1		3		5			8		10		12	13		15		17			20		22		24	52
53	1		3		5			8		10		12	13		15		17			20		22		24	53
54			3	4	5	6	7	8	9	10			13		15		17			20		22		24	54
55			3	4	5	6	7	8	9	10			13		15		17			20		22		24	55
56			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			56
57			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			57
58			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			58
59			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			59
60			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			60
61			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			61
62			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			62
63			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			63
64			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			64
65			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			65
66			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			66
67	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			67
68			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			68
69	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	69
70			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			70
71	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	71
72	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	72

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 103 “Memory mirroring with eight processors \(Processors 3 and 4, 16 to 24 total DIMMs installed in server\)” on page 126](#)
 - [Table 104 “Memory mirroring with eight processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 127](#)
 - [Table 106 “Memory mirroring with eight processors \(Processors 3 and 4, 73 to 96 total DIMMs installed in server\)” on page 129](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 101 “Memory mirroring with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 124](#)
 - [Table 109 “Memory mirroring with eight processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 132](#)
 - [Table 113 “Memory mirroring with eight processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 136](#)

Table 106. Memory mirroring with eight processors (Processors 3 and 4, 73 to 96 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
73	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	73
74	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			74
75	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	75
76	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			76
77	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	77
78	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	78
79	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	79
80	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	80
81	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	81
82	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	82
83	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	83
84	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	84
85	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	85
86	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	86
87	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	87
88	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	88
89	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	89
90	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	90
91	91 DIMM memory mirroring configuration is not supported.												91 DIMM memory mirroring configuration is not supported.												91
92	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	92
93	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	93
94	94 DIMM memory mirroring configuration is not supported.												94 DIMM memory mirroring configuration is not supported.												94
95	95 DIMM memory mirroring configuration is not supported.												95 DIMM memory mirroring configuration is not supported.												95
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 103 “Memory mirroring with eight processors \(Processors 3 and 4, 16 to 24 total DIMMs installed in server\)” on page 126](#)
 - [Table 104 “Memory mirroring with eight processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 127](#)
 - [Table 105 “Memory mirroring with eight processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 128](#)
- To continue populating DIMMs for a system with 73 to 96 DIMMs:
 - [Table 102 “Memory mirroring with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 125](#)
 - [Table 110 “Memory mirroring with eight processors \(Processors 5 and 6, 73 to 96 total DIMMs installed in server\)” on page 133](#)

- Table 114 “Memory mirroring with eight processors (Processors 7 and 8, 73 to 96 total DIMMs installed in server)” on page 137

Table 107. Memory mirroring with eight processors (Processors 5 and 6, 16 to 24 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
16								8		10										20		22			16
17								8		10										20		22			17
18								8		10										20		22			18
19								8		10										20		22			19
20								8		10										20		22			20
21								8		10		12								20		22			21
22								8		10		12								20		22		24	22
23								8		10		12								20		22		24	23
24								8		10		12								20		22		24	24

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - Table 108 “Memory mirroring with eight processors (Processors 5 and 6, 25 to 48 total DIMMs installed in server)” on page 131
 - Table 109 “Memory mirroring with eight processors (Processors 5 and 6, 49 to 72 total DIMMs installed in server)” on page 132
 - Table 110 “Memory mirroring with eight processors (Processors 5 and 6, 73 to 96 total DIMMs installed in server)” on page 133
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - Table 99 “Memory mirroring with eight processors (Processors 1 and 2, 16 to 24 total DIMMs installed in server)” on page 122
 - Table 103 “Memory mirroring with eight processors (Processors 3 and 4, 16 to 24 total DIMMs installed in server)” on page 126
 - Table 111 “Memory mirroring with eight processors (Processors 7 and 8, 16 to 24 total DIMMs installed in server)” on page 134

Table 108. Memory mirroring with eight processors (Processors 5 and 6, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25							8		10		12								20		22		24	25	
26							8		10		12								20		22		24	26	
27							8		10		12								20		22		24	27	
28							8		10		12								20		22		24	28	
29			3		5		8		10										20		22		24	29	
30			3		5		8		10					15		17			20		22			30	
31			3		5		8		10					15		17			20		22			31	
32			3		5		8		10					15		17			20		22			32	
33			3		5		8		10					15		17			20		22			33	
34			3		5		8		10					15		17			20		22			34	
35			3		5		8		10					15		17			20		22			35	
36			3		5		8		10					15		17			20		22			36	
37			3		5		8		10					15		17			20		22			37	
38			3		5		8		10					15		17			20		22			38	
39			3		5		8		10					15		17			20		22			39	
40			3		5		8		10					15		17			20		22			40	
41			3		5		8		10					15		17			20		22			41	
42	1		3		5		8		10		12			15		17			20		22			42	
43			3		5		8		10					15		17			20		22			43	
44	1		3		5		8		10		12	13		15		17			20		22		24	44	
45	1		3		5		8		10		12			15		17			20		22			45	
46	1		3		5		8		10		12	13		15		17			20		22		24	46	
47	1		3		5		8		10		12	13		15		17			20		22		24	47	
48	1		3		5		8		10		12	13		15		17			20		22		24	48	

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 107 “Memory mirroring with eight processors \(Processors 5 and 6, 16 to 24 total DIMMs installed in server\)” on page 130](#)
 - [Table 109 “Memory mirroring with eight processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 132](#)
 - [Table 110 “Memory mirroring with eight processors \(Processors 5 and 6, 73 to 96 total DIMMs installed in server\)” on page 133](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 100 “Memory mirroring with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 123](#)
 - [Table 104 “Memory mirroring with eight processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 127](#)
 - [Table 112 “Memory mirroring with eight processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 135](#)

Table 109. Memory mirroring with eight processors (Processors 5 and 6, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49	1		3		5			8		10		12	13		15		17			20		22		24	49
50	1		3		5			8		10		12	13		15		17			20		22		24	50
51	1		3		5			8		10		12	13		15		17			20		22		24	51
52	1		3		5			8		10		12	13		15		17			20		22		24	52
53	1		3		5			8		10		12	13		15		17			20		22		24	53
54	1		3		5			8		10		12	13		15		17			20		22		24	54
55	1		3		5			8		10		12	13		15		17			20		22		24	55
56	1		3		5			8		10		12	13		15		17			20		22		24	56
57	1		3		5			8		10		12	13		15		17			20		22		24	57
58			3	4	5	6	7	8	9	10			13		15		17			20		22		24	58
59			3	4	5	6	7	8	9	10			13		15		17			20		22		24	59
60			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			60
61			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			61
62			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			62
63			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			63
64			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			64
65			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			65
66			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			66
67			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			67
68			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			68
69	1		3		5		7	8	9	10	11	12	13		15	16	17	18	19	20	21	22			69
70			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			70
71	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	71
72	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	72

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 107 “Memory mirroring with eight processors \(Processors 5 and 6, 16 to 24 total DIMMs installed in server\)” on page 130](#)
 - [Table 108 “Memory mirroring with eight processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 131](#)
 - [Table 110 “Memory mirroring with eight processors \(Processors 5 and 6, 73 to 96 total DIMMs installed in server\)” on page 133](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 101 “Memory mirroring with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 124](#)
 - [Table 105 “Memory mirroring with eight processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 128](#)
 - [Table 113 “Memory mirroring with eight processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 136](#)

Table 110. Memory mirroring with eight processors (Processors 5 and 6, 73 to 96 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
73	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	73
74			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			74
75	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	75
76			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			76
77	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	77
78			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			78
79	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	79
80			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			80
81	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	81
82	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			82
83	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	83
84	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			84
85	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	85
86	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	86
87	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	87
88	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	88
89	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	89
90	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	90
91	91 DIMM memory mirroring configuration is not supported.												91 DIMM memory mirroring configuration is not supported.												91
92	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	92
93	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	93
94	94 DIMM memory mirroring configuration is not supported.												94 DIMM memory mirroring configuration is not supported.												94
95	95 DIMM memory mirroring configuration is not supported.												95 DIMM memory mirroring configuration is not supported.												95
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 107 “Memory mirroring with eight processors \(Processors 5 and 6, 16 to 24 total DIMMs installed in server\)” on page 130](#)
 - [Table 108 “Memory mirroring with eight processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 131](#)
 - [Table 109 “Memory mirroring with eight processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 132](#)
- To continue populating DIMMs for a system with 73 to 96 DIMMs:
 - [Table 102 “Memory mirroring with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 125](#)
 - [Table 106 “Memory mirroring with eight processors \(Processors 3 and 4, 73 to 96 total DIMMs installed in server\)” on page 129](#)

- Table 114 “Memory mirroring with eight processors (Processors 7 and 8, 73 to 96 total DIMMs installed in server)” on page 137

Table 111. Memory mirroring with eight processors (Processors 7 and 8, 16 to 24 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
16								8		10										20		22			16
17								8		10										20		22			17
18								8		10										20		22			18
19								8		10										20		22			19
20								8		10										20		22			20
21								8		10										20		22			21
22								8		10										20		22			22
23								8		10		12								20		22			23
24								8		10		12								20		22		24	24

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - Table 112 “Memory mirroring with eight processors (Processors 7 and 8, 25 to 48 total DIMMs installed in server)” on page 135
 - Table 113 “Memory mirroring with eight processors (Processors 7 and 8, 49 to 72 total DIMMs installed in server)” on page 136
 - Table 114 “Memory mirroring with eight processors (Processors 7 and 8, 73 to 96 total DIMMs installed in server)” on page 137
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - Table 99 “Memory mirroring with eight processors (Processors 1 and 2, 16 to 24 total DIMMs installed in server)” on page 122
 - Table 103 “Memory mirroring with eight processors (Processors 3 and 4, 16 to 24 total DIMMs installed in server)” on page 126
 - Table 107 “Memory mirroring with eight processors (Processors 5 and 6, 16 to 24 total DIMMs installed in server)” on page 130

Table 112. Memory mirroring with eight processors (Processors 7 and 8, 25 to 48 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
25							8		10		12								20		22		24	25	
26							8		10		12								20		22		24	26	
27							8		10		12								20		22		24	27	
28							8		10		12								20		22		24	28	
29							8		10		12								20		22		24	29	
30							8		10		12								20		22		24	30	
31			3		5		8		10										20		22		24	31	
32			3		5		8		10					15		17			20		22			32	
33			3		5		8		10										20		22		24	33	
34			3		5		8		10					15		17			20		22			34	
35			3		5		8		10										20		22		24	35	
36			3		5		8		10					15		17			20		22			36	
37			3		5		8		10					15		17			20		22			37	
38			3		5		8		10					15		17			20		22			38	
39			3		5		8		10					15		17			20		22			39	
40			3		5		8		10					15		17			20		22			40	
41			3		5		8		10					15		17			20		22			41	
42			3		5		8		10					15		17			20		22			42	
43			3		5		8		10					15		17			20		22			43	
44			3		5		8		10					15		17			20		22			44	
45			3		5		8		10					15		17			20		22			45	
46	1		3		5		8		10		12			15		17			20		22			46	
47			3		5		8		10					15		17			20		22			47	
48	1		3		5		8		10		12	13		15		17			20		22		24	48	

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 111 “Memory mirroring with eight processors \(Processors 7 and 8, 16 to 24 total DIMMs installed in server\)” on page 134](#)
 - [Table 113 “Memory mirroring with eight processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 136](#)
 - [Table 114 “Memory mirroring with eight processors \(Processors 7 and 8, 73 to 96 total DIMMs installed in server\)” on page 137](#)
- To continue populating DIMMs for a system with 25 to 48 DIMMs:
 - [Table 100 “Memory mirroring with eight processors \(Processors 1 and 2, 25 to 48 total DIMMs installed in server\)” on page 123](#)
 - [Table 104 “Memory mirroring with eight processors \(Processors 3 and 4, 25 to 48 total DIMMs installed in server\)” on page 127](#)
 - [Table 108 “Memory mirroring with eight processors \(Processors 5 and 6, 25 to 48 total DIMMs installed in server\)” on page 131](#)

Table 113. Memory mirroring with eight processors (Processors 7 and 8, 49 to 72 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
49	1		3		5			8		10		12			15		17			20		22			49
50	1		3		5			8		10		12	13		15		17			20		22		24	50
51	1		3		5			8		10		12	13		15		17			20		22		24	51
52	1		3		5			8		10		12	13		15		17			20		22		24	52
53	1		3		5			8		10		12	13		15		17			20		22		24	53
54	1		3		5			8		10		12	13		15		17			20		22		24	54
55	1		3		5			8		10		12	13		15		17			20		22		24	55
56	1		3		5			8		10		12	13		15		17			20		22		24	56
57	1		3		5			8		10		12	13		15		17			20		22		24	57
58	1		3		5			8		10		12	13		15		17			20		22		24	58
59	1		3		5			8		10		12	13		15		17			20		22		24	59
60	1		3		5			8		10		12	13		15		17			20		22		24	60
61	1		3		5			8		10		12	13		15		17			20		22		24	61
62			3	4	5	6	7	8	9	10			13		15		17			20		22		24	62
63			3	4	5	6	7	8	9	10			13		15		17			20		22		24	63
64			3	4	5	6	7	8	9	10					15	16	17	18		20	21	22			64
65			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			65
66			3	4	5	6	7	8	9	10			13		15		17			20		22		24	66
67			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			67
68			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			68
69			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			69
70			3	4	5	6	7	8	9	10			13		15		17			20		22		24	70
71	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			71
72	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	72

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 111 “Memory mirroring with eight processors \(Processors 7 and 8, 16 to 24 total DIMMs installed in server\)” on page 134](#)
 - [Table 112 “Memory mirroring with eight processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 135](#)
 - [Table 114 “Memory mirroring with eight processors \(Processors 7 and 8, 73 to 96 total DIMMs installed in server\)” on page 137](#)
- To continue populating DIMMs for a system with 49 to 72 DIMMs:
 - [Table 101 “Memory mirroring with eight processors \(Processors 1 and 2, 49 to 72 total DIMMs installed in server\)” on page 124](#)
 - [Table 105 “Memory mirroring with eight processors \(Processors 3 and 4, 49 to 72 total DIMMs installed in server\)” on page 128](#)
 - [Table 109 “Memory mirroring with eight processors \(Processors 5 and 6, 49 to 72 total DIMMs installed in server\)” on page 132](#)

Table 114. Memory mirroring with eight processors (Processors 7 and 8, 73 to 96 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
73			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			73
74			3	4	5	6	7	8	9	10			13		15		17			20		22		24	74
75	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	75
76			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			76
77	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			77
78			3	4	5	6	7	8	9	10			13		15		17			20		22		24	78
79			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			79
80			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			80
81	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	81
82			3	4	5	6	7	8	9	10			13		15		17			20		22		24	82
83	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			83
84			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			84
85			3	4	5	6	7	8	9	10					15	16	17	19	19	20	21	22			85
86			3	4	5	6	7	8	9	10			13		15		17			20		22		24	86
87	1		3		5		7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	87
88			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			88
89	1		3		5		7	8	9	10	11	12			15	16	17	18	19	20	21	22			89
90	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17			20		22		24	90
91	91 DIMM memory mirroring configuration is not supported.												91 DIMM memory mirroring configuration is not supported.												91
92	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			92
93	1	2	3	4	5	6	7	8	9	10	11	12	13		15		17		19	20	21	22	23	24	93
94	94 DIMM memory mirroring configuration is not supported.												94 DIMM memory mirroring configuration is not supported.												94
95	95 DIMM memory mirroring configuration is not supported.												95 DIMM memory mirroring configuration is not supported.												95
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 111 “Memory mirroring with eight processors \(Processors 7 and 8, 16 to 24 total DIMMs installed in server\)” on page 134](#)
 - [Table 112 “Memory mirroring with eight processors \(Processors 7 and 8, 25 to 48 total DIMMs installed in server\)” on page 135](#)
 - [Table 113 “Memory mirroring with eight processors \(Processors 7 and 8, 49 to 72 total DIMMs installed in server\)” on page 136](#)
- To continue populating DIMMs for a system with 73 to 96 DIMMs:
 - [Table 102 “Memory mirroring with eight processors \(Processors 1 and 2, 73 to 96 total DIMMs installed in server\)” on page 125](#)
 - [Table 106 “Memory mirroring with eight processors \(Processors 3 and 4, 73 to 96 total DIMMs installed in server\)” on page 129](#)

- Table 110 “Memory mirroring with eight processors (Processors 5 and 6, 73 to 96 total DIMMs installed in server)” on page 133

Memory sparing

In memory-sparing mode, one memory rank serves as a spare for other ranks on the same channel in case they fail. The spare rank is held in reserve and not used as active memory until a failure is indicated, with reserved capacity subtracted from the total available memory in the system. The DIMM installation order for memory sparing varies based on the number of processors and memory modules installed in the server.

After an error threshold is surpassed in a system protected by memory sparing, the content of a failing rank of DIMMs is copied to the spare rank. The failing rank is then taken offline and the spare rank placed online for use as active memory in place of the failed rank. Since the failover process involves copying of memory content, the level of memory redundancy provided by memory sparing is less than that provided by memory mirroring: memory mirroring is the preferred failure-protection choice for critical applications.

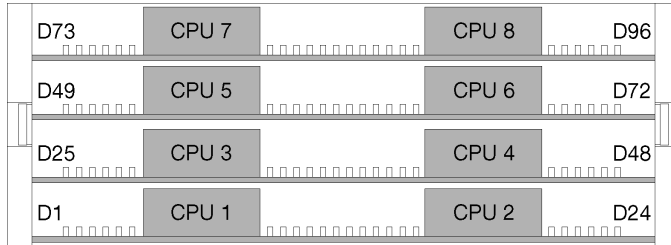


Figure 26. Processor and memory module layout

Memory sparing guidelines:

- The spare rank must have identical or larger memory capacity than all of the other active memory ranks on the same channel.
- If installing DIMMs that are one rank, follow the population sequences listed below.
- If installing DIMMs with more than one rank, follow population sequences specified for independent memory mode. See [“Independent memory mode” on page 63](#).

The memory sparing DIMM population sequences for each supported processor configuration are:

- [“Installation order: memory sparing with two processors” on page 140](#)
- [“Installation order: memory sparing with three processors” on page 141](#)
- [“Installation order: memory sparing with four processors” on page 145](#)
- [“Installation order: memory sparing with six processors” on page 149](#)
- [“Installation order: memory sparing with eight processors” on page 161](#)

For information about configuring memory settings, including how to enable memory sparing, see [“Memory configuration”](#) in the *ThinkSystem SR950 Setup Guide*.

Installation order: memory sparing with two processors

Memory module installation order for memory sparing with two processors installed in the server.

The following table shows the DIMM population sequence for memory sparing when two processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.

Note: An even number of DIMMs is required for memory sparing.

Table 115. Memory sparing with two processors, 4 to 24 total DIMMs installed in server

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
4							7	8											19	20					4
6					5	6	7	8											19	20					6
8					5	6	7	8									17	18	19	20					8
10					5	6	7	8	9	10							17	18	19	20					10
12					5	6	7	8	9	10							17	18	19	20	21	22			12
14			3	4	5	6	7	8	9	10							17	18	19	20	21	22			14
16			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			16
18			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			18
20			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	20
22	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	22
24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	24

Installation order: memory sparing with three processors

Memory module installation order for memory sparing with three processors installed in the server.

The following tables show the DIMM population sequence for memory sparing when three processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processor 3 is installed in the upper system board of the lower compute tray or in the upper compute tray (processor slot 4)

Note: An even number of DIMMs is required for memory sparing.

Table 116. Memory sparing with three processors (Processors 1 and 2, 6 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs	
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24		
6							7	8											19	20					6	
8					5	6	7	8											19	20					8	
10					5	6	7	8									17	18	19	20					10	
12					5	6	7	8									17	18	19	20					12	
14					5	6	7	8	9	10							17	18	19	20					14	
16					5	6	7	8	9	10							17	18	19	20	21	22			16	
18					5	6	7	8	9	10							17	18	19	20	21	22			18	
20			3	4	5	6	7	8	9	10							17	18	19	20	21	22			20	
22			3	4	5	6	7	8	9	10						15	16	17	18	19	20	21	22			22
24			3	4	5	6	7	8	9	10						15	16	17	18	19	20	21	22			24

Related DIMM population sequences for three processor systems:

- Processor 1 and 2 DIMM population sequences for 26 to 48 DIMMs, see [Table 117 “Memory sparing with three processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)”](#) on page 142.
- To continue populating processor 3 DIMMs for a system with 6 to 24 DIMMs, see [Table 118 “Memory sparing with three processors \(Processor 3, 6 to 24 total DIMMs installed in server\)”](#) on page 143.

Table 117. Memory sparing with three processors (Processors 1 and 2, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			26
28			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	28
30			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	30
32			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			32
34			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	34
36	1	2	3	4	5	6	7	8	9	10	11	12	13	13	15	16	17	18	19	20	21	22	23	24	36

Related DIMM population sequences for three processor systems:

- Processor 1 and 2 DIMM population sequences for 6 to 24 DIMMs, see [Table 116 “Memory sparing with three processors \(Processors 1 and 2, 6 to 24 total DIMMs installed in server\)”](#) on page 141.
- To continue populating processor 3 DIMMs for a system with 26 to 48 DIMMs, see [Table 119 “Memory sparing with three processors \(Processor 3, 26 to 48 total DIMMs installed in server\)”](#) on page 144.

Table 118. Memory sparing with three processors (Processor 3, 6 to 24 total DIMMs installed in server)

Total DIMMs	Processor 3 slot is empty												Processor 4 slot (Processor 3)												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
6																			19	20					6
8																			19	20					8
10																			19	20					10
12																	17	18	19	20					12
14																	17	18	19	20					14
16																	17	18	19	20					16
18																	17	18	19	20	21	22			18
20																	17	18	19	20	21	22			20
22																	17	18	19	20	21	22			22
24															15	16	17	18	19	20	21	22			24

Related DIMM population sequences for three processor systems:

- Processor 3 population sequence for systems with 26 to 48 DIMMs, see [Table 119 “Memory sparing with three processors \(Processor 3, 26 to 48 total DIMMs installed in server\)”](#) on page 144.
- To continue populating processor 1 and 2 DIMMs for a system with 6 to 24 DIMMs, see [Table 116 “Memory sparing with three processors \(Processors 1 and 2, 6 to 24 total DIMMs installed in server\)”](#) on page 141.

Table 119. Memory sparing with three processors (Processor 3, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 3 slot is empty												Processor 4 slot (Processor 3)												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26															15	16	17	18	19	20	21	22			26
28															15	16	17	18	19	20	21	22			28
30															15	16	17	18	19	20	21	22	23	24	30
32															15	16	17	18	19	20	21	22	23	24	32
34															15	16	17	18	19	20	21	22	23	24	34
36													13	14	15	16	17	18	19	20	21	22	23	24	36

Related DIMM population sequences for three processor systems:

- Processor 3 DIMM population sequence for 6 to 24 DIMMs, see [Table 118 “Memory sparing with three processors \(Processor 3, 6 to 24 total DIMMs installed in server\)”](#) on page 143.
- To continue populating processor 1 and 2 DIMMs for a system with 26 to 48 DIMMs, see [Table 117 “Memory sparing with three processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)”](#) on page 142.

Installation order: memory sparing with four processors

Memory module installation order for memory sparing with four processors installed in the server.

The following tables show the DIMM population sequence for memory sparing when four processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray or in the upper compute tray.

Note: An even number of DIMMs is required for memory sparing.

Table 120. Memory sparing with four processors (Processors 1 and 2, 8 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
8							7	8											19	20					8
10					5	6	7	8											19	20					10
12					5	6	7	8										17	18	19	20				12
14					5	6	7	8										17	18	19	20				14
16					5	6	7	8										17	18	19	20				16
18					5	6	7	8	9	10								17	18	19	20				18
20					5	6	7	8	9	10								17	18	19	20	21	22		20
22					5	6	7	8	9	10								17	18	19	20	21	22		22
24					5	6	7	8	9	10								17	18	19	20	21	22		24

Related DIMM population sequences for four processor systems:

- Processor 1 and 2 DIMM population sequences for 26 to 48 DIMMs, see [Table 121 “Memory sparing with four processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)”](#) on page 146.
- To continue populating processor 3 and 4 DIMMs for a system with 8 to 24 DIMMs, see [Table 122 “Memory sparing with four processors \(Processors 3 and 4, 8 to 24 total DIMMs installed in server\)”](#) on page 147.

Table 121. Memory sparing with four processors (Processors 1 and 2, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26			3	4	5	6	7	8	9	10					17	18	19	20	21	22				26	
28			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			28
30			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			30
32			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			32
34			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			34
36			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	36
38			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	38
40			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	40
42	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	42
44	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	44
46	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	46
48	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	48

Related DIMM population sequences for four processor systems:

- Processor 1 and 2 DIMM population sequences for 8 to 24 DIMMs, see [Table 120 “Memory sparing with four processors \(Processors 1 and 2, 8 to 24 total DIMMs installed in server\)”](#) on page 145.
- To continue populating processor 3 and 4 DIMMs for a system with 26 to 48 DIMMs, see [Table 123 “Memory sparing with four processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)”](#) on page 148.

Table 122. Memory sparing with four processors (Processors 3 and 4, 8 to 24 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
8							7	8											19	20					8
10							7	8											19	20					10
12							7	8											19	20					12
14					5	6	7	8											19	20					14
16					5	6	7	8									17	18	19	20					16
18					5	6	7	8									17	18	19	20					18
20					5	6	7	8									17	18	19	20					20
22					5	6	7	8	9	10							17	18	19	20					22
24					5	6	7	8	9	10							17	18	19	20	21	22			24

Related DIMM population sequences for four processor systems:

- Processor 3 and 4 DIMM population sequences for systems with 26 to 48 DIMMs, see [Table 123 “Memory sparing with four processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)”](#) on page 148.
- To continue populating processor 1 and 2 DIMMs for a system with 8 to 24 DIMMs, see [Table 120 “Memory sparing with four processors \(Processors 1 and 2, 8 to 24 total DIMMs installed in server\)”](#) on page 145.

Table 123. Memory sparing with four processors (Processors 3 and 4, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26					5	6	7	8	9	10						17	18	19	20	21	22			26	
28					5	6	7	8	9	10						17	18	19	20	21	22			28	
30			3	4	5	6	7	8	9	10						17	18	19	20	21	22			30	
32			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			32
34			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			34
36			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			36
38			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			38
40			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	40
42			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	42
44			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	44
46	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	46
48	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	48

Related DIMM population sequences for four processor systems:

- Processor 3 and 4 DIMM population sequences for 8 to 24 DIMMs, see [Table 122 “Memory sparing with four processors \(Processors 3 and 4, 8 to 24 total DIMMs installed in server\)”](#) on page 147.
- To continue populating processor 1 and 2 DIMMs for a system with 26 to 48 DIMMs, see [Table 121 “Memory sparing with four processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)”](#) on page 146.

Installation order: memory sparing with six processors

Memory module installation order for memory sparing with six processors installed in the server.

The following table shows the DIMM population sequence for memory sparing when six processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processor 5 is installed in the lower system board of the upper compute tray.
- Processor 6 is installed in the upper system board of the upper compute tray (processor slot 7).

Note: An even number of DIMMs is required for memory sparing.

Table 124. Memory sparing with six processors (Processors 1 and 2, 12 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
12							7	8											19	20					12
14					5	6	7	8											19	20					14
16					5	6	7	8										17	18	19	20				16
18					5	6	7	8										17	18	19	20				18
20					5	6	7	8										17	18	19	20				20
22					5	6	7	8										17	18	19	20				22
24					5	6	7	8										17	18	19	20				24

Related DIMM population sequences for six processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 125 “Memory sparing with six processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)” on page 150](#)
 - [Table 126 “Memory sparing with six processors \(Processors 1 and 2, 50 to 72 total DIMMs installed in server\)” on page 151](#)
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - [Table 127 “Memory sparing with six processors \(Processors 3 and 4, 12 to 24 total DIMMs installed in server\)” on page 152](#)
 - [Table 130 “Memory sparing with six processors \(Processors 5, 12 to 24 total DIMMs installed in server\)” on page 155](#)
 - [Table 133 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 12 to 24 total DIMMs installed in server\)” on page 158](#)

Table 125. Memory sparing with six processors (Processors 1 and 2, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26					5	6	7	8	9	10							17	18	19	20					26
28					5	6	7	8	9	10							17	18	19	20	21	22			28
30					5	6	7	8	9	10							17	18	19	20	21	22			30
32					5	6	7	8	9	10							17	18	19	20	21	22			32
34					5	6	7	8	9	10							17	18	19	20	21	22			34
36					5	6	7	8	9	10							17	18	19	20	21	22			36
38			3	4	5	6	7	8	9	10							17	18	19	20	21	22			38
40			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			40
42			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			42
44			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			44
46			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			46
48			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			48

Related DIMM population sequences for six processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 124 “Memory sparing with six processors \(Processors 1 and 2, 12 to 24 total DIMMs installed in server\)” on page 149](#)
 - [Table 126 “Memory sparing with six processors \(Processors 1 and 2, 50 to 72 total DIMMs installed in server\)” on page 151](#)
- To continue populating DIMMs for a system with 26 to 48 DIMMs:
 - [Table 128 “Memory sparing with six processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)” on page 153](#)
 - [Table 131 “Memory sparing with six processors \(Processors 5 and 6, 26 to 48 total DIMMs installed in server\)” on page 156](#)
 - [Table 134 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 26 to 48 total DIMMs installed in server\)” on page 159](#)

Table 126. Memory sparing with six processors (Processors 1 and 2, 50 to 72 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
50			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			50
52			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	52
54			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	54
56			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	56
58			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	58
60			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	60
62	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	62
64	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	64
66	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	66
68	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	68
70	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	70
72	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	72

Related DIMM population sequences for six processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 124 “Memory sparing with six processors \(Processors 1 and 2, 12 to 24 total DIMMs installed in server\)” on page 149](#)
 - [Table 125 “Memory sparing with six processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)” on page 150](#)
- To continue populating DIMMs for a system with 50 to 72 DIMMs:
 - [Table 129 “Memory sparing with six processors \(Processors 3 and 4, 50 to 72 total DIMMs installed in server\)” on page 154](#)
 - [Table 132 “Memory sparing with six processors \(Processors 5 and 6, 50 to 72 total DIMMs installed in server\)” on page 157](#)
 - [Table 135 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 50 to 72 total DIMMs installed in server\)” on page 160](#)

Table 127. Memory sparing with six processors (Processors 3 and 4, 12 to 24 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
12							7	8											19	20					12
14							7	8											19	20					14
16							7	8											19	20					16
18					5	6	7	8											19	20					18
20					5	6	7	8									17	18	19	20					20
22					5	6	7	8									17	18	19	20					22
24					5	6	7	8									17	18	19	20					24

Related DIMM population sequences for six processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 128 “Memory sparing with six processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)” on page 153](#)
 - [Table 129 “Memory sparing with six processors \(Processors 3 and 4, 50 to 72 total DIMMs installed in server\)” on page 154](#)
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - [Table 124 “Memory sparing with six processors \(Processors 1 and 2, 12 to 24 total DIMMs installed in server\)” on page 149](#)
 - [Table 130 “Memory sparing with six processors \(Processors 5, 12 to 24 total DIMMs installed in server\)” on page 155](#)
 - [Table 133 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 12 to 24 total DIMMs installed in server\)” on page 158](#)

Table 128. Memory sparing with six processors (Processors 3 and 4, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26					5	6	7	8									17	18	19	20					26
28					5	6	7	8									17	18	19	20					28
30					5	6	7	8	9	10							17	18	19	20					30
32					5	6	7	8	9	10							17	18	19	20	21	22			32
34					5	6	7	8	9	10							17	18	19	20	21	22			34
36					5	6	7	8	9	10							17	18	19	20	21	22			36
38					5	6	7	8	9	10							17	18	19	20	21	22			38
40					5	6	7	8	9	10							17	18	19	20	21	22			40
42			3	4	5	6	7	8	9	10							17	18	19	20	21	22			42
44			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			44
46			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			46
48			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			48

Related DIMM population sequences for six processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 127 “Memory sparing with six processors \(Processors 3 and 4, 12 to 24 total DIMMs installed in server\)” on page 152](#)
 - [Table 129 “Memory sparing with six processors \(Processors 3 and 4, 50 to 72 total DIMMs installed in server\)” on page 154](#)
- To continue populating DIMMs for a system with 26 to 48 DIMMs:
 - [Table 125 “Memory sparing with six processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)” on page 150](#)
 - [Table 131 “Memory sparing with six processors \(Processors 5 and 6, 26 to 48 total DIMMs installed in server\)” on page 156](#)
 - [Table 134 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 26 to 48 total DIMMs installed in server\)” on page 159](#)

Table 129. Memory sparing with six processors (Processors 3 and 4, 50 to 72 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
50			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			50
52			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			52
54			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			54
56			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	56
58			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	58
60			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	60
62			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	62
64			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	64
66	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	66
68	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	68
70	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	70
72	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	72

Related DIMM population sequences for six processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 127 “Memory sparing with six processors \(Processors 3 and 4, 12 to 24 total DIMMs installed in server\)” on page 152](#)
 - [Table 128 “Memory sparing with six processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)” on page 153](#)
- To continue populating DIMMs for a system with 50 to 72 DIMMs:
 - [Table 126 “Memory sparing with six processors \(Processors 1 and 2, 50 to 72 total DIMMs installed in server\)” on page 151](#)
 - [Table 132 “Memory sparing with six processors \(Processors 5 and 6, 50 to 72 total DIMMs installed in server\)” on page 157](#)
 - [Table 135 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 50 to 72 total DIMMs installed in server\)” on page 160](#)

Table 130. Memory sparing with six processors (Processors 5, 12 to 24 total DIMMs installed in server)

Note: Processor 6 is actually installed in the processor 7 slot.

Total DIMMs	Processor 5												Processor 6 slot is empty												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
12							7	8																	12
14							7	8																	14
16							7	8																	16
18							7	8																	18
20							7	8																	20
22					5	6	7	8																	22
24					5	6	7	8																	24

Related DIMM population sequences for six processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 131 “Memory sparing with six processors \(Processors 5 and 6, 26 to 48 total DIMMs installed in server\)” on page 156](#)
 - [Table 132 “Memory sparing with six processors \(Processors 5 and 6, 50 to 72 total DIMMs installed in server\)” on page 157](#)
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - [Table 124 “Memory sparing with six processors \(Processors 1 and 2, 12 to 24 total DIMMs installed in server\)” on page 149](#)
 - [Table 127 “Memory sparing with six processors \(Processors 3 and 4, 12 to 24 total DIMMs installed in server\)” on page 152](#)
 - [Table 133 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 12 to 24 total DIMMs installed in server\)” on page 158](#)

Table 131. Memory sparing with six processors (Processors 5 and 6, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6 slot is empty												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26					5	6	7	8																	26
28					5	6	7	8																	28
30					5	6	7	8																	30
32					5	6	7	8																	32
34					5	6	7	8	9	10															34
36					5	6	7	8	9	10															36
38					5	6	7	8	9	10															38
40					5	6	7	8	9	10															40
42					5	6	7	8	9	10															42
44					5	6	7	8	9	10															44
46			3	4	5	6	7	8	9	10															46
48			3	4	5	6	7	8	9	10															48

Related DIMM population sequences for six processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 130 “Memory sparing with six processors \(Processors 5, 12 to 24 total DIMMs installed in server\)” on page 155](#)
 - [Table 132 “Memory sparing with six processors \(Processors 5 and 6, 50 to 72 total DIMMs installed in server\)” on page 157](#)
- To continue populating DIMMs for a system with 26 to 48 DIMMs:
 - [Table 125 “Memory sparing with six processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)” on page 150](#)
 - [Table 128 “Memory sparing with six processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)” on page 153](#)
 - [Table 134 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 26 to 48 total DIMMs installed in server\)” on page 159](#)

Table 132. Memory sparing with six processors (Processors 5 and 6, 50 to 72 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6 slot is empty												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
50			3	4	5	6	7	8	9	10															50
52			3	4	5	6	7	8	9	10															52
54			3	4	5	6	7	8	9	10															54
56			3	4	5	6	7	8	9	10															56
58			3	4	5	6	7	8	9	10	11	12													58
60			3	4	5	6	7	8	9	10	11	12													60
62			3	4	5	6	7	8	9	10	11	12													62
64			3	4	5	6	7	8	9	10	11	12													64
66			3	4	5	6	7	8	9	10	11	12													66
68			3	4	5	6	7	8	9	10	11	12													68
70	1	2	3	4	5	6	7	8	9	10	11	12													70
72	1	2	3	4	5	6	7	8	9	10	11	12													72

Related DIMM population sequences for six processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 130 “Memory sparing with six processors \(Processors 5, 12 to 24 total DIMMs installed in server\)” on page 155](#)
 - [Table 131 “Memory sparing with six processors \(Processors 5 and 6, 26 to 48 total DIMMs installed in server\)” on page 156](#)
- To continue populating DIMMs for a system with 50 to 72 DIMMs:
 - [Table 126 “Memory sparing with six processors \(Processors 1 and 2, 50 to 72 total DIMMs installed in server\)” on page 151](#)
 - [Table 129 “Memory sparing with six processors \(Processors 3 and 4, 50 to 72 total DIMMs installed in server\)” on page 154](#)
 - [Table 135 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 50 to 72 total DIMMs installed in server\)” on page 160](#)

Table 133. Memory sparing with six processors (Processor 7 slot, which is actually Processor 6, 12 to 24 total DIMMs installed in server)

Note: Processor 6 is actually installed in the processor 7 slot.

Total DIMMs	Processor 7 slot (Processor 6)												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
12							7	8																	12
14							7	8																	14
16							7	8																	16
18							7	8																	18
20							7	8																	20
22							7	8																	22
24					5	6	7	8																	24

Related DIMM population sequences for six processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 134 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 26 to 48 total DIMMs installed in server\)” on page 159](#)
 - [Table 135 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 50 to 72 total DIMMs installed in server\)” on page 160](#)
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - [Table 124 “Memory sparing with six processors \(Processors 1 and 2, 12 to 24 total DIMMs installed in server\)” on page 149](#)
 - [Table 127 “Memory sparing with six processors \(Processors 3 and 4, 12 to 24 total DIMMs installed in server\)” on page 152](#)
 - [Table 130 “Memory sparing with six processors \(Processors 5, 12 to 24 total DIMMs installed in server\)” on page 155](#)

Table 134. Memory sparing with six processors (Processor 7 slot, which is actually Processor 6, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 7 slot (Processor 6)												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26					5	6	7	8																	26
28					5	6	7	8																	28
30					5	6	7	8																	30
32					5	6	7	8																	32
34					5	6	7	8																	34
36					5	6	7	8	9	10															36
38					5	6	7	8	9	10															38
40					5	6	7	8	9	10															40
42					5	6	7	8	9	10															42
44					5	6	7	8	9	10															44
46					5	6	7	8	9	10															46
48			3	4	5	6	7	8	9	10															48

Related DIMM population sequences for six processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 133 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 12 to 24 total DIMMs installed in server\)” on page 158](#)
 - [Table 135 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 50 to 72 total DIMMs installed in server\)” on page 160](#)
- To continue populating DIMMs for a system with 26 to 48 DIMMs:
 - [Table 125 “Memory sparing with six processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)” on page 150](#)
 - [Table 128 “Memory sparing with six processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)” on page 153](#)
 - [Table 131 “Memory sparing with six processors \(Processors 5 and 6, 26 to 48 total DIMMs installed in server\)” on page 156](#)

Table 135. Memory sparing with six processors (Processor 7 slot, which is actually Processor 6, 50 to 72 total DIMMs installed in server)

Total DIMMs	Processor 7 slot (Processor 6)												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
50			3	4	5	6	7	8	9	10															50
52			3	4	5	6	7	8	9	10															52
54			3	4	5	6	7	8	9	10															54
56			3	4	5	6	7	8	9	10															56
58			3	4	5	6	7	8	9	10															58
60			3	4	5	6	7	8	9	10	11	12													60
62			3	4	5	6	7	8	9	10	11	12													62
64			3	4	5	6	7	8	9	10	11	12													64
66			3	4	5	6	7	8	9	10	11	12													66
68			3	4	5	6	7	8	9	10	11	12													68
70			3	4	5	6	7	8	9	10	11	12													70
72	1	2	3	4	5	6	7	8	9	10	11	12													72

Related DIMM population sequences for six processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 133 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 12 to 24 total DIMMs installed in server\)” on page 158](#)
 - [Table 134 “Memory sparing with six processors \(Processor 7 slot, which is actually Processor 6, 26 to 48 total DIMMs installed in server\)” on page 159](#)
- To continue populating DIMMs for a system with 50 to 72 DIMMs:
 - [Table 126 “Memory sparing with six processors \(Processors 1 and 2, 50 to 72 total DIMMs installed in server\)” on page 151](#)
 - [Table 129 “Memory sparing with six processors \(Processors 3 and 4, 50 to 72 total DIMMs installed in server\)” on page 154](#)
 - [Table 132 “Memory sparing with six processors \(Processors 5 and 6, 50 to 72 total DIMMs installed in server\)” on page 157](#)

Installation order: memory sparing with eight processors

Memory module installation order for memory sparing with eight processors installed in the server.

The following table shows the DIMM population sequence for memory sparing when eight processors are installed.

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processors 5 and 6 are installed in the lower system board of the upper compute tray.
- Processors 7 and 8 are installed in the upper system board of the upper compute tray.

Note: An even number of DIMMs is required for memory sparing.

Table 136. Memory sparing with eight processors (Processors 1 and 2, 16 to 24 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
16							7	8											19	20					16
18					5	6	7	8											19	20					18
20					5	6	7	8											19	20					20
22					5	6	7	8									17	18	19	20					22
24					5	6	7	8									17	18	19	20					24

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 137 “Memory sparing with eight processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)” on page 162](#)
 - [Table 138 “Memory sparing with eight processors \(Processors 1 and 2, 50 to 72 total DIMMs installed in server\)” on page 163](#)
 - [Table 139 “Memory sparing with eight processors \(Processors 1 and 2, 74 to 96 total DIMMs installed in server\)” on page 164](#)
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - [Table 140 “Memory sparing with eight processors \(Processors 3 and 4, 16 to 24 total DIMMs installed in server\)” on page 165](#)
 - [Table 144 “Memory sparing with eight processors \(Processors 5 and 6, 16 to 24 total DIMMs installed in server\)” on page 169](#)
 - [Table 148 “Memory sparing with eight processors \(Processors 7 and 8, 16 to 24 total DIMMs installed in server\)” on page 173](#)

Table 137. Memory sparing with eight processors (Processors 1 and 2, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26					5	6	7	8									17	18	19	20					26
28					5	6	7	8									17	18	19	20					28
30					5	6	7	8									17	18	19	20					30
32					5	6	7	8									17	18	19	20					32
34					5	6	7	8	9	10							17	18	19	20					34
36					5	6	7	8	9	10							17	18	19	20	21	22			36
38					5	6	7	8	9	10							17	18	19	20	21	22			38
40					5	6	7	8	9	10							17	18	19	20	21	22			40
42					5	6	7	8	9	10							17	18	19	20	21	22			42
44					5	6	7	8	9	10							17	18	19	20	21	22			44
46					5	6	7	8	9	10							17	18	19	20	21	22			46
48					5	6	7	8	9	10							17	18	19	20	21	22			48

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 136 “Memory sparing with eight processors \(Processors 1 and 2, 16 to 24 total DIMMs installed in server\)” on page 161](#)
 - [Table 138 “Memory sparing with eight processors \(Processors 1 and 2, 50 to 72 total DIMMs installed in server\)” on page 163](#)
 - [Table 139 “Memory sparing with eight processors \(Processors 1 and 2, 74 to 96 total DIMMs installed in server\)” on page 164](#)
- To continue populating DIMMs for a system with 26 to 48 DIMMs:
 - [Table 141 “Memory sparing with eight processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)” on page 166](#)
 - [Table 145 “Memory sparing with eight processors \(Processors 5 and 6, 26 to 48 total DIMMs installed in server\)” on page 170](#)
 - [Table 149 “Memory sparing with eight processors \(Processors 7 and 8, 26 to 48 total DIMMs installed in server\)” on page 174](#)

Table 138. Memory sparing with eight processors (Processors 1 and 2, 50 to 72 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
50			3	4	5	6	7	8	9	10						17	18	19	20	21	22			50	
52			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			52
54			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			54
56			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			56
58			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			58
60			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			60
62			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			62
64			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			64
66			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			66
68			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	68
70			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	70
72			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	72

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 136 “Memory sparing with eight processors \(Processors 1 and 2, 16 to 24 total DIMMs installed in server\)” on page 161](#)
 - [Table 137 “Memory sparing with eight processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)” on page 162](#)
 - [Table 139 “Memory sparing with eight processors \(Processors 1 and 2, 74 to 96 total DIMMs installed in server\)” on page 164](#)
- To continue populating DIMMs for a system with 50 to 72 DIMMs:
 - [Table 142 “Memory sparing with eight processors \(Processors 3 and 4, 50 to 72 total DIMMs installed in server\)” on page 167](#)
 - [Table 146 “Memory sparing with eight processors \(Processors 5 and 6, 50 to 72 total DIMMs installed in server\)” on page 171](#)
 - [Table 150 “Memory sparing with eight processors \(Processors 7 and 8, 50 to 72 total DIMMs installed in server\)” on page 175](#)

Table 139. Memory sparing with eight processors (Processors 1 and 2, 74 to 96 total DIMMs installed in server)

Total DIMMs	Processor 1												Processor 2												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
74			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	74
76			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	76
78			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	78
80			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	80
82	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	82
84	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	84
86	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	86
88	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	88
90	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	90
92	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	92
94	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	94
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 1 and 2 DIMM population sequences:
 - [Table 136 “Memory sparing with eight processors \(Processors 1 and 2, 16 to 24 total DIMMs installed in server\)” on page 161](#)
 - [Table 137 “Memory sparing with eight processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)” on page 162](#)
 - [Table 138 “Memory sparing with eight processors \(Processors 1 and 2, 50 to 72 total DIMMs installed in server\)” on page 163](#)
- To continue populating DIMMs for a system with 74 to 96 DIMMs:
 - [Table 143 “Memory sparing with eight processors \(Processors 3 and 4, 74 to 96 total DIMMs installed in server\)” on page 168](#)
 - [Table 147 “Memory sparing with eight processors \(Processors 5 and 6, 74 to 96 total DIMMs installed in server\)” on page 172](#)
 - [Table 151 “Memory sparing with eight processors \(Processors 7 and 8, 74 to 96 total DIMMs installed in server\)” on page 176](#)

Table 140. Memory sparing with eight processors (Processors 3 and 4, 16 to 24 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
16							7	8											19	20					16
18							7	8											19	20					18
20							7	8											19	20					20
22					5	6	7	8											19	20					22
24					5	6	7	8									17	18	19	20					24

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 141 “Memory sparing with eight processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)” on page 166](#)
 - [Table 142 “Memory sparing with eight processors \(Processors 3 and 4, 50 to 72 total DIMMs installed in server\)” on page 167](#)
 - [Table 143 “Memory sparing with eight processors \(Processors 3 and 4, 74 to 96 total DIMMs installed in server\)” on page 168](#)
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - [Table 136 “Memory sparing with eight processors \(Processors 1 and 2, 16 to 24 total DIMMs installed in server\)” on page 161](#)
 - [Table 144 “Memory sparing with eight processors \(Processors 5 and 6, 16 to 24 total DIMMs installed in server\)” on page 169](#)
 - [Table 148 “Memory sparing with eight processors \(Processors 7 and 8, 16 to 24 total DIMMs installed in server\)” on page 173](#)

Table 141. Memory sparing with eight processors (Processors 3 and 4, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26					5	6	7	8									17	18	19	20					26
28					5	6	7	8									17	18	19	20					28
30					5	6	7	8									17	18	19	20					30
32					5	6	7	8									17	18	19	20					32
34					5	6	7	8									17	18	19	20					34
36					5	6	7	8									17	18	19	20					36
38					5	6	7	8	9	10							17	18	19	20					38
40					5	6	7	8	9	10							17	18	19	20	21	22			40
42					5	6	7	8	9	10							17	18	19	20	21	22			42
44					5	6	7	8	9	10							17	18	19	20	21	22			44
46					5	6	7	8	9	10							17	18	19	20	21	22			46
48					5	6	7	8	9	10							17	18	19	20	21	22			48

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 140 “Memory sparing with eight processors \(Processors 3 and 4, 16 to 24 total DIMMs installed in server\)” on page 165](#)
 - [Table 142 “Memory sparing with eight processors \(Processors 3 and 4, 50 to 72 total DIMMs installed in server\)” on page 167](#)
 - [Table 143 “Memory sparing with eight processors \(Processors 3 and 4, 74 to 96 total DIMMs installed in server\)” on page 168](#)
- To continue populating DIMMs for a system with 26 to 48 DIMMs:
 - [Table 137 “Memory sparing with eight processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)” on page 162](#)
 - [Table 145 “Memory sparing with eight processors \(Processors 5 and 6, 26 to 48 total DIMMs installed in server\)” on page 170](#)
 - [Table 149 “Memory sparing with eight processors \(Processors 7 and 8, 26 to 48 total DIMMs installed in server\)” on page 174](#)

Table 142. Memory sparing with eight processors (Processors 3 and 4, 50 to 72 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
50					5	6	7	8	9	10							17	18	19	20	21	22			50
52					5	6	7	8	9	10							17	18	19	20	21	22			52
54			3	4	5	6	7	8	9	10							17	18	19	20	21	22			54
56			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			56
58			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			58
60			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			60
62			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			62
64			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			64
66			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			66
68			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			68
70			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			70
72			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	72

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 140 “Memory sparing with eight processors \(Processors 3 and 4, 16 to 24 total DIMMs installed in server\)” on page 165](#)
 - [Table 141 “Memory sparing with eight processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)” on page 166](#)
 - [Table 143 “Memory sparing with eight processors \(Processors 3 and 4, 74 to 96 total DIMMs installed in server\)” on page 168](#)
- To continue populating DIMMs for a system with 50 to 72 DIMMs:
 - [Table 138 “Memory sparing with eight processors \(Processors 1 and 2, 50 to 72 total DIMMs installed in server\)” on page 163](#)
 - [Table 146 “Memory sparing with eight processors \(Processors 5 and 6, 50 to 72 total DIMMs installed in server\)” on page 171](#)
 - [Table 150 “Memory sparing with eight processors \(Processors 7 and 8, 50 to 72 total DIMMs installed in server\)” on page 175](#)

Table 143. Memory sparing with eight processors (Processors 3 and 4, 74 to 96 total DIMMs installed in server)

Total DIMMs	Processor 3												Processor 4												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
74			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	74
76			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	76
78			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	78
80			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	80
82			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	82
84			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	84
86	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	86
88	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	88
90	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	90
92	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	92
94	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	94
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 3 and 4 DIMM population sequences:
 - [Table 140 “Memory sparing with eight processors \(Processors 3 and 4, 16 to 24 total DIMMs installed in server\)” on page 165](#)
 - [Table 141 “Memory sparing with eight processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)” on page 166](#)
 - [Table 142 “Memory sparing with eight processors \(Processors 3 and 4, 50 to 72 total DIMMs installed in server\)” on page 167](#)
- To continue populating DIMMs for a system with 74 to 96 DIMMs:
 - [Table 139 “Memory sparing with eight processors \(Processors 1 and 2, 74 to 96 total DIMMs installed in server\)” on page 164](#)
 - [Table 147 “Memory sparing with eight processors \(Processors 5 and 6, 74 to 96 total DIMMs installed in server\)” on page 172](#)
 - [Table 151 “Memory sparing with eight processors \(Processors 7 and 8, 74 to 96 total DIMMs installed in server\)” on page 176](#)

Table 144. Memory sparing with eight processors (Processors 5 and 6, 16 to 24 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
16							7	8											19	20					16
18							7	8											19	20					18
20							7	8											19	20					20
22							7	8											19	20					22
24							7	8											19	20					24

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 145 “Memory sparing with eight processors \(Processors 5 and 6, 26 to 48 total DIMMs installed in server\)” on page 170](#)
 - [Table 146 “Memory sparing with eight processors \(Processors 5 and 6, 50 to 72 total DIMMs installed in server\)” on page 171](#)
 - [Table 147 “Memory sparing with eight processors \(Processors 5 and 6, 74 to 96 total DIMMs installed in server\)” on page 172](#)
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - [Table 136 “Memory sparing with eight processors \(Processors 1 and 2, 16 to 24 total DIMMs installed in server\)” on page 161](#)
 - [Table 140 “Memory sparing with eight processors \(Processors 3 and 4, 16 to 24 total DIMMs installed in server\)” on page 165](#)
 - [Table 148 “Memory sparing with eight processors \(Processors 7 and 8, 16 to 24 total DIMMs installed in server\)” on page 173](#)

Table 145. Memory sparing with eight processors (Processors 5 and 6, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26					5	6	7	8										19	20					26	
28					5	6	7	8								17	18	19	20					28	
30					5	6	7	8								17	18	19	20					30	
32					5	6	7	8								17	18	19	20					32	
34					5	6	7	8								17	18	19	20					34	
36					5	6	7	8								17	18	19	20					36	
38					5	6	7	8								17	18	19	20					38	
40					5	6	7	8								17	18	19	20					40	
42					5	6	7	8	9	10						17	18	19	20					42	
44					5	6	7	8	9	10						17	18	19	20	21	22			44	
46					5	6	7	8	9	10						17	18	19	20	21	22			46	
48					5	6	7	8	9	10						17	18	19	20	21	22			48	

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 144 “Memory sparing with eight processors \(Processors 5 and 6, 16 to 24 total DIMMs installed in server\)” on page 169](#)
 - [Table 146 “Memory sparing with eight processors \(Processors 5 and 6, 50 to 72 total DIMMs installed in server\)” on page 171](#)
 - [Table 147 “Memory sparing with eight processors \(Processors 5 and 6, 74 to 96 total DIMMs installed in server\)” on page 172](#)
- To continue populating DIMMs for a system with 26 to 48 DIMMs:
 - [Table 137 “Memory sparing with eight processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)” on page 162](#)
 - [Table 141 “Memory sparing with eight processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)” on page 166](#)
 - [Table 149 “Memory sparing with eight processors \(Processors 7 and 8, 26 to 48 total DIMMs installed in server\)” on page 174](#)

Table 146. Memory sparing with eight processors (Processors 5 and 6, 50 to 72 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
50					5	6	7	8	9	10							17	18	19	20	21	22			50
52					5	6	7	8	9	10							17	18	19	20	21	22			52
54					5	6	7	8	9	10							17	18	19	20	21	22			54
56					5	6	7	8	9	10							17	18	19	20	21	22			56
58			3	4	5	6	7	8	9	10							17	18	19	20	21	22			58
60			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			60
62			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			62
64			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			64
66			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			66
68			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			68
70			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			70
72			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			72

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 144 “Memory sparing with eight processors \(Processors 5 and 6, 16 to 24 total DIMMs installed in server\)” on page 169](#)
 - [Table 145 “Memory sparing with eight processors \(Processors 5 and 6, 26 to 48 total DIMMs installed in server\)” on page 170](#)
 - [Table 147 “Memory sparing with eight processors \(Processors 5 and 6, 74 to 96 total DIMMs installed in server\)” on page 172](#)
- To continue populating DIMMs for a system with 50 to 72 DIMMs:
 - [Table 138 “Memory sparing with eight processors \(Processors 1 and 2, 50 to 72 total DIMMs installed in server\)” on page 163](#)
 - [Table 142 “Memory sparing with eight processors \(Processors 3 and 4, 50 to 72 total DIMMs installed in server\)” on page 167](#)
 - [Table 150 “Memory sparing with eight processors \(Processors 7 and 8, 50 to 72 total DIMMs installed in server\)” on page 175](#)

Table 147. Memory sparing with eight processors (Processors 5 and 6, 74 to 96 total DIMMs installed in server)

Total DIMMs	Processor 5												Processor 6												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
74			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			74
76			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	76
78			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	78
80			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	80
82			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	82
84			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	84
86			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	86
88			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	88
90	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	90
92	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	92
94	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	94
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 5 and 6 DIMM population sequences:
 - [Table 144 “Memory sparing with eight processors \(Processors 5 and 6, 16 to 24 total DIMMs installed in server\)” on page 169](#)
 - [Table 145 “Memory sparing with eight processors \(Processors 5 and 6, 26 to 48 total DIMMs installed in server\)” on page 170](#)
 - [Table 146 “Memory sparing with eight processors \(Processors 5 and 6, 50 to 72 total DIMMs installed in server\)” on page 171](#)
- To continue populating DIMMs for a system with 74 to 96 DIMMs:
 - [Table 139 “Memory sparing with eight processors \(Processors 1 and 2, 74 to 96 total DIMMs installed in server\)” on page 164](#)
 - [Table 143 “Memory sparing with eight processors \(Processors 3 and 4, 74 to 96 total DIMMs installed in server\)” on page 168](#)
 - [Table 151 “Memory sparing with eight processors \(Processors 7 and 8, 74 to 96 total DIMMs installed in server\)” on page 176](#)

Table 148. Memory sparing with eight processors (Processors 7 and 8, 16 to 24 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
16							7	8											19	20					16
18							7	8											19	20					18
20							7	8											19	20					20
22							7	8											19	20					22
24							7	8											19	20					24

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 149 “Memory sparing with eight processors \(Processors 7 and 8, 26 to 48 total DIMMs installed in server\)” on page 174](#)
 - [Table 150 “Memory sparing with eight processors \(Processors 7 and 8, 50 to 72 total DIMMs installed in server\)” on page 175](#)
 - [Table 151 “Memory sparing with eight processors \(Processors 7 and 8, 74 to 96 total DIMMs installed in server\)” on page 176](#)
- To continue populating DIMMs for a system with 16 to 24 DIMMs:
 - [Table 136 “Memory sparing with eight processors \(Processors 1 and 2, 16 to 24 total DIMMs installed in server\)” on page 161](#)
 - [Table 140 “Memory sparing with eight processors \(Processors 3 and 4, 16 to 24 total DIMMs installed in server\)” on page 165](#)
 - [Table 144 “Memory sparing with eight processors \(Processors 5 and 6, 16 to 24 total DIMMs installed in server\)” on page 169](#)

Table 149. Memory sparing with eight processors (Processors 7 and 8, 26 to 48 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
26							7	8										19	20					26	
28							7	8										19	20					28	
30					5	6	7	8										19	20					30	
32					5	6	7	8								17	18	19	20					32	
34					5	6	7	8								17	18	19	20					34	
36					5	6	7	8								17	18	19	20					36	
38					5	6	7	8								17	18	19	20					38	
40					5	6	7	8								17	18	19	20					40	
42					5	6	7	8								17	18	19	20					42	
44					5	6	7	8								17	18	19	20					44	
46					5	6	7	8	9	10						17	18	19	20					46	
48					5	6	7	8	9	10						17	18	19	20	21	22			48	

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 148 “Memory sparing with eight processors \(Processors 7 and 8, 16 to 24 total DIMMs installed in server\)” on page 173](#)
 - [Table 150 “Memory sparing with eight processors \(Processors 7 and 8, 50 to 72 total DIMMs installed in server\)” on page 175](#)
 - [Table 151 “Memory sparing with eight processors \(Processors 7 and 8, 74 to 96 total DIMMs installed in server\)” on page 176](#)
- To continue populating DIMMs for a system with 26 to 48 DIMMs:
 - [Table 137 “Memory sparing with eight processors \(Processors 1 and 2, 26 to 48 total DIMMs installed in server\)” on page 162](#)
 - [Table 141 “Memory sparing with eight processors \(Processors 3 and 4, 26 to 48 total DIMMs installed in server\)” on page 166](#)
 - [Table 145 “Memory sparing with eight processors \(Processors 5 and 6, 26 to 48 total DIMMs installed in server\)” on page 170](#)

Table 150. Memory sparing with eight processors (Processors 7 and 8, 50 to 72 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
50					5	6	7	8	9	10							17	18	19	20	21	22			50
52					5	6	7	8	9	10							17	18	19	20	21	22			52
54					5	6	7	8	9	10							17	18	19	20	21	22			54
56					5	6	7	8	9	10							17	18	19	20	21	22			56
58					5	6	7	8	9	10							17	18	19	20	21	22			58
60					5	6	7	8	9	10							17	18	19	20	21	22			60
62			3	4	5	6	7	8	9	10							17	18	19	20	21	22			62
64			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			64
66			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			66
68			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			68
70			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			70
72			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			72

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 148 “Memory sparing with eight processors \(Processors 7 and 8, 16 to 24 total DIMMs installed in server\)” on page 173](#)
 - [Table 149 “Memory sparing with eight processors \(Processors 7 and 8, 26 to 48 total DIMMs installed in server\)” on page 174](#)
 - [Table 151 “Memory sparing with eight processors \(Processors 7 and 8, 74 to 96 total DIMMs installed in server\)” on page 176](#)
- To continue populating DIMMs for a system with 50 to 72 DIMMs:
 - [Table 138 “Memory sparing with eight processors \(Processors 1 and 2, 50 to 72 total DIMMs installed in server\)” on page 163](#)
 - [Table 142 “Memory sparing with eight processors \(Processors 3 and 4, 50 to 72 total DIMMs installed in server\)” on page 167](#)
 - [Table 146 “Memory sparing with eight processors \(Processors 5 and 6, 50 to 72 total DIMMs installed in server\)” on page 171](#)

Table 151. Memory sparing with eight processors (Processors 7 and 8, 74 to 96 total DIMMs installed in server)

Total DIMMs	Processor 7												Processor 8												Total DIMMs
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
74			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			74
76			3	4	5	6	7	8	9	10					15	16	17	18	19	20	21	22			76
78			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22			78
80			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	80
82			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	82
84			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	84
86			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	86
88			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	88
90			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	90
92			3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	92
94	1	2	3	4	5	6	7	8	9	10	11	12			15	16	17	18	19	20	21	22	23	24	94
96	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	96

Related DIMM population sequences for eight processor systems:

- Processor 7 and 8 DIMM population sequences:
 - [Table 148 “Memory sparing with eight processors \(Processors 7 and 8, 16 to 24 total DIMMs installed in server\)” on page 173](#)
 - [Table 149 “Memory sparing with eight processors \(Processors 7 and 8, 26 to 48 total DIMMs installed in server\)” on page 174](#)
 - [Table 150 “Memory sparing with eight processors \(Processors 7 and 8, 50 to 72 total DIMMs installed in server\)” on page 175](#)
- To continue populating DIMMs for a system with 74 to 96 DIMMs:
 - [Table 139 “Memory sparing with eight processors \(Processors 1 and 2, 74 to 96 total DIMMs installed in server\)” on page 164](#)
 - [Table 143 “Memory sparing with eight processors \(Processors 3 and 4, 74 to 96 total DIMMs installed in server\)” on page 168](#)
 - [Table 147 “Memory sparing with eight processors \(Processors 5 and 6, 74 to 96 total DIMMs installed in server\)” on page 172](#)

DCPMM installation order

The server also supports Intel Optane DC persistent memory modules (DCPMMs). Use this information to determine the correct installation order, depending on the configuration.

Notes:

- Before installing DCPMMs and DRAM DIMMs, refer to [“DC Persistent Memory Module \(DCPMM\) setup” on page 177](#) and make sure to meet all the requirements.
- To verify if the presently installed processors support DCPMMs, examine the four digits in the processor description. Only the processor with description meeting *both* of the following requirements support DCPMMs.
 - The first digit is **5** or a larger number.

Note: The only exception to this rule is *Intel Xeon Silver 4215*, which also supports DCPMM.

- The second digit is **2**.

Example: *Intel Xeon 5215L* and *Intel Xeon Platinum 8280M*

If the presently installed processors do not support DCPMMs, replace them with the processors that support DCPMMs.

- Supported memory capacity range varies with the following types of processors.
 - **Large memory tier (L):** The processors with **L** after the four digits (for example: *Intel Xeon 5215L*)
 - **Medium memory tier (M):** The processors with **M** after the four digits (for example: *Intel Xeon Platinum 8280M*)
 - **Other:** Other processors that support DCPMMs (for example: *Intel Xeon Gold 5222*)

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

http://1config.lenovo.com/#/memory_configuration

DC Persistent Memory Module (DCPMM) setup

Follow the instructions in this section to complete required setup before installing DCPMMs for the first time, determine the most suitable configuration, and install memory modules accordingly.

Complete the following steps to finish system setup to support DCPMMs, and install the memory modules according to the designated combination.

1. Update the system firmware to the latest version that supports DCPMMs (see “[Update the firmware](#)” on [page 256](#)).
2. Make sure to meet all the following requirements before installing DCPMMs.
 - All the DCPMMs that are installed must be of the same part number.
 - All the DRAM DIMMs that are installed must be of the same type, rank, and capacity with minimum capacity of 16 GB. It is recommended to use Lenovo DRAM DIMMs of the same part number.
3. Refer to “[DCPMM installation order](#)” on [page 176](#) to determine the most suitable combination and the following:
 - Number and capacity of the DCPMMs and DRAM DIMMs to install.
 - Check if the presently installed processors support the combination. If not, replace the processors with ones that support the combination.
4. Based on the determined DCPMM combination, acquire the DCPMMs, DRAM DIMMs and processors if necessary.
5. Replace the processors if necessary (see “[Processor and heat sink replacement](#)” in *Maintenance Manual*).
6. Remove all the memory modules that are installed (see “[Remove a memory module](#)” in *Maintenance Manual*).
7. Follow the slot combination in “[DCPMM installation order](#)” on [page 176](#) to install all the DCPMMs and DRAM DIMMs (see “[Install a memory module](#)” on [page 355](#)).
8. Disable security on all the installed DCPMMs (see “[Configure DC Persistent Memory Module \(DCPMM\)](#)” on [page 261](#)).
9. Make sure the DCPMM firmware is the latest version. If not, update it to the latest version (see https://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/update_fw.html).
10. Configure DCPMMs so that the capacity is available for use (see “[Configure DC Persistent Memory Module \(DCPMM\)](#)” on [page 261](#)).

Adding memory modules with DCPMMs

Follow the instructions in this section to add memory modules to the existing configuration with DCPMMs.

If DCPMMs are already installed and configured in the system, complete the following steps to add new memory modules.

1. Update the system firmware to the latest version (see [“Update the firmware” on page 256](#)).
 2. Consider the following DCPMM requirements before acquiring new DCPMM units.
 - All the DCPMMs that are installed must be of the same part number.
 - All the DRAM DIMMs that are installed must be of the same type, rank, and capacity with minimum capacity of 16 GB. It is recommended to use Lenovo DRAM DIMMs of the same part number.
 3. See [“DCPMM installation order” on page 176](#) to determine the new configuration, and acquire memory modules accordingly.
 4. If the DCPMMs are in Memory Mode and will stay in Memory Mode after new units are installed, follow the combination in [“DCPMM installation order” on page 176](#) to install the new modules in the correct slots. Otherwise, go to the next step.
 5. Make sure to back up the stored data.
 6. If the App Direct capacity is interleaved:
 - a. Delete all the created namespaces and filesystems in the operating system.
 - b. Perform secure erase on all the DCPMMs that are installed. Go to **Intel Optane DCPMMs → Security → Press to Secure Erase** to perform secure erase.
- Note:** If one or more DCPMMs are secured with passphrase, make sure security of every unit is disabled before performing secure erase. In case the passphrase is lost or forgotten, contact Lenovo service.
7. Follow the slot combination in [“DCPMM installation order” on page 176](#) to install all the DCPMMs and DRAM DIMMs (see [“Install a memory module” on page 355](#)).
 8. Disable security on all the installed DCPMMs (see [“Configure DC Persistent Memory Module \(DCPMM\)” on page 261](#)).
 9. Make sure the DCPMM firmware is the latest version. If not, update it to the latest version (see https://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/update_fw.html).
 10. Configure DCPMMs so that the capacity is available for use (see [“Configure DC Persistent Memory Module \(DCPMM\)” on page 261](#)).
 11. Restore the data that have been backed up.

App Direct Mode

In App Direct Mode, DCPMMs act as independent and persistent memory resources directly accessible by specific applications, and DRAM DIMMs act as system memory.

When implementing App Direct Mode, any supported DIMMs in any capacity can be installed.

DCPMM Installation order: App Direct mode with two processors

When implementing App Direct Mode, any supported DIMMs in any capacity can be installed.

When two processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.

Several configurations are supported with implementing App Direct mode with eight processors:

- 6 DCPMMs/6 DRAM DIMMs per processor
- 4 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/8 DRAM DIMMs per processor
- 2 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/4 DRAM DIMMs per processor
- 1 DCPMM/6 DRAM DIMMs per processor
- 1 DCPMM in the system

6 DCPMMs/6 DRAM DIMMs per processor

Table 152. App Direct mode with 6 DCPMMs and 6 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/6 DRAM DIMMs per processor

Table 153. App Direct mode with 4 DCPMMs and 6 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 8 DRAM DIMMs per processor

Table 154. App Direct mode with 2 DCPMMs and 8 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P

2 DCPMMs/6 DRAM DIMMs per processor

Table 155. App Direct mode with 2 DCPMMs and 6 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

2 DCPMMs/4 DRAM DIMMs per processor

Table 156. App Direct mode with 2 DCPMMs and 4 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

1 DCPMM/6 DRAM DIMMs per processor

Table 157. App Direct mode with 1 DCPMMs and 6 DRAM DIMMs

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D		P	D		D		D

1 DCPMM in the system

Table 158. App Direct mode with 1 DCPMM in the system

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D			D		D		D

DCPMM Installation order: App Direct mode with four processors

When implementing App Direct Mode, any supported DIMMs in any capacity can be installed.

When eight processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.

Several configurations are supported with implementing App Direct mode with eight processors:

- 6 DCPMMs/6 DRAM DIMMs per processor
- 4 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/8 DRAM DIMMs per processor
- 2 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/4 DRAM DIMMs per processor
- 1 DCPMM/6 DRAM DIMMs per processor
- 1 DCPMM in the system

6 DCPMMs/6 DRAM DIMMs per processor

Table 159. App Direct mode with 6 DCPMMs and 6 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/6 DRAM DIMMs per processor

Table 160. App Direct mode with 4 DCPMMs and 6 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 8 DRAM DIMMs per processor

Table 161. App Direct mode with 2 DCPMMs and 8 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P

2 DCPMMs/6 DRAM DIMMs per processor

Table 162. App Direct mode with 2 DCPMMs and 6 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

2 DCPMMs/4 DRAM DIMMs per processor

Table 163. App Direct mode with 2 DCPMMs and 4 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

1 DCPMM/6 DRAM DIMMs per processor

Table 164. App Direct mode with 1 DCPMMs and 6 DRAM DIMMs

In the table below:

Table 164. App Direct mode with 1 DCPMMs and 6 DRAM DIMMs (continued)

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D		P	D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D		P	D		D		D

1 DCPMM in the system

Table 165. App Direct mode with 1 DCPMM in the system

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D			D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D			D		D		D	D		D		D			D		D		D

DCPMM Installation order: App Direct mode with six processors

When implementing App Direct Mode, any supported DIMMs in any capacity can be installed.

When eight processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processors 5 and 6 are installed in the lower system board of the upper compute tray.

Several configurations are supported with implementing App Direct mode with eight processors:

- 6 DCPMMs/ 6 DRAM DIMMs per processor
- 4 DCPMMs/ 6 DRAM DIMMs per processor
- 2 DCPMMs/8 DRAM DIMMs per processor
- 2 DCPMMs/ 6 DRAM DIMMs per processor
- 2 DCPMMs/ 4 DRAM DIMMs per processor
- 1 DCPMM/6 DRAM DIMMs per processor
- 1 DCPMM in the system

6 DCPMMs/ 6 DRAM DIMMs per processor

Table 166. App Direct mode with 6 DCPMMs and 6 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/ 6 DRAM DIMMs per processor

Table 167. App Direct mode with 4 DCPMMs and 6 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 3												Processor 4											

Table 167. App Direct mode with 4 DCPMMs and 6 DRAM DIMMs per processor (6 processors) (continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 8 DRAM DIMMs per processor

Table 168. App Direct mode with 2 DCPMMs and 8 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P

2 DCPMMs/ 6 DRAM DIMMs per processor

Table 169. App Direct mode with 2 DCPMMs and 6 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

2 DCPMMs/ 4 DRAM DIMMs per processor

Table 170. App Direct mode with 2 DCPMMs and 4 DRAM DIMMs per processor (6 processors)

In the table below:

Table 170. App Direct mode with 2 DCPMMs and 4 DRAM DIMMs per processor (6 processors) (continued)

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

1 DCPMM/6 DRAM DIMMs per processor

Table 171. App Direct mode with 1 DCPMMs and 6 DRAM DIMMs

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D		P	D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D		P	D		D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D		P	D		D		D

1 DCPMM in the system

Table 172. App Direct mode with 1 DCPMM in the system

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D			D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D			D		D		D	D		D		D			D		D		D

Table 172. App Direct mode with 1 DCPMM in the system (continued)

Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D			D		D		D	D		D		D			D		D		D

DCPMM Installation order: App Direct mode with eight processors

When implementing App Direct Mode, any supported DIMMs in any capacity can be installed.

When eight processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processors 5 and 6 are installed in the lower system board of the upper compute tray.
- Processors 7 and 8 are installed in the upper system board of the upper compute tray.

Several configurations are supported with implementing App Direct mode with eight processors:

- 6 DCPMMs/6 DRAM DIMMs per processor
- 4 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/8 DRAM DIMMs per processor
- 2 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/4 DRAM DIMMs per processor
- 1 DCPMM/6 DRAM DIMMs per processor
- 1 DCPMM in the system

6 DCPMMs/ 6 DRAM DIMMs per processor

Table 173. App Direct mode with 6 DCPMMs and 6 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/ 6 DRAM DIMMs per processor

Table 174. App Direct mode with 4 DCPMMs and 6 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Table 174. App Direct mode with 4 DCPMMs and 6 DRAM DIMMs per processor (8 processors) (continued)

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 8 DRAM DIMMs per processor

Table 175. App Direct mode with 2 DCPMMs and 8 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P

2 DCPMMs/ 6 DRAM DIMMs per processor

Table 176. App Direct mode with 2 DCPMMs and 6 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24

Table 176. App Direct mode with 2 DCPMMs and 6 DRAM DIMMs per processor (8 processors) (continued)

D		D		D	P	P	D		D		D	D	D	D	D	P	P	D		D		D		D
Processor 3												Processor 4												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
D		D		D	P	P	D		D		D	D	D	D	D	P	P	D		D		D		D
Processor 5												Processor 6												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
D		D		D	P	P	D		D		D	D	D	D	D	P	P	D		D		D		D
Processor 7												Processor 8												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
D		D		D	P	P	D		D		D	D	D	D	D	P	P	D		D		D		D

2 DCPMMs/ 4 DRAM DIMMs per processor

Table 177. App Direct mode with 2 DCPMMs and 4 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

1 DCPMM/6 DRAM DIMMs per processor

Table 178. App Direct mode with 1 DCPMMs and 6 DRAM DIMMs

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D		P	D		D		D

Table 178. App Direct mode with 1 DCPMMs and 6 DRAM DIMMs (continued)

Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D		P	D		D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D		P	D		D		D
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D		P	D		D		D

1 DCPMM in the system

Table 179. App Direct mode with 1 DCPMM in the system

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D		P	D		D		D	D		D		D			D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D			D		D		D	D		D		D			D		D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D			D		D		D	D		D		D			D		D		D
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D			D		D		D	D		D		D			D		D		D

Mixed Memory Mode

In Mixed Memory Mode, 1-99% of DCPMM capacity acts as system memory. In this mode, some percentage of DCPMM capacity is directly accessible to specific applications (App Direct), while the rest serves as system memory. The App Direct part of DCPMM is displayed as persistent memory, while the rest of DCPMM capacity is displayed as system memory. DRAM DIMMs act as cache in this mode.

When implementing Mixed Memory Mode, any supported DIMMs in any capacity can be installed.

DCPMM Installation order: Mixed Memory mode with two processors

When implementing Mixed Memory mode, any supported DIMMs in any capacity can be installed.

When two processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.

Several configurations are supported with implementing Mixed Memory mode with six processors:

- 6 DCPMMs/ 6 DRAM DIMMs per processor
- 4 DCPMMs/ 6 DRAM DIMMs per processor
- 2 DCPMMs/ 6 DRAM DIMMs per processor
- 2 DCPMMs/ 4 DRAM DIMMs per processor

6 DCPMMs/ 6 DRAM DIMMs per processor

Table 180. Mixed Memory mode with 6 DCPMMs and 6 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/ 6 DRAM DIMMs per processor

Table 181. Mixed Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 6 DRAM DIMMs per processor

Note: Only RDIMMs are recommended for this configuration

Table 182. Mixed Memory mode with 2 DCPMMs and 6 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

2 DCPMMs/ 4 DRAM DIMMs per processor

Table 183. Mixed Memory mode with 2 DCPMMs and 4 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

DCPMM Installation order: Mixed Memory mode with four processors

When implementing Mixed Memory mode, any supported DIMMs in any capacity can be installed.

When four processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.

Several configurations are supported with implementing Mixed Memory mode with six processors:

- 6 DCPMMs/ 6 DRAM DIMMs per processor
- 4 DCPMMs/ 6 DRAM DIMMs per processor
- 2 DCPMMs/ 6 DRAM DIMMs per processor
- 2 DCPMMs/ 4 DRAM DIMMs per processor

6 DCPMMs/ 6 DRAM DIMMs per processor

Table 184. Mixed Memory mode with 6 DCPMMs and 6 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/ 6 DRAM DIMMs per processor

Table 185. Mixed Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 6 DRAM DIMMs per processor

Note: Only RDIMMs are recommended for this configuration

Table 186. Mixed Memory mode with 2 DCPMMs and 6 DRAM DIMMs per processor (4 processors)

In the table below:

Table 186. Mixed Memory mode with 2 DCPMMs and 6 DRAM DIMMs per processor (4 processors) (continued)

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

2 DCPMMs/ 4 DRAM DIMMs per processor

Table 187. Mixed Memory mode with 2 DCPMMs and 4 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

DCPMM Installation order: Mixed Memory mode with six processors

When implementing Mixed Memory mode, any supported DIMMs in any capacity can be installed.

When six processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processors 5 and 6 are installed in the lower system board of the upper compute tray.

Several configurations are supported with implementing Mixed Memory mode with six processors:

- 6 DCPMMs/ 6 DRAM DIMMs per processor
- 4 DCPMMs/ 6 DRAM DIMMs per processor
- 2 DCPMMs/ 6 DRAM DIMMs per processor
- 2 DCPMMs/ 4 DRAM DIMMs per processor

6 DCPMMs/ 6 DRAM DIMMs per processor

Table 188. Mixed Memory mode with 6 DCPMMs and 6 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/ 6 DRAM DIMMs per processor

Table 189. Mixed Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 5												Processor 6											

Table 189. Mixed Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (6 processors) (continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 6 DRAM DIMMs per processor

Note: Only RDIMMs are recommended for this configuration

Table 190. Mixed Memory mode with 2 DCPMMs and 6 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

2 DCPMMs/ 4 DRAM DIMMs per processor

Table 191. Mixed Memory mode with 2 DCPMMs and 4 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

DCPMM Installation order: Mixed Memory mode with eight processors

When implementing Mixed Memory mode, any supported DIMMs in any capacity can be installed.

When eight processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processors 5 and 6 are installed in the lower system board of the upper compute tray.
- Processors 7 and 8 are installed in the upper system board of the upper compute tray.

Several configurations are supported with implementing Mixed Memory mode with eight processors:

- 6 DCPMMs/ 6 DRAM DIMMs per processor
- 4 DCPMMs/ 6 DRAM DIMMs per processor
- 2 DCPMMs/ 6 DRAM DIMMs per processor
- 2 DCPMMs/ 4 DRAM DIMMs per processor

6 DCPMMs/ 6 DRAM DIMMs per processor

Table 192. Mixed Memory mode with 6 DCPMMs and 6 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/ 6 DRAM DIMMs per processor

Table 193. Mixed Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 3												Processor 4											

Table 193. Mixed Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (8 processors) (continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 6 DRAM DIMMs per processor

Note: Only RDIMMs are recommended for this configuration

Table 194. Mixed Memory mode with 2 DCPMMs and 6 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

2 DCPMMs/ 4 DRAM DIMMs per processor

Table 195. Mixed Memory mode with 2 DCPMMs and 4 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D				D		D			P
Processor 3												Processor 4											

Table 195. Mixed Memory mode with 2 DCPMMs and 4 DRAM DIMMs per processor (8 processors) (continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

Memory Mode

In Memory Mode, 100% of DCPMM capacity acts as system memory. The DRAM DIMMs act as cache.

When implementing Memory Mode, any supported DIMMs in any capacity can be installed.

DCPMM Installation order: Memory mode with two processors

When implementing Memory mode, any supported DIMMs in any capacity can be installed.

When two processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.

Several configurations are supported with implementing Memory mode with two processors:

- 6 DCPMMs/6 DRAM DIMMs per processor
- 4 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/4 DRAM DIMMs per processor

6 DCPMMs/ 6 DRAM DIMMs per processor

Table 196. Memory mode with 6 DCPMMs and 6 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/ 6 DRAM DIMMs per processor

Table 197. Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 8 DRAM DIMMs per processor

Table 198. Memory mode with 2 DCPMMs and 8 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P

2 DCPMMs/ 6 DRAM DIMMs per processor

Table 199. Memory mode with 2 DCPMMs and 6 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Note: In this configuration, only RDIMMs are recommended for the DRAM DIMMs.

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

2 DCPMMs/ 4 DRAM DIMMs per processor

Table 200. App Direct mode with 2 DCPMMs and 4 DRAM DIMMs per processor (2 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

DCPMM Installation order: Memory mode with four processors

When implementing Memory mode, any supported DIMMs in any capacity can be installed. However, you should consider using DIMMs that are greater than 32 GB.

When four processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.

Several configurations are supported with implementing Memory mode with four processors:

- 6 DCPMMs/6 DRAM DIMMs per processor
- 4 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/4 DRAM DIMMs per processor

6 DCPMMs/ 6 DRAM DIMMs per processor

Table 201. Memory mode with 6 DCPMMs and 6 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/ 6 DRAM DIMMs per processor

Table 202. Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 8 DRAM DIMMs per processor

Table 203. Memory mode with 2 DCPMMs and 8 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM

Table 203. Memory mode with 2 DCPMMs and 8 DRAM DIMMs per processor (4 processors) (continued)

- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P

2 DCPMMs/ 6 DRAM DIMMs per processor

Table 204. Memory mode with 2 DCPMMs and 6 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Note: In this configuration, only RDIMMs are recommended for the DRAM DIMMs.

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

2 DCPMMs/ 4 DRAM DIMMs per processor

Table 205. App Direct mode with 2 DCPMMs and 4 DRAM DIMMs per processor (4 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

DCPMM Installation order: Memory mode with six processors

When implementing Memory mode, any supported DIMMs in any capacity can be installed. However, you should consider using DIMMs that are greater than 32 GB.

When six processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processors 5 and 6 are installed in the lower system board of the upper compute tray.

Several configurations are supported with implementing Memory mode with six processors:

- 6 DCPMMs/6 DRAM DIMMs per processor
- 4 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/4 DRAM DIMMs per processor

6 DCPMMs/ 6 DRAM DIMMs per processor

Table 206. Memory mode with 6 DCPMMs and 6 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/ 6 DRAM DIMMs per processor

Table 207. Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 5												Processor 6											

Table 207. Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (6 processors) (continued)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 8 DRAM DIMMs per processor

Table 208. Memory mode with 2 DCPMMs and 8 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P

2 DCPMMs/ 6 DRAM DIMMs per processor

Table 209. Memory mode with 2 DCPMMs and 6 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Note: In this configuration, only RDIMMs are recommended for the DRAM DIMMs.

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

2 DCPMMs/ 4 DRAM DIMMs per processor

Table 210. App Direct mode with 2 DCPMMs and 4 DRAM DIMMs per processor (6 processors)

In the table below:

- P = DCPMM

Table 210. App Direct mode with 2 DCPMMs and 4 DRAM DIMMs per processor (6 processors) (continued)

- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

DCPMM Installation order: Memory mode with eight processors

When implementing Memory mode, any supported DIMMs in any capacity can be installed. However, you should consider using DIMMs that are greater than 32 GB.

When eight processors are installed in the server:

- Processors 1 and 2 are installed in the lower system board of the lower compute tray.
- Processors 3 and 4 are installed in the upper system board of the lower compute tray.
- Processors 5 and 6 are installed in the lower system board of the upper compute tray.
- Processors 7 and 8 are installed in the upper system board of the upper compute tray.

Several configurations are supported with implementing Memory mode with eight processors:

- 6 DCPMMs/6 DRAM DIMMs per processor
- 4 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/6 DRAM DIMMs per processor
- 2 DCPMMs/4 DRAM DIMMs per processor

6 DCPMMs/ 6 DRAM DIMMs per processor

Table 211. Memory mode with 6 DCPMMs and 6 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D	P	D	P	D	P	P	D	P	D	P	D	D	P	D	P	D	P	P	D	P	D	P	D

4 DCPMMs/ 6 DRAM DIMMs per processor

Table 212. Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

Table 212. Memory mode with 4 DCPMMs and 6 DRAM DIMMs per processor (8 processors) (continued)

Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D	P	D	P	P	D	P	D		D	D		D	P	D	P	P	D	P	D		D

2 DCPMMs/ 8 DRAM DIMMs per processor

Table 213. Memory mode with 2 DCPMMs and 8 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D	D	D	D	D	D	D	D		P	P		D	D	D	D	D	D	D	D		P

2 DCPMMs/ 6 DRAM DIMMs per processor

Table 214. Memory mode with 2 DCPMMs and 6 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Note: In this configuration, only RDIMMs are recommended for the DRAM DIMMs.

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

Table 214. Memory mode with 2 DCPMMs and 6 DRAM DIMMs per processor (8 processors) (continued)

Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
D		D		D	P	P	D		D		D	D		D		D	P	P	D		D		D

2 DCPMMs/ 4 DRAM DIMMs per processor

Table 215. App Direct mode with 2 DCPMMs and 4 DRAM DIMMs per processor (8 processors)

In the table below:

- P = DCPMM
- D = DRAM DIMM

Processor 1												Processor 2											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 3												Processor 4											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 5												Processor 6											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P
Processor 7												Processor 8											
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
P		D		D			D		D		P	P		D		D			D		D		P

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 your server. For a list of supported optional components for the server, see <https://static.lenovo.com/us/en/serverproven/index.shtml>.

- 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 [ThinkSystem SR950 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 front cover

Remove the front cover by pressing the release buttons and pulling the cover from the front of the server.

Complete the following steps to remove the front cover:

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

-  [YouTube](#)
-  [Youku](#)

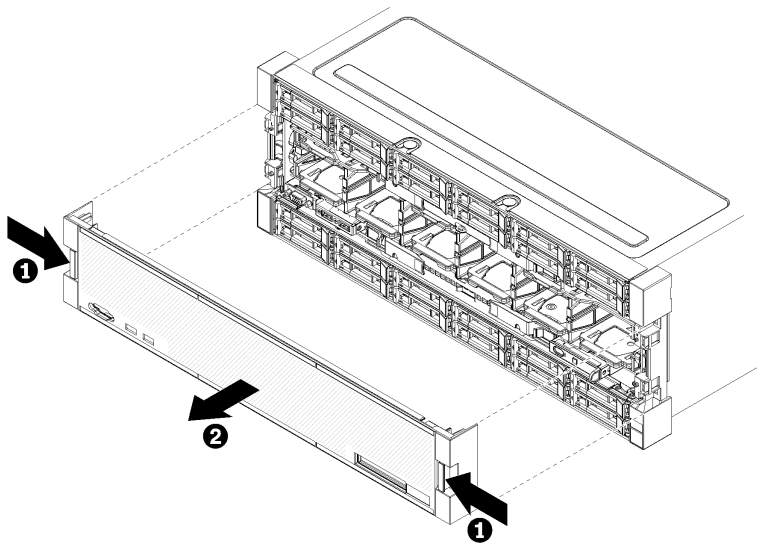


Figure 27. Front cover removal

Step 1. Press release buttons at either side of the front cover.

Step 2. Pull the cover forward and remove it from the server.

Install the system board

System boards are in the upper or lower compute tray that is accessed from the front of the server.

S002



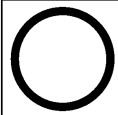
CAUTION:

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



**Read the
Installation
Guidelines**

“ on page 56 “



**Power off
server and
disconnect all
power cords
for this task**

” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Notes:

- If you are installing an optional processor or memory module, perform those tasks first. See [“Install a processor-heat-sink module” on page 213](#) or [“Install a memory module” on page 216](#).
- Make sure that memory module fillers are installed in all vacant memory module connectors.
- Make sure that all memory air baffles are installed. See [“Memory air baffle replacement” on page 350](#).

Before you install the system board:

1. If the front cover is installed, remove it. See [“Remove the front cover” on page 322](#).
2. Remove compute tray where the system board is being installed. See [“Remove a compute tray” on page 305](#).

Complete the following steps to install the compute system board:

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

-  [YouTube](#)
-  [Youku](#)

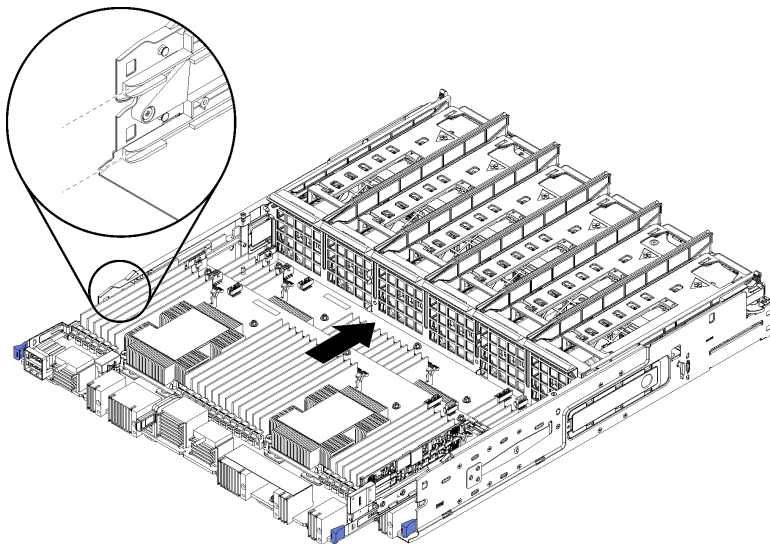


Figure 28. System board installation

- Step 1. Align the system board with the rails in the compute tray; then, insert the system board, making sure that the rails on the board fit into the slots in the compute tray.

- Step 2. Slide the system board into the compute tray until the release clips snap into the locked position.
- Step 3. Connect all cables on the system board that go to connectors in the compute tray. See [“Internal cable routing” on page 35](#).

After you install the system board:

- If you installed the lower system board in a compute tray, slide the upper system board or filler back into the compute tray until the release clips snap into the locked position.
- If you have no additional options to install in this compute tray, install the compute tray. See [“Install a compute tray” on page 307](#).
- If you have no additional options to install in the upper or lower compute tray, install the front cover. See [“Install the front cover” on page 227](#).

Install a processor-heat-sink module

Processors are in the 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.


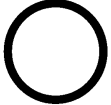

S002



CAUTION:

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

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

 <p>Read the Installation Guidelines</p>	 <p>Power off server and disconnect all power cords for this task</p>
<p>” on page 56 “ ” on page 254 “</p>	
 <p>ATTENTION: Static Sensitive Device Ground package before opening</p>	
<p>” on page 58</p>	

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

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.
- To ensure the best performance, check the manufacturing date on the new heat sink and make sure it does not exceed 2 years. Otherwise, wipe off the existing thermal grease and apply the new grease onto it for optimal thermal performance.

Notes:

- PHMs are keyed for the socket where they can be installed and for their orientation in the socket.
- See <https://static.lenovo.com/us/en/serverproven/index.shtml> 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 256.
- Installing an additional PHM can change the memory requirements for your system. See “[Install a memory module](#)” on page 216 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. Remove the front cover. See “[Remove the front cover](#)” on page 322.
2. Remove the compute tray where the system board is installed. See “[Remove a compute tray](#)” on page 305.
3. If you are installing a PHM in the lower system board, remove the upper system board or system board filler. See “[Remove a system board](#)” on page 309.

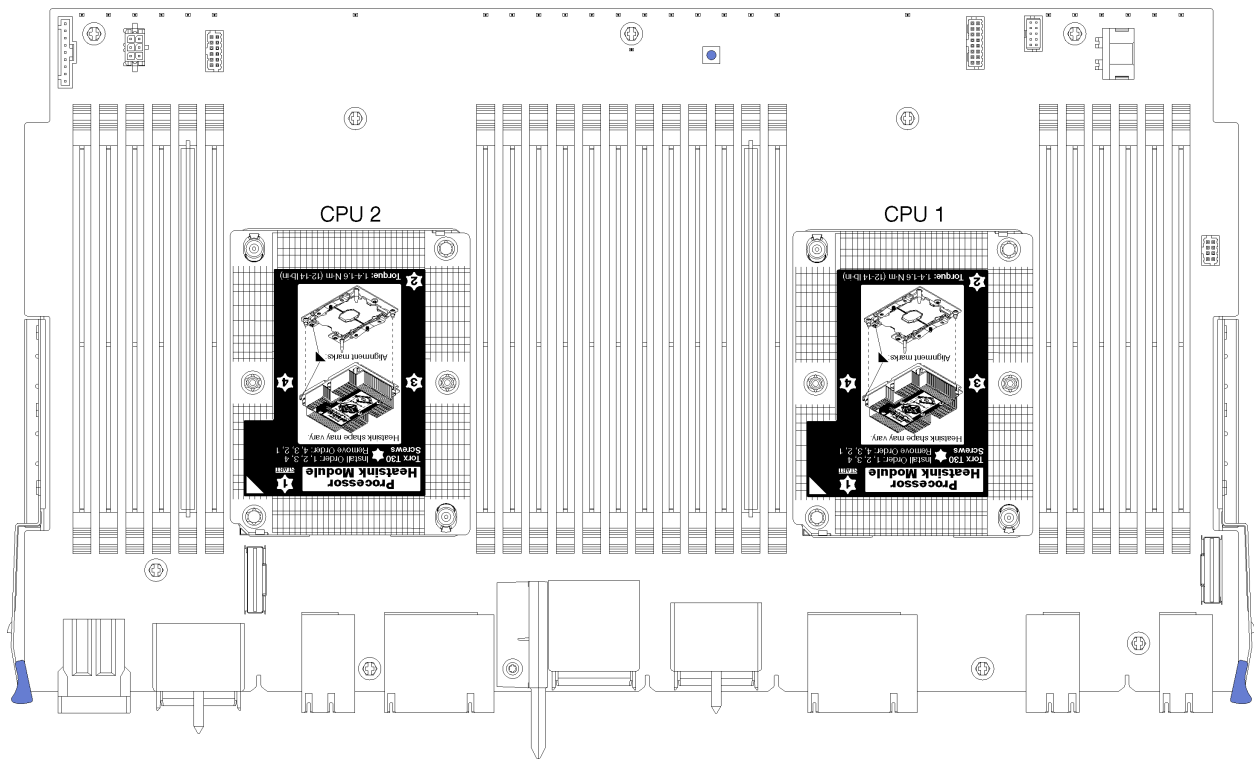


Figure 29. Processor locations on system board

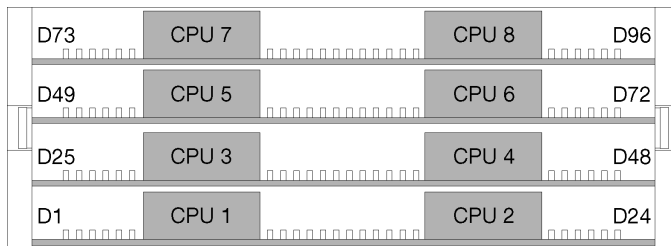


Figure 30. Processor layout for multi-processor systems (viewed from front of server)

Complete the following steps to install a PHM.

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

-  [YouTube](#)
-  [Youku](#)

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.

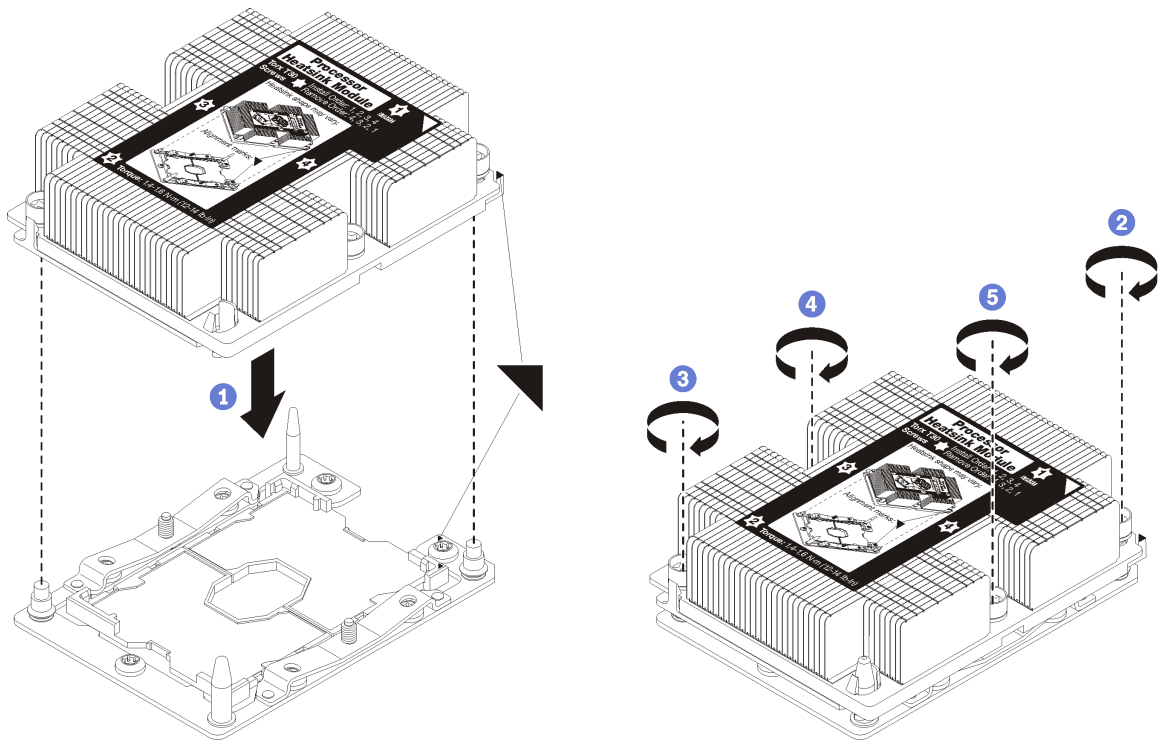


Figure 31. Installing a PHM

- 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 216](#). Also install memory module fillers, that are provided with the PHM, in any vacant memory module connectors.
2. Install the upper system board or system board filler, if it was removed. See [“Install a system board” on page 310](#).
3. Install the compute tray . See [“Install a compute tray” on page 307](#).
4. If you have no additional options to install in the upper or lower compute tray, install the front cover. See [“Install the front cover” on page 227](#).

Install a memory module

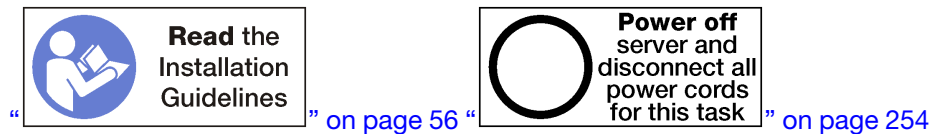
Memory modules are installed in the system boards that are accessed from the front of the server.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

See [“Memory module installation rules and order” on page 58](#) for detailed information about memory configuration and setup.

If you are installing an optional processor, install it before installing memory modules. See [“Install a processor-heat-sink module” on page 213](#)

See <https://static.lenovo.com/us/en/serverproven/index.shtml> for a list of all the memory module types and capacities that are supported for your server.

Notes:

- Do not mix RDIMMs and LR-DIMMs in the same server.
- Install higher capacity (ranked) DIMMs first, following the population sequence for the memory mode being used.
- Installing or removing DIMMs changes the server configuration. When you restart the server, it displays a message that indicates that the memory configuration has changed. There are multiple ways to view the server configuration. See [“Management options” on page 19](#) for a description of each management method and how each method applies to various deployment situations.

If the system board is already installed in the server:

1. If the front cover is installed, remove it. See [“Remove the front cover” on page 322](#).
2. Remove the compute tray with the system board where you are installing the memory module. See [“Remove a compute tray” on page 305](#).
3. If you are installing a memory module in the lower compute system board, remove the upper system board or system board filler. See [“Remove a system board” on page 309](#).

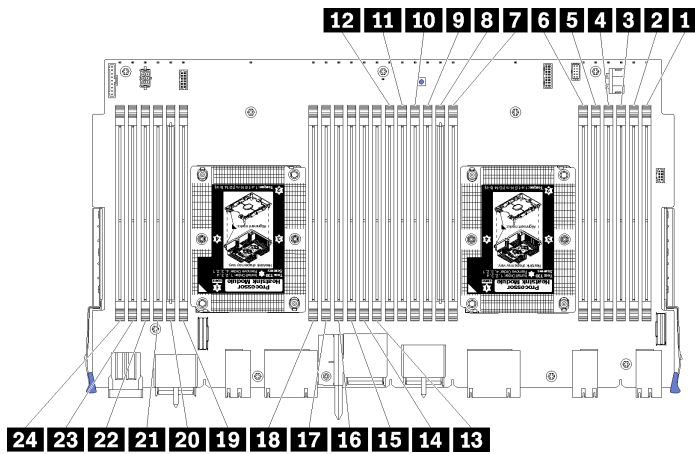


Figure 32. Memory module locations

Table 216. Memory module locations on each system board

DIMM number	System board 1 (lower board, lower tray) DIMM number	System board 2 (upper board, lower tray) DIMM number	System board 3 (lower board, upper tray) DIMM number	System board 4 (upper board, upper tray) DIMM number
1	1	25	49	73
2	2	26	50	74
3	3	27	51	75
4	4	28	52	76
5	5	29	53	77
6	6	30	54	78
7	7	31	55	79
8	8	32	56	80
9	9	33	57	81
10	10	34	58	82
11	11	35	59	83
12	12	36	60	84
13	13	37	61	85
14	14	38	62	86
15	15	39	63	87
16	16	40	64	88
17	17	41	65	89
18	18	42	66	90
19	19	43	67	91
20	20	44	68	92
21	21	45	69	93
22	22	46	70	94

Table 216. Memory module locations on each system board (continued)

DIMM number	System board 1 (lower board, lower tray) DIMM number	System board 2 (upper board, lower tray) DIMM number	System board 3 (lower board, upper tray) DIMM number	System board 4 (upper board, upper tray) DIMM number
23	23	47	71	95
24	24	48	72	96

Complete the following steps to install a memory module:

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

-  [YouTube](#)
-  [Youku](#)



Attention: Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for [Handling static-sensitive devices](#):

- 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.

Step 1. Install the memory module.

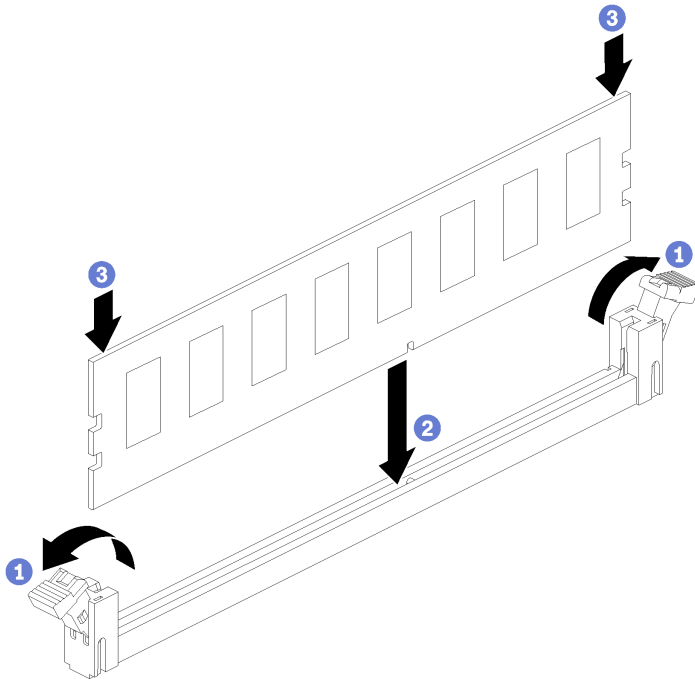


Figure 33. Memory module installation

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

Step 2. If you are installing additional memory modules, do so now.

After installing a memory module option:

1. Install the upper system board or system board filler, if it was removed. See [“Install a system board” on page 310](#).
2. Install the compute tray . See [“Install a compute tray” on page 307](#).
3. If you have no additional options to install in the upper or lower compute tray, install the front cover. See [“Install the front cover” on page 227](#).

Install a hard disk drive backplane

Hard disk drive backplanes are in the upper and lower compute trays that are accessed from the front of the server. The installation procedure for backplanes in the upper and lower compute trays is different.

Install a hard disk drive backplane (upper tray)

Hard disk drive backplanes in the upper compute tray or optional storage tray are accessed from the front of the server. There are several types of hard disk drive backplane. Steps that are backplane specific are noted in each procedure.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Note: If you are installing a system board, processor, memory module, as options in the upper compute tray, perform these tasks first. See [“Install the system board” on page 211](#), [“Install a processor-heat-sink module” on page 213](#), or [“Install a memory module” on page 216](#).

Before you install the hard disk drive backplane:

1. If the front cover is installed, remove it. See [“Remove the front cover” on page 322](#).
2. Determine the location of the backplanes to be installed. Backplanes are installed in the following order:
 - For SAS-only drive backplanes, backplanes should be populated from left to right, when viewed from the front of the server (backplane for drives 12-15 first; then, 16-19 and 20-23).
 - For NVMe/SAS drive backplanes, backplanes should be populated from right to left, when viewed from the front of the server (backplane for drives 20-23 first; then, 16-19 and 12-15).
 - These population orders allow a mix of drive backplane types to be installed in the server.
3. Apply new drive-bay labels based on the backplane locations determined in the previous step. Several drive bay labels come with each type of the supported drive backplane. Install the labels that match the label types used for your server.
4. Remove the upper compute tray or storage tray. See [“Remove a compute tray” on page 305](#) or [“Remove a storage tray” on page 375](#).
5. If a hard disk drive backplane is already installed in this location:
 - a. After noting their locations, remove any hard disk drives that are installed in the upper compute tray or optional storage tray. See [“Remove a hard disk drive” on page 323](#).
 - b. Remove the hard disk drive backplane. See [“Remove a hard disk drive backplane \(upper tray\)” on page 327](#)
6. Turn the tray upside down.
7. Remove the fan cage. See [“Remove a fan cage \(upper tray\)” on page 314](#).

Note: The hard disk drive backplane option comes with data cables of multiple lengths. Choose a data cable with the minimum length to support connection and correct cable routing between the backplane and the RAID controller (SAS cable) or the system board (NVMe cable). See [“Cable routing for drives” on page 40](#).

Complete the following steps to install a hard disk drive backplane in the upper compute tray or optional storage tray.

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

-  [YouTube](#)
-  [Youku](#)

Step 1. Connect the power cable to the backplane. If this cable is connected to the storage interposer, you might find it easier to disconnect it from the storage interposer and then reconnect it to the storage interposer after the backplane is installed. See “[Cable routing for drives](#)” on page 40.

Step 2. Install the hard disk drive backplane.

Note: Existing cables might need to be removed from their retaining clips or moved to the side to install the backplane.

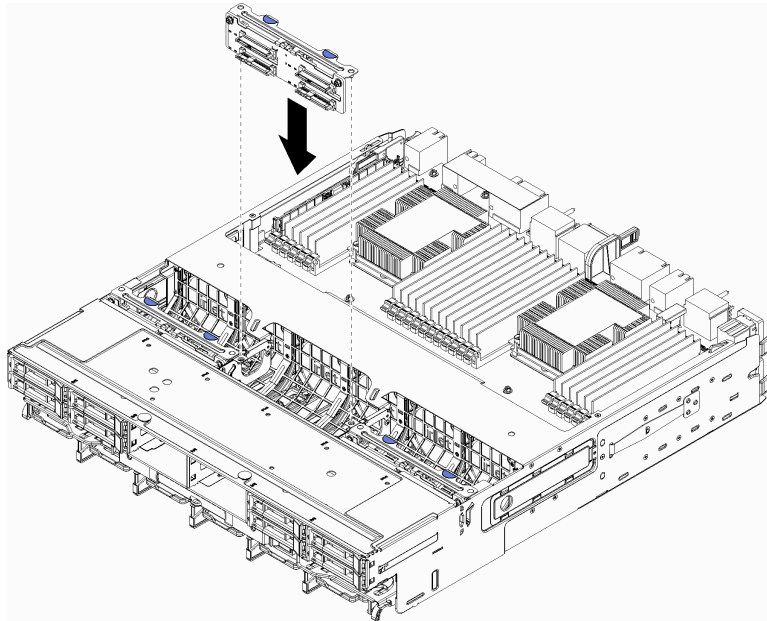


Figure 34. Hard disk drive backplane (upper) installation

Align the backplane with its location in the tray; then, insert the backplane and push it down until it is fully seated.

- Step 3. Connect the data cables to the backplane. (SAS backplanes have only one data cable. NVMe backplanes have two data cables.) See “[Cable routing for drives](#)” on page 40.
- Step 4. Repeat [Step 1 on page 222](#), [Step 2 on page 222](#), and [Step 3 on page 222](#) for each hard disk drive backplane being installed in the upper tray.
- Step 5. Turn the tray upside down.
- Step 6. Route and connect the data cables. See “[Cable routing for drives](#)” on page 40.
- Route each SAS data cable to its connector on the RAID adapter; then, connect the SAS cable.
 - Route each NVMe data cable to its connector on a system board or optional storage tray; then, connect the NVMe cable.
- Step 7. Make sure that all power cables are connected to the storage interposer.
- Step 8. Make sure that all of the cables are correctly routed after they have been connected.

After you install the hard disk drive backplane:

1. Install the fan cage. See “[Install a fan cage \(upper tray\)](#)” on page 317.
2. Turn the tray right-side up.

3. If you have no additional options to install in the upper compute tray or storage tray, install it into the chassis. See [“Install a compute tray” on page 307](#) or [“Install the storage tray \(fully removed\)” on page 377](#).
4. Install any hard disk drives that you removed from the upper compute tray or storage tray. Each drive should be installed in its original location. See [“Install a hard disk drive” on page 324](#).
5. If you have no additional options to install in the upper or lower compute tray or in the storage tray, install the front cover. See [“Install the front cover” on page 227](#).

Install a hard disk drive backplane (lower tray)

Hard disk drive backplanes in the lower compute tray are accessed from the front of the server. There are several types of hard disk drive backplane. Steps that are backplane specific are noted in each procedure.

S002



CAUTION:

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



“ [on page 56](#) “



” [on page 254](#)”

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Note: If you are installing a system board, processor, memory module, as options in the lower compute tray, perform these tasks first. See [“Install the system board” on page 211](#), [“Install a processor-heat-sink module” on page 213](#), or [“Install a memory module” on page 216](#).

Before you install the hard disk drive backplane:

1. If the front cover is installed, remove it. See [“Remove the front cover” on page 322](#).
2. Determine the location of the backplanes to be installed. Backplanes are installed in the following order:
 - For SAS-only drive backplanes, backplanes should be populated from left to right, when viewed from the front of the server (backplane for drives 0-3 first; then, 4-7 and 8-11).
 - For NVMe/SAS drive backplanes, backplanes should be populated from right to left, when viewed from the front of the server (backplane for drives 8-11 first; then, 4-7 and 0-3).
 - These population orders allow a mix of drive backplane types to be installed in the server.
3. Apply new drive-bay labels based on the backplane locations determined in the previous step. Several drive bay labels come with each type of the supported drive backplane. Install the labels that match the label types used for your server.
4. Remove the lower compute tray. See [“Remove a compute tray” on page 305](#).
5. Remove the fan cage. See [“Remove a fan cage \(lower tray\)” on page 316](#).

6. Move or remove the storage interposer to access the hard disk drive backplanes. See [“Remove a storage interposer \(lower tray\)” on page 371](#).
7. If a hard disk drive backplane is already installed in this location:
 - a. After noting their locations, remove any hard disk drives that are installed in the lower compute tray. See [“Remove a hard disk drive” on page 323](#).
 - b. Remove the hard disk drive backplane. See [“Remove a hard disk drive backplane \(lower tray\)” on page 329](#)
8. Move cables and harnesses to provide a clear path for accessing the hard disk drive backplanes and their connectors.

Note: The hard disk drive backplane option comes with data cables of multiple lengths. Choose a data cable with the minimum length to support connection and correct cable routing between the backplane and the RAID controller (SAS cable) or the system board (NVMe cable). See [“Cable routing for drives” on page 40](#).

Complete the following steps to install a hard disk drive backplane in the lower compute tray.

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

-  [YouTube](#)
-  [Youku](#)

- Step 1. Connect the power and data cables to the hard disk drive backplane. See [“Cable routing for drives” on page 40](#).
- a. Connect the power cable to the backplane. If this cable is connected to the storage interposer, you might find it easier to disconnect it from the storage interposer and then reconnect it to the storage interposer after the backplane is installed.
 - b. Connect the data cables to the backplane. (SAS backplanes have only one data cable. NVMe backplanes have two data cables.)

- Step 2. Install the hard disk drive backplane.

Note: Existing cables might need to be removed from their retaining clips or moved to the side to install the backplane.

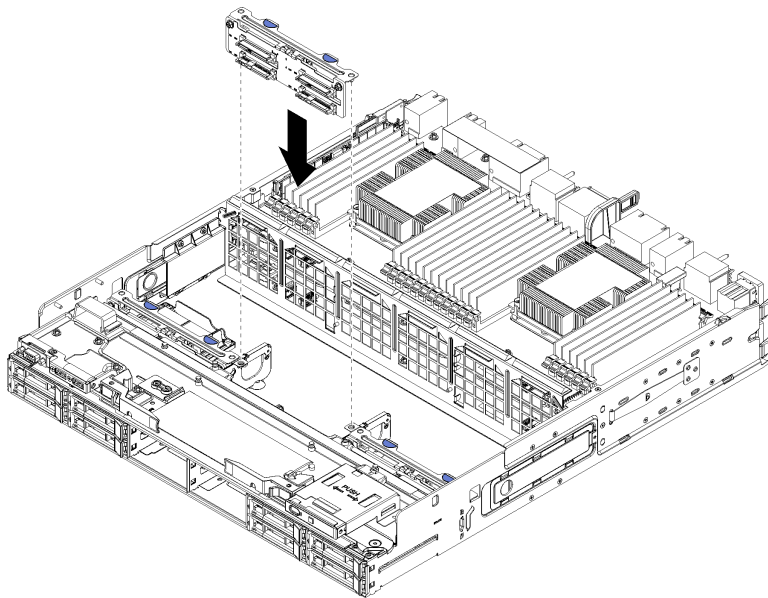


Figure 35. Hard disk drive backplane (lower) installation

Align the backplane with its location in the server; then, insert the backplane and push it down until it is fully seated.

Step 3. Repeat [Step 1 on page 224](#) and [Step 2 on page 224](#) for each hard disk drive backplane being installed in the lower compute tray.

Step 4. Route and connect the data cables. See [“Cable routing for drives” on page 40](#).

- Route each SAS data cable to its connector on the RAID adapter; then, connect the SAS cable.
- Route each NVMe data cable to its connector on the compute system board; then, connect the NVMe cable.

Step 5. Make sure that all power cables are connected to the storage interposer.

Step 6. Route any cables that were moved to access the backplanes and connectors.

After you install the hard disk drive backplane:

1. Install the storage interposer and connect all cables. See [“Install a storage interposer \(lower tray\)” on page 373](#).
2. Make sure that all of the cables are correctly routed after they have been connected.
3. Install the fan cage. See [“Install a fan cage \(lower tray\)” on page 320](#).
4. If you have no additional options to install in the lower compute tray, install it into the chassis. See [“Install a compute tray” on page 307](#).
5. Install any hard disk drives that you removed from the lower compute tray. Each drive should be installed in its original location. See [“Install a hard disk drive” on page 324](#).
6. If you have no additional options to install in the upper or lower compute tray, install the front cover. See [“Install the front cover” on page 227](#).

Install a hard disk drive

Insert the hard disk drive in its bay and close the latch handle to lock the drive in place. Hard disk drives are hot-swap devices that can be installed while the server is powered on.



[“Read the Installation Guidelines” on page 56](#)

Note: If you are installing an optional hard disk drive backplane, perform that task first. See [“Install a hard disk drive backplane \(upper tray\)” on page 220](#) or [“Install a hard disk drive backplane \(lower tray\)” on page 223](#).

Before installing a hard disk drive, make sure that it is compatible with both the server and its configuration. See [“Hard disk drive installation considerations” on page 226](#) for information.

Before you install a hard disk drive:

1. If the hard disk drive bay contains a filler, press the release tab and pull the filler from the bay.

Hard disk drive fillers can be of two types: single-bay fillers and four-bay fillers. If you remove a four-bay filler and are not installing four hard disk drives, you must install single-bay fillers in each of the empty drive bays.

Complete the following steps to install a hard disk drive:

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

-  [YouTube](#)

-  Youku

Note: NVMe drive bays can accept either SATA/SAS or NVMe drives.

- Step 1. Determine the drive type that you can install in the bay (SATA/SAS or NVMe) based on labels stenciled on the front of the server and any drive bay labels that might have been applied to the front of the server. These labels correspond to the drive backplane types that are installed. The drive type must match the drive bay type. Drive type information is available on the package that contains the drive.
- Step 2. Install the hard disk drive in the drive bay.

If the server is operating (turned on), the green activity LED on the hard disk drive should light solid, indicating that the drive is receiving power.

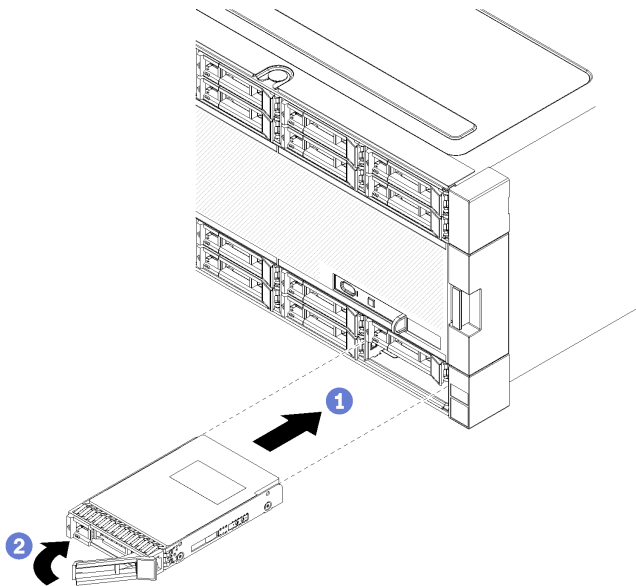


Figure 36. Hard disk drive installation

- Open the drive handle, align the drive with the drive bay, and insert the drive.
 - Push the drive into the bay until the drive stops; then, rotate drive handle closed to fully seat the drive and lock it in place.
- Step 3. Check the hard disk drive status LED to verify that the hard disk drive is operating correctly.
 - If the yellow hard disk drive status LED of a drive is lit continuously, that drive is faulty and must be replaced.
 - If the green hard disk drive activity LED is lit, the drive is powered, but not actively reading or writing data. If the LED is flashing, the drive is being accessed.
 - Step 4. If you are installing additional hard disk drives, do so now.

After you have installed all hard disk drives:

1. Install fillers in all empty hard disk drive bays. If you removed a four-bay filler and do not install four hard disk drives in its place, place single-bay fillers in any vacant bays.

Hard disk drive installation considerations

Hard disk drives must be installed in a specific order based on the hard disk drive configuration that you implement on your server.

The following notes describe the type of hard disk drives that the server supports and other information that you must consider when installing a hard disk drive:

- For a complete list of hard disk drives supported for the server, see <https://static.lenovo.com/us/en/serverproven/index.shtml>.
- The server supports up to 24 2.5-inch hard disk drives.
- The electromagnetic interference (EMI) integrity and cooling of the server are protected by having all bays and PCI Express slots covered or occupied. When you install a drive or a PCI Express adapter, save the EMC shield and filler panel from the bay or PCI Express adapter slot cover in the event that you later remove the device.
- Locate the documentation that comes with the hard disk drive and follow those instructions in addition to the instructions in this chapter.
- Do not mix standard 512-byte and advanced 4-KB format drives in the same RAID array because it may lead to potential performance issues.
- Check the instructions that come with the drive to determine whether you have to set any switches or jumpers on the drive. If you are installing a SAS or SATA hard disk drive, be sure to set the SAS or SATA ID for that device.

Install the front cover

Install the front cover by sliding the cover into position and pressing until it is fully seated.

Complete the following steps to install the front cover:

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

-  [YouTube](#)
-  [Youku](#)

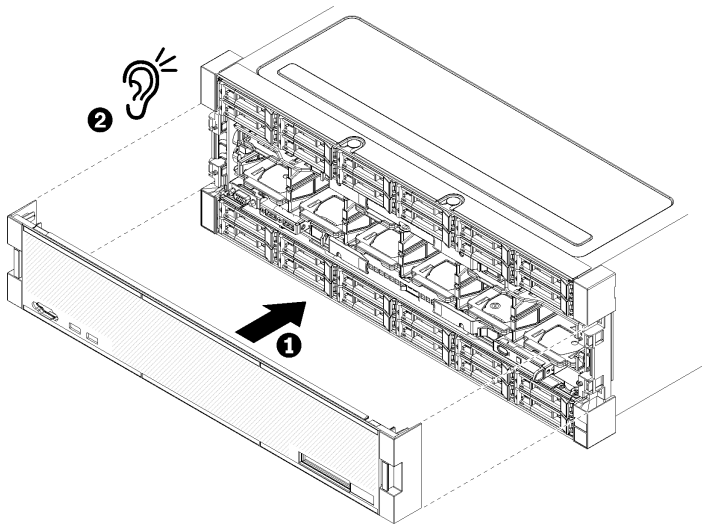


Figure 37. Front cover installation

Step 1. Position the cover on the front of the server.

Note: Make sure that the pull tab on the operator panel, used to access the LCD system information display panel, passes through the hole for the display panel on the front cover.

Step 2. Press and slide the cover toward the rear of the server until the release clips engage.

Install an adapter

Adapters are in the I/O tray that is accessed from the rear of the server.

Install the LOM adapter (slot 9) and other adapters that are installed directly in the I/O tray (adapters 5 to 8) before installing adapters that are in the I/O tray risers.

Installation considerations for the Mellanox InnoVA™-2 Flex Open Programmable SmartNIC

Review the following guidelines before installing the Mellanox InnoVA™-2 Flex Open Programmable SmartNIC:

- If you install the Mellanox InnoVA™-2 Flex Open Programmable SmartNIC in the ThinkSystem SR950, the maximum supported ambient temperature for the system is 35°C.
- The Mellanox InnoVA™-2 Flex Open Programmable SmartNIC is **not** supported in the following adapter slots: 1, 5, and 10.
- When installing the Mellanox InnoVA™-2 Flex Open Programmable SmartNIC in a 4-socket configuration:
 - A maximum of two of these adapters can be installed in the system.
 - The Mellanox InnoVA™-2 Flex Open Programmable SmartNIC can be installed only in adapter slots 6, 7, or 17.
 - The installation of two of these adapters in contiguous, sequential slots is not supported. For example, you cannot install two adapters in slots 6 and 7.
- When installing the Mellanox InnoVA™-2 Flex Open Programmable SmartNIC in an 8-socket configuration:
 - A maximum of four of these adapters can be installed in the system.
 - The Mellanox InnoVA™-2 Flex Open Programmable SmartNIC can be installed only in adapter slots 2, 3, 4, 6, 7, 11, 12, 13, 14, 15, 16, or 17.
 - The installation of two of these adapters in contiguous, sequential slots is not supported. For example, you cannot install two adapters in slots 2 and 3.

Install a LOM adapter in slot 9

The LOM adapter in slot 9 is in the I/O tray that is accessed from the rear of the server. With the I/O tray removed from the chassis, insert the adapter in the I/O tray.

S002



CAUTION:

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



“ on page 56 “



” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install an optional LOM adapter in slot 9:

1. If the I/O tray is installed in the server, remove it. See [“Remove the I/O tray” on page 334](#).
2. Remove the riser for slot 10 to 15 (riser 2) to access the adapter connectors in the I/O tray. See [“Remove the riser for slot 10 to 15 \(riser 2\)” on page 359](#).
3. Make sure that there is no filler installed in slot 9.

Complete the following steps to install a LOM adapter in slot 9.

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

-  [YouTube](#)
-  [Youku](#)

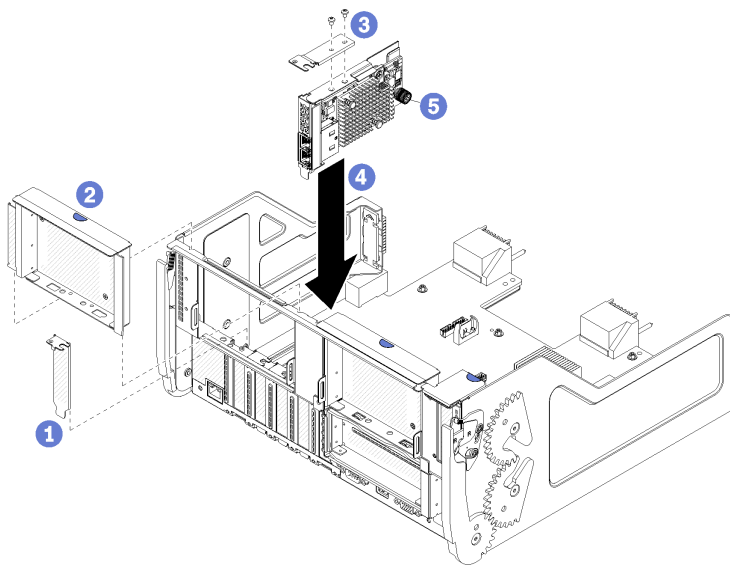


Figure 38. LOM adapter installation (slot 9)

- Step 1. Attach the extension bracket to the top of the LOM adapter using two screws.
- Step 2. Align the adapter with I/O tray slot 9 and insert it; then, press the adapter into the I/O tray until the connector is fully seated.
- Step 3. Tighten the captive thumbscrew on the side of the LOM adapter that secures it to the bracket on the I/O tray.

After installing an optional LOM adapter in slot 9:

1. If you have no additional adapters to install in the I/O tray or in the riser for slot 10 to 15 (riser 2), install the riser for slot 10 to 15. See [“Install the riser for slot 10 to 15 \(riser 2\)” on page 365](#).
2. If any of the adapters in the I/O tray have internal cables, make sure that they are connected before installing the I/O tray.
3. If you have no additional options to install in the I/O tray, install it. See [“Install the I/O tray” on page 335](#).

Install a PCIe adapter in slot 5 to 8

PCIe adapters in slot 5 to 8 are in the I/O tray that is accessed from the rear of the server. With the I/O tray removed from the chassis, insert the adapter in the I/O tray.

Note: You should not install a RAID or Host Bus Adapter card in slot 7.

S002



CAUTION:

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



“ on page 56 “



” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install an optional adapter in slot 5 to 8:

1. If the I/O tray is installed in the server, remove it. See [“Remove the I/O tray” on page 334](#).
2. Remove the riser or riser filler for slot 1 to 4 (left riser) to access the adapter connectors in the I/O tray. See [“Remove the riser for slot 1 to 4 \(riser 1\)” on page 358](#).
3. Make sure that there is no filler installed in the slot where you are installing the adapter.

Complete the following steps to install an adapter for slot 5 to 8.

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

-  [YouTube](#)
-  [Youku](#)

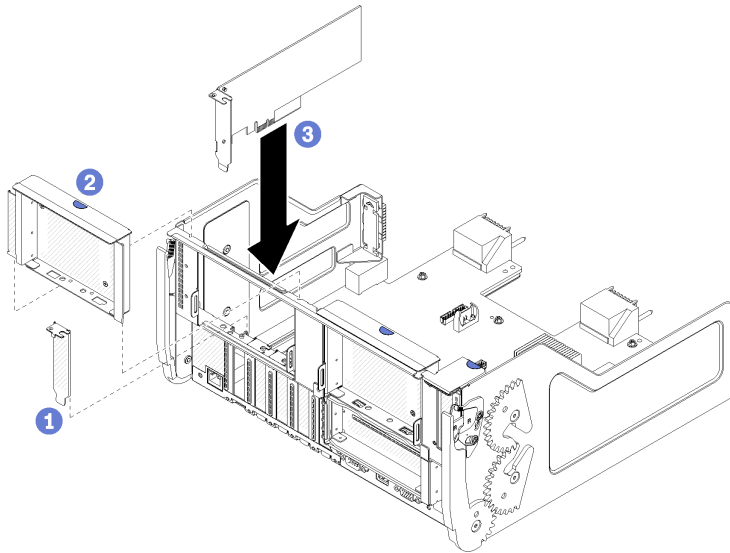


Figure 39. Adapter installation (slot 5 to 8)

Step 1. Align the adapter with the I/O tray slot and insert it; then, press the adapter into the I/O tray until the connector is fully seated.

After installing an optional adapter in slot 5 to 8:

1. If you have no additional adapters to install in the I/O tray or in the riser for slot 1 to 4 (riser 1), install the riser or riser filler for slot 1 to 4. See [“Install the riser for slot 1 to 4 \(riser 1\)” on page 364](#).
2. If any of the adapters in the I/O tray have internal cables, make sure that they are connected before installing the I/O tray.
3. If you have no additional options to install in the I/O tray, install it. See [“Install the I/O tray” on page 335](#).

Install a PCIe adapter in slot 1 to 4


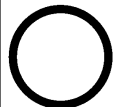
PCIe adapters in slot 1 to 4 are in an I/O tray riser that is accessed from the rear of the server. With the riser removed from the I/O tray, open the retention latch and insert the adapter in the riser; then, close the retention latch.

S002



CAUTION:

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


Read the Installation Guidelines on page 56 “

Power off server and disconnect all power cords for this task on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install an optional adapter in slot 1 to 4:

1. If the I/O tray is installed in the server, remove it. See [“Remove the I/O tray” on page 334](#).

Important: You must remove the riser from the I/O tray before installing an adapter. If you are installing a network adapter (with an RJ45 connector), make sure that there is sufficient clearance to disconnect the Ethernet cable from the adapter after it is installed.

2. Remove the riser for slot 1 to 4 (riser 1). See [“Remove the riser for slot 1 to 4 \(riser 1\)” on page 358](#).
3. Make sure that there is no filler installed in the slot where you are installing the adapter.

Complete the following steps to install an adapter in slot 1 to 4.

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

-  [YouTube](#)
-  [Youku](#)

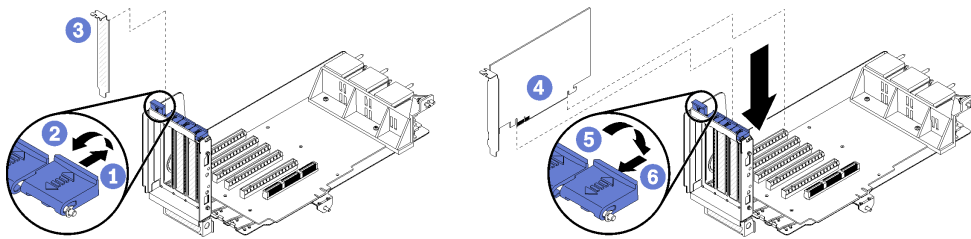


Figure 40. Adapter installation (slot 1 to 4)

Step 1. Open the retention latch.

Step 2. Align the adapter with the riser slot and insert it; then, press the adapter into the riser until the connector is fully seated.

Step 3. Close and lock the retention latch.

If you have no additional adapters to install in the riser after installing an optional adapter in slot 1 to 4:

1. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.
2. Install the riser in the I/O tray. See [“Install the riser for slot 1 to 4 \(riser 1\)” on page 364](#).
3. If you have no additional options to install in the I/O tray, install it. See [“Install the I/O tray” on page 335](#).

Install a PCIe adapter in slot 10 to 15

PCIe adapters in slot 10 to 15 are in an I/O tray riser that is accessed from the rear of the server. With the riser removed from the I/O tray, open the retention latch and insert the adapter in the riser; then, close the retention latch.

S002



CAUTION:

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



**Read the
Installation
Guidelines**

“ on page 56 “



**Power off
server and
disconnect all
power cords
for this task**

” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

If you are installing an optional LOM adapter in slot 9, install it before installing other adapters in the riser for slot 10 to 15 (riser 2). See “[Install a LOM adapter in slot 9](#)” on page 228.

Before you install an optional adapter in slot 10 to 15:

1. If the I/O tray is installed in the server, remove it. See “[Remove the I/O tray](#)” on page 334.

Important: You must remove the riser from the I/O tray before installing an adapter. If you are installing a network adapter (with an RJ45 connector), make sure that there is sufficient clearance to disconnect the Ethernet cable from the adapter after it is installed.

2. Remove the riser for slot 10 to 15 (riser 2). See “[Remove the riser for slot 10 to 15 \(riser 2\)](#)” on page 359.
3. Make sure that there is no filler installed in the slot where you are installing the adapter.

Note: If you are installing an adapter in slot 14 or 15, the optional slot 14 to 15 riser bracket or a riser bracket filler must be installed on the riser. See “[Install a riser bracket for slot 14 to 15](#)” on page 241

Complete the following steps to install an adapter in slot 10 to 15.

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

-  [YouTube](#)
-  [Youku](#)

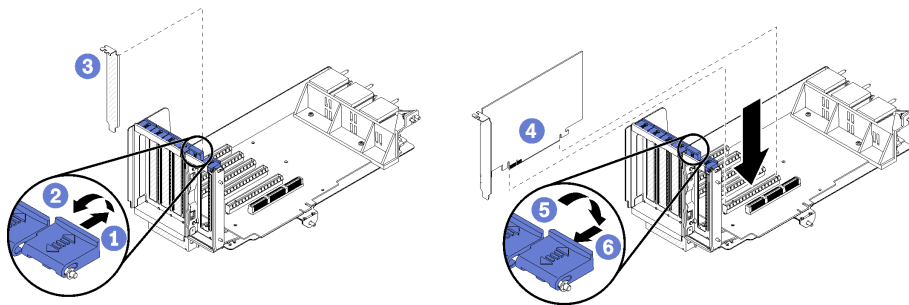


Figure 41. Adapter installation (slot 10 to 15)

- Step 1. Open the retention latch.
- Step 2. Align the adapter with the riser slot and insert it; then, press the adapter into the riser until the connector is fully seated.
- Step 3. Close and lock the retention latch.

If you have no additional adapters to install in the riser after installing an optional adapter in slot 10 to 15:

1. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.
2. Install the riser in the I/O tray. See [“Install the riser for slot 10 to 15 \(riser 2\)” on page 365.](#)
3. If you have no additional options to install in the I/O tray, install it. See [“Install the I/O tray” on page 335.](#)

Install an I/O adapter in slot 16 to 17

I/O adapters in slot 16 to 17 are in an I/O tray riser that is accessed from the rear of the server. With the riser removed from the I/O tray, open the retention latch and insert the adapter in the riser; then, close the retention latch.

S002



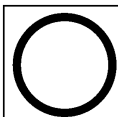
CAUTION:

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



**Read the
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“ [on page 56](#) “



**Power off
server and
disconnect all
power cords
for this task**

” [on page 254](#)”

Attention: The adapter installed in slot 16 must have a metal bezel with holes no larger than 3.0 mm in any dimension.

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install an optional adapter in slots 16 or 17:

1. If the I/O tray is installed in the server, remove it. See [“Remove the I/O tray” on page 334.](#)

Important: You must remove the riser from the I/O tray before installing an adapter.

2. Remove the riser for slot 16 to 17. See [“Remove the riser for slot 16 to 17 \(riser 3\)” on page 362.](#)
3. Make sure that there is no filler installed in the slot where you are installing the adapter.

Complete the following steps to install an adapter in slots 16 or 17.

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

-  [YouTube](#)
-  [Youku](#)

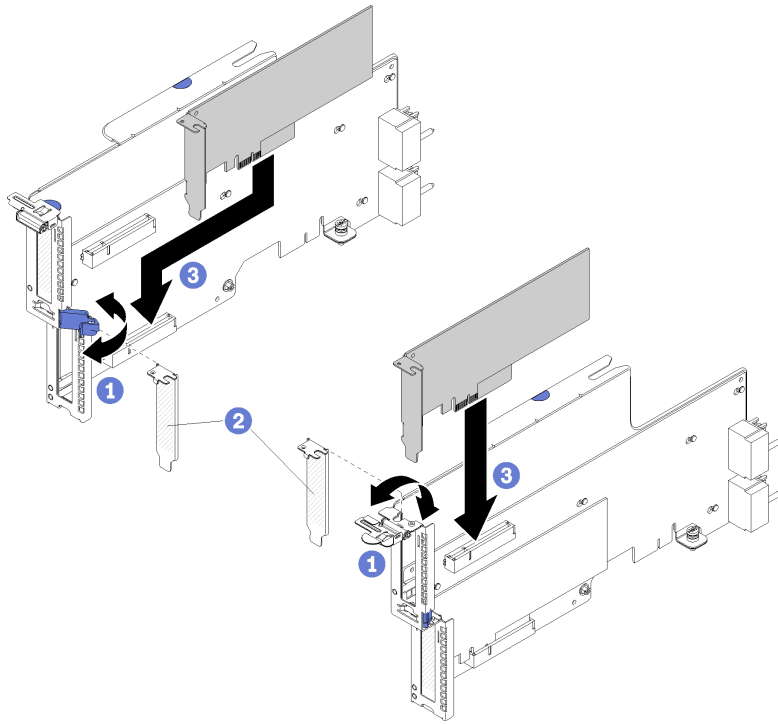


Figure 42. Adapter installation (slot 16 to 17)

- Step 1. Open the retention latch.
- Step 2. Align the adapter with the riser slot and insert it; then, press the adapter into the riser until the connector is fully seated.
- Step 3. Close and lock the retention latch.

If you have no additional adapters to install in the riser after installing an optional adapter in slots 16 or 17:

1. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.
2. Install the riser in the I/O tray. See [“Install the riser for slot 16 to 17 \(riser 3\)”](#) on page 368.
3. If you have no additional options to install in the I/O tray, install it. See [“Install the I/O tray”](#) on page 335.

Install an M.2 drive

Use this information to install an M.2 drive option.

S002



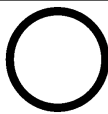
CAUTION:

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



**Read the
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“ on page 56 “



**Power off
server and
disconnect all
power cords
for this task**

” on page 254 “



**ATTENTION:
Static Sensitive Device**
Ground package before opening

” on page 58

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install an M.2 drive, if the M.2 backplane is installed in the server, remove it. See [“Remove the M.2 backplane” on page 342.](#)

Complete the following steps to install an M.2 drive in the M.2 backplane.

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

-  [YouTube](#)
-  [Youku](#)



**ATTENTION:
Static Sensitive Device**
Ground package before opening

“ on page 58

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

Step 2. Insert the M.2 drive.

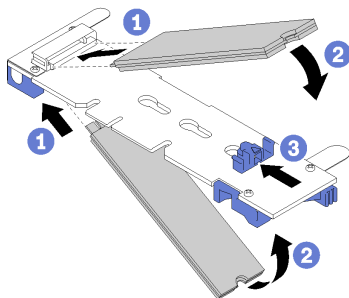


Figure 43. Inserting the M.2 drives

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

Notes:

- When installing two drives, align and support both drives before sliding the retainer forward to secure the drives.
- When only one drive is installed, it must be in slot 0.

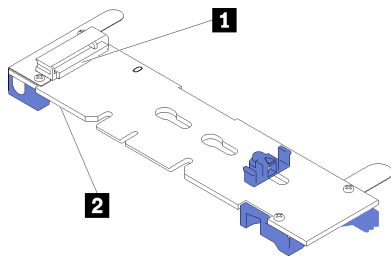


Figure 44. M.2 drive slots

Table 217. M.2 drive slots

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

Step 3. Secure the M.2 drives in the backplane.

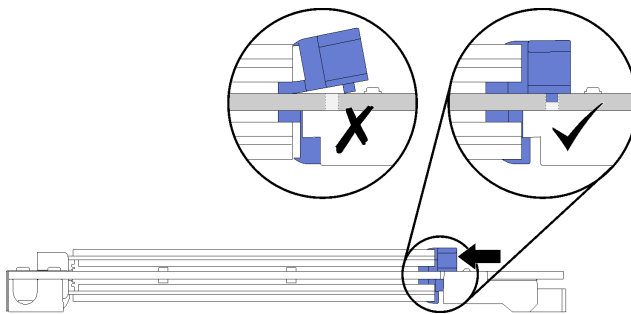


Figure 45. Securing the M.2 drives

Attention: Make sure the two nubs on the retainer are in the small holes on the M.2 backplane when the retainer is slid forward.

Slide the retainer forward (toward the connector) until you hear a soft “click” sound.

After installing an M.2 drive option:

1. Install the M.2 backplane. See [“Install the M.2 backplane” on page 244](#).
2. If you have no additional options to install in the I/O tray, install it. See [“Install the I/O tray” on page 335](#).

Note: You will need to configure the M.2 drive to complete the installation. See the information that comes with the M.2 drive option for information.

Install a riser

Risers are in the I/O tray that is accessed from the rear of the server.

Install adapters before installing the risers.

Install the riser for slot 1 to 4 (riser 1)

The riser for adapter slot 1 to 4 (riser 1) is in the I/O tray that is accessed from the rear of the server. After installing adapters in the riser, insert the riser in the I/O tray and secure it with two captive screws.

S002



CAUTION:

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



**Read the
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Guidelines**

“ on page 56 “



**Power off
server and
disconnect all
power cords
for this task**

” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install the riser for slot 1 to 4 option:

1. If the I/O tray is installed in the server, remove it. See [“Remove the I/O tray” on page 334](#).
2. Make sure that there is no screw (item 2 in following figure) securing the I/O tray board to the I/O tray in a location where a captive riser screw will be installed.
3. Make sure that there are no I/O tray fillers installed in riser slot 1 to 4.
4. Install adapters in the riser. See [“Install a PCIe adapter in slot 1 to 4” on page 231](#).
5. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.

Complete the following steps to install the riser for slot 1 to 4.

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

-  [YouTube](#)
-  [Youku](#)

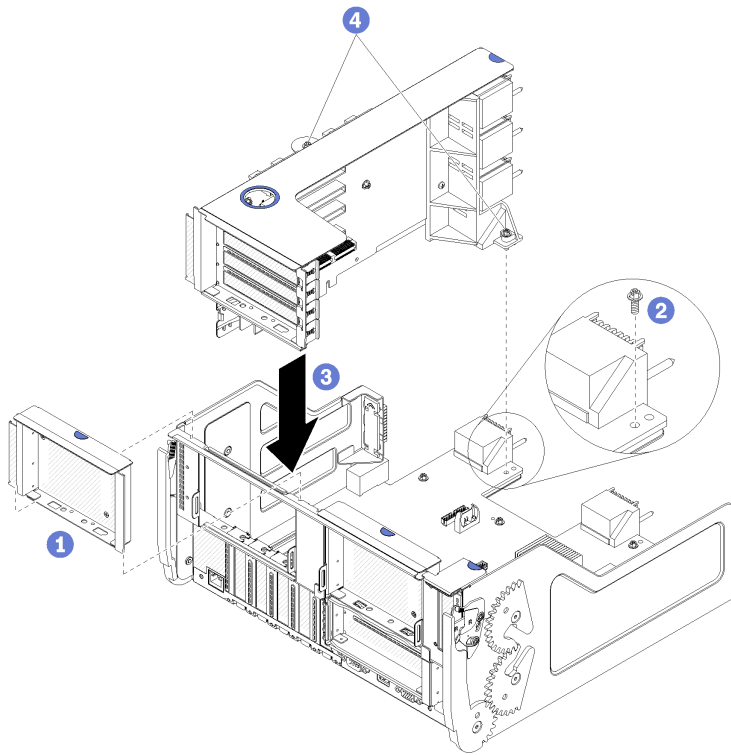


Figure 46. Riser for slot 1 to 4 (riser 1) installation

- Step 1. Align the riser with the I/O tray and insert it; then, press the riser into the I/O tray until the connector is fully seated.
- Step 2. Tighten the two captive screws (items 4 in preceding figure) that secure the riser to the I/O tray board.

If you have no other options to install in the I/O tray after installing the riser for slot 1 to 4, install the I/O tray in the chassis. See [“Install the I/O tray” on page 335](#).

Install the riser for slot 10 to 15 (riser 2)

The riser for adapter slot 10 to 15 (riser 2) is in the I/O tray that is accessed from the rear of the server. After installing adapters in the riser, insert the riser in the I/O tray and secure it with two captive screws.

S002



CAUTION:

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

Install the optional M.2 backplane and optional riser bracket for slot 14 to 15 before installing the riser for adapter slot 10 through 15 (riser 2).



**Read the
Installation
Guidelines**

“ on page 56 “



**Power off
server and
disconnect all
power cords
for this task**

” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

If you are installing an optional LOM adapter in slot 9, install it before installing the riser for slot 10 to 15 (riser 2). See [“Install a LOM adapter in slot 9” on page 228](#).

Before you install the riser for slot 10 through 15 option:

1. If the I/O tray is installed in the server, remove it. See [“Remove the I/O tray” on page 334](#).
2. Make sure that there is no screw (item 2 in following figure) securing the I/O tray board to the I/O tray in a location where a captive riser screw will be installed.
3. Make sure that there are no I/O tray fillers installed in riser slot 10 to 15.
4. If you are installing the optional slot 14 to 15 bracket, make sure that it is in place. See [“Install a riser bracket for slot 14 to 15” on page 241](#).
5. Install adapters in the riser. See [“Install a PCIe adapter in slot 10 to 15” on page 232](#).
6. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.

Complete the following steps to install the riser for slot 10 to 15.

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

-  [YouTube](#)
-  [Youku](#)

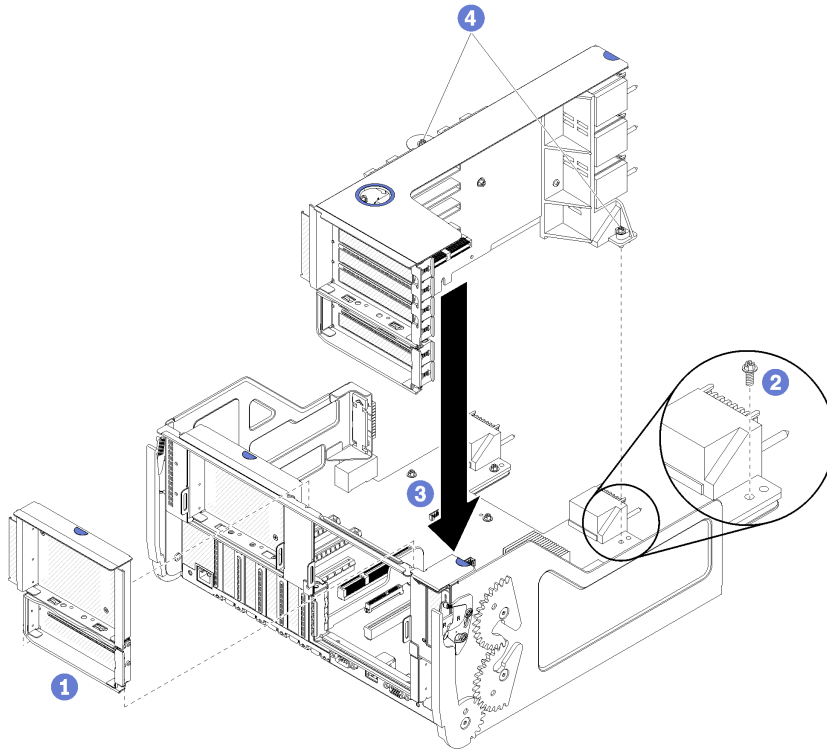


Figure 47. Riser for slot 10 to 15 (riser 2) installation

- Step 1. Align the riser with the I/O tray and insert it; then, press the riser into the I/O tray until the connector is fully seated.
- Step 2. Tighten the two captive screws (items 4 in preceding figure) that secure the riser to the I/O tray board.

If you have no other options to install in the I/O tray after installing the riser for slot 10 to 15, install the I/O tray in the chassis. See [“Install the I/O tray” on page 335](#).

Install a riser bracket for slot 14 to 15

The riser bracket for slot 14 to 15 is attached to the slot 10 to 15 I/O tray riser that is accessed from the rear of the server. After removing the I/O tray and the riser for slot 10 to 15 (riser 2), slide the bracket onto the riser until the retaining clips engage.

S002



CAUTION:

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



“ on page 56 “



” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

If you are installing an optional LOM adapter in slot 9, install it before installing the riser bracket for slot 14 to 15. See [“Install a LOM adapter in slot 9” on page 228](#).

Before you install the optional riser bracket for slot 14 to 15:

1. If the I/O tray is installed in the server, remove it. See [“Remove the I/O tray” on page 334](#).
2. Remove the riser for slot 10 to 15 (riser 2). See [“Remove the riser for slot 10 to 15 \(riser 2\)” on page 359](#).
3. Make sure that there is no filler installed on the I/O tray for slot 14 to 15.

Complete the following steps to install the riser bracket.

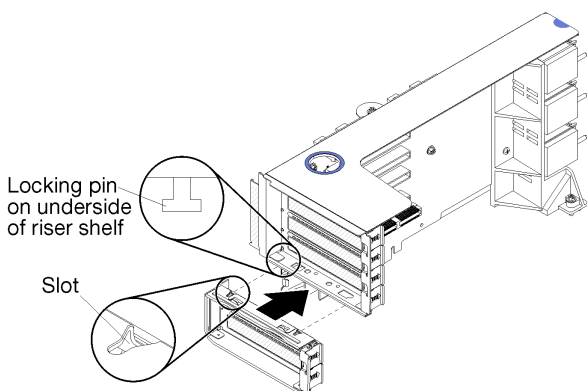


Figure 48. Riser bracket installation (slot 14 to 15)

Step 1. Align the slots on the riser bracket with the pins on the riser and slide it in place; then, press the bracket onto the riser until the retaining clips engage.

After installing the optional riser bracket for slot 14 to 15:

1. Install adapters in the riser. See [“Install a PCIe adapter in slot 10 to 15” on page 232](#).
2. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.
3. Install the riser in the I/O tray. See [“Install the riser for slot 10 to 15 \(riser 2\)” on page 365](#).
4. If you have no other options to install in the I/O tray after installing the riser, install the I/O tray in the chassis. See [“Install the I/O tray” on page 335](#).

Install the riser for slot 16 to 17

The riser for adapter slot 16 to 17 is in the I/O tray that is accessed from the rear of the server. After installing adapters in the riser, insert the riser in the I/O tray and secure it with the captive screw.

S002



CAUTION:

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

Install the M.2 backplane before installing the riser for adapter slots 16 through 17.



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Attention: Do not use the riser for slot 16 to 17 with four socket storage rich configurations.

Before you install the optional riser for slot 16 to 17:

1. If the I/O tray is installed in the server, remove it. See [“Remove the I/O tray” on page 334](#).
2. Make sure that there is no screw (item 2 in following figure) securing the I/O tray board to the I/O tray in a location where a captive riser screw will be installed.
3. Make sure that there are no I/O tray fillers installed in adapter slot 16 to 17.
4. Install adapters in the riser. See [“Install an I/O adapter in slot 16 to 17” on page 304](#).
5. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.

Complete the following steps to install the riser for slot 16 to 17.

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

-  [YouTube](#)
-  [Youku](#)

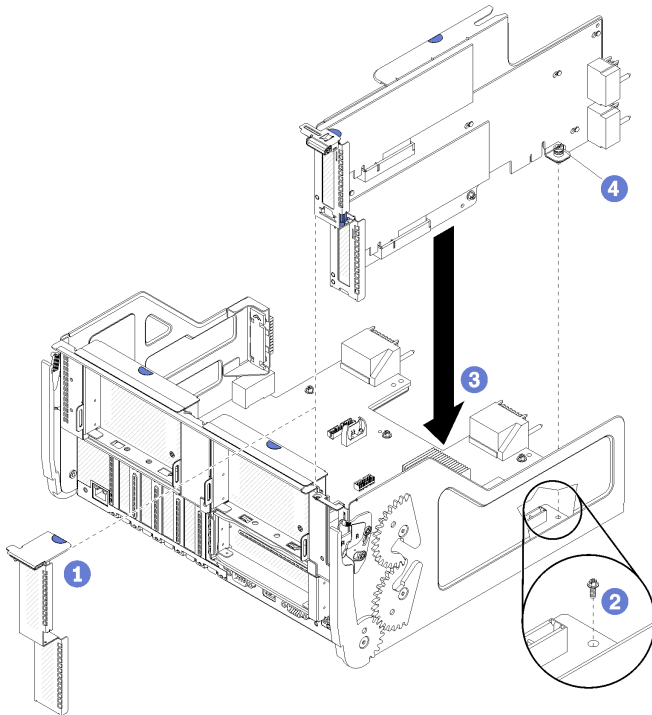


Figure 49. Riser for slot 16 to 17 installation

- Step 1. Align the riser with the I/O tray, making sure that the sides of the riser fit into the guides on the I/O tray, and insert the riser; then, press the riser into the I/O tray until the connector is fully seated.
- Step 2. Tighten the captive screw (item 4 in preceding figure) that secures the riser to the I/O tray board.

If you have no other options to install in the I/O tray after installing the riser for slot 16 to 17, install the I/O tray in the chassis. See [“Install the I/O tray” on page 335](#).

Install the M.2 backplane

The M.2 backplane is in the I/O tray that is accessed from the rear of the server. After installing M.2 drives in the backplane, insert the backplane in the I/O tray and press it in place.

S002



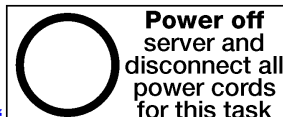
CAUTION:

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



**Read the
Installation
Guidelines**

“ on page 56 “



**Power off
server and
disconnect all
power cords
for this task**

” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Install the M.2 drives before you install the M.2 backplane. See [“Install an M.2 drive” on page 235](#).

Before you install an M.2 backplane option:

1. If the I/O tray is installed in the server, remove it. See [“Remove the I/O tray” on page 334](#).
2. If the riser for slot 10 to 15 (riser 2) and the riser for slot 16 to 17 are installed, remove one of them to access the M.2 backplane connector. See [“Remove the riser for slot 10 to 15 \(riser 2\)” on page 359](#) or [“Remove the riser for slot 16 to 17 \(riser 3\)” on page 362](#).

Complete the following steps to install the M.2 backplane.

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

-  [YouTube](#)
-  [Youku](#)

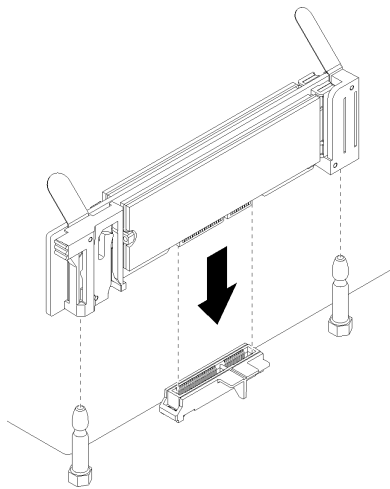


Figure 50. M.2 backplane installation

Step 1. Align the openings in the plastic supports at each end of the M.2 backplane with the guide pins on the system board; then, insert the backplane in the system-board connector.

Step 2. Press down on the M.2 backplane to fully seat it.

After installing the M.2 backplane option:

1. If you removed a riser and have no adapters to install in it, install the riser. See [“Install the riser for slot 10 to 15 \(riser 2\)” on page 365](#) or [“Install the riser for slot 16 to 17 \(riser 3\)” on page 368](#).
2. If you have no additional options to install in the I/O tray, install it. See [“Install the I/O tray” on page 335](#).

Install a power supply

Insert the power supply in its bay and press it in until the release tab locks. Power supplies are hot-swap devices that can be installed while the server is powered on.

S001



 **DANGER**

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

- Connect all power cords to a properly wired and grounded electrical outlet/source.
- Connect any equipment that will be attached to this product to properly wired outlets/sources.
- When possible, use one hand only to connect or disconnect signal cables.
- Never turn on any equipment when there is evidence of fire, water, or structural damage.
- The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

S002



CAUTION:

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

S035



CAUTION:

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



“ on page 56 ”

Important: Observe the following criteria when installing power supplies:

- All power supplies installed in the server must be of the same capacity.
- 1100-watt power supplies accept either 100-127 vac or 200-240 vac input.
- 1600-watt power supplies accept only 200-240 vac input.

- The server supports the following power supply configurations:
 - For two processor server configurations, one or more 1600-watt or 1100-watt power supplies.
 - For four processor server configurations, two or more 1600-watt or 1100-watt power supplies.
 - For eight processor server configurations, two or more 1600-watt or four 1100-watt power supplies

Attempting to operate the server with an unsupported power configuration results in an “unsupported configuration” message in the system event log and on the system front panel

- Power supplies can be installed in any power supply bay and populated in any order. Redundancy differs depending on how many processors are installed, the number of power supplies that are required to keep the system operating, which power supply bays are populated, and the number of input power sources.

Notes:

- For power source redundancy, the power supplies in bays 1 and 3 must be fed from a different power source than the power supplies in bays 2 and 4.
- Use the Lenovo Capacity Planner to calculate the required power capacity for what is configured for your server. More information about the Lenovo Capacity Planner is available at: <https://datacentersupport.lenovo.com/solutions/Invo-lcp>

Before you install a power supply:

1. If the power supply bay contains a filler, pull the filler from the bay.

Complete the following steps to install a power supply:

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

-  [YouTube](#)
-  [Youku](#)

Step 1. Install the power supply in the bay.

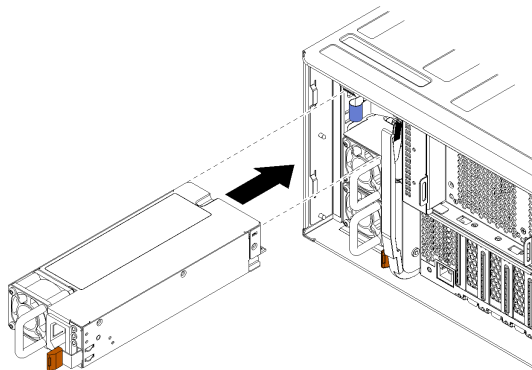


Figure 51. Power supply installation

Insert the power supply in its bay and press it in until the release tab locks.

After you have installed a power supply:

1. If the power supplies being installed are of a different wattage than the power supplies previously installed in the chassis, cover the existing chassis power rating label with a new label of the same style from the system power rating labels sheet that comes with the power supply option.
2. Route the power cable from the power supply to the power source and secure it.

The cable should pass through the cable hook-and-loop on the rear of the server so that it does not accidentally become unplugged.

3. Connect the power cable to the power supply; then, connect it to the power source.

Installing the 4S Performance to 8S Upgrade Kit

A ThinkSystem SR950 server with a four-socket performance configuration can be upgraded with the 4S Performance to 8S Upgrade Kit to support an eight-socket configuration. The installation of this conversion kit must be done by a trained service technician.

The 4S Performance to 8S Upgrade Kit includes the following parts:

- Four midplanes (interconnect cards)
- Nine Torx-head screws (you will use eight screws, but an extra screw is included in case it is needed)

Important: The 4S Performance to 8S Upgrade Kit enables the ThinkSystem SR950 server to support eight processors. However, extra processors do not come with the conversion kit; you are responsible for purchasing the desired number and type of processors. If you install the conversion kit, all processors in the server must be 8100 Series processors.

S002



CAUTION:

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

S014



CAUTION:

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

S037



CAUTION:

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

S036



18 - 32 kg (39 - 70 lb)



32 - 55 kg (70 - 121 lb)

CAUTION:
Use safe practices when lifting.



“ on page 56 “



” on page 254

CAUTION:
Make sure that all server power cords are disconnected from their power sources before performing this procedure.

The process for installing the conversion kit requires that you remove the existing midplanes (interconnect cards) in the server and replace them with the midplanes provided in the conversion kit. In addition, an upper compute tray must be installed in the server to take advantage of all eight processors.

The following illustration identifies the various midplanes that might be installed in your server.

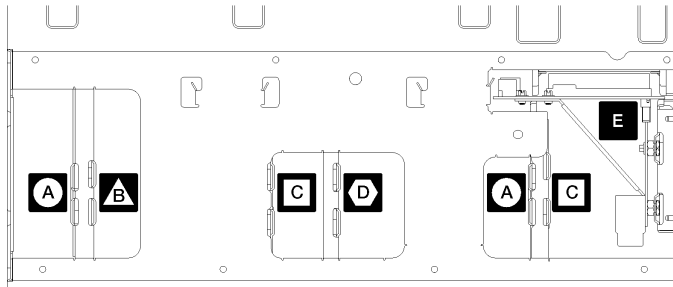


Figure 52. Midplane identification

Table 218. Midplanes

<p>A Midplane used in four-socket storage rich configurations</p>	<p>D Midplane used in four-socket and eight-socket configurations The 4S Performance to 8S Upgrade Kit comes with one of these midplanes.</p>
<p>B Midplane used in four-socket and eight-socket configurations The 4S Performance to 8S Upgrade Kit comes with one of these midplanes.</p>	<p>E Power midplane used in all server configurations</p>
<p>C Midplane used in four-socket and eight-socket configurations The 4S Performance to 8S Upgrade Kit comes with two of these midplanes.</p>	

Complete the following steps to install the 4S Performance to 8S Upgrade Kit:

- Step 1. Make sure that the server is powered off and disconnected from power source.
- Step 2. Disconnect all the external cables.
- Step 3. Remove the front cover. See “Remove the front cover” in *Maintenance Manual*.
- Step 4. Make sure that all the trays, including compute trays, storage tray, and the I/O tray are removed from the server.
 - For compute tray removal instructions, see http://thinksystem.lenovofiles.com/help/topic/7X12/remove_the_compute_tray.html.
 - For storage tray removal instructions, see http://thinksystem.lenovofiles.com/help/topic/7X12/remove_the_storage_tray.html.
 - For I/O tray removal instructions, see http://thinksystem.lenovofiles.com/help/topic/7X12/remove_the_io_tray.html.
- Step 5. If the server is in a rack, remove it from the rack.

See the *ThinkSystem SR950 Rack Installation Instructions*, which is available here:

http://thinksystem.lenovofiles.com/help/topic/7X12/pdf_files.html

- Step 6. Remove the midplanes from the server (depending on the configuration, you might need to remove up to 6 midplanes). You **must** remove midplanes A (if installed), B, C, and D. However, you do not need to remove the power midplane (midplane E). See “Midplane identification” in *Maintenance Manual* for the locations of all the midplanes.

Instructions for removing the midplanes are available here:

http://thinksystem.lenovofiles.com/help/topic/7X12/remove_a_midplane.html

Note: When you remove the top cover, discard the screws. Use the Torx-head screws that are provided with the conversion kit instead (eight screws and an extra screw are included).

- Step 7. Install the midplanes that are provided with the conversion kit. Install **only** midplane B, C, and D.

Note: Two midplane C interconnect cards are provided in the conversion kit. Make sure to install both of them.

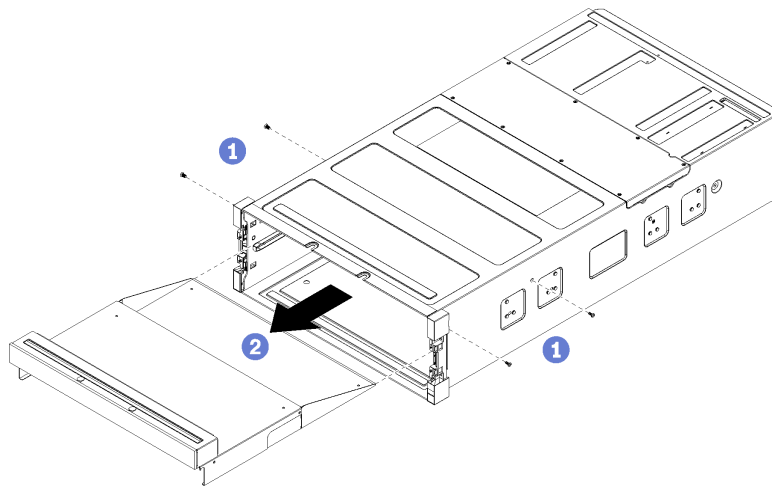
Instructions for installing the midplanes are available here:

http://thinksystem.lenovofiles.com/help/topic/7X12/install_a_midplane.html

- Step 8. If a filler is installed in the upper tray bay, you must remove it and install a compute tray to enable eight-socket capability.

Complete the following steps to remove the upper tray filler and install a compute tray:

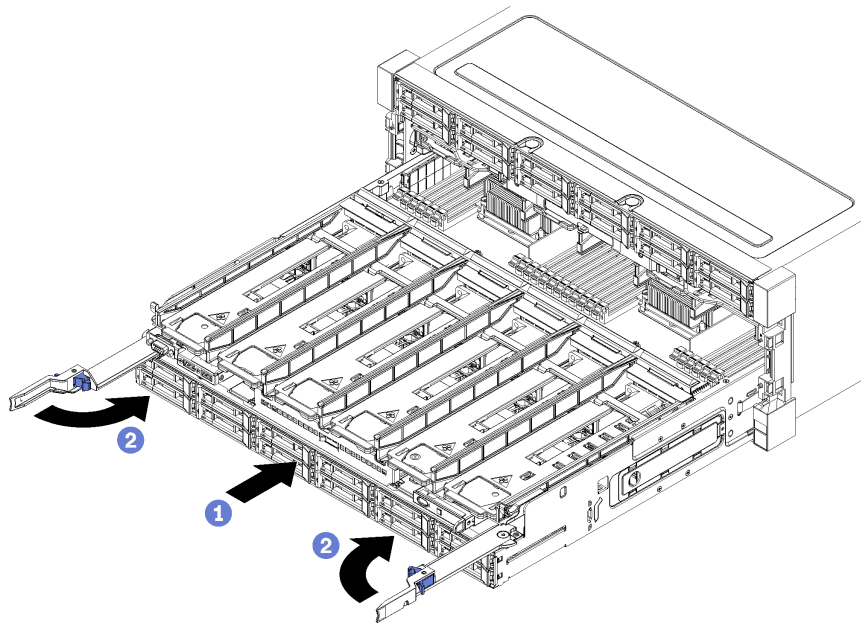
- a. Remove the four screws (two each side) securing the upper tray filler.



- b. Slide the upper tray filler out from the front of the server.
- c. Some cables may be packaged separately with the option, make sure all the cables are connected correctly to the lower system board and upper system board in the compute tray.

See http://thinksystem.lenovofiles.com/help/topic/7X12/cable_routing_common.html and http://thinksystem.lenovofiles.com/help/topic/7X12/cable_routing_for_drives.html.

- d. Align the compute tray with the opening in the front of the chassis, and insert it.
- e. Fully open the compute tray release levers, and push the compute tray into the chassis until it stops.
- f. Rotate the compute tray release levers towards the center until they lock and are fully closed.



- g. Remove the fan fillers in fan bay 7 to 12, and install fans in those bays.

See http://thinksystem.lenovofiles.com/help/topic/7X12/install_the_fan.html.

Step 9. If a storage tray is installed in the upper-tray position, you must convert it to a compute tray to take advantage of eight processors.

Notes: Cables that connect to the storage tray are longer than the cables that connect to the compute tray. For optimal cable routing, you should replace the following cables when converting from a storage tray to a compute tray in the upper-tray position:

- Fan cage cable. Replace part number 01GW929 with part number 01GW928.
- Drive power cable. Replace part number 01GW930 with part number 01GW917.
- Drive Signal cable. Replace part number 01GW931 with part number 01GW918.

Complete the following steps to convert a storage tray to a compute tray:

- a. Remove the upper tray from the server if you have not already done so.

See http://thinksystem.lenovofiles.com/help/topic/7X12/remove_the_storage_tray.html.

- b. Disconnect all cables from the storage boards.

See http://thinksystem.lenovofiles.com/help/topic/7X12/cable_routing_common.html and http://thinksystem.lenovofiles.com/help/topic/7X12/cable_routing_for_drives.html.

- c. Remove the storage board assembly.

See http://thinksystem.lenovofiles.com/help/topic/7X12/remove_the_storage_board.html.

- d. Install the system board into the lower bay in the tray.

See http://thinksystem.lenovofiles.com/help/topic/7X12/install_the_compute_system_board.html.

- e. Connect cables to the lower system board.

See http://thinksystem.lenovofiles.com/help/topic/7X12/cable_routing_common.html and http://thinksystem.lenovofiles.com/help/topic/7X12/cable_routing_for_drives.html.

- f. Install the system board into the upper bay in the tray.

See http://thinksystem.lenovofiles.com/help/topic/7X12/install_the_compute_system_board.html.

- g. Connect cables to the upper system board.

See http://thinksystem.lenovofiles.com/help/topic/7X12/cable_routing_common.html and http://thinksystem.lenovofiles.com/help/topic/7X12/cable_routing_for_drives.html.

- h. Remove the fan fillers in fan bay 8, 10, and 12, and install fans in those bays.

See http://thinksystem.lenovofiles.com/help/topic/7X12/install_the_fan.html.

Step 10. Install the server back into a rack.

See the *ThinkSystem SR950 Rack Installation Instructions*, which is available here:

http://thinksystem.lenovofiles.com/help/topic/7X12/pdf_files.html

Step 11. Install all the compute tray and I/O tray that were removed.

- For compute tray installation instructions, see http://thinksystem.lenovofiles.com/help/topic/7X12/install_the_compute_tray.html.
- For I/O tray installation instructions, see http://thinksystem.lenovofiles.com/help/topic/7X12/install_the_io_tray.html.

Step 12. Install the front cover. See “[Install the front cover](#)” on page 322.

After installation is complete, reconnect all external cables and power on the server.

Install the server in a rack

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

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 (connect input power)

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

S002



CAUTION:

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

Turn on the server

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

- You can press the power button.
- The server can start or 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 \(disconnect input power\)” on page 254](#).

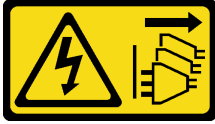
Validate server setup

After powering up the server, make sure that only green LEDs are lit. If any yellow error LEDs are lit, it indicates a problem that must be investigated.

Power off the server (disconnect input power)

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 LED off), you must disconnect all power cables.

S002



CAUTION:

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

Place the server in standby

To place the server in a standby state (power 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 \(connect input power\)” on page 253](#).

Chapter 4. System configuration

Complete these procedures to configure your system.

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

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

Set the network connection for the Lenovo XClarity Controller

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

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

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

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

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

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

- If no monitor attached to the server, you can set the network connection through the Lenovo XClarity Controller interface. Connect an Ethernet cable from your laptop to Lenovo XClarity Controller connector, which is located at the rear of the server. For the location of the Lenovo XClarity Controller connector, see “Rear view” on page 31.

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

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

- If you are using the Lenovo XClarity Administrator Mobile app from a mobile device, you can connect to the Lenovo XClarity Controller through the Lenovo XClarity Controller USB connector on the front of the server. For the location of the Lenovo XClarity Controller USB connector, see “[Front view](#)” on page 24.

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

To connect using the Lenovo XClarity Administrator Mobile app:

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

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

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

Update the firmware

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

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

- Best practices related to updating firmware is available at the following site:
 - <http://lenovopress.com/LP0656>
- The latest firmware can be found at the following site:
 - <http://datacentersupport.lenovo.com/us/en/products/servers/thinksystem/sr950/7X12/downloads>
- You can subscribe to product notification to stay up to date on firmware updates:
 - <https://datacentersupport.lenovo.com/tw/en/solutions/ht509500>

UpdateXpress System Packs (UXSPs)

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

Update method terminology

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

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

Firmware updating tools

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

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

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Graphical user interface	Command line interface	Supports UXSPs
Lenovo XClarity Integrator (LXCI) for Microsoft Windows Admin Center	In-band	√	All I/O devices	√		√
	Out-of-band					
	On-Target					
	Off-Target					
Lenovo XClarity Integrator (LXCI) for Microsoft System Center Configuration Manager	In-band	√	All I/O devices	√		√
	On-Target					
Notes:						
1. For I/O firmware updates.						
2. For BMC and UEFI firmware updates.						

- **Lenovo XClarity Provisioning Manager**

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

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

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

“Firmware Update” section in the LXPM documentation compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.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.

For additional information about configuring Ethernet over USB, see:

“Configuring Ethernet over USB” section in the XCC documentation version compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.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.

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

“Updating Server Firmware” section in the XCC documentation compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.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).

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

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/solutions/Invo-xpress>

- **Lenovo XClarity Essentials Bootable Media Creator**

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

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

<https://datacentersupport.lenovo.com/solutions/Invo-bomc>

- **Lenovo XClarity Administrator**

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

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

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

- **Lenovo XClarity Integrator offerings**

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

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

https://sysmgt.lenovofiles.com/help/topic/lxci/lxci_product_page.html

Configure the firmware

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

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

- **Lenovo XClarity Provisioning Manager**

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

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

See the following documentations for more information:

- *Lenovo XClarity Provisioning Manager User Guide*
 - Search for the LXPM documentation version compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html
- *UEFI User Guide*
 - https://thinksystem.lenovofiles.com/help/topic/dcg_uefi/overview_dcg_uefi.html

- **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:

“Configuring the Server” section in the XCC documentation compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.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 tool, which is available at the following site:

http://1config.lenovo.com/#/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 *ThinkSystem SR950 Memory Population Reference*](#).

Independent memory mode

Independent memory mode provides the highest level of memory performance, but lacks failover protection.

See [the *ThinkSystem SR950 Memory Population Reference*](#) for independent memory mode requirements and recommended memory module population sequences.

Memory mirroring

Memory-mirroring mode provides full memory redundancy while reducing the total system memory capacity in half. Memory channels are grouped in pairs with each channel receiving the same data. If a failure occurs, the memory controller switches from the DIMMs on the primary channel to the DIMMs on the backup channel.

See [the *ThinkSystem SR950 Memory Population Reference*](#) for memory mirroring requirements and recommended memory module population sequences.

Memory sparing

In memory-sparing mode, one memory rank serves as a spare for other ranks on the same channel in case they fail. The spare rank is held in reserve and not used as active memory until a failure is indicated, with reserved capacity subtracted from the total available memory in the system. After an error threshold is surpassed in a system protected by memory sparing, the content of a failing rank of DIMMs is copied to the spare rank. The failing rank is then taken offline and the spare rank placed online for use as active memory in place of the failed rank. Since the failover process involves copying of memory content, the level of memory redundancy provided by memory sparing is less than that provided by memory mirroring: memory mirroring is the preferred failure-protection choice for critical applications.

See [the *ThinkSystem SR950 Memory Population Reference*](#) for memory sparing requirements and recommended memory module population sequences.

Configure DC Persistent Memory Module (DCPMM)

Follow the instructions in this section to configure DCPMMs and DRAM DIMMs.

DCPMM capacity could act as accessible persistent memory for applications or volatile system memory. Based on the approximate percentage of DCPMM capacity invested in volatile system memory, the following three operating modes are available:

- **App Direct Mode** (0% of DCPMM capacity acts as system memory):

In this mode, DCPMMs act as independent and persistent memory resources directly accessible by specific applications, and DRAM DIMMs act as system memory.

The total displayed volatile system memory in this mode is the sum of DRAM DIMM capacity.

Notes:

- In App Direct Mode, the DRAM DIMMs that are installed can be configured to mirror mode.
- When only one DCPMM is installed for each processor, only not-interleaved App Direct Mode is supported.
- **Mixed Memory Mode** (1-99% of DCPMM capacity acts as system memory):

In this mode, some percentage of DCPMM capacity is directly accessible to specific applications (App Direct), while the rest serves as system memory. The App Direct part of DCPMM is displayed as persistent memory, while the rest of DCPMM capacity is displayed as system memory. DRAM DIMMs act as cache in this mode.

The total displayed volatile system memory in this mode is the DCPMM capacity that is invested in volatile system memory.
- **Memory Mode** (100% of DCPMM capacity acts as system memory):

In this mode, DCPMMs act as volatile system memory, while DRAM DIMMs act as cache.

The total displayed volatile system memory in this mode is the sum of DCPMM capacity.

DCPMM Management options

DCPMMs can be managed with the following tools:

- **Lenovo XClarity Provisioning Manager**

To open Lenovo XClarity Provisioning Manager, power on the system and press **F1** as soon as the logo screen appears. If a password has been set, enter the password to unlock Lenovo XClarity Provisioning Manager.

Go to **UEFI Setup → System Settings → Intel Optane DCPMMs** to configure and manage DCPMMs.

For more details, see the “UEFI Setup” section in the Lenovo XClarity Provisioning Manager documentation version compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.

Note: If the text-based interface of Setup Utility opens instead of Lenovo XClarity Provisioning Manager, go to **System Settings → <F1> Start Control** and select **Tool Suite**. Then, reboot the system and press **F1** as soon as the logo screen appears to open Lenovo XClarity Provisioning Manager.

- **Setup Utility**

To enter Setup Utility:

1. Power on the system and press **F1** to open Lenovo XClarity Provisioning Manager.
2. Go to **UEFI Settings → System Settings**, click on the pull-down menu on the upper right corner of the screen, and select **Text Setup**.
3. Reboot the system, and press **F1** as soon as the logo screen appears.

Go to **System Configuration and Boot Management → System Settings → Intel Optane DCPMMs** to configure and manage DCPMMs.

- **Lenovo XClarity Essentials OneCLI**

Some management options are available in commands that are executed in the path of Lenovo XClarity Essentials OneCLI in the operating system. See https://sysmgt.lenovofiles.com/help/topic/toolsctr_cli_lenovo/onecli_t_download_use_tcscli.html to learn how to download and use Lenovo XClarity Essentials OneCLI.

Following are the available management options:

- **Intel Optane DCPMM details**

Select this option to view the following details concerning each of the installed DCPMMs:

- Firmware version
- Configuration status
- Raw capacity
- Memory capacity
- App Direct capacity
- Unconfigured capacity
- Inaccessible capacity
- Reserved capacity
- Percentage remaining
- Security state

Alternatively, view DCPMM details with the following command in OneCLI:

```
onecli.exe config show IntelOptaneDCPMM --imm USERID:PASSWORD@10.104.195.86
```

Notes:

- *USERID* stands for XCC user ID.
- *PASSWORD* stands for XCC user password.
- *10.104.195.86* stands for IP address.

• **Goals**

- **Memory Mode [%]**

Select this option to define the percentage of DCPMM capacity that is invested in system memory, and hence decide the DCPMM mode:

- **0%:** App Direct Mode
- **1-99%:** Mixed Memory Mode
- **100%:** Memory Mode

Go to **Goals → Memory Mode [%]**, input the memory percentage, and reboot the system.

Notes:

- Before changing from one mode to another:
 1. Back up all the data and delete all the created namespaces. Go to **Namespaces → View/Modify/Delete Namespaces** to delete the created namespaces.
 2. Perform secure erase on all the installed DCPMMs. Go to **Security → Press to Secure Erase** to perform secure erase.
- Make sure the capacity of installed DCPMMs and DRAM DIMMs meets system requirements for the new mode (see “[DCPMM installation order](#)” on page 176).
- After the system is rebooted and the input goal value is applied, the displayed value in **System Configuration and Boot Management → Intel Optane DCPMMs → Goals** will go back to the following default selectable options:
 - **Scope:** [Platform]
 - **Memory Mode [%]:** 0
 - **Persistent Memory Type:** [App Direct]These values are selectable options for DCPMM settings, and do not represent the current DCPMM status.

In addition, you can take advantage of a memory configurator, which is available at the following site: http://1config.lenovo.com/#/memory_configuration

Alternatively, set DCPMM Goals with the following commands in OneCLI:

1. Set create goal status.

```
onecli.exe config set IntelOptaneDCPMM.CreateGoal Yes --imm USERID:PASSWORD@10.104.195.86
```

2. Define the DCPMM capacity that is invested in system volatile memory.

```
onecli.exe config set IntelOptaneDCPMM.MemoryModePercentage 20 --imm USERID:PASSWORD@10.104.195.86
```

Where *20* stands for the percentage of capacity that is invested in system volatile memory.

3. Set the DCPMM mode.

```
onecli.exe config set IntelOptaneDCPMM.PersistentMemoryType "App Direct" --imm  
USERID:PASSWORD@10.104.195.86
```

Where *App Direct* stands for the DCPMM mode.

– Persistent Memory Type

In App Direct Mode and Mixed Memory Mode, the DCPMMs that are connected to the same processor are by default interleaved (displayed as **App Direct**), while memory banks are used in turns. To set them as not interleaved in the Setup Utility, go to **Intel Optane DCPMMs → Goals → Persistent Memory Type [(DCPMM mode)]**, select **App Direct Not Interleaved** and reboot the system.

Note: Setting DCPMM App Direct capacity to not interleaved will turn the displayed App Direct regions from one region per processor to one region per DCPMM.

• Regions

After the memory percentage is set and the system is rebooted, regions for the App Direct capacity will be generated automatically. Select this option to view the App Direct regions.

• Namespaces

App Direct capacity of DCPMMs requires the following steps before it is truly available for applications.

1. Namespaces must be created for region capacity allocation.
2. Filesystem must be created and formatted for the namespaces in the operating system.

Each App Direct region can be allocated into one namespace. Create namespaces in the following operating systems:

- Windows: Use *Pmem* command.
- Linux: Use *ndctl* command.
- VMware: Reboot the system, and VMware will create namespaces automatically.

After creating namespaces for App Direct capacity allocation, make sure to create and format filesystem in the operating system so that the App Direct capacity is accessible for applications.

• Security

- Enable Security

Attention: By default, DCPMM security is disabled. Before enabling security, make sure all the country or local legal requirements regarding data encryption and trade compliance are met. Violation could cause legal issues.

DCPMMs can be secured with passphrases. Two types of passphrase protection scope are available for DCPMM:

- **Platform:** Choose this option to run security operation on all the installed DCPMM units at once. A platform passphrase is stored and automatically applied to unlock DCPMMs before operating system starts running, but the passphrase still has to be disabled manually for secure erase.

Alternatively, enable/disable platform level security with the following commands in OneCLI:

- Enable security:

1. Enable security.

```
onecli.exe config set IntelOptaneDCPMM.SecurityOperation "Enable Security" --imm
USERID:PASSWORD@10.104.195.86
```

2. Set the security passphrase.

```
onecli.exe config set IntelOptaneDCPMM.SecurityPassphrase "123456" --imm
USERID:PASSWORD@10.104.195.86
```

Where *123456* stands for the passphrase.

3. Reboot the system.

- Disable security:

1. Disable security.

```
onecli.exe config set IntelOptaneDCPMM.SecurityOperation "Disable Security" --imm
USERID:PASSWORD@10.104.195.86
```

2. Enter passphrase.

```
onecli.exe config set IntelOptaneDCPMM.SecurityPassphrase "123456" --imm
USERID:PASSWORD@10.104.195.86
```

3. Reboot the system.

- **Single DCPMM:** Choose this option to run security operation on one or more selected DCPMM units.

Notes:

- Single DCPMM passphrases are not stored in the system, and security of the locked units needs to be disabled before the units are available for access or secure erase.
- Always make sure to keep records of the slot number of locked DCPMMs and corresponding passphrases. In the case the passphrases are lost or forgotten, the stored data cannot be backed up or restored, but you can contact Lenovo service for administrative secure erase.
- After three failed unlocking attempts, the corresponding DCPMMs enter “exceeded” state with a system warning message, and the DCPMM unit can only be unlocked after the system is rebooted.

To enable passphrase, go to **Security → Press to Enable Security**.

- Secure Erase

Notes:

- Password is required to perform Secure Erase when security enabled.
- Before executing secure erase, make sure ARS (Address Range Scrub) is done on all PMEMs or on the specific PMEMs selected. Otherwise, secure erase cannot be started on all PMEMs or the specific PMEM selected, and the following text message will pop out:

```
The passphrase is incorrect for single or multiple or all Intel Optane PMEMs selected, or maybe there is
namespace on the selected PMEMs. Secure erase operation is not done on all Intel Optane PMEMs selected.
```

Secure erase cleanses all the data that is stored in the PMEM unit, including encrypted data. This data deletion method is recommended before returning or disposing a malfunctioning unit, or changing PMEM mode. To perform secure erase, go to **Security → Press to Secure Erase**.

Alternatively, perform platform level secure erase with the following command in OneCLI:

```
OneCli.exe config set IntelOptanePMEM.SecurityOperation "Secure Erase Without Passphrase" --bmc
USERID:PASSWORD@10.104.195.86
```

- **DCPMM Configuration**

DCPMM contains spared internal cells to stand in for the failed ones. When the spared cells are exhausted to 0%, there will be an error message, and it is advised to back up data, collect service log, and contact Lenovo support.

There will also be a warning message when the percentage reaches 1% and a selectable percentage (10% by default). When this message appears, it is advised to back up data and run PMem diagnostics (see the “Running diagnostics” section in the Lenovo XClarity Provisioning Manager documentation version compatible with your server at https://sysmgmt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html). To adjust the selectable percentage that the warning message requires, go to **Intel Optane PMems → PMem Configuration**, and input the percentage.

Alternatively, change the selectable percentage with the following command in OneCLI:

```
onecli.exe config set IntelOptaneDCPMM.PercentageRemainingThresholds 20 --imm USERID:PASSWORD@10.104.195.86
```

Where 20 is the selectable percentage.

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>

Deploy the operating system

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

Available operating systems

- Microsoft Windows Server
- VMware ESXi
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server

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

Tool-based deployment

- **Multi-server**

Available tools:

- Lenovo XClarity Administrator
http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/compute_node_image_deployment.html
- Lenovo XClarity Essentials OneCLI
http://sysmgt.lenovofiles.com/help/topic/toolsctr_cli_lenovo/onecli_r_uxspi_proxy_tool.html
- Lenovo XClarity Integrator deployment pack for SCCM (for Windows operating system only)
https://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxci_deploypack_sccm.doc/dpsccm_c_endtoend_deploy_scenario.html

- **Single-server**

Available tools:

- Lenovo XClarity Provisioning Manager
“OS Installation” section in the LXPM documentation compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html
- Lenovo XClarity Essentials OneCLI
http://sysmgt.lenovofiles.com/help/topic/toolsctr_cli_lenovo/onecli_r_uxspi_proxy_tool.html
- Lenovo XClarity Integrator deployment pack for SCCM (for Windows operating system only)
https://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxci_deploypack_sccm.doc/dpsccm_c_endtoend_deploy_scenario.html

Manual deployment

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

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

Back up the server configuration

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

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

- **Management processor**

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

“Backing up the BMC configuration” section in the XCC documentation compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.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 backup methods to back up the operating system and user data for the server.

Update the Vital Product Data (VPD)

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

Update the Universal Unique Identifier (UUID)

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

There are two methods available to update the UUID:

- From Lenovo XClarity Provisioning Manager

To update the UUID from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key according to the on-screen instructions. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://sysmgmt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.) The Lenovo XClarity Provisioning Manager interface is displayed by default.
2. If the power-on Administrator password is required, enter the password.
3. From the System Summary page, click **Update VPD**.
4. Update the UUID.

- From Lenovo XClarity Essentials OneCLI

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

- Operate from the target system, such as LAN or keyboard console style (KCS) access
- Remote access to the target system (TCP/IP based)

To update the UUID from Lenovo XClarity Essentials OneCLI:

1. Download and install Lenovo XClarity Essentials OneCLI.

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

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

2. Copy and unpack the OneCLI package, which also includes other required files, to the server. Make sure that you unpack the OneCLI and the required files to the same directory.
3. After you have Lenovo XClarity Essentials OneCLI in place, type the following command to set the UUID:

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

Where:

<uuid_value>

Up to 16-byte hexadecimal value assigned by you.

[access_method]

The access method that you select to use from the following methods:

- Online authenticated LAN access, type the command:

```
[--bmc-username xcc_user_id --bmc-password xcc_password]
```


Where:

xcc_user_id

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

xcc_password

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

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

`--bmc-username xcc_user_id`

`--bmc-password xcc_password`

- Online KCS access (unauthenticated and user restricted):

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

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

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

- Remote LAN access, type the command:

`[--bmc xcc_user_id:xcc_password@xcc_external_ip]`

Where:

xcc_external_ip

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

xcc_user_id

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

xcc_password

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

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

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

`--bmc xcc_user_id:xcc_password@xcc_external_ip`

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

Update the asset tag

Optionally, you can update the asset tag.

There are two methods available to update the asset tag:

- From Lenovo XClarity Provisioning Manager

To update the asset tag from Lenovo XClarity Provisioning Manager:

1. Start the server and press F1 to display the Lenovo XClarity Provisioning Manager interface.
2. If the power-on Administrator password is required, enter the password.
3. From the System Summary page, click **Update VPD**.
4. Update the asset tag information.

- From Lenovo XClarity Essentials OneCLI

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

- Operate from the target system, such as LAN or keyboard console style (KCS) access
- Remote access to the target system (TCP/IP based)

To update the asset tag from Lenovo XClarity Essentials OneCLI:

1. Download and install Lenovo XClarity Essentials OneCLI.

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

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

2. Copy and unpack the OneCLI package, which also includes other required files, to the server. Make sure that you unpack the OneCLI and the required files to the same directory.
3. After you have Lenovo XClarity Essentials OneCLI in place, type the following command to set the DMI:

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

Where:

<asset_tag>

The server asset tag number. Type asset aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa, where aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa is the asset tag number.

[access_method]

The access method that you select to use from the following methods:

- Online authenticated LAN access, type the command:

```
[--bmc-username xcc_user_id --bmc-password xcc_password]
```

Where:

xcc_user_id

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

xcc_password

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

Example command is as follows: `onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --bmc-username xcc_user_id --bmc-password xcc_password`

- Online KCS access (unauthenticated and user restricted):

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

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

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

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

Where:

xcc_external_ip

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

xcc_user_id

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

xcc_password

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

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

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

`--bmc xcc_user_id:xcc_password@xcc_external_ip`

4. Reset the Lenovo XClarity Controller to the factory defaults. See “Resetting the BMC to Factory Default” section in the XCC documentation compatible with your server at https://sysmgmt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html.

Chapter 5. Resolving installation issues

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

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

- [“Server does not power on \(no indication that input power is connected to the server\)” on page 273](#)
- [“The power button does not work \(server does not start\)” on page 273](#)
- [“The server immediately displays the POST Event Viewer when it is turned on” on page 274](#)
- [“Embedded hypervisor is not in the boot list” on page 274](#)
- [“Server cannot recognize a hard drive” on page 274](#)
- [“Displayed system memory less than installed physical memory” on page 275](#)
- [“A Lenovo optional device that was just installed does not work” on page 276](#)
- [“Voltage planar fault is displayed in the event log” on page 277](#)

Server does not power on (no indication that input power is connected to the server)

Complete the following steps until the problem is resolved:

1. Check the power LED on the front operator panel.
2. Check the power supply LEDs.
3. Check the front operator panel LCD display for error indications.
4. Check the event log for any events related to the server not powering on.
5. Check for any LEDs that are flashing amber.
6. Disconnect and reconnect the input power cords.
7. Make sure that the power cords are connected to a working electrical outlet that is providing the necessary levels of input power (see the power supply labels for input power requirements).
8. Reseat the power supplies.
9. Replace the power supplies.

The power button does not work (server does not start)

Note: The power button will not function until approximately 10 to 20 seconds after the server has been connected to ac power.

Check the following items to help resolve the problem:

- Verify that input power is applied to the server and that the power supplies are functioning. See [“Server does not power on \(no indication that input power is connected to the server\)” on page 273](#).
- Make sure that the minimum number of DIMMs are installed and functional for your processor configuration.
- If you just installed an optional device, remove it, and restart the server. If the server starts, you might have installed more devices than the power supply supports.
- Make sure that the power button on the server is working correctly:

Reseat the operator information panel cable. If the problem remains, replace the operator information panel.

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

Complete the following steps until the problem is solved.

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

You can view processor details from system setup.

To determine if the processor is supported for the server, see <https://static.lenovo.com/us/en/serverproven/index.shtml>.

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 solved.

1. If the server has been installed, moved, or serviced recently, or if this is the first time the embedded hypervisor is being used, make sure that the device is connected properly and that there is no physical damage to the connectors.
2. See the documentation that comes with the optional embedded hypervisor flash device for setup and configuration information.
3. Check <https://static.lenovo.com/us/en/serverproven/index.shtml> to validate that the embedded hypervisor device is supported for the server.
4. Make sure that the embedded hypervisor device is listed in the list of available boot options. From the management controller user interface, click **Server Configuration → Boot Options**.

For information about accessing the management controller user interface, see the XClarity Controller product documentation:

https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html

5. Check <http://datacentersupport.lenovo.com> for any tech tips (service bulletins) related to the embedded hypervisor and the server.
6. Make sure that other software works on the server to ensure that it is working properly.

Server cannot recognize a hard drive

Complete the following steps until the problem is solved.

1. Observe the associated yellow hard disk drive status LED. If the LED is lit, it indicates a drive fault.
2. If the LED is lit, remove the drive from the bay, wait 45 seconds, and reinsert the drive, making sure that the drive assembly connects to the hard disk drive backplane.
3. Observe the associated green hard disk drive activity LED and the yellow status LED:
 - If the green activity LED is flashing and the yellow status LED is not lit, the drive is recognized by the controller and is working correctly. Run the diagnostics tests for the hard disk drives. When you start a server and press the key according to the on-screen instructions, the LXPM is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test**.

- If the green activity LED is flashing and the yellow status LED is flashing slowly, the drive is recognized by the controller and is rebuilding.
 - If neither LED is lit or flashing, check the hard disk drive backplane (go to step Hard disk drive problems).
 - If the green activity LED is flashing and the yellow status LED is lit, replace the drive. If the activity of the LEDs remains the same, go to step Hard disk drive problems. If the activity of the LEDs changes, return to step 1.
4. Make sure that the hard disk drive backplane is correctly seated. When it is correctly seated, the drive assemblies correctly connect to the backplane without bowing or causing movement of the backplane.
 5. Reseat the backplane power cable and repeat steps 1 through 3.
 6. Reseat the backplane signal cable and repeat steps 1 through 3.
 7. Suspect the backplane signal cable or the backplane:
 - Replace the affected backplane signal cable.
 - Replace the affected backplane.
 8. Run the diagnostics tests for the hard disk drives. When you start a server and press the key according to the on-screen instructions, the LXPM is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://sysmgmt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → Disk Drive Test**.

Based on those tests:

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

Displayed system memory less than installed physical memory

Complete the following steps until the problem is resolved:

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 Lenovo XClarity Provisioning Manager.
 - 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 are no memory errors when the server is at the minimum memory configuration.
 - When DCPMMs are installed:
 - a. If the memory is set in App Direct or Mixed memory mode, all the saved data have been backed up, and created namespaces are deleted before any DCPMM is replaced.
 - b. Refer to “[DC Persistent Memory Module \(DCPMM\) setup](#)” on page 177 and see if the displayed memory fits the mode description.

- c. If DCPMMs are recently set in Memory mode, turn it back to App Direct mode and examine if there is namespace that has not been deleted (see “[DC Persistent Memory Module \(DCPMM\) setup](#)” on page 177).
 - d. Go to the Setup Utility, select **System Configuration and Boot Management → Intel Optane DCPMMs → Security**, and make sure all the DCPMM units are unlocked.
2. Reseat the DIMMs, and then restart the server.
 3. Run memory diagnostics. When you start a solution and press the key according to the on-screen instructions, the LXPM interface is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.) You can perform memory diagnostics with this interface. From the Diagnostic page, go to **Run Diagnostic → Memory test**.
 4. Check the POST error log:
 - If a DIMM was disabled by a systems-management interrupt (SMI), replace the DIMM.
 - If a DIMM was disabled by the user or by POST, reseat the DIMM; then, run the Lenovo XClarity Provisioning Manager and enable the DIMM.
 5. Run memory diagnostics. When you start a solution and press the key according to the on-screen instructions, the LXPM interface is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.) You can perform memory diagnostics with this interface. From the Diagnostic page, go to **Run Diagnostic → Memory test** or **DCPMM test**.

Notes: When DCPMMs are installed, run diagnostics based on the mode that is set presently:

- App Direct mode:
 - Run Memory Test for DRAM memory modules.
 - Run DCPMM Test for DCPMMs.
 - Memory and Mixed memory mode:
 - Run both Memory Test and DCPMM Test for DCPMMs.
6. Move the suspect DIMMs in one channel to another channel of the same processor that is a supported configuration, and then restart the server. If the problem is related to a memory module, replace the failing memory module.

Note: When DCPMMs are installed, only adopt this method in Memory mode.
 7. Replace the DIMM.
 8. Restart the server.

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

1. Make sure that:
 - The device is supported for the server (see <https://static.lenovo.com/us/en/serverproven/index.shtml>).
 - You followed the installation instructions that came with the device and the device is installed correctly.
 - You have not loosened any other installed devices or cables.
 - You updated the configuration information in system setup. When you start a server and press the key according to the on-screen instructions to display the Setup Utility. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.) Whenever memory or any other device is changed, you must update the configuration.
 - Make sure that the latest levels of device firmware and device drivers are installed. See “[Update the firmware](#)” on page 256 information.
2. Reseat the device that you just installed.

3. Replace the device that you just installed.

Voltage planar fault is displayed in the event log

Complete the following steps until the problem is solved.

1. Revert the system to the minimum configuration. See [“Specifications” on page 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: 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 <https://static.lenovo.com/us/en/serverproven/index.shtml> 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://support.lenovo.com/servicerequest> to submit an Electronic Service Request. Submitting an Electronic Service Request will start the process of determining a solution to your problem by making the pertinent information available to the service technicians. The Lenovo service technicians can start working on your solution as soon as you have completed and submitted an Electronic Service Request.

Collecting service data

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

Service data can be collected through the following tools:

- **Lenovo XClarity Provisioning Manager**

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

- **Lenovo XClarity Controller**

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

- For more information about using the web interface to collect service data, see the “Downloading service data” section in the XCC documentation version compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html.
- For more information about using the CLI to collect service data, see the “ffdc command” section in the XCC documentation version compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.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/toolsctr_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/serviceprovider> and use filter searching for different countries. For Lenovo support telephone numbers, see <https://datacentersupport.lenovo.com/supportphonenumber> for your region support details.

Appendix B. Component reference

When installing optional components, you will often need to remove other components to gain access.

Internal connector locations and procedures for removing and installing components to gain access to other system components are in this appendix.

- [“Internal connectors” on page 283](#)
- [“Component access” on page 292](#)

Internal connectors

The topics in this section provide information about connectors that are inside the server.

For information about external connectors on the front and rear of the server, see [“Front view” on page 24](#) and [“Rear view” on page 31](#).

System-board connectors

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

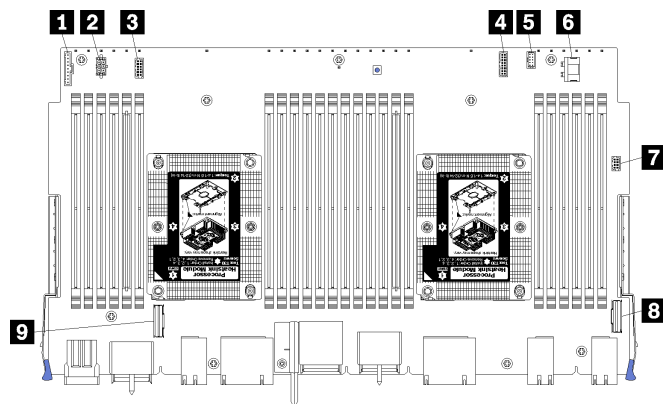


Figure 53. System-board connectors

Table 219. System-board internal connectors

Callout	Callout
1 “Front panel” connector	6 Hard disk drive “Power” connector
2 “Fan board” power connector (J56)	7 Front panel “USB” connector
3 “Fan board” signal connector (J40)	8 “PCIe/NVMe” connector
4 “Front video” connector	9 “NVMe” connector
5 Hard disk drive “Signal” connector	

System-board LEDs

The following illustration shows the location of light path diagnostic LEDs and light path diagnostic switch on the system board. These LEDs can often identify the source of an error.

Press the light path diagnostic switch **3** to turn on the system board LEDs for a limited amount of time when the system board is removed from the chassis.

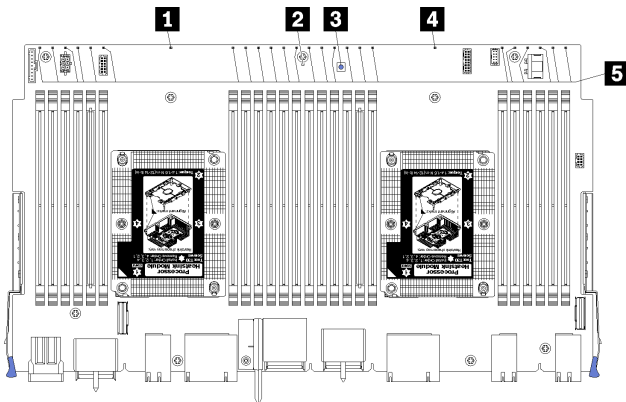


Figure 54. System-board light path LEDs

Table 220. Light path diagnostics: System-board LED status and actions

LED	Description	Action
1 Processor 2 error LED	LED on: An error has occurred with processor 2.	See “Processor problems” in <i>Maintenance Manual</i>
2 System board error LED	LED on: An error has occurred on the system board.	Complete the following steps: <ol style="list-style-type: none"> 1. Check the Lenovo XClarity Controller event log and the system error log for information about the error. 2. Save the log if necessary, and clear the log afterward.
3 Light path diagnostic switch	Press the light path diagnostic switch to turn on the system board LEDs.	
4 Processor 1 error LED	LED on: An error has occurred with processor 1.	See “Processor problems” in <i>Maintenance Manual</i>
5 Memory module 1 through 24 error LEDs	LED on: An error has occurred with the designated memory module.	See “Memory problems” in <i>Maintenance Manual</i>

Storage-board-assembly connectors

The following illustration shows the internal connectors on the storage board assembly.

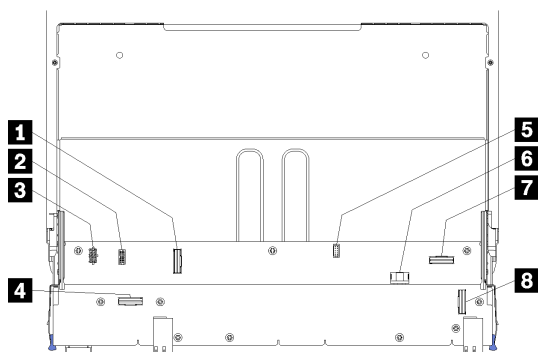


Figure 55. Storage-board-assembly connectors

Table 221. Storage-board-assembly connectors

Callout	Callout
1 “NVMe” connector	5 Hard disk signal connector (J13)
2 Fan signal connector (J5)	6 Hard disk drive power connector (J2)
3 Fan power connector (J3)	7 “PCIe” connector
4 “NVMe” connector	8 “NVMe” connector

I/O tray connectors

The following illustration shows the internal connectors on the I/O tray (including connectors of PCIe slot 5 to 8 and the LOM connector of slot 9).

For information about connectors on I/O tray risers, see [“I/O tray riser connectors” on page 287](#). For information about all external connectors on the rear of the server, including those on the I/O tray, see [“Rear view” on page 31](#).

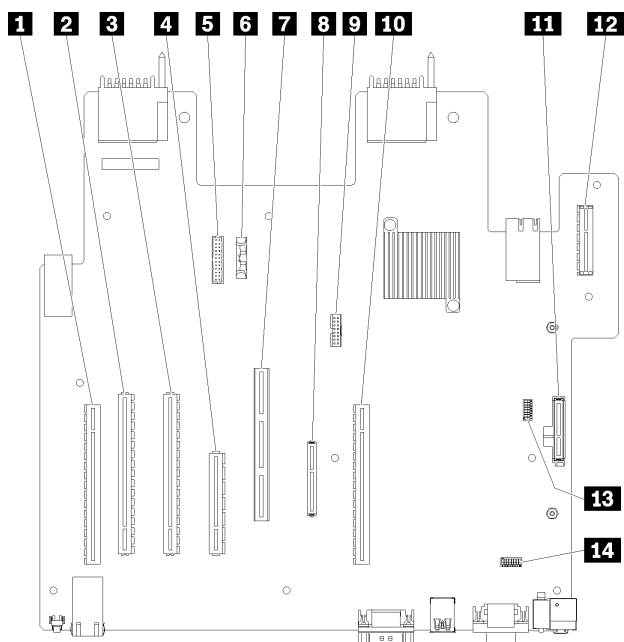


Figure 56. I/O tray connectors

Table 222. I/O tray connectors

Callout	Callout
1 Riser for slot 1 to 4 connectors (Riser 1)	8 Network (LOM) connector (slot 9)
2 PCIe3, x16, 75 watt connector (slot 5)	9 TCM connector (see “Enable TPM/TCM” in the ThinkSystem SR950 Maintenance Manual)
3 PCIe3, x16, 75 watt connector (slot 6)	10 Riser for slot 10 to 15 connectors (Riser 2)
4 PCIe3, x8, 25 watt connector (slot 7)	11 M.2 SATA/PCIe (Hypervisor) backplane connector (see note following this table)
5 Signal cable to power backplane	12 Riser for PCIe slot 16 to 17 (Riser 3)
6 Battery (CR2032)	13 SW2 - Switch block 2
7 ML2 PCIe3, x16 connector (slot 8)	14 SW1 - Switch block 1
	Note: This switch block is reserved.

Notes: The following PCIe “slots” are assigned to components elsewhere in the server:

- PCIe slot 18 is assigned to the RAID card in the lower tray.
- PCIe slot 19 is assigned to the RAID card in the upper tray.
- PCIe slot 20 is assigned to the M.2 backplane inside the I/O tray.

I/O tray switches

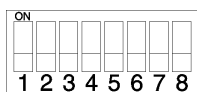
Two switch blocks are located on the I/O tray

SW1

The switch block SW1 is located near the VGA connector on the I/O tray. All switches in this switch block are reserved.

SW2

The switch block SW2 is located near the M2 SATA/PCIe backplane connector.



[Table 223 “SW2 switch block definition” on page 286](#) describes the functions of the switch block.

Table 223. SW2 switch block definition

Switch number	Default position	Description
1	Off	TPM/TCM physical presence.
2	Off	Reserved.
3	Off	Reserved.
4	Off	Clear CMOS memory. When this switch is toggled to ON, it clears the data in CMOS memory, which clears the power-on password.
5	Off	Force UEFI recovery. Changing the position of the switch to ON will force the system to boot from the recovery UEFI image.
6	Off	Force XCC backup bank. Changing the position of the switch to ON will force the system to boot from the backup XCC bank.

Table 223. SW2 switch block definition (continued)

Switch number	Default position	Description
7	Off	Power-on password override. Changing the position of this switch bypasses the power-on password check the next time the server is turned on and starts the Lenovo XClarity Provisioning Manager so that you can change or delete the power-on password. You do not have to move the switch back to the default position after the power-on password is overridden. Changing the position of this switch does not affect the administrator password check if an administrator password is set.
8	Off	Reserved

Important:

1. Before you change any switch settings or move any jumpers, turn off the server; then, disconnect all power cords and external cables. Review the information in http://thinksystem.lenovofiles.com/help/topic/safety_documentation/pdf_files.html, “Installation Guidelines” on page 56, “Handling static-sensitive devices” on page 58, and “Power off the server (disconnect input power)” on page 254.

I/O tray riser connectors

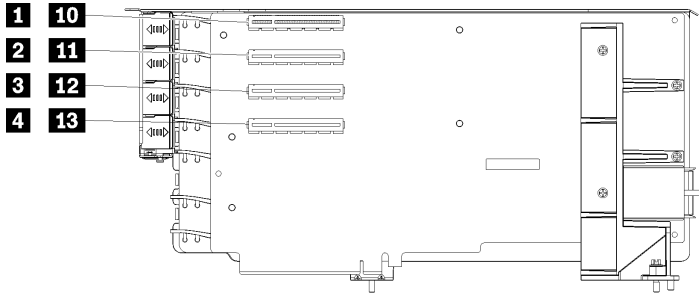
The following illustrations show the internal connectors on the I/O tray risers.

Up to three risers can be installed in the I/O tray. The chassis supports the following riser configurations:

- **Riser 1:**
 - Slot 1 to 4 riser provides four PCIe3 x8, full height, half length connectors.
 - Slot 1 to 4 riser provides four PCIe x16, full height, half length connectors. (8-socket configurations only)
 - Slot 3 to 4 riser provides two PCIe3 x16, full height, half length connectors.
- **Riser 2:**
 - Slot 10 to 13 riser provides four PCIe3 x8, full height, half length connectors.
 - Slot 12 and 13 riser provides two PCIe3 x16, full height, half length connectors.
 - Slot 10 to 15 riser provides five PCIe3 x16, full height, half length connectors and one ML2 PCIe3 x16 connector.
- **Riser 3:**
 - Slot 16 to 17 riser provides two PCIe3 x8, full height, half length connectors.

Slot 1 to 4 and slot 10 to 13 riser connectors

There are four PCIe3 x8, full height, half length connectors each in the slot 1 to 4 (riser connector 1) and slot 10 to 13 (riser connector 2) risers.



Note: Callouts for slots **1** to **4** apply when the riser is installed in the riser 1 position. Callouts for slots **10** to **13** apply when the riser is installed in the riser 2 position.

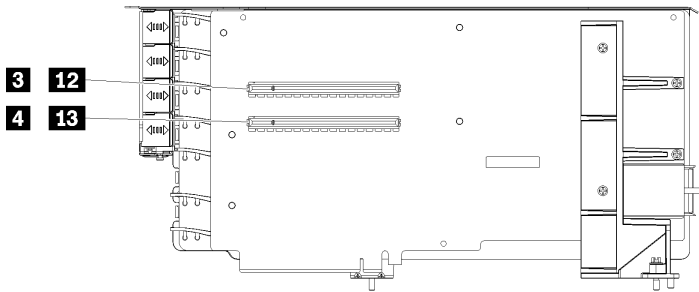
Figure 57. Slot 1 to 4 and slot 10 to 13 riser connectors

Table 224. Slot 1 to 4 and slot 10 to 13 riser connectors

Callout	Callout
1 10 PCIe3 x8 (Slot 1 or 10)	3 12 PCIe3 x8 (Slot 3 or 12)
2 11 PCIe3 x8 (Slot 2 or 11)	4 13 PCIe3 x8 (Slot 4 or 13)

Slot 3 to 4 and slot 12 to 13 connectors

There are two PCIe3 x16, full height, half length connectors in the slot 3 to 4 and slot 12 to 13 riser.



Note: Callouts for slots **3** to **4** apply when the riser is installed in the riser 1 position. Callouts for slots **12** to **13** apply when the riser is installed in the riser 2 position.

Figure 58. Slot 3 to 4 and slot 12 to 13 riser connectors

Table 225. Slot 14 to 15 riser connectors

Callout	Callout
3 12 PCIe3 x16 (Slot 3 or 12)	4 13 PCIe3 x16 (Slot 4 or 13)

Slot 10 to 15 riser connectors

There are five PCIe3 x16, full height, half length connectors and one ML2 PCIe3 x16 connector in the slot 10 to 15 riser.

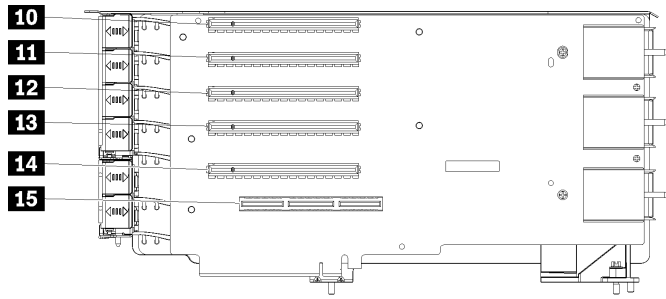


Figure 59. Slot 10 to 15 riser connectors

Table 226. Slot 10 to 15 riser connectors

Callout	Callout
10 PCIe3 x16 (Slot 10)	13 PCIe3 x16 (Slot 13)
11 PCIe3 x16 (Slot 11)	14 PCIe3 x16 (Slot 14)
12 PCIe3 x16 (Slot 12)	15 ML2 PCIe3 x16 (Slot 15)

Slot 16 to 17 riser

There are two PCIe3 x8, full height, half length connectors in the slot 16 to 17 riser.

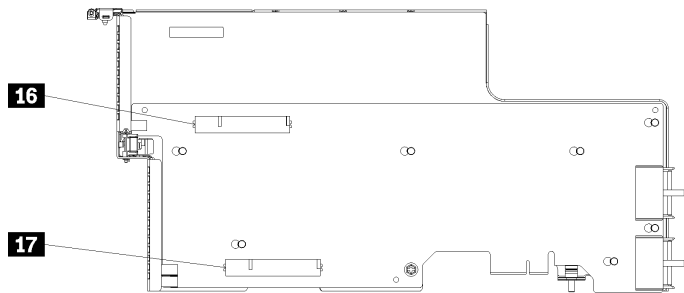


Figure 60. Slot 16 to 17 riser connectors

Table 227. Slot 16 to 17 riser connectors

Callout	Callout
16 PCIe3 x8 (Slot 16)	17 PCIe3 x8 (Slot 17)

Storage interposer connectors

The following illustration shows the internal connectors on the interposer.

Note: Some cable connectors have locks or latches that must be disengaged to disconnect the cable.

For information about interposer cable routing, see [“Cable routing for drives” on page 40](#).

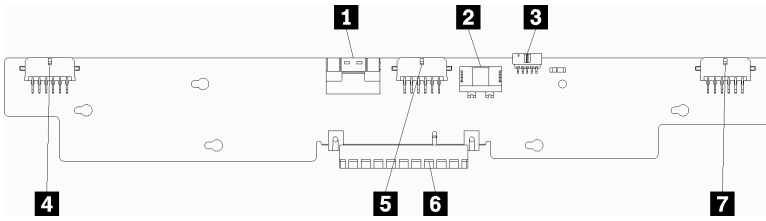


Figure 61. Storage interposer connectors

Table 228. Storage interposer connectors

Callout	Callout
1 PCIe SAS interface from system board (PCIE) (SAS only)	5 Power for drive to backplane 2 or 5 (BP 2/5)
2 Drive power from system board (POWER)	6 PCI connector to RAID card
3 Drive signal from system board (SIDE BAND)	7 Power for drive to backplane 3 or 4 (BP 3/4)
4 Power for drive to backplane 1 or 6 (BP 1/6)	

RAID card connectors

The following illustration shows the internal connectors on the RAID card.

There are two basic RAID card configurations.

Notes:

- The RAID cards in the illustration might be different than the RAID card in your system. Connector locations for all RAID cards are similar.
- Some cable connectors have locks or latches that must be disengaged to disconnect the cable.

For information about RAID card cable routing, see [“Cable routing for drives” on page 40](#).

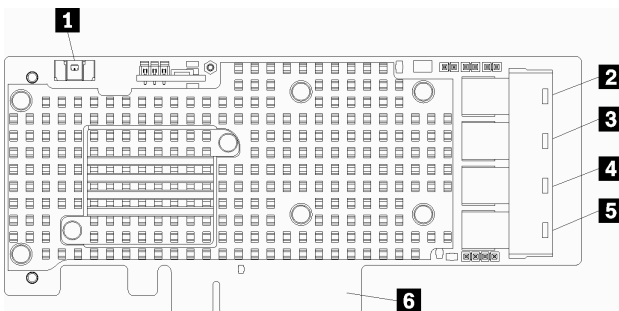


Figure 62. RAID card connectors (type 1)

Table 229. RAID card connectors (type 1)

Callout	Callout
1 RAID flash power module (J14) connector	4 RAID connector for drive backplane 2 or 5 (SAS only)
2 Unused	5 RAID connector for drive backplane 1 or 4 (SAS only)
3 RAID connector for drive backplane 3 or 6 (SAS only)	6 PCI connector to storage interposer

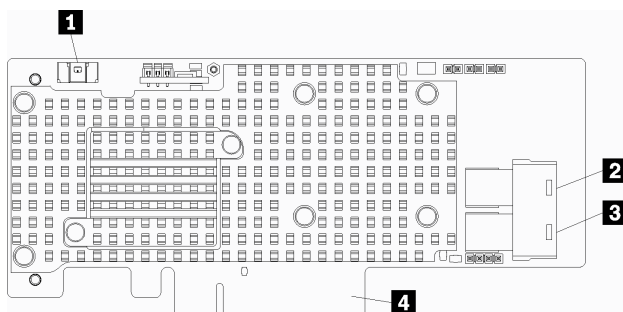


Figure 63. RAID card connectors (type 2)

Table 230. RAID card connectors (type 2)

Callout	Callout
1 RAID flash power module (J14) connector	3 RAID connector for drive backplane 1 or 4 (SAS only)
2 RAID connector for drive backplane 2 or 5 (SAS only)	4 PCI connector to storage interposer

Drive backplane connectors

The following illustration shows the internal connectors on the drive backplanes.

Note: Some cable connectors have locks or latches that must be disengaged to disconnect the cable.

There are two types of drive backplane used in the server: one that controls only SAS drives and one that controls both SAS and NVMe drives. Cable routing for drive components is different for SAS and SAS/NVMe drives:

- [SAS drive backplane connectors](#)
- [SAS/NVMe drive backplane connectors](#)

For information about drive backplane cable routing, see [“Cable routing for drives” on page 40](#).

SAS drive backplane connectors

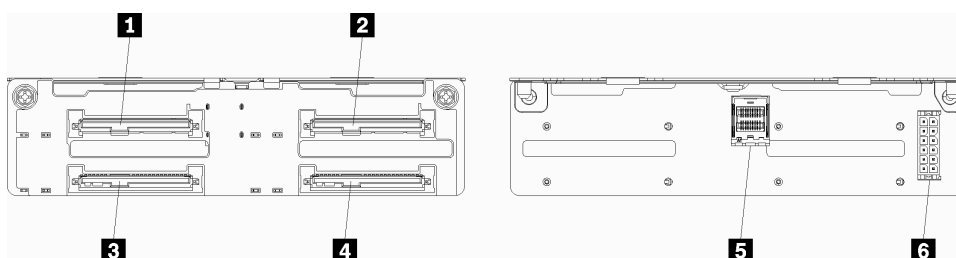


Figure 64. SAS drive backplane connectors

Table 231. SAS drive backplane connectors

Callout	Callout
1 Drive connector for SAS drives 0, 4, 8, 12, 16, and 20	4 Drive connector for SAS drives 3, 7, 11, 15, 19, and 23
2 Drive connector for SAS drives 2, 6, 10, 14, 18, and 22	5 SAS signal from RAID card
3 Drive connector for SAS drives 1, 5, 9, 13, 17, and 21	6 Backplane power from interposer

SAS/NVMe drive backplane connectors

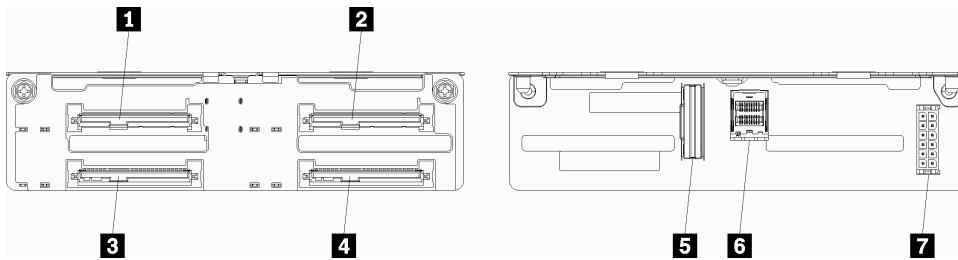


Figure 65. SAS/NVMe drive backplane connectors

Table 232. SAS/NVMe drive backplane connectors

Callout	Callout
1 Drive connector for SAS or NVMe drives 0, 4, 8, 12, 16, and 20	5 NVMe signal from compute board or storage tray
2 Drive connector for SAS or NVMe drives 2, 6, 10, 14, 18, and 22	6 SAS signal from RAID card
3 Drive connector for SAS drives 1, 5, 9, 13, 17, and 21	7 Backplane power from interposer
4 Drive connector for SAS drives 3, 7, 11, 15, 19, and 23	

Component access

When installing optional components, you will often need to remove other components to gain access. Procedures for removing and installing components to gain access to other system components are in this section.

Adapter replacement

Adapters are in several locations in the I/O tray that is accessed from the rear of the server. You can install up to 17 adapters in the server. The removal and installation procedures for each riser type are different and are described in the following topics:

- PCIe adapters 1 to 4: see [“Remove a PCIe adapter from slot 1 to 4” on page 293](#) and [“Install a PCIe adapter in slot 1 to 4” on page 299](#)
- PCIe adapters 5 to 8 and the LOM adapter (slot 9):
 - For PCIe adapters 5 to 8, see [“Remove a PCIe adapter from slot 5 to 8” on page 294](#) and [“Install a PCIe adapter in slot 5 to 8” on page 300](#)
 - For the LOM adapter (slot 9), see [“Remove a LOM adapter from slot 9” on page 295](#) and [“Install a LOM adapter in slot 9” on page 301](#)
- PCIe adapters 10 to 15: see [“Remove a PCIe adapter from slot 10 to 15” on page 296](#) and [“Install a PCIe adapter in slot 10 to 15” on page 302](#)
- I/O adapters 16 to 17: see [“Remove an I/O adapter from slot 16 to 17” on page 297](#) and [“Install an I/O adapter in slot 16 to 17” on page 304](#)

Installation considerations for the Mellanox InnoVA™-2 Flex Open Programmable SmartNIC

Review the following guidelines before installing the Mellanox InnoVA™-2 Flex Open Programmable SmartNIC:

- If you install the Mellanox InnoVA™-2 Flex Open Programmable SmartNIC in the ThinkSystem SR950, the maximum supported ambient temperature for the system is 35°C.
- The Mellanox InnoVA™-2 Flex Open Programmable SmartNIC is **not** supported in the following adapter slots: 1, 5, and 10.
- When installing the Mellanox InnoVA™-2 Flex Open Programmable SmartNIC in a 4-socket configuration:
 - A maximum of two of these adapters can be installed in the system.
 - The Mellanox InnoVA™-2 Flex Open Programmable SmartNIC can be installed only in adapter slots 6, 7, or 17.
 - The installation of two of these adapters in contiguous, sequential slots is not supported. For example, you cannot install two adapters in slots 6 and 7.
- When installing the Mellanox InnoVA™-2 Flex Open Programmable SmartNIC in an 8-socket configuration:
 - A maximum of four of these adapters can be installed in the system.
 - The Mellanox InnoVA™-2 Flex Open Programmable SmartNIC can be installed only in adapter slots 2, 3, 4, 6, 7, 11, 12, 13, 14, 15, 16, or 17.
 - The installation of two of these adapters in contiguous, sequential slots is not supported. For example, you cannot install two adapters in slots 2 and 3.

Remove a PCIe adapter from slot 1 to 4

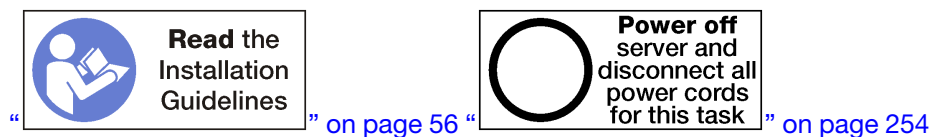
PCIe adapters in slot 1 to 4 are in an I/O tray riser that is accessed from the rear of the server. After removing the I/O tray and the riser for slot 1 to 4 (riser 1), open the retention latch and remove the adapter from the riser.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove an adapter from slot 1 to 4:

1. Disconnect and label all cables connected to adapters in the I/O tray; then, remove the I/O tray. See [“Remove the I/O tray” on page 334](#).
2. Remove the riser for slot 1 to 4 (riser 1). See [“Remove the riser for slot 1 to 4 \(riser 1\)” on page 358](#).

Complete the following steps to remove an adapter from slot 1 to 4.

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

-  [YouTube](#)
-  [Youku](#)

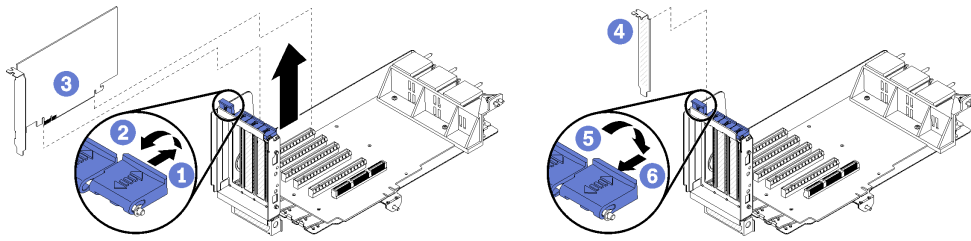


Figure 66. Adapter removal (slot 1 to 4)

Step 1. Open the retention latch.

Step 2. Disengage the adapter from its connector on the riser and lift the adapter from the riser.

After you remove the adapter:

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

Remove a PCIe adapter from slot 5 to 8

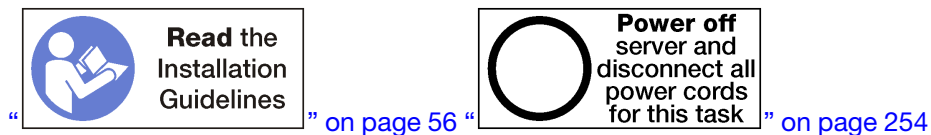
PCIe adapters in slot 5 to 8 are in the I/O tray that is accessed from the rear of the server. After removing the I/O tray from the chassis, remove the adapter from the I/O tray.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove an adapter from slot 5 to 8:

1. Disconnect and label all cables connected to adapters in the I/O tray; then, remove the I/O tray. See [“Remove the I/O tray” on page 334](#).
2. Remove the riser for slot 1 to 4 (riser 1) to access the adapter connectors in the I/O tray. See [“Remove the riser for slot 1 to 4 \(riser 1\)” on page 358](#).

Complete the following steps to remove an adapter from slot 5 to 8.

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

-  [YouTube](#)
-  [Youku](#)

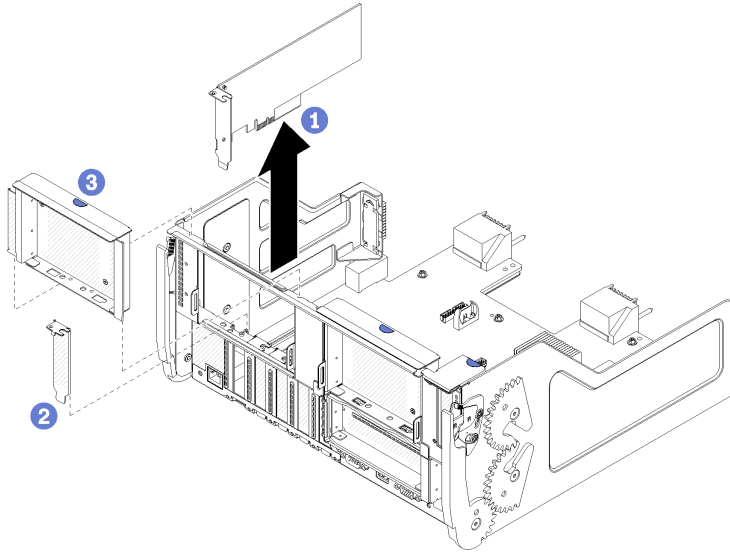


Figure 67. Adapter removal (slot 5 to 8)

Step 1. Disengage the adapter from its connector on the I/O tray and lift the adapter from the I/O tray.

After you remove the adapter:

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

Remove a LOM adapter from slot 9


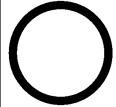
The LOM adapter in slot 9 is in the I/O tray that is accessed from the rear of the server. After removing the I/O tray from the chassis and remove the adapter from the I/O tray.

S002



CAUTION:

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

 **Read the Installation Guidelines** ” on page 56 “  **Power off server and disconnect all power cords for this task** ” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove a LOM adapter from slot 9:

1. Disconnect and label all cables connected to adapters in the I/O tray; then, remove the I/O tray. See [“Remove the I/O tray” on page 334](#).
2. Remove the riser for slot 10 to 15 (riser 2) to access the adapter connectors in the I/O tray. See [“Remove the riser for slot 10 to 15 \(riser 2\)” on page 359](#).

Complete the following steps to remove a LOM adapter from slot 9.

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

-  [YouTube](#)
-  [Youku](#)

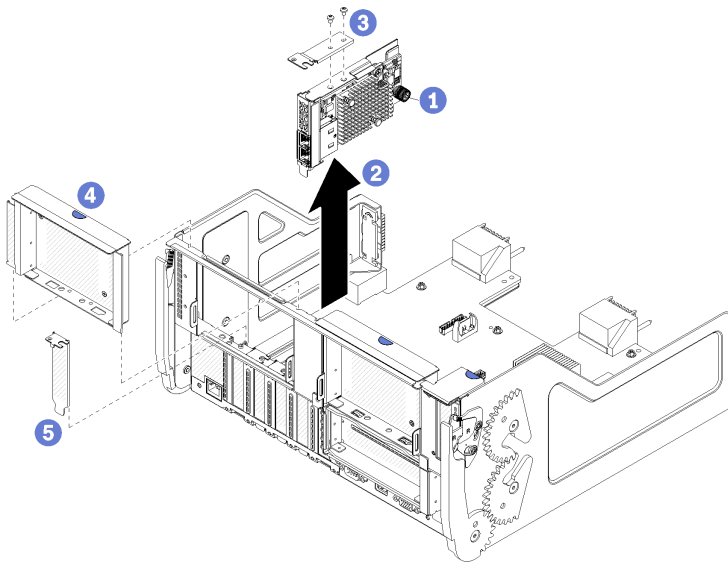


Figure 68. LOM adapter removal (slot 9)

- Step 1. Fully loosen the captive thumbscrew on the side of the LOM adapter that secures it to the bracket on the I/O tray.
- Step 2. Disengage the LOM adapter from its connector on the I/O tray and lift the adapter from the I/O tray.

After you remove a LOM adapter:

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

Remove a PCIe adapter from slot 10 to 15

PCIe adapters in slot 10 to 15 are in an I/O tray riser that is accessed from the rear of the server. After removing the I/O tray and the riser for slot 10 to 15 (riser 2), open the retention latch and remove the adapter from the riser.

S002



CAUTION:

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



Before you remove an adapter from slot 10 to 15:

1. Disconnect and label all cables connected to adapters in the I/O tray; then, remove the I/O tray. See “Remove the I/O tray” on page 334.
2. Remove the riser for slot 10 to 15 (riser 2). See “Remove the riser for slot 10 to 15 (riser 2)” on page 359.

Complete the following steps to remove an adapter from slot 10 to 15.

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

- YouTube
- http://list.youku.com/albumlist/show/id_50952215

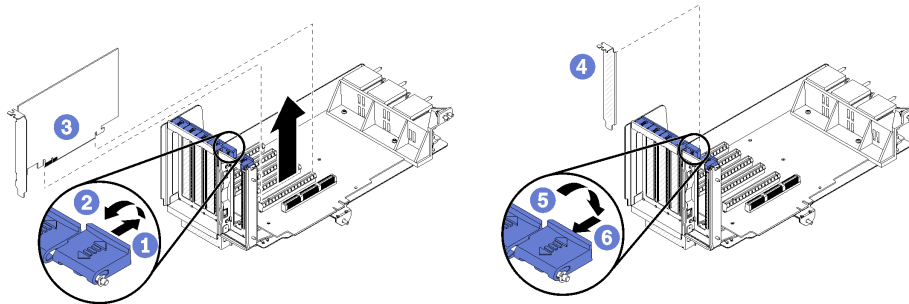


Figure 69. Adapter removal (slot 10 to 15)

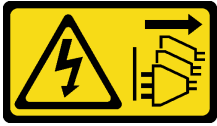
- Step 1. Open the retention latch.
- Step 2. Disengage the adapter from its connector on the riser and lift the adapter from the riser.

After you remove the adapter:

Remove an I/O adapter from slot 16 to 17

I/O adapters in slot 16 to 17 are in an I/O tray riser that is accessed from the rear of the server. After removing the I/O tray and the riser for slot 16 to 17, open the retention latch and remove the adapter from the riser.

S002



CAUTION:

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



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Before you remove an adapter from slot 16 to 17:

1. Disconnect and label all cables connected to adapters in the I/O tray; then, remove the I/O tray. See [“Remove the I/O tray” on page 334.](#)
2. Remove the riser for slot 16 to 17. See [“Remove the riser for slot 16 to 17 \(riser 3\)” on page 362.](#)

Complete the following steps to remove an adapter from slot 16 to 17.

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

-  [YouTube](#)
-  [Youku](#)

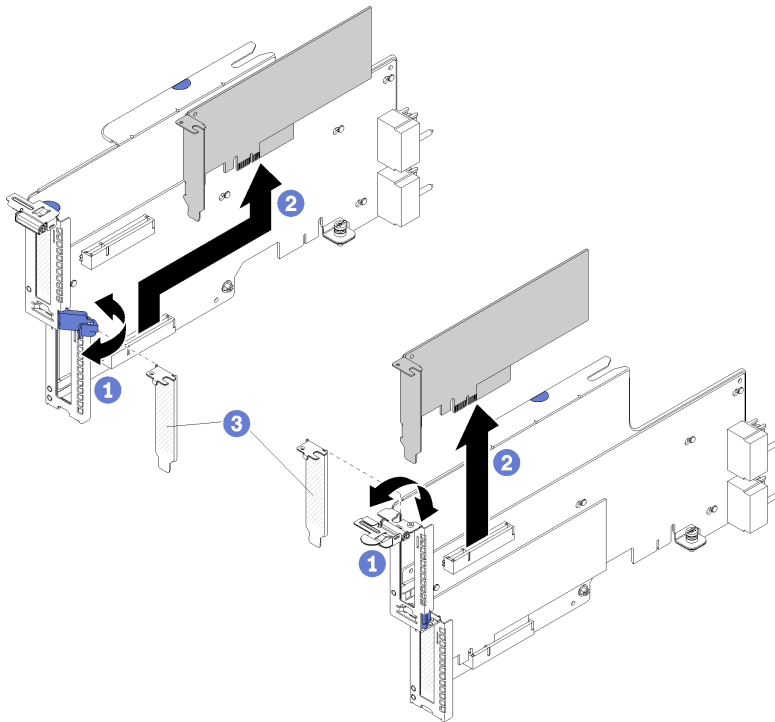


Figure 70. Adapter removal (slot 16 to 17)

Step 1. Open the retention latch.

Step 2. Disengage the adapter from its connector on the riser and lift the adapter from the riser.

After you remove the adapter:

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

Install a PCIe adapter in slot 1 to 4

PCIe adapters in slot 1 to 4 are in an I/O tray riser that is accessed from the rear of the server. With the riser removed from the I/O tray, open the retention latch and insert the adapter in the riser; then, close the retention latch.

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CAUTION:

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



CAUTION:


Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install an adapter in slot 1 to 4, make sure that there is no filler installed in the slot where you are installing the adapter.

Important: You must remove the riser from the I/O tray before installing an adapter. If you are installing a network adapter (with an RJ45 connector), make sure that there is sufficient clearance to disconnect the Ethernet cable from the adapter after it is installed.

Complete the following steps to install an adapter in slot 1 to 4.

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

-  [YouTube](#)
-  [Youku](#)

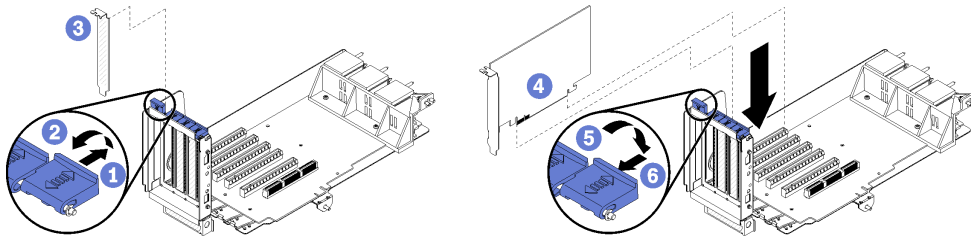


Figure 71. Adapter installation (slot 1 to 4)

- Step 1. Open the retention latch.
- Step 2. Align the adapter with the riser slot and insert it; then, press the adapter into the riser until the connector is fully seated.
- Step 3. Close and lock the retention latch.

If you have no other operations to perform on the riser after installing an adapter in slot 1 to 4:

1. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.
2. Install the riser in the I/O tray. See [“Install the riser for slot 1 to 4 \(riser 1\)” on page 364](#).
3. Install the I/O tray in the chassis and connect all cables. See [“Install the I/O tray” on page 335](#).

Install a PCIe adapter in slot 5 to 8

PCIe adapters in slot 5 to 8 are in the I/O tray that is accessed from the rear of the server. With the I/O tray removed from the chassis, insert the adapter in the I/O tray.

Note: You should not install a RAID or Host Bus Adapter card in slot 7.

S002



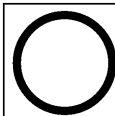
CAUTION:

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



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CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install a PCIe adapter in slot 5 to 8, make sure that there is no filler installed in the slot where you are installing the adapter.

Important: You must remove the riser from the I/O tray before installing an adapter.

Complete the following steps to install an adapter for slot 5 to 8.

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

-  [YouTube](#)
-  [Youku](#)

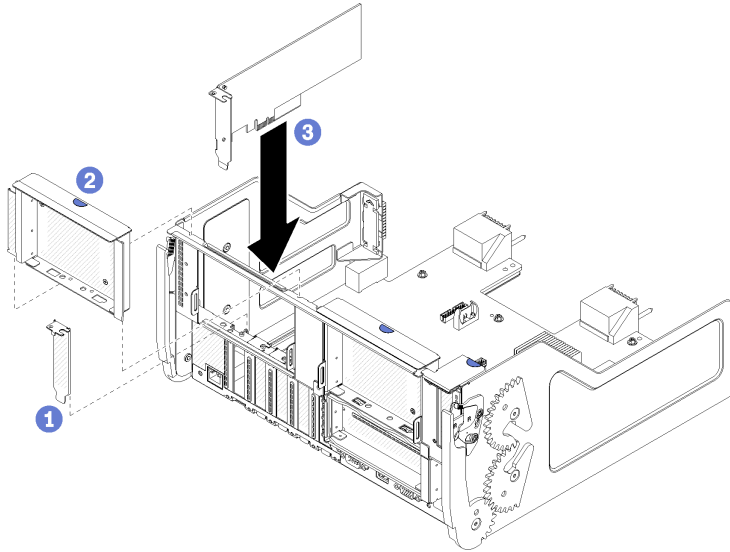


Figure 72. Adapter installation (slot 5 to 8)

Step 1. Align the adapter with the I/O tray slot and insert it; then, press the adapter into the I/O tray until the connector is fully seated.

If you have no other operations to perform on the I/O tray after installing an adapter in slot 5 to 8:

1. If any of the adapters in the I/O tray have internal cables, make sure that they are connected before installing the I/O tray.
2. Install the riser or riser filler for slot 1 to 4 (left riser). See [“Install the riser for slot 1 to 4 \(riser 1\)”](#) on page 364.
3. Install the I/O tray in the chassis and connect all cables. See [“Install the I/O tray”](#) on page 335.

Install a LOM adapter in slot 9

The LOM adapter in slot 9 is in the I/O tray that is accessed from the rear of the server. With the I/O tray removed from the chassis, insert the adapter in the I/O tray.

S002



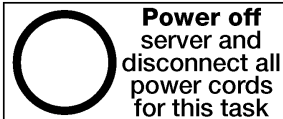
CAUTION:

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



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Before you install a LOM adapter in slot 9, make sure that there is no filler installed in slot 9.

Important: You must remove the riser from the I/O tray before installing an adapter.

Complete the following steps to install a LOM adapter in slot 9.

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

-  [YouTube](#)
-  [Youku](#)

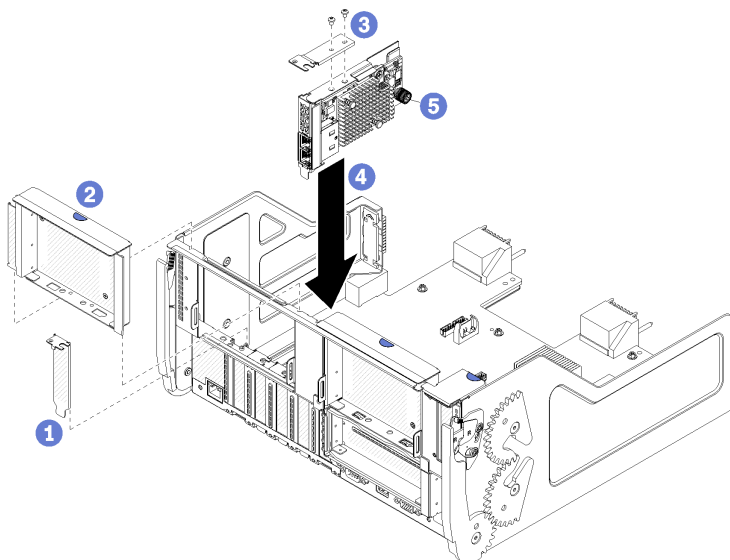


Figure 73. LOM adapter installation (slot 9)

- Step 1. Attach the extension bracket to the top of the LOM adapter using two screws.
- Step 2. Align the adapter with I/O tray slot 9 and insert it; then, press the adapter into the I/O tray until the connector is fully seated.
- Step 3. Tighten the captive thumbscrew on the side of the LOM adapter that secures it to the bracket on the I/O tray.

If you have no other operations to perform on the I/O tray after installing a LOM adapter in slot 9:

1. Install the riser for slot 10 to 15 (riser 2). See [“Install the riser for slot 10 to 15 \(riser 2\)” on page 365](#).
2. If any of the adapters in the I/O tray have internal cables, make sure that they are connected before installing the I/O tray.
3. Install the I/O tray in the chassis and connect all cables. See [“Install the I/O tray” on page 335](#).

Install a PCIe adapter in slot 10 to 15

PCIe adapters in slot 10 to 15 are in an I/O tray riser that is accessed from the rear of the server. With the riser removed from the I/O tray, open the retention latch and insert the adapter in the riser; then, close the retention latch.

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CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install an adapter in slot 10 to 15, make sure that there is no filler installed in the slot where you are installing the adapter.

Important: You must remove the riser from the I/O tray before installing an adapter. If you are installing a network adapter (with an RJ45 connector), make sure that there is sufficient clearance to disconnect the Ethernet cable from the adapter after it is installed.

Note: If you are installing an adapter in slot 14 or 15, the slot 14 to 15 riser bracket or a riser bracket filler must be installed on the riser. See “[Install the riser bracket for slot 14 to 15 \(riser 2\)](#)” on page 367

Complete the following steps to install an adapter in slot 10 to 15.

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

- [YouTube](#)
- [Youku](#)

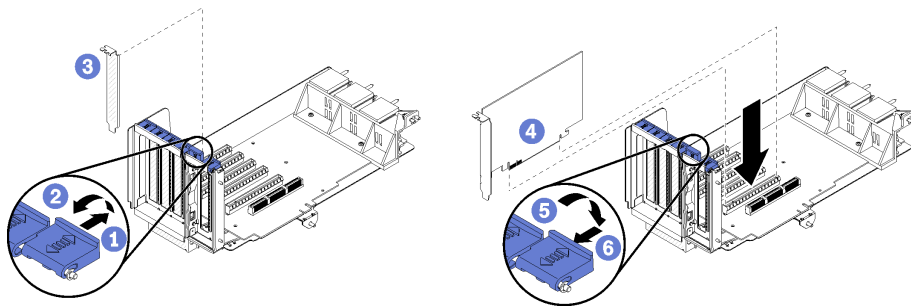


Figure 74. Adapter installation (slot 10 to 15)

- Step 1. Open the retention latch.
- Step 2. Align the adapter with the riser slot and insert it; then, press the adapter into the riser until the connector is fully seated.
- Step 3. Close and lock the retention latch.

If you have no other operations to perform on the riser after installing an adapter in slot 10 to 15:

1. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.
2. Install the riser in the I/O tray. See [“Install the riser for slot 1 to 4 \(riser 1\)” on page 364.](#)
3. Install the I/O tray in the chassis and connect all cables. See [“Install the I/O tray” on page 335.](#)

Install an I/O adapter in slot 16 to 17

I/O adapters in slot 16 to 17 are in an I/O tray riser that is accessed from the rear of the server. With the riser removed from the I/O tray, open the retention latch and insert the adapter in the riser; then, close the retention latch.

S002



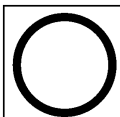
CAUTION:

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



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CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install an adapter in slots 16 or 17, make sure that there is no filler installed in the slot where you are installing the adapter.

Important: You must remove the riser from the I/O tray before installing an adapter.

Complete the following steps to install an adapter in slots 16 or 17.

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

-  [YouTube](#)
-  [Youku](#)

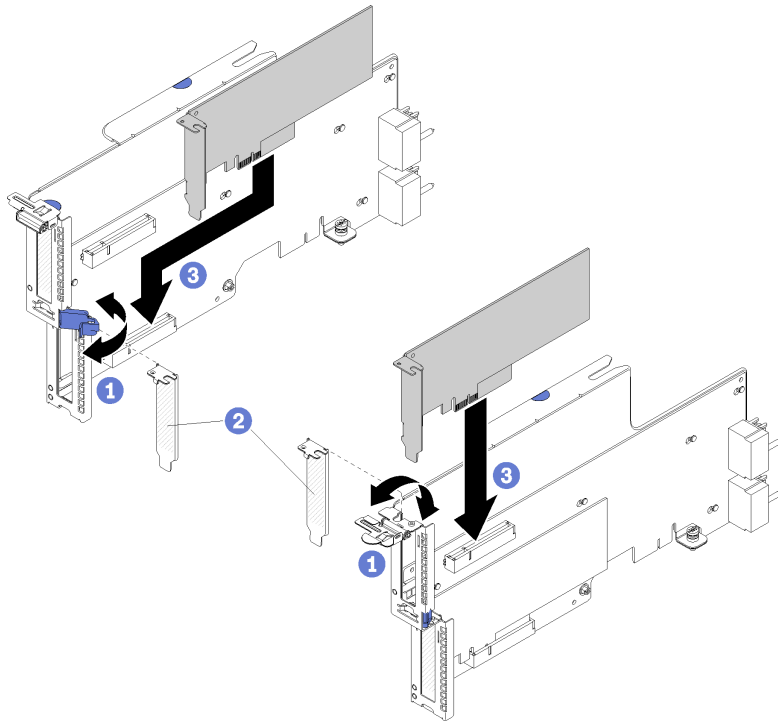


Figure 75. Adapter installation (slot 16 to 17)

- Step 1. Open the retention latch.
- Step 2. Align the adapter with the riser slot and insert it; then, press the adapter into the riser until the connector is fully seated.
- Step 3. Close and lock the retention latch.

If you have no other operations to perform on the riser after installing an adapter in slot 16 to 17:

1. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.
2. Install the riser in the I/O tray. See [“Install the riser for slot 16 to 17 \(riser 3\)”](#) on page 368.
3. Install the I/O tray in the chassis and connect all cables. See [“Install the I/O tray”](#) on page 335.

Upper/lower compute tray replacement

Use the following procedures to remove and install the upper or lower compute tray.

Remove a compute tray

The upper and lower compute trays are accessed from the front of the server. Open the release levers to extract the compute tray, pressing the release tabs when it stops to remove the tray fully from the chassis.

S002

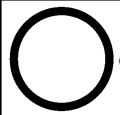


CAUTION:

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



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CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove the compute tray, remove the front cover. See “[Remove the front cover](#)” on page 322.

Complete the following steps to remove the compute tray:

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

-  [YouTube](#)
-  [Youku](#)

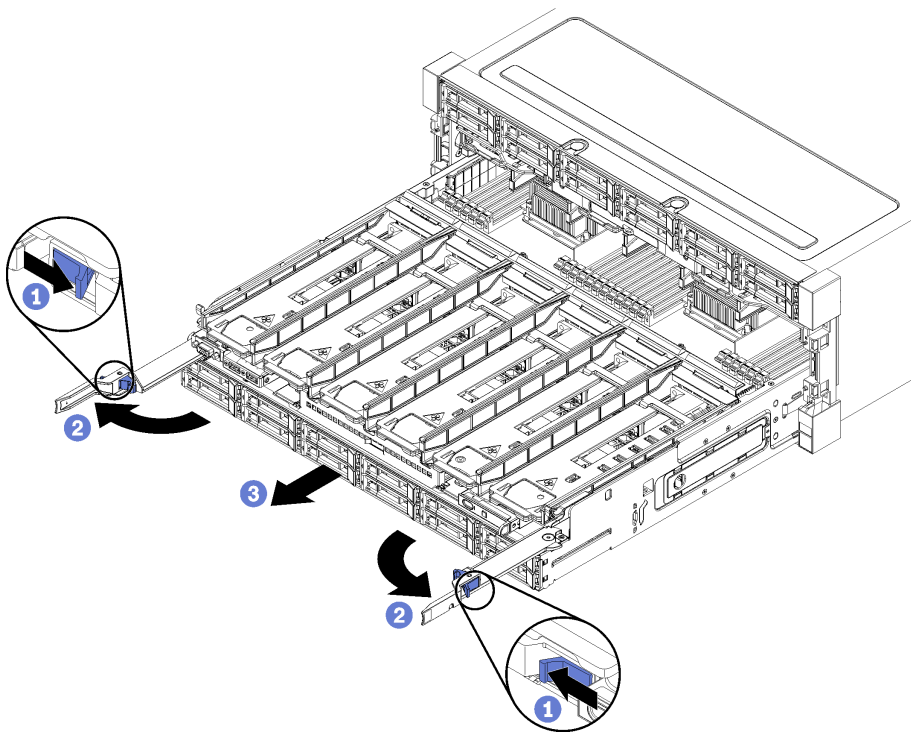


Figure 76. Compute tray removal to stop position

- Step 1. Press the button on each release lever; then, simultaneously rotate the release levers until they are perpendicular to the chassis.
- Step 2. Pull compute tray forward evenly until it stops; then, close the release levers.
- Step 3. Press the release tabs on either side of the tray; then, slide the tray fully forward evenly and remove it from the chassis.

Attention:

- Be prepared to support the full weight of the compute tray when you remove it from the chassis.
- Do not use the release levers as handles to support the compute tray.

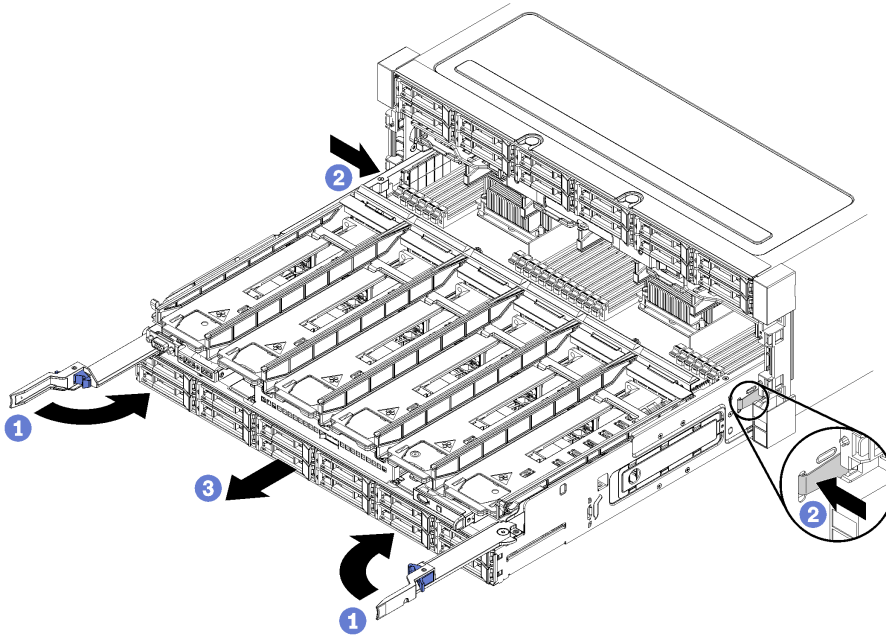


Figure 77. Compute tray removal from chassis

After you remove the compute tray:

- If you are instructed to return the compute tray, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install a compute tray

Install a compute tray by inserting it in the front of the chassis, pushing it in until it stops, and closing the release levers.

S002



CAUTION:

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

 <p>Read the Installation Guidelines</p>	 <p>Power off server and disconnect all power cords for this task</p>
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<p>” on page 254 ”</p>	

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install the compute tray:

1. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
2. Make sure that all internal cables are correctly routed. See [“Internal cable routing” on page 35](#).

Complete the following steps to install the compute tray when it is fully removed from the chassis:

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

-  [YouTube](#)
-  [Youku](#)

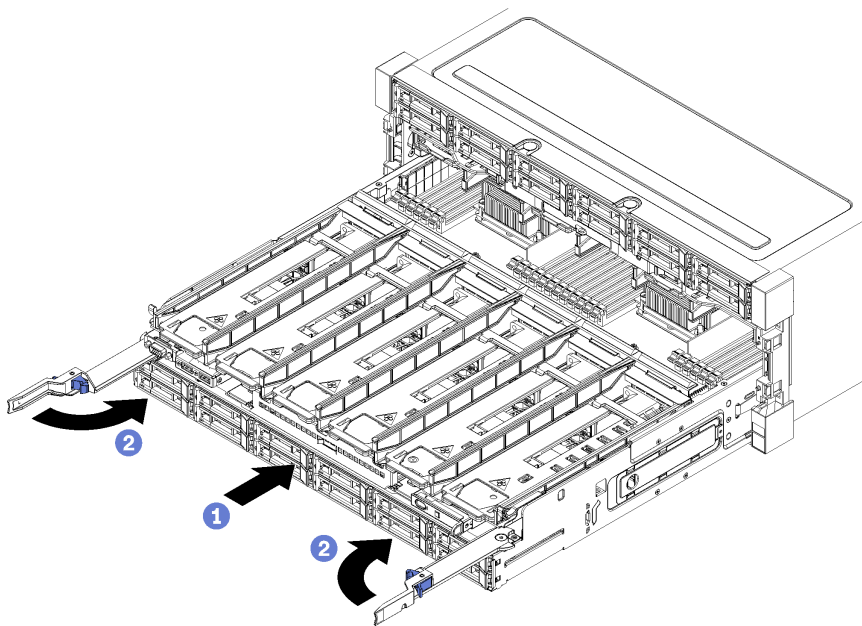


Figure 78. Compute tray installation (fully removed)

Important: Compute trays must be inserted in the chassis with the processors and memory visible from the top.

Step 1. Align the compute tray with its opening in the front of the chassis and insert.

Step 2. Fully open the compute tray release levers and push the compute tray into the chassis until it stops.

Step 3. Rotate the compute tray release levers until they lock, fully closed.

If you are done performing installation or maintenance procedures at the front of the chassis, install the front cover. See [“Install the front cover” on page 322](#).

System board replacement

System boards are in the upper or lower compute tray that is accessed from the front of the server.

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

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

Remove a system board

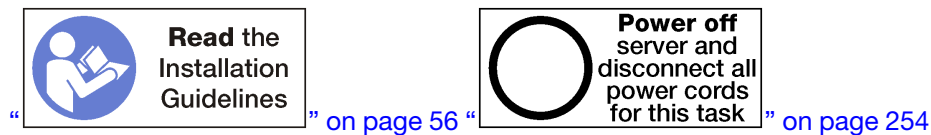
Remove a system board by disconnecting the cables inside the compute tray, pressing the release clips on the compute system board, and sliding it out of the compute tray.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove the system board:

1. Remove the front cover. See [“Remove the front cover” on page 322](#).
2. Remove compute tray where the system board is installed. See [“Remove a compute tray” on page 305](#).
3. If you are removing the lower system board in a compute tray, first remove the upper system board or filler from the compute tray to access connectors on the lower system board. See the steps below or [“Remove a system board filler” on page 312](#).

Complete the following steps to remove the compute system board:

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

-  [YouTube](#)
-  [Youku](#)

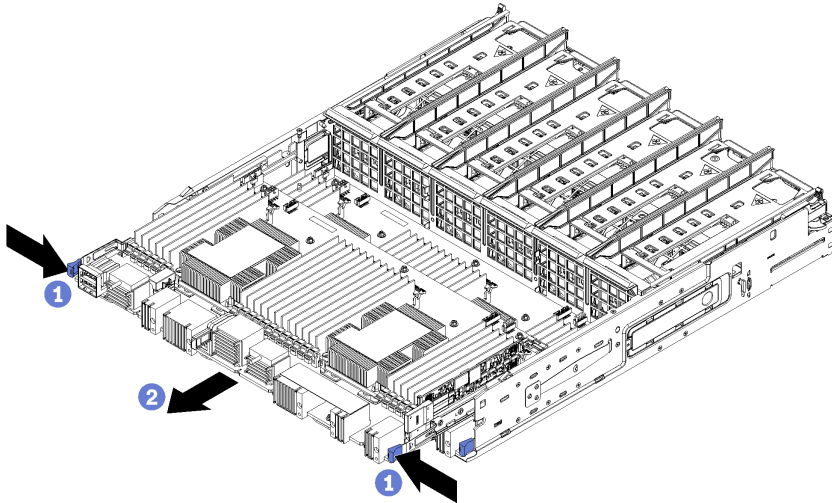


Figure 79. System board removal

- Step 1. Disconnect all cables on the system board that go to connectors in the compute tray. See [“Internal cable routing” on page 35](#).
- Step 2. Press the release clips and slide the system board out of the compute tray.

After you remove the system board:

- If you removed the upper system board and are not installing another system board, install a system board filler, install the compute tray, and install the front cover. See [“Install a system board filler” on page 313](#), [“Install a compute tray” on page 307](#), and [“Install the front cover” on page 322](#).
- If you removed the lower system board, it must be replaced before you reinstall the upper system board or filler.
- If you are instructed to return the system board, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

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

1. Take a dust cover from the CPU socket assembly on the new compute system board and orient it correctly above the CPU socket assembly on the removed system board.
 2. Gently press down the dust cover legs to the CPU socket assembly, pressing on the edges to avoid damage to the socket pins. You might hear a click on the dust cover is securely attached.
 3. **Make sure** that the dust cover is securely attached to the CPU socket assembly.
- If you are planning to recycle the system board, follow the instructions in “Disassemble the system board for recycle” in *Maintenance Manual* for compliance with local regulations.

Install a system board

Install a system board by inserting it in the compute tray, pushing it in until it locks in place, and connecting the cables.

S002



CAUTION:

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



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**Power off
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power cords
for this task**

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CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

If you are installing the lower system board in a compute tray, first remove the upper system board or filler from the compute tray to access connectors on the lower system board. See [“Remove a system board” on page 309](#) or [“Remove a system board filler” on page 312](#).

Complete the following steps to install the compute system board:

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

-  [YouTube](#)
-  [Youku](#)

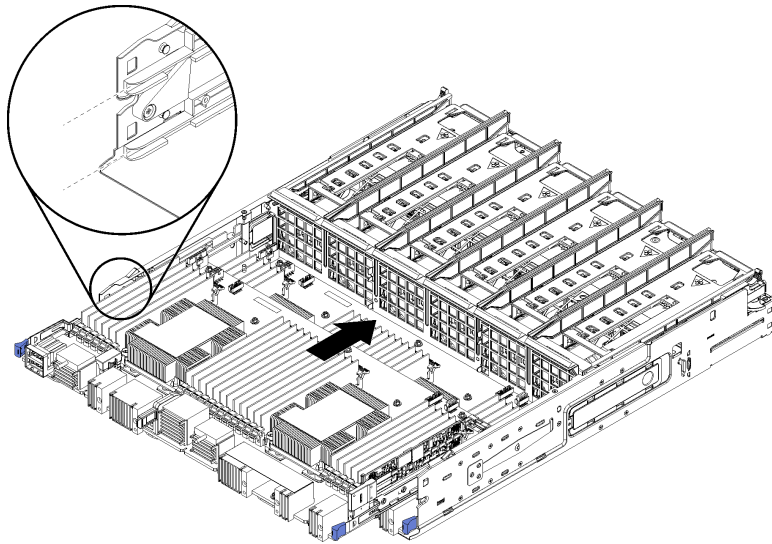


Figure 80. System board installation

- Step 1. Align the system board with the rails in the compute tray; then, insert the system board, making sure that the rails on the board fit into the slots in the compute tray.
- Step 2. Slide the system board into the compute tray until the release clips snap into the locked position.
- Step 3. Connect all cables on the system board that go to connectors in the compute tray. See [“Internal cable routing” on page 35](#).

After you install the system board:

- If you installed the lower system board in a compute tray, slide the upper system board or filler back into the compute tray until the release clips snap into the locked position.

- If you are not installing another system board, install the compute tray and front cover. See [“Install a compute tray” on page 307](#) and [“Install the front cover” on page 322](#).

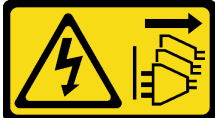
System board filler replacement

System board fillers are in the upper or lower compute tray that is accessed from the front of the server.

Remove a system board filler

Remove a system board filler by pressing the release clips on the filler, and sliding it out of the compute tray.

S002



CAUTION:

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



**Read the
Installation
Guidelines**

“ [on page 56](#) “



**Power off
server and
disconnect all
power cords
for this task**

” [on page 254](#)”

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove the system board filler:

1. Remove the front cover. See [“Remove the front cover” on page 322](#).
2. Remove compute tray where the system board filler is installed. See [“Remove a compute tray” on page 305](#).

Complete the following steps to remove the compute system board filler:

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

-  [YouTube](#)
-  [Youku](#)

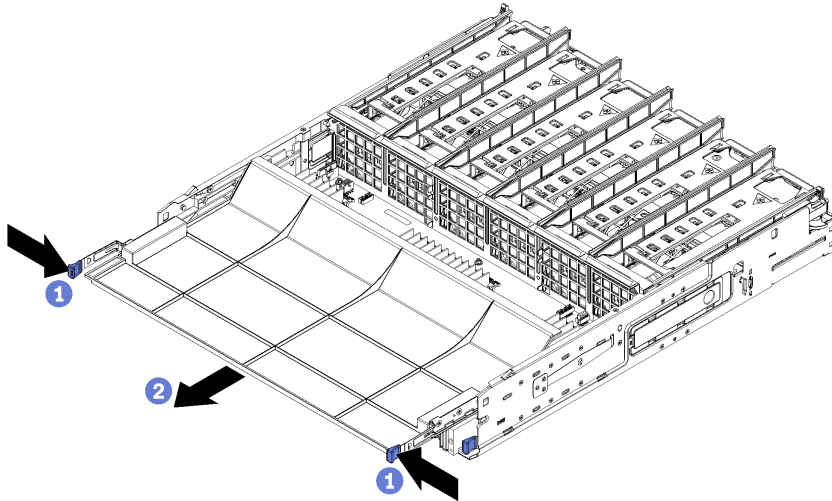


Figure 81. System board filler removal

Step 1. Press the release clips and slide the system board filler out of the compute tray.

After you remove the system board filler:

- If you are instructed to return the system board filler, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
- If you are planning to recycle the system board filler, follow the instructions in “Disassemble the system board filler for recycle” in *Maintenance Manual* for compliance with local regulations.

Install a system board filler

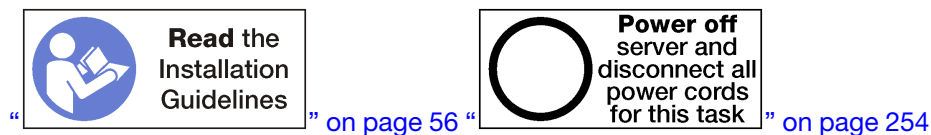
Install a system board filler by inserting it in the compute tray and pushing it in until it locks in place.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Complete the following steps to install the compute system board filler:

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

-  YouTube
-  Youku

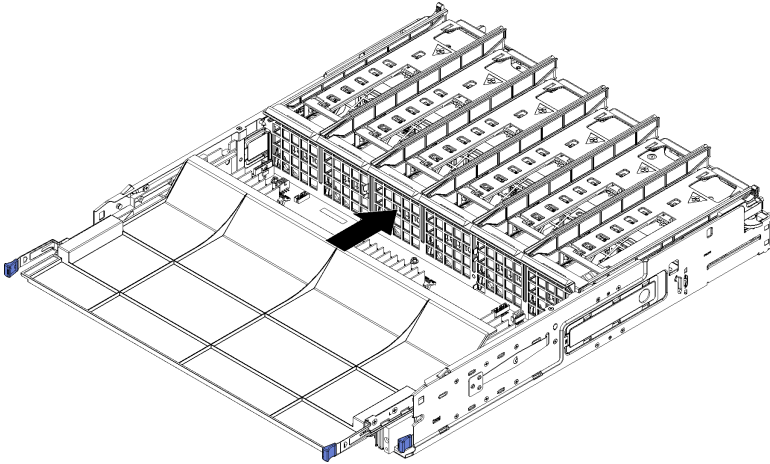


Figure 82. System board filler installation

- Step 1. Align the system board filler with the rails in the compute tray; then, insert the system board filler, making sure that the rails on the board fit into the slots in the compute tray.
- Step 2. Slide the system board filler into the compute tray until the release clips snap into the locked position.

After you install the system board filler, install the compute tray and front cover. See [“Install a compute tray” on page 307](#) and [“Install the front cover” on page 322](#).

Fan cage replacement

Fan cages are in the upper and lower compute trays or optional storage tray that are accessed from the front of the server. Procedures for removing and installing fan cages in the upper and lower trays are different.

Remove a fan cage (upper tray)

The upper fan cage is in the upper compute tray or optional storage tray that is accessed from the front of the server. After removing the upper tray, turn it upside down, press the fan cage releases, and pull the fan cage toward the front of the tray to remove it; then, disconnect the fan cage electrical connector.

S002

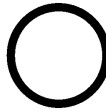


CAUTION:

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



**Read the
Installation
Guidelines**



**Power off
server and
disconnect all
power cords
for this task**

“ on page 56 ”

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove an upper fan cage:

1. Remove the front cover. See “Remove the front cover” on page 322.
2. Remove the upper compute tray or storage tray. See “Remove a compute tray” on page 305 or “Remove a storage tray” on page 375.
3. If you removed a compute tray and it has one or more compute system boards or a system board filler installed, remove the system boards or system board filler. See “Remove a system board” on page 309 or “Remove a system board filler” on page 312.
4. Turn the tray upside down.

Complete the following steps to remove an upper fan cage.

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

-  [YouTube](#)
-  [Youku](#)

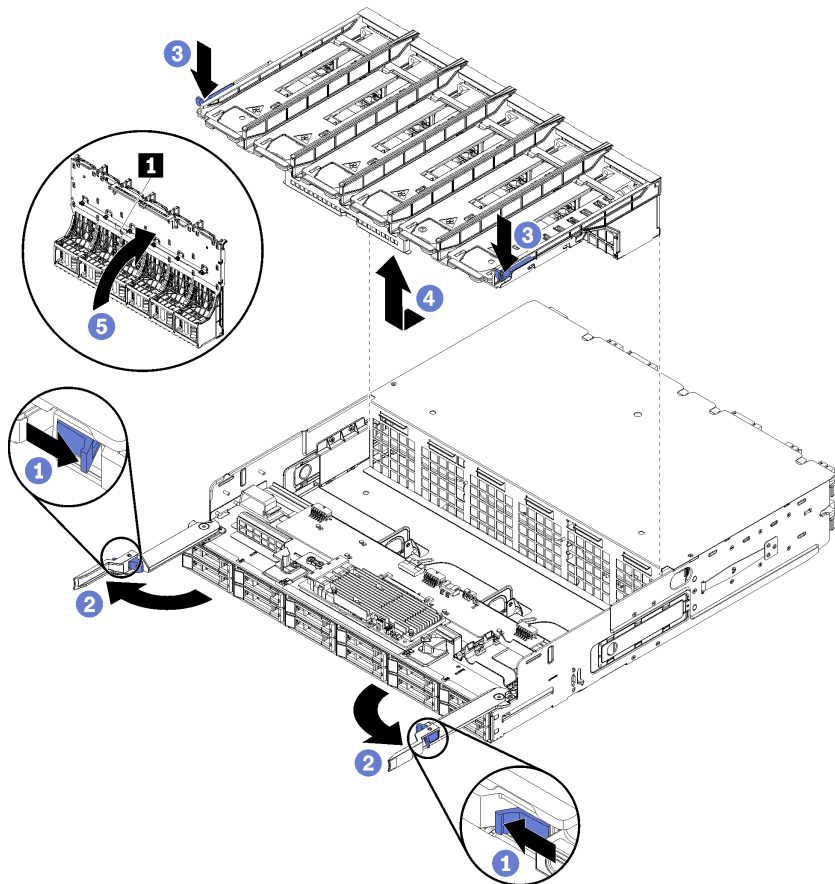


Figure 83. Upper fan cage removal

- Step 1. Press the button on each compute or storage tray release lever; then, rotate the release levers until they are perpendicular to the tray.
- Step 2. Press the fan cage releases at either side of the fan cage; then, pull the fan cage toward the front of the compute or storage tray and lift the cage slightly to access the connector on the underside of the fan cage.
- Step 3. Disconnect the cable from the connector **1** in the underside of the fan cage.

Attention: To prevent damage to components, lift the fan cage straight up when removing it from the tray.

- Step 4. Lift and remove the fan cage from the tray.

If you are instructed to return the fan cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Remove a fan cage (lower tray)

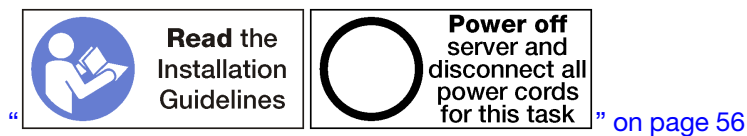
The lower fan cage is in the lower compute tray that is accessed from the front of the server. After removing the lower compute tray, press the fan cage releases and pull the fan cage toward the front of the compute tray to remove it; then, disconnect the fan cage electrical connector.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove a lower fan cage:

1. Remove the front cover. See [“Remove the front cover” on page 322](#).
2. Remove the lower compute tray. See [“Remove a compute tray” on page 305](#).

Complete the following steps to remove a lower fan cage.

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

- [YouTube](#)
- [Youku](#)

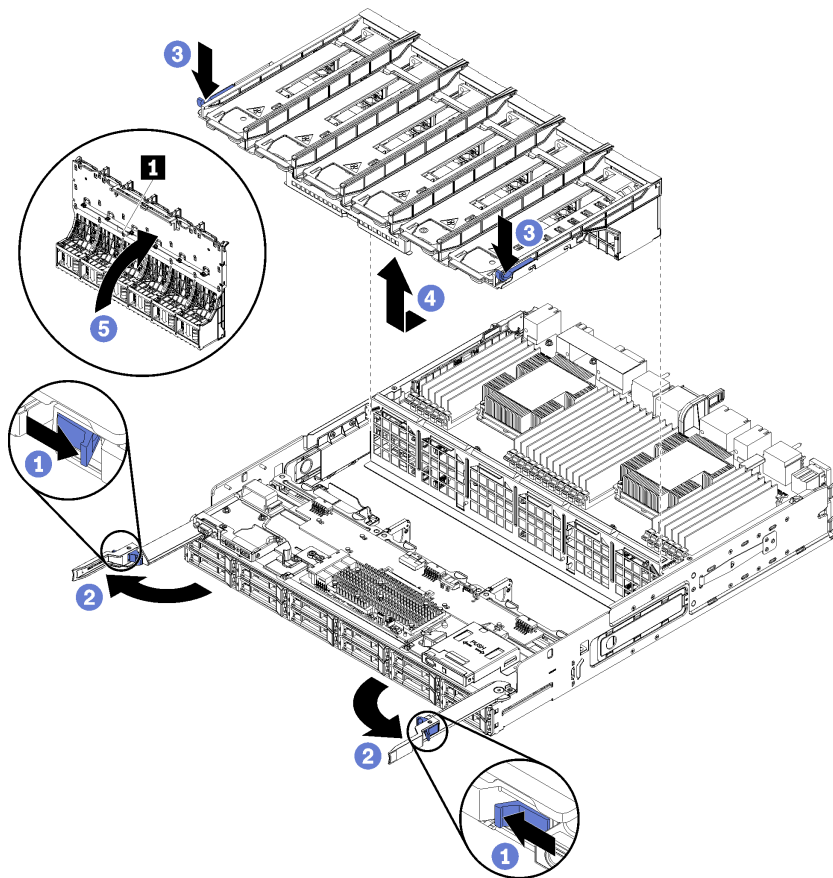


Figure 84. Lower fan cage removal

- Step 1. Press the button on each compute tray release lever; then, rotate the release levers until they are perpendicular to the tray.
- Step 2. Press the fan cage releases at either side of the fan cage; then, pull the fan cage toward the front of the compute tray and lift the cage slightly to access the connector on the underside of the fan cage.
- Step 3. Disconnect the cable from the connector **1** in the underside of the fan cage.

Attention: To prevent damage to components, lift the fan cage straight up when removing it from the tray.
- Step 4. Lift and remove the fan cage from the tray.

If you are instructed to return the fan cage, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install a fan cage (upper tray)

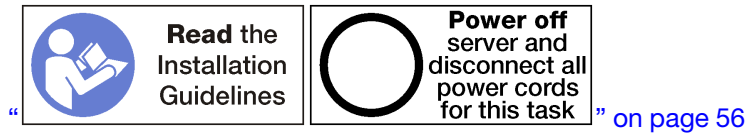
The upper fan cage is in the upper compute tray or optional storage tray that is accessed from the front of the server. Fan cages are keyed and each can be used only in one type of tray (upper or lower). Numbers on the fan cages are right-side up when the compute or storage tray is installed in the chassis. Install the upper fan cage by connecting the fan cage electrical connector, inserting the fan cage in the upper tray, and pushing it backward until it locks in place.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Complete the following steps to install an upper fan cage:

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

-  [YouTube](#)
-  [Youku](#)

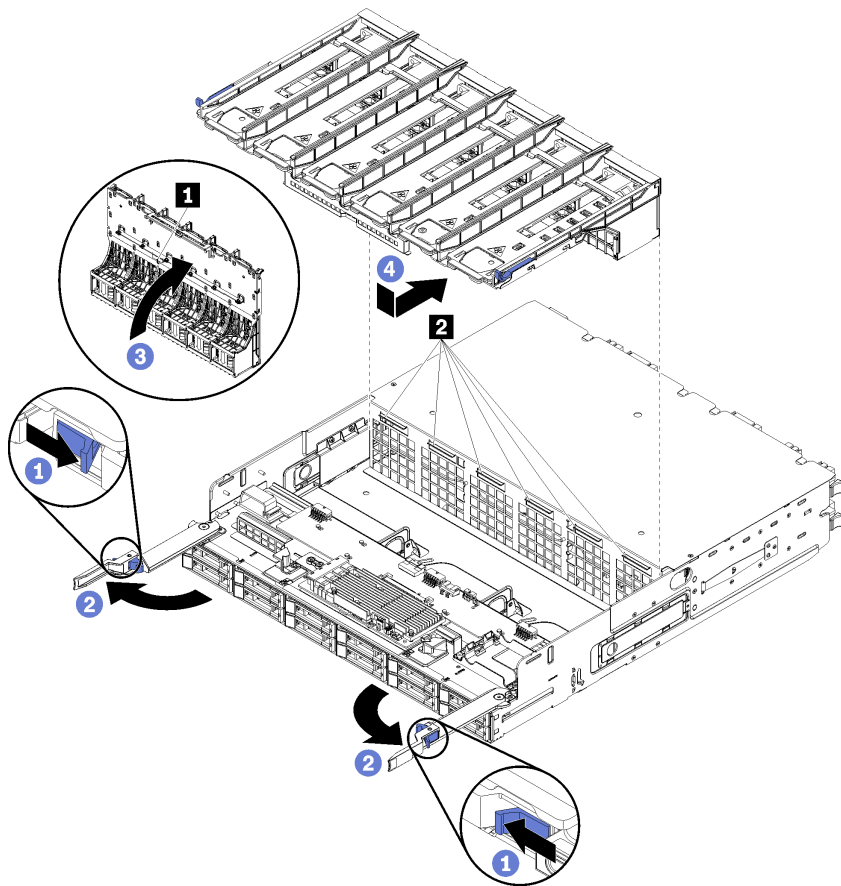


Figure 85. Upper fan cage installation

- Step 1. Make sure that the area where the fan cage installs is clear and that cables are routed to allow fan cage insertion.
- Step 2. Make sure that the compute or storage tray release levers are open and perpendicular to the tray.

Attention: To prevent damage to components, lower the fan cage straight down when inserting it in the tray.
- Step 3. Position the fan cage in the compute or storage tray, making sure that no cables are in the way; then, insert the fan cage part way into the tray.
- Step 4. Connect the cable to the connector **1** in the underside of the fan cage.
- Step 5. Insert the fan cage fully down into the tray, making sure that you do not pinch any cables.

Important: Make sure the that fan cage goes beneath all tabs on the tray when pushing it backward. The fan cage must be pushed fully back until it is against the tray bulkhead along its entire length.
- Step 6. Slide the fan cage back into the tray with the fan cage under the tabs on the tray (**2** in above illustration). Push the fan cage backward until it locks in place. If the fan cage does not move into place freely, make sure that no cables are obstructing its movement.

After you have installed the upper fan cage:

1. Close the compute or storage tray release levers.
2. Turn the tray right-side up.

3. If you removed one or more system boards or a compute system board filler from a compute tray, install the system boards or system board filler. See [“Install a system board” on page 310](#) or [“Install a system board filler” on page 313](#).
4. Install the upper compute tray or storage tray. See [“Install a compute tray” on page 307](#) or [“Install the storage tray \(fully removed\)” on page 377](#).
5. Install the front cover. See [“Install the front cover” on page 322](#).

Install a fan cage (lower tray)

The lower fan cage is in the lower compute tray that is accessed from the front of the server. Fan cages are keyed and each can be used only in one type of Upper/lower compute tray. Numbers on the fan cages are right-side up when the compute tray is installed in the chassis. Install the lower fan cage by connecting the fan cage electrical connector, inserting the fan cage in the lower compute tray, and pushing it backward until it locks in place.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Complete the following steps to install a lower fan cage:

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

- [YouTube](#)
- [Youku](#)

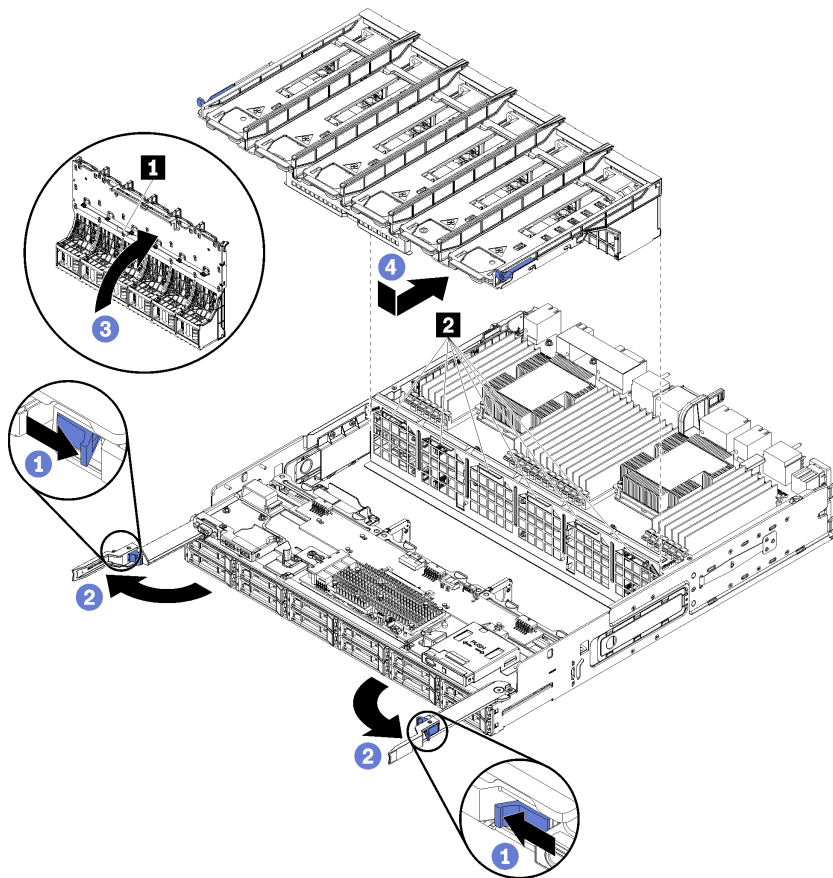


Figure 86. Lower fan cage installation

Step 1. Make sure that the area where the fan cage installs is clear and that cables are routed to allow fan cage insertion.

Step 2. Make sure that the compute tray release levers are open and perpendicular to the tray.

Attention: To prevent damage to components, lower the fan cage straight down when inserting it in the tray.

Step 3. Position the fan cage in the compute tray, making sure that no cables are in the way; then, insert the fan cage part way into the tray.

Step 4. Connect the cable to the connector **1** in the underside of the fan cage.

Step 5. Insert the fan cage fully down into the tray, making sure that you do not pinch any cables.

Important: Make sure the that fan cage goes beneath all tabs on the tray when pushing it backward. The fan cage must be pushed fully back until it is against the tray bulkhead along its entire length.

Step 6. Slide the fan cage back into the tray with the fan cage under the tabs on the tray (**2** in above illustration). Push the fan cage backward until it locks in place. If the fan cage does not move into place freely, make sure that no cables are obstructing its movement.

After you have installed the lower fan cage:

1. Close the compute tray release levers.
2. Install the lower compute tray; then, install the front cover. See [“Install a compute tray” on page 307](#) and [“Install the front cover” on page 322](#).

Front cover replacement

Use the following procedures to remove and install the front cover.

Remove the front cover

Remove the front cover by pressing the release buttons and pulling the cover from the front of the server.

Complete the following steps to remove the front cover:

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

-  [YouTube](#)
-  [Youku](#)

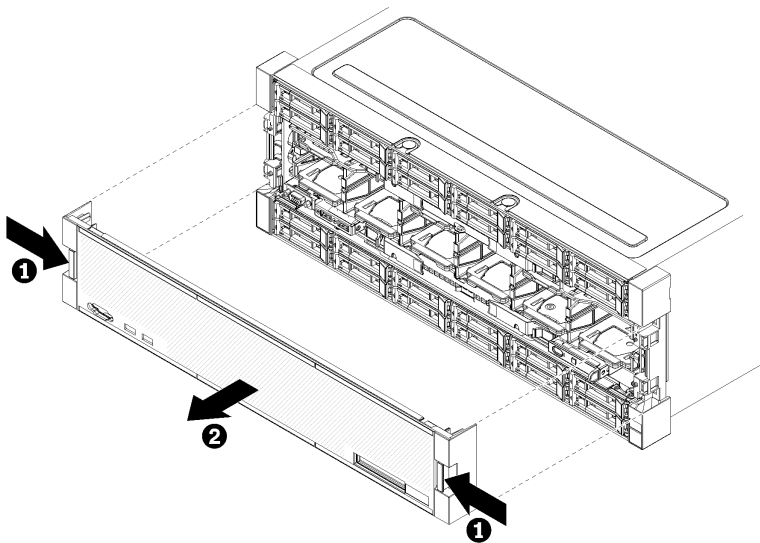


Figure 87. Front cover removal

Step 1. Press release buttons at either side of the front cover.

Step 2. Pull the cover forward and remove it from the server.

After you remove the front cover:


- If you are instructed to return the front cover, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.
- If you are planning to recycle the front cover, follow the instructions in “Disassemble the front cover for recycle” in *Maintenance Manual* for compliance with local regulations.

Install the front cover

Install the front cover by sliding the cover into position and pressing until it is fully seated.

Complete the following steps to install the front cover:

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

-  [YouTube](#)
-  [Youku](#)

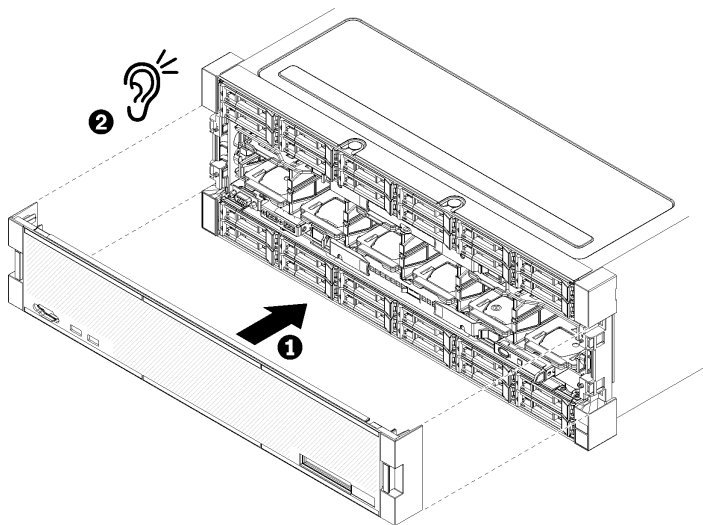


Figure 88. Front cover installation

Step 1. Position the cover on the front of the server.

Note: Make sure that the pull tab on the operator panel, used to access the LCD system information display panel, passes through the hole for the display panel on the front cover.

Step 2. Press and slide the cover toward the rear of the server until the release clips engage.

Hard disk drive replacement

Use the following procedures to remove and install hard disk drives and hard disk drive fillers. Hard disk drives are at the front of the server.

Remove a hard disk drive

Open the latch handle and pull the drive to remove it from the drive bay. Hard disk drives are hot-swap devices that can be removed while the server is powered on.



Before you remove a hard disk drive:

1. Make sure you save the data on your drive, especially if it is part of a RAID array, before you remove it from the server.
 - Before you make changes to disk drives, disk drive controllers, disk drive backplanes, or disk drive cables, back up all important data that is stored on hard disks.
 - Before you remove any component of a RAID array, back up all RAID configuration information.
2. If one or more NVMe solid-state drives are to be removed, make sure that the drive is shut down via the operating system (see the documentation for your operating system for information and instructions). The drive activity (green) LED is on solid for an NVMe drive that is shut down. See the labels above the drive bays to determine the type of the drive to remove. If the drive bay numbers come with the term “NVMe,” it indicates the installed drives are NVMe solid-state drives.

Attention: To make sure that there is adequate system cooling, do not operate the server for more than 2 minutes without either a hard disk drive or a filler panel installed in each bay.

Complete the following steps to remove a hard disk drive.

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

-  [YouTube](#)
-  [Youku](#)

Step 1. Make a note of the bay where the hard disk drive is installed: drives must be installed in the bay from which they were removed.

Step 2. Remove the hard disk drive.

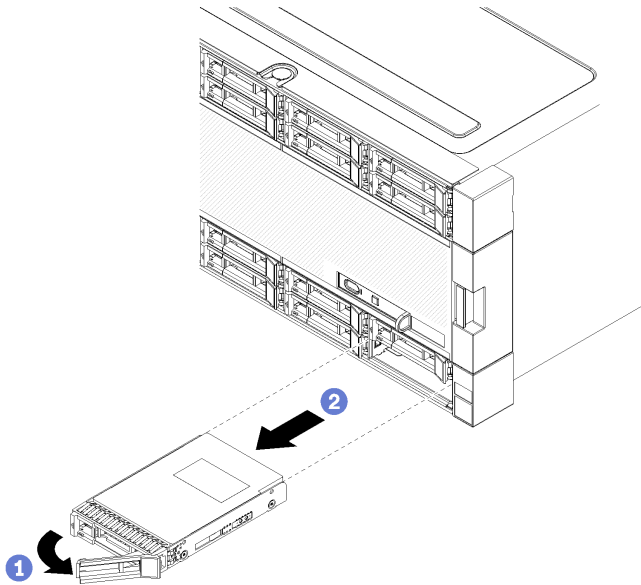


Figure 89. Hard disk drive installation

- Slide the release latch to unlock the drive handle; then, rotate the handle outward.
- Pull the handle to remove the drive from the drive bay.

After you remove the hard disk drive:

- Install a replacement hard disk drive or filler in the empty drive bay.
- If you are instructed to return the drive assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install a hard disk drive

Insert the hard disk drive in its bay and close the latch handle to lock the drive in place. Hard disk drives are hot-swap devices that can be installed while the server is powered on.



Before you install a hard disk drive, if the hard disk drive bay contains a filler, press the release tab and pull the filler from the bay.

Hard disk drive fillers can be of two types: single-bay fillers and four-bay fillers. If you remove a four-bay filler and are not installing four hard disk drives, you must install single-bay fillers in each of the empty drive bays.

When replacing a hard disk drive that was previously installed, make sure that you install it in the same drive bay from which it was removed.

Complete the following steps to install a hard disk drive:

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

-  [YouTube](#)
-  [Youku](#)

Note: NVMe drive bays can accept either SATA/SAS or NVMe drives.

- Step 1. Determine the drive type that you can install in the bay (SATA/SAS or NVMe) based on labels stenciled on the front of the server and any drive bay labels that might have been applied to the front of the server. These labels correspond to the drive backplane types that are installed. The drive type must match the drive bay type. Drive type information is available on the package that contains the drive.
- Step 2. Install the hard disk drive in the drive bay.

If the server is operating (turned on), the green activity LED on the hard disk drive should light solid, indicating that the drive is receiving power.

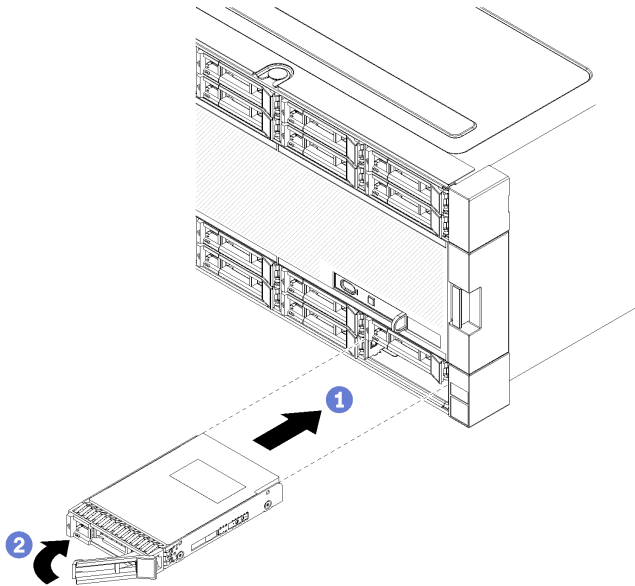


Figure 90. Hard disk drive installation

- a. Open the drive handle, align the drive with the drive bay, and insert the drive.
 - b. Push the drive into the bay until the drive stops; then, rotate drive handle closed to fully seat the drive and lock it in place.
- Step 3. Check the hard disk drive status LED to verify that the hard disk drive is operating correctly.
 - If the yellow hard disk drive status LED of a drive is lit continuously, that drive is faulty and must be replaced.
 - If the green hard disk drive activity LED is lit, the drive is powered, but not actively reading or writing data. If the LED is flashing, the drive is being accessed.
 - Step 4. If you are installing additional hard disk drives, do so now.

After you have installed all hard disk drives:

1. Install fillers in all empty hard disk drive bays. If you removed a four-bay filler and do not install four hard disk drives in its place, place single-bay fillers in any vacant bays.
2. If the server is configured for RAID operation, you might have to reconfigure your disk arrays after you install hard disk drives. See [“RAID configuration” in the ThinkSystem SR950 Setup Guide](#) for information.

Remove a hard disk drive filler

Remove a hard disk drive filler by pressing the release tab and pulling the filler from the bay. Hard disk drive fillers can be of two types: single-bay fillers and four-bay fillers.

Complete the following steps to remove a hard disk drive filler:

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

-  [YouTube](#)
-  [Youku](#)

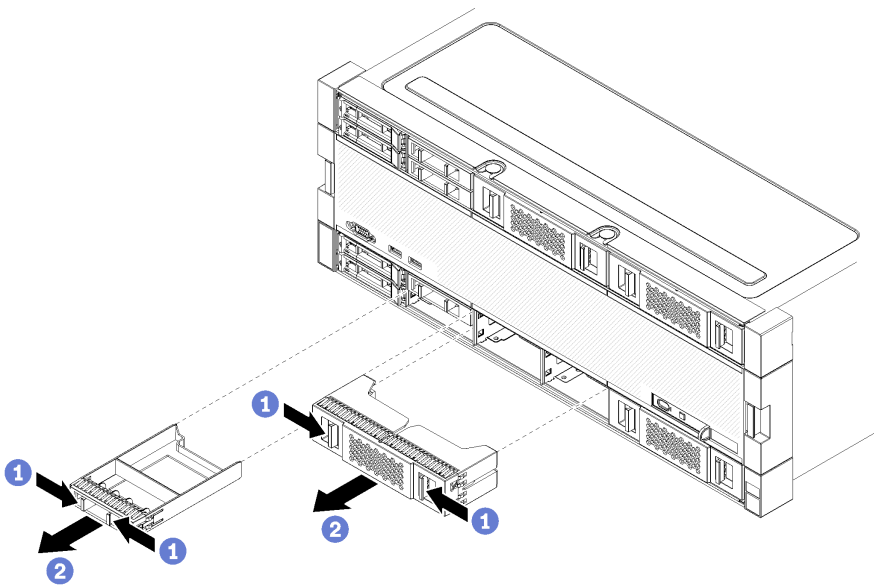


Figure 91. Hard disk drive filler removal

Step 1. Press the release tab and pull the filler from the bay

Install fillers in all empty hard disk drive bays. If you remove a four-bay filler, the vacant drive bays must be filled with a four-bay filler, hard disk drives, or single-bay fillers.

Install a hard disk drive filler

Insert the hard disk drive filler in the bay and press it in place. Hard disk drive fillers can be of two types: single-bay fillers and four-bay fillers.

Complete the following steps to install a hard disk drive filler:

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

-  [YouTube](#)
-  [Youku](#)

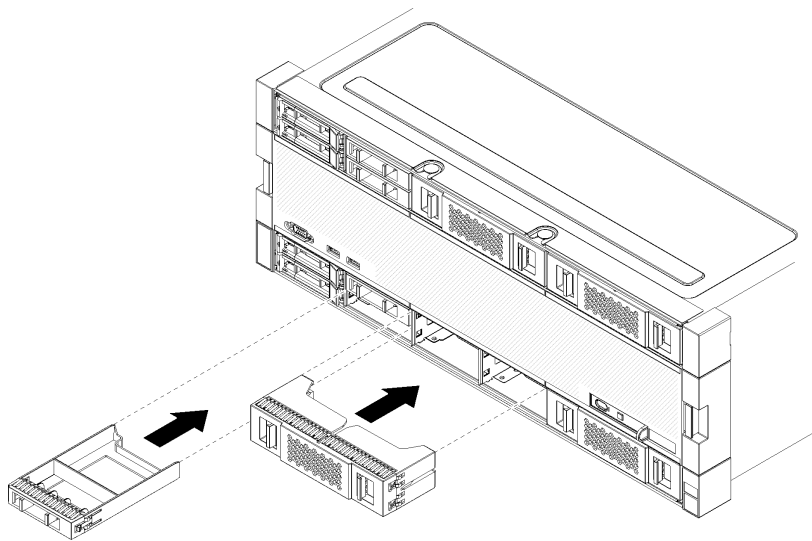


Figure 92. Hard disk drive filler installation

Step 1. Insert the filler in the hard disk drive in the drive bay and press it in place.

Install fillers in all empty hard disk drive bays. You can use either a four-bay filler or single-bay fillers in any vacant bays.

Hard disk drive backplane replacement

Hard disk drive backplanes are in the upper and lower trays that are accessed from the front of the server. The removal and installation procedures for backplanes in the upper and lower trays are different.

Remove a hard disk drive backplane (upper tray)

Hard disk drive backplanes in the upper compute tray or optional storage tray are accessed from the front of the server. There are several types of hard disk drive backplane. Steps that are backplane specific are noted in each procedure.

S002



CAUTION:

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



**Read the
Installation
Guidelines**

“ on page 56 “



**Power off
server and
disconnect all
power cords
for this task**

” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove the hard disk drive backplane:

1. Remove the front cover. See [“Remove the front cover” on page 322](#).
2. After noting their locations, remove any hard disk drives that are installed in the upper tray. See [“Remove a hard disk drive” on page 323](#).
3. Remove the upper compute tray or storage tray. See [“Remove a compute tray” on page 305](#) or [“Remove a storage tray” on page 375](#).
4. Turn the tray upside down.
5. Remove the fan cage. See [“Remove a fan cage \(upper tray\)” on page 314](#).

Complete the following steps to remove the hard disk drive backplane:

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

-  [YouTube](#)
-  [Youku](#)

- Step 1. Disconnect all power and data cables on the hard disk drive backplane that go to the storage interposer or to connectors on the system board or optional storage tray. You might find it easier to disconnect cables from the backplane if you disconnect them from the storage interposer first, reconnecting them to the storage interposer after removing the backplane or installing a new one. Other cables might also need to be removed from their retaining clips or moved to the side to remove the backplane.
- Step 2. Turn the tray right-side up.
- Step 3. Remove the hard disk drive backplane.

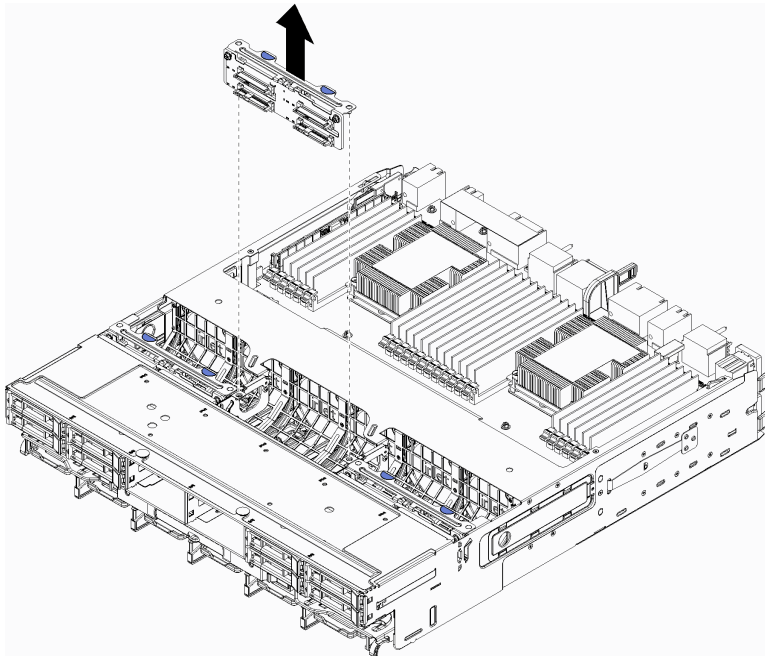


Figure 93. Hard disk drive backplane (upper) removal

Grasp the backplane and pull it up and out of the upper tray.

If you are not installing another hard disk drive backplane after you remove the hard disk drive backplane:

- Install the fan cage. See [“Install a fan cage \(upper tray\)” on page 317](#).

- Install the upper compute tray or storage tray. See [“Install a compute tray” on page 307](#) or [“Install the storage tray \(fully removed\)” on page 377](#).
- Install the front cover. See [“Install the front cover” on page 322](#).

If you are instructed to return the backplane, follow all packaging instructions and use any packaging materials that are provided.

Remove a hard disk drive backplane (lower tray)

Hard disk drive backplanes in the lower compute tray are accessed from the front of the server. There are several types of hard disk drive backplane. Steps that are backplane specific are noted in each procedure.

S002



CAUTION:

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



**Read the
Installation
Guidelines**

“ [on page 56](#) “



**Power off
server and
disconnect all
power cords
for this task**

” [on page 254](#)”

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove the hard disk drive backplane:

1. Remove the front cover. See [“Remove the front cover” on page 322](#).
2. After noting their locations, remove any hard disk drives that are installed in the lower compute tray. See [“Remove a hard disk drive” on page 323](#).
3. Remove the lower compute tray. See [“Remove a compute tray” on page 305](#).
4. Remove the fan cage. See [“Remove a fan cage \(lower tray\)” on page 316](#).
5. Move or remove the storage interposer to access the hard disk drive backplanes. See [“Remove a storage interposer \(lower tray\)” on page 371](#).
6. Move cables and harnesses to provide a clear path for accessing the hard disk drive backplanes and their connectors.

Complete the following steps to remove the hard disk drive backplane:

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

- [YouTube](#)
- [Youku](#)

Step 1. Disconnect all power and data cables on the hard disk drive backplane that go to the storage interposer or to connectors on the system board or optional storage tray. You might find it easier to disconnect cables from the backplane if you disconnect them from the storage interposer first,

reconnecting them to the storage interposer after removing the backplane or installing a new one. Other cables might also need to be removed from their retaining clips or moved to the side to remove the backplane.

Step 2. Remove the hard disk drive backplane.

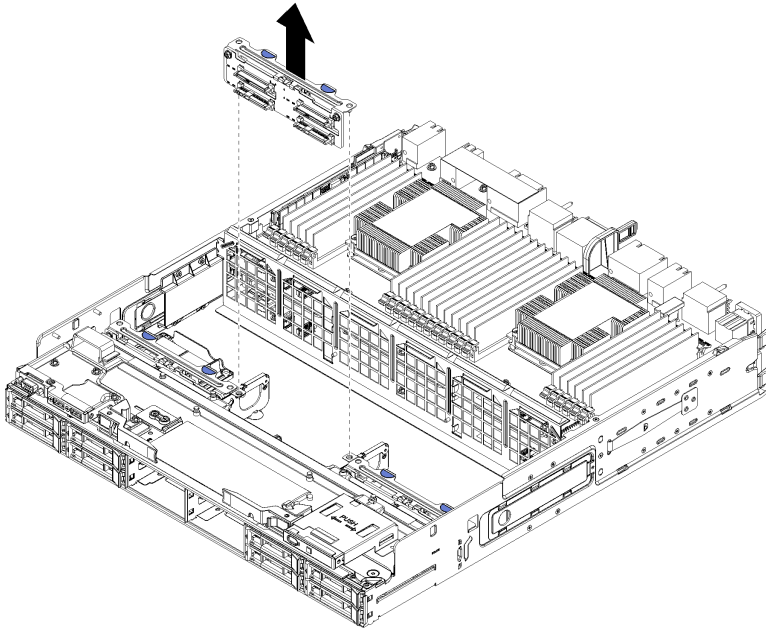


Figure 94. Hard disk drive backplane (lower) removal

Grasp the backplane and pull it up and out of the lower tray.

If you are not installing another hard disk drive backplane, after you remove the hard disk drive backplane:

- Replace or reposition the storage interposer. See [“Install a storage interposer \(lower tray\)”](#) on page 373.
- Make sure that all cables are routed and connected.
- Install the fan cage. See [“Install a fan cage \(lower tray\)”](#) on page 320.
- Install the lower compute tray. See [“Install a compute tray”](#) on page 307.
- Install the front cover. See [“Install the front cover”](#) on page 322.

If you are instructed to return the backplane, follow all packaging instructions and use any packaging materials that are provided.

Install a hard disk drive backplane (upper tray)

Hard disk drive backplanes in the upper compute tray or optional storage tray are accessed from the front of the server. There are several types of hard disk drive backplane. Steps that are backplane specific are noted in each procedure.

S002



CAUTION:

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



**Read the
Installation
Guidelines**

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**Power off
server and
disconnect all
power cords
for this task**

” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Complete the following steps to install a hard disk drive backplane in the upper compute tray or optional storage tray.

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

-  [YouTube](#)
-  [Youku](#)

Step 1. Connect the power cable to the backplane. If this cable is connected to the storage interposer, you might find it easier to disconnect it from the storage interposer and then reconnect it to the storage interposer after the backplane is installed. See “[Cable routing for drives](#)” on page 40.

Step 2. Install the hard disk drive backplane.

Note: Existing cables might need to be removed from their retaining clips or moved to the side to install the backplane.

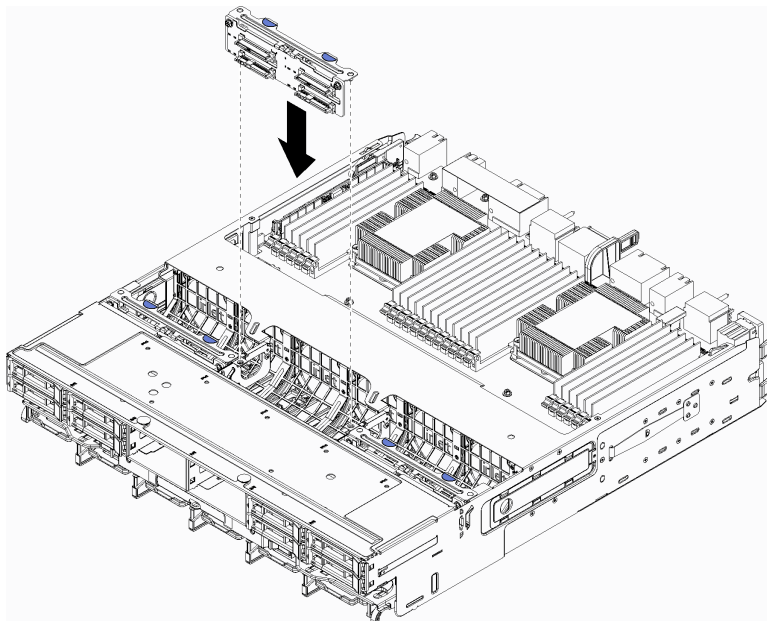


Figure 95. Hard disk drive backplane (upper) installation

Align the backplane with its location in the tray; then, insert the backplane and push it down until it is fully seated.

- Step 3. Connect the data cables to the backplane. (SAS backplanes have only one data cable. NVMe backplanes have two data cables.) See [“Cable routing for drives” on page 40](#).
- Step 4. Repeat [Step 1 on page 331](#), [Step 2 on page 331](#), and [Step 3 on page 332](#) for each hard disk drive backplane being installed in the upper tray.
- Step 5. Turn the tray upside down.
- Step 6. Route and connect the data cables. See [“Cable routing for drives” on page 40](#).
 - Route each SAS data cable to its connector on the RAID adapter; then, connect the SAS cable.
 - Route each NVMe data cable to its connector on a system board or optional storage tray; then, connect the NVMe cable.
- Step 7. Make sure that all power cables are connected to the storage interposer.
- Step 8. Make sure that all of the cables are correctly routed after they have been connected.

After you install a hard disk drive backplane:

1. Install the fan cage. See [“Install a fan cage \(upper tray\)” on page 317](#).
2. Turn the tray right-side up.
3. Install the upper compute tray or storage tray. See [“Install a compute tray” on page 307](#) or [“Install the storage tray \(fully removed\)” on page 377](#).
4. Install any hard disk drives that you removed from the upper tray. Each drive should be installed in its original location. See [“Install a hard disk drive” on page 324](#).
5. Install the front cover. See [“Install the front cover” on page 322](#).

Install a hard disk drive backplane (lower tray)

Hard disk drive backplanes in the lower compute tray are accessed from the front of the server. There are several types of hard disk drive backplane. Steps that are backplane specific are noted in each procedure.

S002



CAUTION:

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



**Read the
Installation
Guidelines**

“ [on page 56](#) “



**Power off
server and
disconnect all
power cords
for this task**

” [on page 254](#)

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Complete the following steps to install a hard disk drive backplane in the lower compute tray.

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

- [YouTube](#)

-  [Youku](#)

- Step 1. Connect the power and data cables to the hard disk drive backplane. See [“Cable routing for drives” on page 40](#).
- Connect the power cable to the backplane. If this cable is connected to the storage interposer, you might find it easier to disconnect it from the storage interposer and then reconnect it to the storage interposer after the backplane is installed.
 - Connect the data cables to the backplane. (SAS backplanes have only one data cable. NVMe backplanes have two data cables.)
- Step 2. Install the hard disk drive backplane.

Note: Existing cables might need to be removed from their retaining clips or moved to the side to install the backplane.

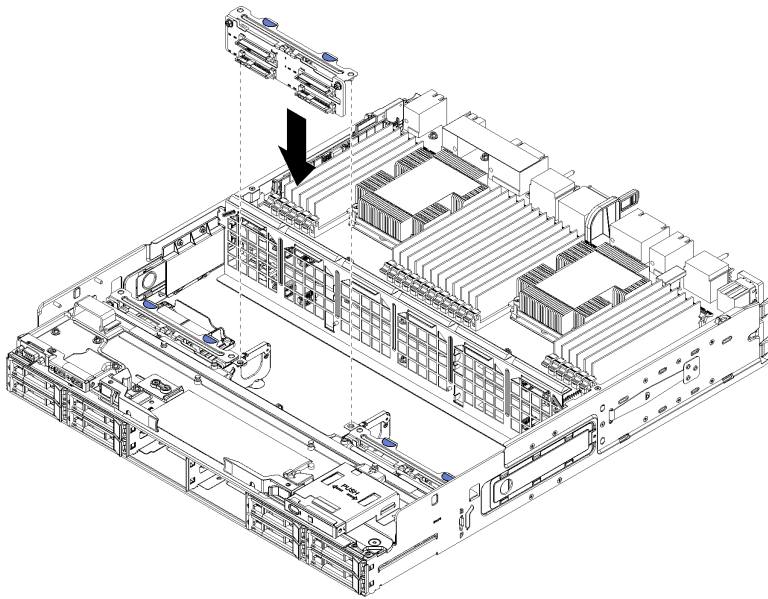


Figure 96. Hard disk drive backplane (lower) installation

Align the backplane with its location in the server; then, insert the backplane and push it down until it is fully seated.

- Step 3. Repeat [Step 1 on page 333](#) and [Step 2 on page 333](#) for each hard disk drive backplane being installed in the lower compute tray.
- Step 4. Route and connect the data cables. See [“Cable routing for drives” on page 40](#).
- Route each SAS data cable to its connector on the RAID adapter; then, connect the SAS cable.
 - Route each NVMe data cable to its connector on the compute system board; then, connect the NVMe cable.
- Step 5. Make sure that all power cables are connected to the storage interposer.
- Step 6. Route any cables that were moved to access the backplanes and connectors.

After you install a hard disk drive backplane:

- Install the storage interposer and connect all cables. See [“Install a storage interposer \(lower tray\)” on page 373](#).
- Make sure that all of the cables are correctly routed after they have been connected.

3. Install the fan cage. See [“Install a fan cage \(lower tray\)” on page 320.](#)
4. Install the lower compute tray. See [“Install a compute tray” on page 307.](#)
5. Install any hard disk drives that you removed from the lower compute tray. Each drive should be installed in its original location. See [“Install a hard disk drive” on page 324.](#)
6. Install the front cover. See [“Install the front cover” on page 322.](#)

I/O tray replacement

The I/O tray is accessed from the rear of the server. The I/O tray is the server component that stores server identity information. This information must be transferred to the new I/O tray during maintenance replacement.

Remove the I/O tray

The I/O tray is accessed from the rear of the server. Open the release levers to extract the I/O tray. If you are removing the I/O tray as part of a maintenance replacement, you must transfer system identification information to the new I/O tray.

S002



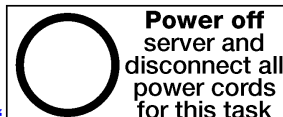
CAUTION:

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



**Read the
Installation
Guidelines**

“ [on page 56](#) “



**Power off
server and
disconnect all
power cords
for this task**

” [on page 254](#)”

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove the I/O tray:

- Disconnect and label all cables connected to adapters in the I/O tray.

Note: System identification information for the ThinkSystem SR950 server is stored in the I/O tray. If you are removing the I/O tray to replace it as part of a maintenance operation, you will need to transfer system identification information to the new I/O tray, after it is installed in the server.

- If you are managing the server from Lenovo XClarity Administrator, make sure that you unmanage the server before removing the I/O tray. Then, you can manage the server again after the new I/O tray has been replaced.

Complete the following steps to remove the I/O tray.

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

- [YouTube](#)
- [Youku](#)

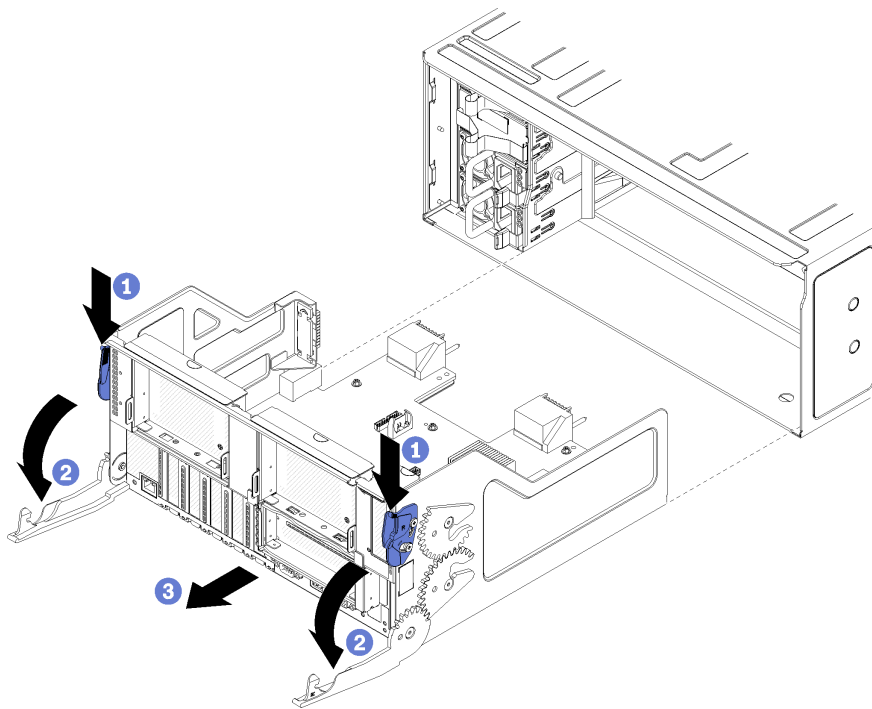


Figure 97. I/O tray removal

- Step 1. Press the button on each release lever; then, simultaneously rotate the release levers until they are perpendicular to the chassis.
- Step 2. Pull I/O tray out of the chassis.

After you remove the I/O tray:

- If you are instructed to return the I/O tray, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install the I/O tray

Install the I/O tray by inserting it in the rear of the chassis, pushing it in until it stops, and closing the release levers. If you are installing a new I/O tray as a maintenance replacement, you must transfer system identification information as part of the new I/O tray installation.

S002



CAUTION:

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



**Read the
Installation
Guidelines**

“ on page 56 “



**Power off
server and
disconnect all
power cords
for this task**

” on page 254

Before you install the I/O tray:

1. Make sure that all cables, adapters, and other components in the I/O tray are installed and seated correctly and that you have not left loose tools or parts inside the server.
2. Make sure that all internal cables are correctly routed. See [“Internal cable routing” on page 35](#).

Complete the following steps to install the I/O tray:

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

-  [YouTube](#)
-  [Youku](#)

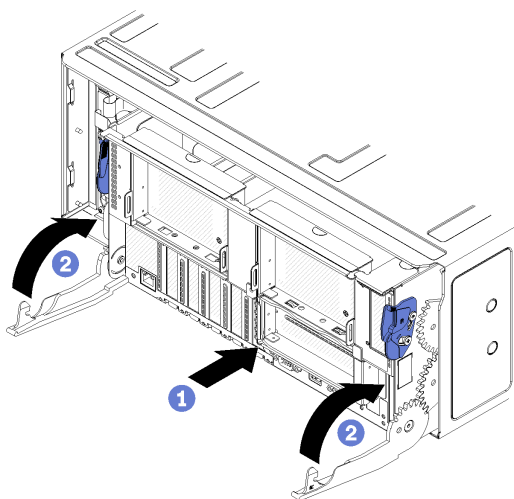


Figure 98. I/O tray installation

Attention: When inserting the I/O tray, do not hit any of the I/O tray connectors against the edge of the chassis.

- Step 1. Align the I/O tray with its opening in the rear of the chassis and insert. Position the tray toward the right side of the opening during insertion.
- Step 2. Fully open the I/O tray release levers and push the tray into the chassis until it stops.
- Step 3. Rotate the I/O tray release levers until they lock, fully closed.

After installing the I/O tray

- If you are done performing installation or maintenance procedures at the rear of the chassis, reconnect the cables. See [“Cable the server” on page 253](#).
- Update the machine type and serial number with new vital product data (VPD). Use the Lenovo XClarity Provisioning Manager to update the machine type and serial number. See [“Update the machine type and serial number” on page 337](#).
- Enable TPM/TCM. See [“Enable TPM/TCM” on page 338](#)
- Optionally, enable Secure Boot. See [“Enable UEFI Secure Boot” on page 342](#).

Update the machine type and serial number

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

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

- From Lenovo XClarity Provisioning Manager

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

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

- From Lenovo XClarity Essentials OneCLI

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

- Operate from the target system, such as LAN or keyboard console style (KCS) access
- Remote access to the target system (TCP/IP based)

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

1. Download and install Lenovo XClarity Essentials OneCLI.

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

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

2. Copy and unpack the OneCLI package, which also includes other required files, to the server. Make sure that you unpack the OneCLI and the required files to the same directory.
3. After you have Lenovo XClarity Essentials OneCLI in place, type the following commands to set the machine type and serial number:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]
```

```
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]
```

Where:

<m/t_model>

The server machine type and model number. Type *m t m xxxxyyy*, where *xxxx* is the machine type and *yyy* is the server model number.

<s/n>

The serial number on the server. Type *sn zzzzzzz*, where *zzzzzzz* is the serial number.

[access_method]

The access method that you select to use from the following methods:

- Online authenticated LAN access, type the command:

```
[--bmc-username xcc_user_id --bmc-password xcc_password]
```

Where:

xcc_user_id

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

xcc_password

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

Example commands are as follows:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --bmc-username xcc_user_id
--bmc-password xcc_password
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --bmc-username xcc_user_id
--bmc-password xcc_password
```

- Online KCS access (unauthenticated and user restricted):

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

Example commands are as follows:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
```

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

- Remote LAN access, type the command:

```
[--bmc xcc_user_id:xcc_password@xcc_external_ip]
```

Where:

xcc_external_ip

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

xcc_user_id

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

xcc_password

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

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

Example commands are as follows:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
--bmc xcc_user_id:xcc_password@xcc_external_ip
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
--bmc xcc_user_id:xcc_password@xcc_external_ip
```

4. Reset the Lenovo XClarity Controller to the factory defaults. See “Resetting the BMC to Factory Default” section in the XCC documentation compatible with your server at https://sysmgt.lenovofiles.com/help/topic/ixcc_frontend/ixcc_overview.html.

Enable TPM/TCM

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

Note: For customers in Chinese Mainland, TPM is not supported. However, customers in Chinese Mainland can install a Trusted Cryptographic Module (TCM) adapter (sometimes called a daughter card).

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

CAUTION:

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

Set the TPM policy

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

There are two methods available to set the TPM policy:

- From Lenovo XClarity Provisioning Manager

To set the TPM policy from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key according to the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface.
2. If the power-on Administrator password is required, enter the password.
3. From the System Summary page, click **Update VPD**.
4. Set the policy to one of the following settings.
 - **NationZ TPM 2.0 enabled - China only**. Customers in the Chinese Mainland should choose this setting if a NationZ TPM 2.0 adapter is installed.
 - **TPM enabled - ROW**. Customers outside of the Chinese Mainland should choose this setting.
 - **Permanently disabled**. Customers in the Chinese Mainland should use this setting if no TPM adapter is installed.

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

- From Lenovo XClarity Essentials OneCLI

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

To set the TPM policy from Lenovo XClarity Essentials OneCLI:

1. Read TpmTcmPolicyLock to check whether the TPM_TCM_POLICY has been locked:

```
OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>
```

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

2. Configure the TPM_TCM_POLICY into XCC:

- For customers in Chinese Mainland with no TPM, or customers that require to disable TPM:

```
OneCli.exe config set imm.TpmTcmPolicy "NeitherTpmNorTcm" --override --imm <userid>:<password>@<ip_address>
```

- For customers in Chinese Mainland that require to enable TPM:

```
OneCli.exe config set imm.TpmTcmPolicy "NationZTPM20Only" --override --imm <userid>:<password>@<ip_address>
```

- For customers outside Chinese Mainland that require to enable TPM:

```
OneCli.exe config set imm.TpmTcmPolicy "TpmOnly" --override --imm <userid>:<password>@<ip_address>
```

3. Issue reset command to reset system:

```
OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>
```

4. Read back the value to check whether the change has been accepted:

```
OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>
```

Notes:

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

imm.TpmTcmPolicy is defined as below:

- Value 0 use string "Undefined" , which means UNDEFINED policy.
- Value 1 use string "NeitherTpmNorTcm", which means TPM_PERM_DISABLED.
- Value 2 use string "TpmOnly", which means TPM_ALLOWED.
- Value 4 use string "NationZTPM20Only", which means NationZ_TPM20_ALLOWED.
- Below 4 steps must also be used to 'lock' the TPM_TCM_POLICY when using OneCli/ASU commands:

5. Read TpmTcmPolicyLock to check whether the TPM_TCM_POLICY has been locked , command as below:

```
OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>
```

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

6. Lock the TPM_TCM_POLICY:

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

7. Issue reset command to reset system, command as below:

```
OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>
```

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

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

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

8. Read back the value to check whether the 'Lock' is accepted or rejected. command as below:

```
OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>
```

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

imm.TpmTcmPolicyLock is defined as below:

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

Assert Physical Presence

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

There are two ways to assert the Physical Presence:

1. If the Physical Presence Policy is enabled, you can assert Physical Presence through the Lenovo XClarity Provisioning Manager or through the Lenovo XClarity Controller.
2. Switch the hardware jumpers on the system board.

Notes: If the Physical Presence Policy has been disabled:

1. Set the hardware Physical Presence jumper on the system board to assert Physical Presence.
2. Enable the Physical Presence Policy using either F1 (UEFI Settings) or Lenovo XClarity Essentials OneCLI.

Assert Physical Presence through the Lenovo XClarity Controller

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

1. Log in to the Lenovo XClarity Controller interface.

For information about logging in to the Lenovo XClarity Controller, see the “Opening and Using the XClarity Controller Web Interface” section in the XCC documentation version compatible with your server at https://sysmgmt.lenovofiles.com/help/topic/lxcc_frontend/lxcc_overview.html.

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

Set the TPM version

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

The Lenovo XClarity Provisioning Manager or the Lenovo XClarity Essentials OneCLI can be used to set the TPM version.

To set the TPM version:

1. Download and install Lenovo XClarity Essentials OneCLI.
 - a. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
 - b. Click **Drivers & Software**.
 - c. Navigate to the version of Lenovo XClarity Essentials OneCLI for your operating system and download the package.
2. Run the following command to set the TPM version:

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

To set the TPM version to version 2.0:`onecli.exe config set TrustedComputingGroup.DeviceOperation "Update to TPM2.0 compliant" --bmc userid:password@ip_address`

To set the TPM version to version 1.2:`onecli.exe config set TrustedComputingGroup.DeviceOperation "Update to TPM1.2 compliant" --bmc userid:password@ip_address`

where:

- `<userid>:<password>` are the credentials used to access the BMC (Lenovo XClarity Controller interface) of your server. The default user ID is USERID, and the default password is PASSWORD (zero, not an uppercase o)
- `<ip_address>` is the IP address of the BMC.

For more information about the Lenovo XClarity Essentials OneCLI `set` command, see:

http://sysmgmt.lenovofiles.com/help/topic/toolstr_cli_lenovo/onecli_r_set_command.html

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

To set the TPM version to version 2.0:`asu64 set TPMVersion.TPMVersion "Update to TPM2.0 compliant" --host <ip_address> --user <userid> --password <password> --override`

To set the TPM version to version 1.2:`asu64 set TPMVersion.TPMVersion "Update to TPM1.2 compliant" --host <ip_address> --user <userid> --password <password> --override`

where:

- `<userid>` and `<password>` are the credentials used to the BMC (Lenovo XClarity Controller interface) of your server. The default user ID is USERID, and the default password is PASSWORD (zero, not an uppercase o)
- `<ip_address>` is the IP address of the BMC.

Enable UEFI Secure Boot

Optionally, you can enable UEFI Secure Boot.

There are two methods available to enable UEFI Secure Boot:

- From Lenovo XClarity Provisioning Manager

To enable UEFI Secure Boot from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key specified in the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://sysmgt.lenovofiles.com/help/topic/lxpm_frontend/lxpm_product_page.html.)
2. If the power-on Administrator password is required, enter the password.
3. From the UEFI Setup page, click **System Settings** → **Security** → **Secure Boot**.
4. Enable Secure Boot and save the settings.

- From Lenovo XClarity Essentials OneCLI

To enable UEFI Secure Boot from Lenovo XClarity Essentials OneCLI:

1. Download and install Lenovo XClarity Essentials OneCLI.

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

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

2. Run the following command to enable Secure Boot:

```
OneCli.exe config set SecureBootConfiguration.SecureBootSetting Enabled
--bmc <userid>:<password>@<ip_address>
```

where:

- `<userid>:<password>` are the credentials used to access the BMC (Lenovo XClarity Controller interface) of your server. The default user ID is USERID, and the default password is PASSWORD (zero, not an uppercase o)
- `<ip_address>` is the IP address of the BMC.

For more information about the Lenovo XClarity Essentials OneCLI `set` command, see:

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

M.2 backplane replacement

The M.2 backplane is in the I/O tray that is accessed from the rear of the server.

Remove the M.2 backplane

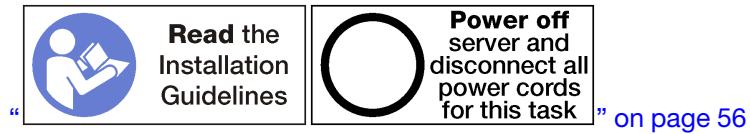
The M.2 backplane is in the I/O tray that is accessed from the rear of the server. After removing the I/O tray and one of the risers to gain access to the M.2 backplane, lift and remove the M.2 backplane from the I/O tray.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove the M.2 backplane:

1. Disconnect and label all cables connected to adapters in the I/O tray; then, remove the I/O tray. See [“Remove the I/O tray” on page 334](#).
2. Remove the riser for slot 10 to 15 (riser 2) or the riser for slot 16 to 17 to access the M.2 backplane. See [“Remove the riser for slot 10 to 15 \(riser 2\)” on page 359](#) or [“Remove the riser for slot 16 to 17 \(riser 3\)” on page 362](#).

Complete the following steps to remove the M.2 backplane.

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

-  [YouTube](#)
-  [Youku](#)

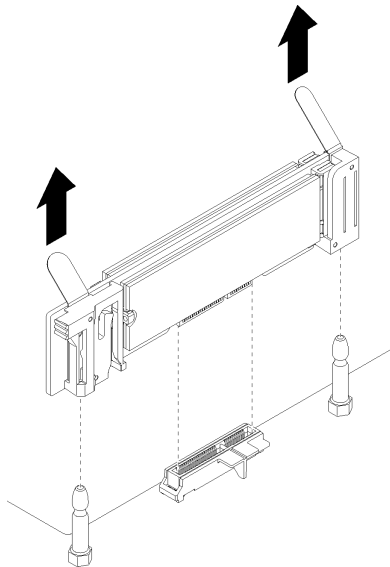


Figure 99. M.2 backplane removal

Step 1. Remove the M.2 backplane from the system board by pulling up on both ends of the backplane at the same time.

Note: Pull the M.2 backplane straight up when removing it from the system board.

After you remove the M.2 backplane:

- If you are replacing the M.2 backplane, remove any M.2 drives installed in the backplane. See [“Remove an M.2 drive” on page 346](#).
- If you are removing the M.2 backplane and are not installing a replacement:
 1. Install the riser that you removed to access the M.2 backplane. See [“Install the riser for slot 10 to 15 \(riser 2\)” on page 365](#) or [“Install the riser for slot 16 to 17 \(riser 3\)” on page 368](#).
 2. Install the I/O tray and connect all cables. See [“Install the I/O tray” on page 335](#).

If you are instructed to return the M.2 backplane, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install the M.2 backplane

The M.2 backplane is in the I/O tray that is accessed from the rear of the server. After removing the I/O tray and one of the risers to gain access to the M.2 backplane, install the M.2 drives in the backplane; then, insert the backplane in the I/O tray and press it in place.

S002



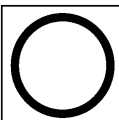
CAUTION:

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



**Read the
Installation
Guidelines**

” on page 56 “



**Power off
server and
disconnect all
power cords
for this task**

” on page 254

Before you install the M.2 backplane, install the M.2 drives. See [“Install an M.2 drive” on page 347](#).

Complete the following steps to install the M.2 backplane.

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

-  [YouTube](#)
-  [Youku](#)

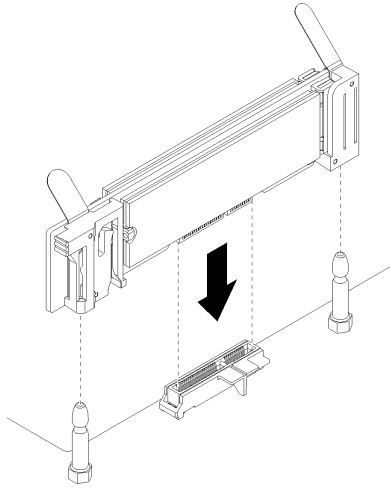


Figure 100. M.2 backplane installation

- Step 1. Align the openings in the plastic supports at each end of the M.2 backplane with the guide pins on the system board; then, insert the backplane in the system-board connector.
- Step 2. Press down on the M.2 backplane to fully seat it.

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

1. Install the riser that you removed to access the M.2 backplane. See [“Install the riser for slot 10 to 15 \(riser 2\)” on page 365](#) or [“Install the riser for slot 16 to 17 \(riser 3\)” on page 368](#).
2. Install the I/O tray and connect all cables. See [“Install the I/O tray” on page 335](#).
3. See the documentation that comes with the M.2 backplane for device-driver and configuration information to complete the installation.

M.2 backplane retainer adjustment

The M.2 backplane retainer can be adjusted to accommodate three physical M.2 drive sizes.

Complete the following steps to adjust the M.2 backplane retainer position:

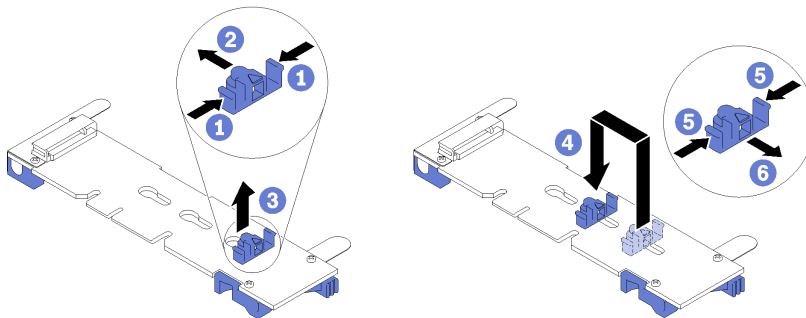


Figure 101. M.2 backplane retainer adjustment

- Step 1. Locate the correct keyhole to accommodate the retainer for the size of the M.2 drive that you are installing.
- Step 2. Press both sides of the retainer and move it toward the connector until it is in the large opening of the keyhole; then, remove the retainer from the backplane.

Step 3. Insert the retainer into the keyhole that matches the size of your M.2 drive; then, and slide it back until the retainer locking nubs are in the holes.

M.2 drive replacement

M.2 drives are in the I/O tray that is accessed from the rear of the server.

Remove an M.2 drive

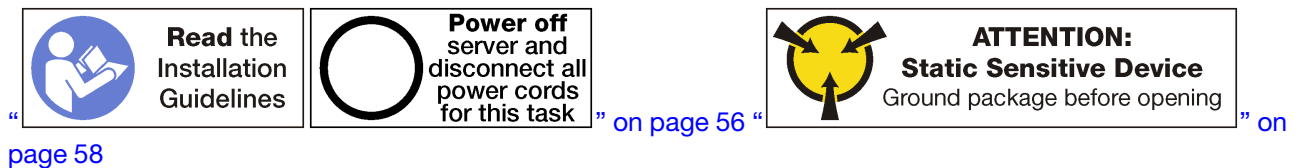
The M.2 drive is in the I/O tray that is accessed from the rear of the server. After removing the I/O tray and the M.2 backplane, slide open the drive retainer and rotate the M.2 drive from the backplane.

S002



CAUTION:

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



Before you remove an M.2 drive:

1. Disconnect and label all cables connected to adapters in the I/O tray; then, remove the I/O tray. See [“Remove the I/O tray” on page 334](#).
2. Remove the riser for slot 10 to 15 (riser 2) or the riser for slot 16 to 17 to access the M.2 backplane. See [“Remove the riser for slot 10 to 15 \(riser 2\)” on page 359](#) or [“Remove the riser for slot 16 to 17 \(riser 3\)” on page 362](#).
3. Remove the M.2 backplane from your system. See [“Remove the M.2 backplane” on page 342](#).

Complete the following steps to remove an M.2 drive.

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

-  [YouTube](#)
-  [Youku](#)

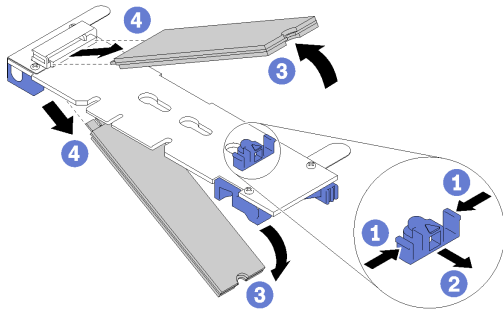


Figure 102. M.2 drive removal

- Step 1. Press both sides of the drive retainer and slide it away from the connector to release the M.2 drive. If your backplane has two M.2 drives, both will release when you slide the retainer.
- Step 2. Rotate the M.2 drive up from the backplane and pull it away from the connector.

After removing the M.2 drive, if you are removing the M.2 backplane and drives and not installing a replacement:

1. Install the riser that you removed to access the M.2 backplane. See [“Install the riser for slot 10 to 15 \(riser 2\)” on page 365](#) or [“Install the riser for slot 16 to 17 \(riser 3\)” on page 368](#).
2. Install the I/O tray and connect all cables. See [“Install the I/O tray” on page 335](#).

If you are instructed to return an M.2 drive, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install an M.2 drive

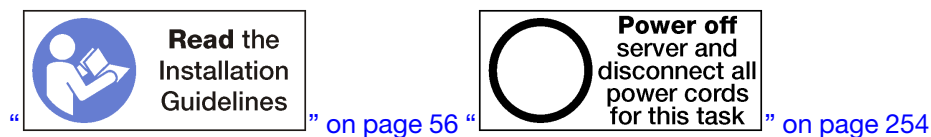
The M.2 drives are in the I/O tray that is accessed from the rear of the server. After removing the I/O tray and the M.2 backplane, insert the M.2 drives in the backplane and lock them in place with the drive retainer.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you install an M.2 drive, make sure that the retainer on the M.2 backplane is in the correct keyhole to accommodate the size of the M.2 drive you are installing. See “M.2 backplane retainer adjustment” on page 345.

Complete the following steps to install an M.2 drive in the M.2 backplane.

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

-  [YouTube](#)
-  [Youku](#)

 **ATTENTION:**
Static Sensitive Device
Ground package before opening” on page 58

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

Step 2. Insert the M.2 drive.

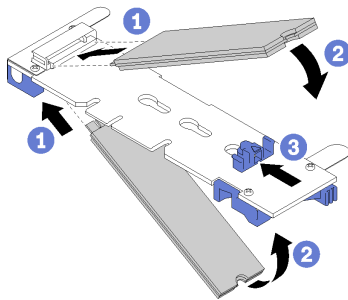


Figure 103. Inserting the M.2 drives

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

Notes:

- When installing two drives, align and support both drives before sliding the retainer forward to secure the drives.
- When only one drive is installed, it must be in slot 0.

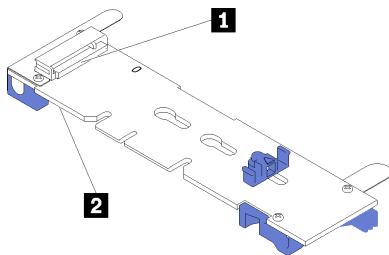


Figure 104. M.2 drive slots

Table 233. M.2 drive slots

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

Step 3. Secure the M.2 drives in the backplane.

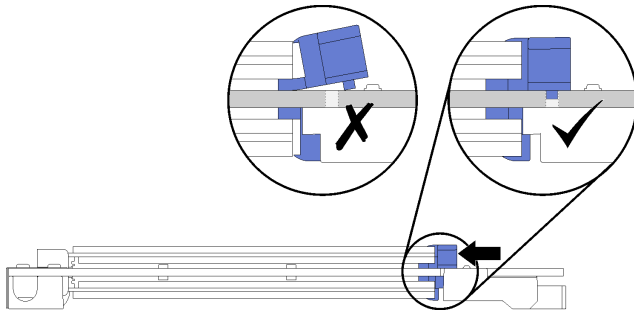


Figure 105. Securing the M.2 drives

Attention: Make sure the two nubs on the retainer are in the small holes on the M.2 backplane when the retainer is slid forward.

Slide the retainer forward (toward the connector) until you hear a soft “click” sound.

After installing an M.2 drive:



1. Install the M.2 backplane. See [“Install the M.2 backplane” on page 344](#).
2. Install the riser that you removed to access the M.2 backplane. See [“Install the riser for slot 10 to 15 \(riser 2\)” on page 365](#) or [“Install the riser for slot 16 to 17 \(riser 3\)” on page 368](#).
3. Install the I/O tray and connect all cables. See [“Install the I/O tray” on page 335](#).

Memory air baffle replacement


Use the following procedures to replace a memory air baffle.

Remove a memory baffle

Memory air baffles are in the system boards that are accessed from the front of the server.

 Read the Installation Guidelines	 Power off server and disconnect all power cords for this task
---	--

“ on page 56 “ on page 254 “

 ATTENTION: Static Sensitive Device Ground package before opening
--

” on page 58

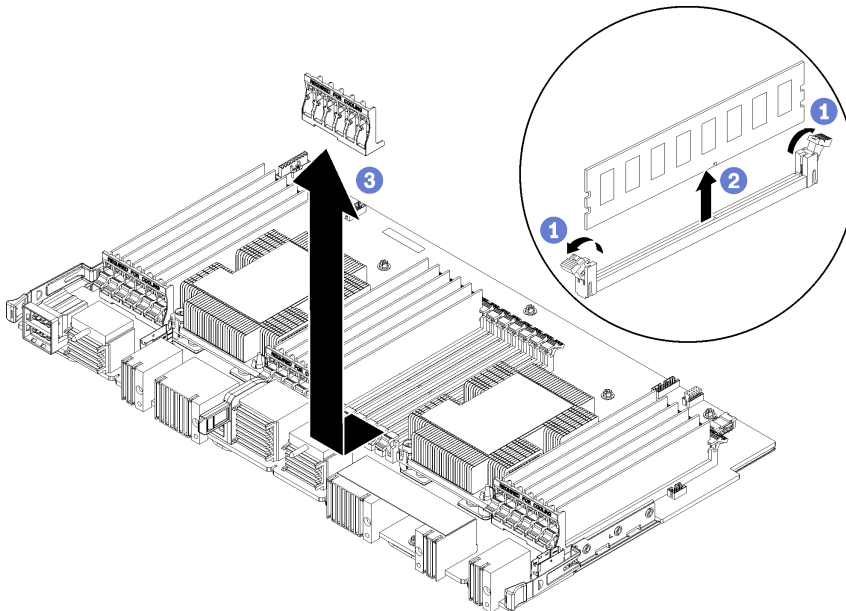
Before you remove a memory air baffle:

1. Remove the front cover. See [“Remove the front cover” on page 322.](#)
2. Remove the compute tray where the system board and memory air baffles are installed. See [“Remove a compute tray” on page 305.](#)
3. If you are removing a memory air baffle from the lower compute system board, remove the upper system board or system board filler. See [“Remove a system board” on page 309.](#)

Complete the following steps to remove a memory air baffle.

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

-  [YouTube](#)
-  [Youku](#)



Note: Each memory air baffle spans six memory modules.

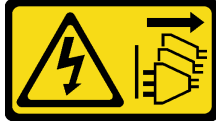
- Step 1. Open the six pairs of memory module connector retaining clips that span the memory air baffle.
- Step 2. Slide the memory air baffle up and off of the memory module connector retaining clips; then, remove the air baffle from the compute system board.

If you are instructed to return the memory air baffle, follow all packaging instructions and use any packaging materials that are provided.

Install a memory air baffle


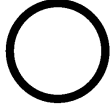

Memory air baffles are in the system boards that are accessed from the front of the server.

S002



CAUTION:

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

 Read the Installation Guidelines	 Power off server and disconnect all power cords for this task
“ on page 56 “	
 ATTENTION: Static Sensitive Device Ground package before opening	
” on page 58	

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Complete the following steps to install a memory air baffle:

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

-  [YouTube](#)
-  [Youku](#)

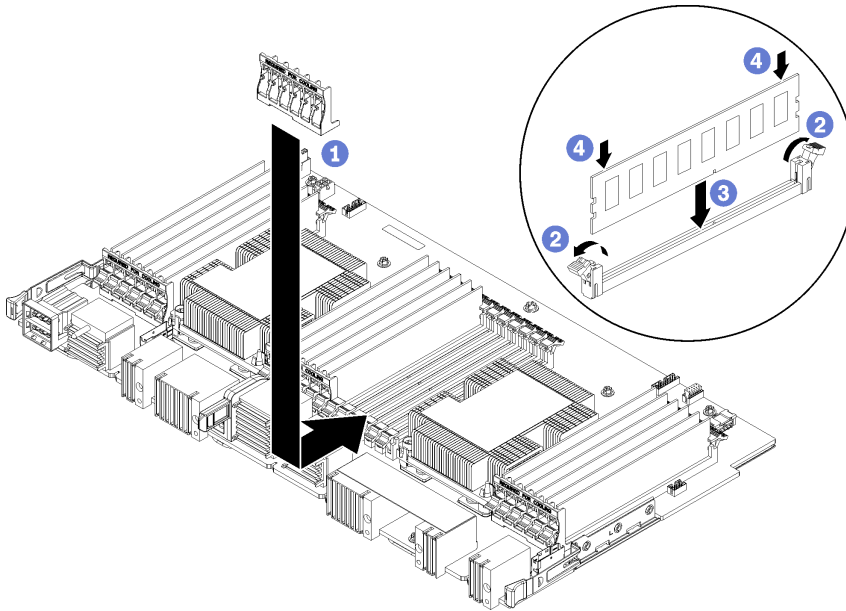


Figure 106. Memory baffle installation

Attention: To prevent damage to memory modules and memory module sockets, you must open the retaining clips at both ends of each memory module.

Note: Each memory air baffle spans six memory modules.

- Step 1. Make sure that all six pairs of memory module connector retaining clips spanning the memory air baffle are open.
- Step 2. Hold the memory air baffle so the “REQUIRED FOR COOLING” text on the baffle is right-side up and facing away from the memory modules; then, slide the lower half of the slots in the air baffle over the memory module connector retaining clips.
- Step 3. Slide the air baffle up and over the memory module retaining clips until the air baffle is positioned on the surface of the compute system board.
- Step 4. Make sure that each memory module aligns with its connector; then, seat each memory module. See [“Install a memory module” on page 355](#) for more information.

Note: Make sure that all memory module connector retaining clips spanning the memory air baffle are closed, even if a memory module is not installed in the connector.

- Step 5. After installing each memory baffle, make sure that it is secure by attempting to lift and remove it. Installation of the air baffle was performed correctly if the air baffle remains in place.
- Step 6. If you are installing additional memory air baffles, do so now.

After you install a memory air baffle:

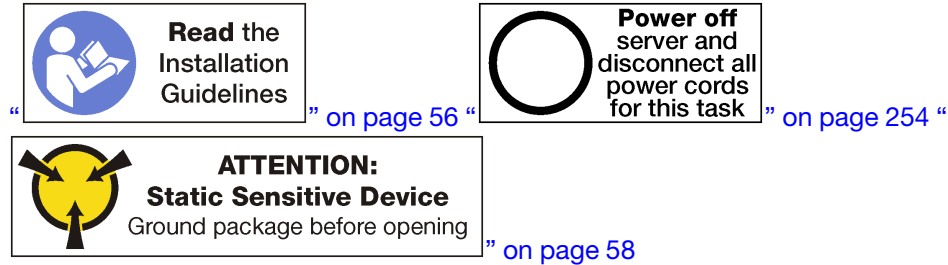
1. Install the upper system board or system board filler, if it was removed. See [“Install a system board” on page 310](#).
2. Install the compute tray where the system board is installed. See [“Install a compute tray” on page 307](#).
3. Install the front cover. See [“Install the front cover” on page 322](#)

Memory module replacement

Use the following procedures to replace a memory module.

Remove a memory module

Memory modules are in the 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 58](#):

- 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.

Note: The same procedure is used to remove memory modules and memory module fillers.

Before you remove a memory module:

1. If you are removing a DCPMM in App Direct or Mixed memory mode, make sure to back up the stored data, and delete any created namespace.
2. Remove the front cover. See [“Remove the front cover” on page 322](#).
3. Remove the compute tray where the system board and memory module are installed. See [“Remove a compute tray” on page 305](#).
4. If you are removing a memory module from the lower compute system board, remove the upper system board or system board filler. See [“Remove a system board” on page 309](#).

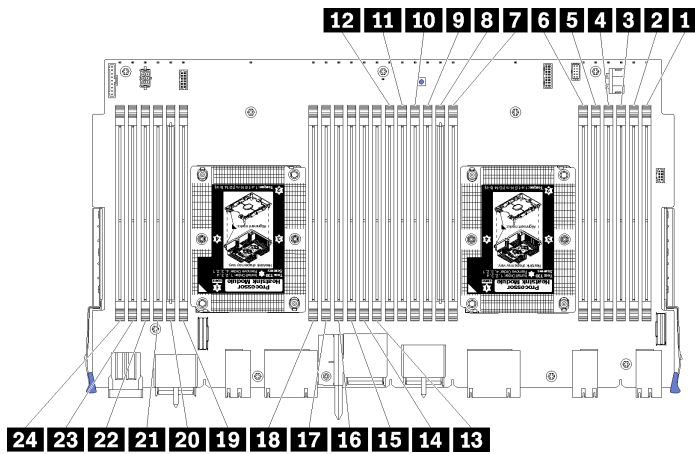
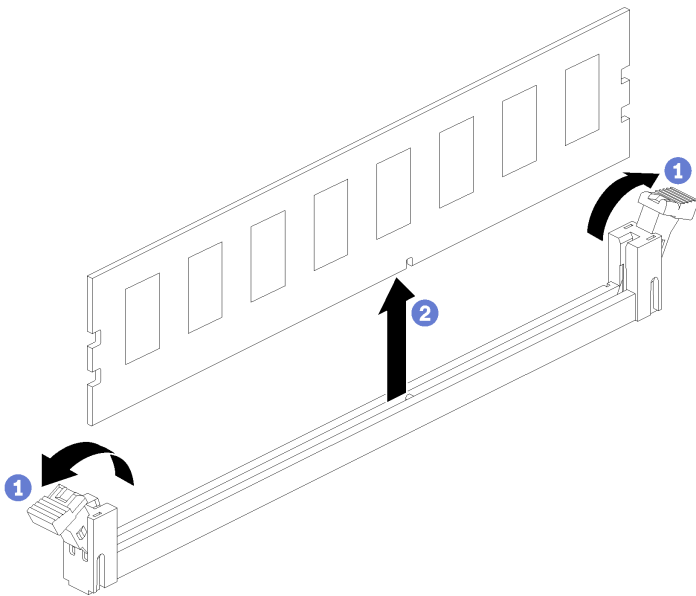


Figure 107. Memory module locations

Complete the following steps to remove a memory module.

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

-  [YouTube](#)
-  [Youku](#)



Step 1. Open the memory module connector retaining clips to extract the memory module; then, remove the memory module.

If you are not replacing the memory module that you removed:

1. See the *ThinkSystem SR950 Memory Population Reference* for the required installation order of the remaining memory modules.
2. Install a memory module filler, that was originally provided with the PHM option, in any vacant memory module connectors.
3. Install the upper system board or system board filler, if it was removed. See [“Install a system board” on page 310](#).
4. Install the compute tray where the system board is installed. See [“Install a compute tray” on page 307](#).

5. Install the front cover. See [“Install the front cover” on page 322](#)

If you are instructed to return the memory module, follow all packaging instructions and use any packaging materials that are provided.

Install a memory module

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


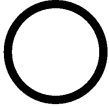
S002




CAUTION:

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

See [“Memory module installation rules and order” on page 58](#) for detailed information about memory configuration and setup.

“  **Read the Installation Guidelines** ” on page 56 “  **Power off server and disconnect all power cords for this task** ” on page 254 “

 **ATTENTION: Static Sensitive Device**
Ground package before opening ” on page 58

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Note: The same procedure is used to install memory modules and memory module fillers.

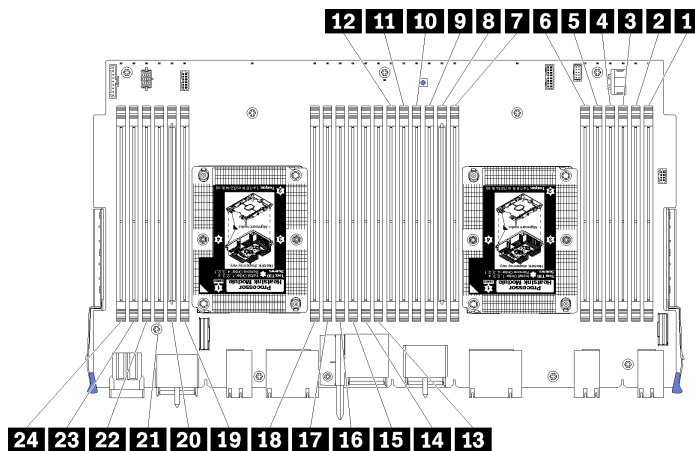


Figure 108. Memory module locations

Table 234. Memory module locations on each system board

DIMM number	System board 1 (lower board, lower tray) DIMM number	System board 2 (upper board, lower tray) DIMM number	System board 3 (lower board, upper tray) DIMM number	System board 4 (upper board, upper tray) DIMM number
1	1	25	49	73
2	2	26	50	74
3	3	27	51	75
4	4	28	52	76
5	5	29	53	77
6	6	30	54	78
7	7	31	55	79
8	8	32	56	80
9	9	33	57	81
10	10	34	58	82
11	11	35	59	83
12	12	36	60	84
13	13	37	61	85
14	14	38	62	86
15	15	39	63	87
16	16	40	64	88
17	17	41	65	89
18	18	42	66	90
19	19	43	67	91
20	20	44	68	92
21	21	45	69	93
22	22	46	70	94
23	23	47	71	95
24	24	48	72	96

Complete the following steps to install a memory module:

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

-  [YouTube](#)
-  [Youku](#)

 **ATTENTION:**
Static Sensitive Device
 Ground package before opening” [on page 58](#)

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 58:](#)

- 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.

Step 1. Install the memory module.

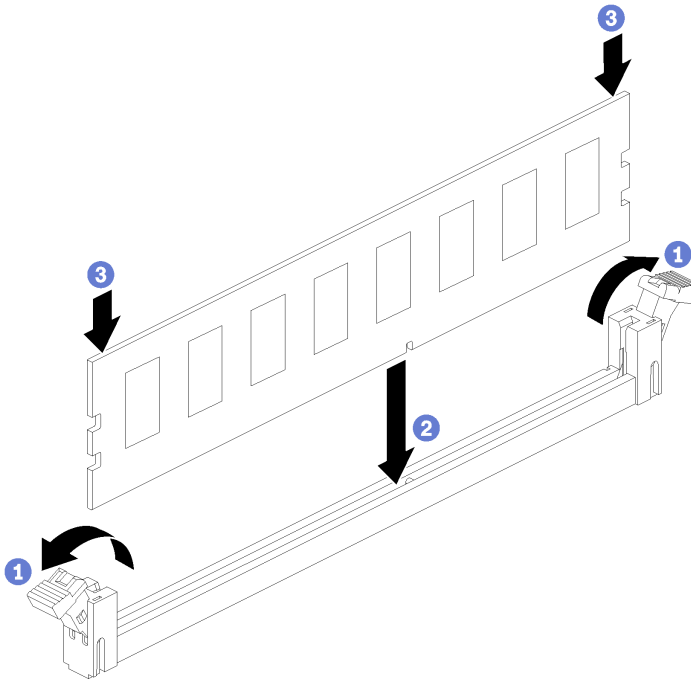


Figure 109. Memory module installation

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

Step 2. If you are installing additional memory modules, do so now.

After you install a memory module:

- Install the upper system board or system board filler, if it was removed. See [“Install a system board” on page 310](#).
- Install the compute tray where the system board is installed. See [“Install a compute tray” on page 307](#).
- Install the front cover. See [“Install the front cover” on page 322](#)
- Power on the system.
- If you have installed a DCPMM:
 - Update the system firmware to the latest version (see https://thinksystem.lenovofiles.com/help/topic/7X12/maintenance_manual_firmware_updates.html).
 - Make sure that the firmware on all of the DCPMM units is the latest version. If not, update it to the latest version (see https://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/update_fw.html).

- c. Configure DCPMMs and DRAM DIMMs (see [“Configure DC Persistent Memory Module \(DCPMM\)” on page 261](#)).
- d. Restore the data that have been backed up if necessary.

Riser replacement

Risers are in the I/O tray that is accessed from the rear of the server. The removal and installation procedures for each riser type are different and are described in the following topics:

- Riser for slot 1 to 4 (riser 1): see [“Remove the riser for slot 1 to 4 \(riser 1\)” on page 358](#) and [“Install the riser for slot 1 to 4 \(riser 1\)” on page 364](#)

Note: There is no riser for slot 5 to 7, the ML2 x16 network adapter (slot 8), and the LOM adapter (slot 9); these adapters install directly in the I/O tray.

- Riser for slot 10 to 15 (riser 2): see [“Remove the riser for slot 10 to 15 \(riser 2\)” on page 359](#) and [“Install the riser for slot 10 to 15 \(riser 2\)” on page 365](#)

Riser bracket for slot 14 to 15 (riser 2): see [“Remove the riser bracket for slot 14 to 15 \(riser 2\)” on page 361](#) and [“Install the riser bracket for slot 14 to 15 \(riser 2\)” on page 367](#)

- Riser for slot 16 and 17 (riser 3): see [“Remove the riser for slot 16 to 17 \(riser 3\)” on page 362](#) and [“Install the riser for slot 16 to 17 \(riser 3\)” on page 368](#)

Remove the riser for slot 1 to 4 (riser 1)

The riser for adapter slot 1 to 4 (riser 1) is in the I/O tray that is accessed from the rear of the server. After removing the I/O tray, loosen the two captive screws that secure the riser to the I/O tray; then, remove the riser from the I/O tray.

S002



CAUTION:

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



**Read the
Installation
Guidelines**

” on page 56 “



**Power off
server and
disconnect all
power cords
for this task**

” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove the riser for slot 1 to 4, disconnect and label all cables connected to adapters in the I/O tray; then, remove the I/O tray. See [“Remove the I/O tray” on page 334](#).

Complete the following steps to remove the riser for slot 1 to 4 (riser 1).

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

-  YouTube
-  Youku

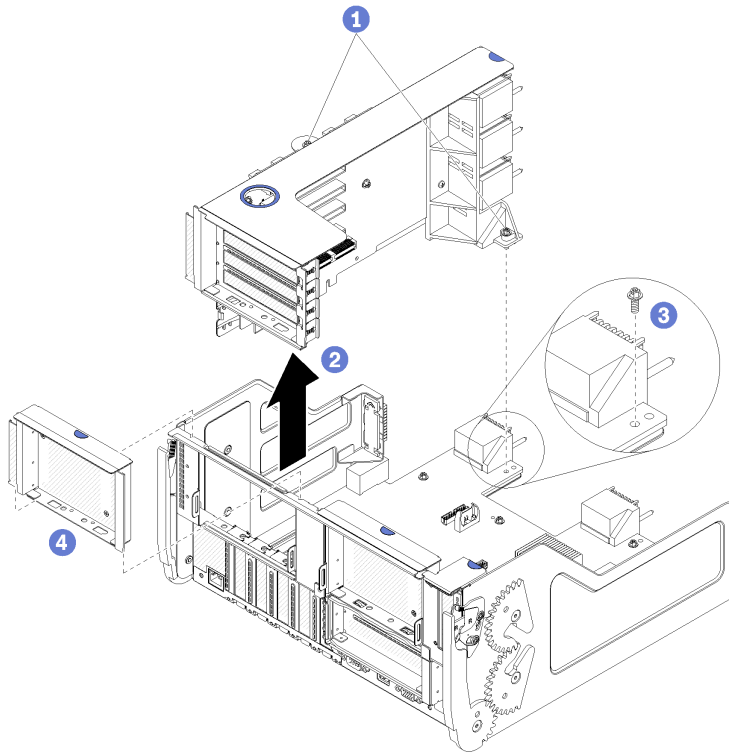


Figure 110. Riser for slot 1 to 4 (riser 1) removal

- Step 1. Loosen the two captive screws (items 1 in preceding figure) that secure the riser to the I/O tray board.
- Step 2. Lift the riser up and out of the I/O tray.

After you remove the riser:

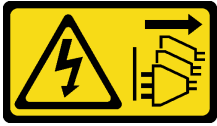
- If you are removing the riser and are not installing a replacement:
 1. Install the screw that secures the I/O tray board to the I/O tray (item 3 in the figure). This screw replaces the captive screw on the rear edge of the riser below the midplane connectors. Screw location is labelled “Remove screw before installing riser” on the I/O board.
 2. Install the I/O tray fillers in adapter slot 1 to 4 (item 4 in the figure).

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

Remove the riser for slot 10 to 15 (riser 2)

The riser for adapter slot 10 to 15 (riser 2) is in the I/O tray that is accessed from the rear of the server. After removing the I/O tray, loosen the two captive screws that secure the riser to the I/O tray; then, remove the riser from the I/O tray.

S002



CAUTION:

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

S002



CAUTION:

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



**Read the
Installation
Guidelines**

“ on page 56 “



**Power off
server and
disconnect all
power cords
for this task**

” on page 254

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove the riser for slot 10 to 15, disconnect and label all cables connected to adapters in the I/O tray; then, remove the I/O tray. See [“Remove the I/O tray” on page 334](#).

Complete the following steps to remove the riser for slot 10 to 15 (riser 2).

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

-  [YouTube](#)
-  [Youku](#)

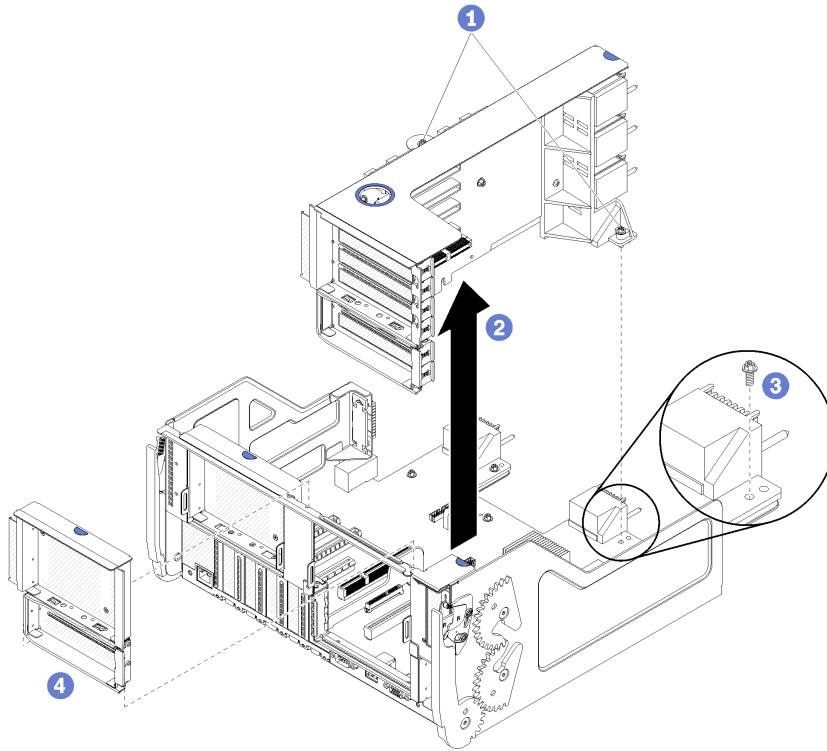


Figure 111. Riser for slot 10 to 15 (riser 2) removal

- Step 1. Loosen the two captive screws (items 1 in preceding figure) that secure the riser to the I/O tray board.
- Step 2. Lift the riser up and out of the I/O tray.

After you remove the riser:

- If you are removing the riser and are not installing a replacement:
 1. Install the screw that secures the I/O tray board to the I/O tray (item 3 in the figure). This screw replaces the captive screw on the rear edge of the riser below the midplane connectors. Screw location is labelled “Remove screw before installing riser” on the I/O board.
 2. Install the I/O tray fillers in adapter slot 10 to 15 (item 4 in the figure).

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

Remove the riser bracket for slot 14 to 15 (riser 2)

The riser bracket for slot 14 to 15 is attached to the slot 10 to 15 I/O tray riser that is accessed from the rear of the server. After removing the I/O tray and the riser for slot 10 to 15 (riser 2), release the retaining clips and remove the bracket from the riser.

S002



CAUTION:

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



**Read the
Installation
Guidelines**



**Power off
server and
disconnect all
power cords
for this task**

“ on page 56 “ on page 254 ”

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove the riser bracket:

1. Disconnect and label all cables connected to adapters in the I/O tray; then, remove the I/O tray. See [“Remove the I/O tray” on page 334.](#)
2. Remove the riser for slot 10 to 15 (riser 2). See [“Remove the riser for slot 10 to 15 \(riser 2\)” on page 359.](#)
3. Remove any adapters that are installed in slots 14 or 15. See [“Remove a PCIe adapter from slot 10 to 15” on page 296.](#)

Complete the following steps to remove the riser bracket.

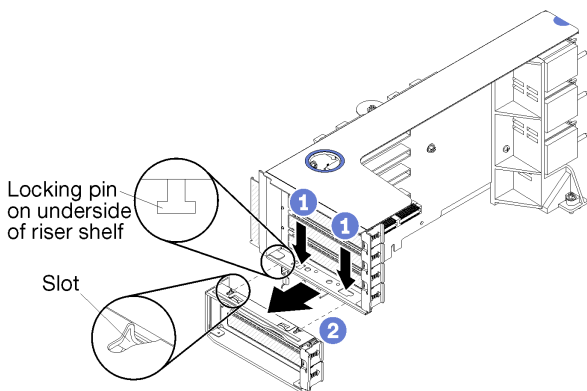


Figure 112. Riser bracket removal (slot 14 to 15)

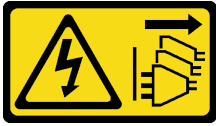
- Step 1. Open the retaining clips.
- Step 2. Slide the bracket from the riser.

After you remove the riser bracket:

Remove the riser for slot 16 to 17 (riser 3)

The riser for adapter slot 16 to 17 is in the I/O tray that is accessed from the rear of the server. After removing the I/O tray, loosen the captive screw that secures the riser to the I/O tray; then, remove the riser from the I/O tray.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove the riser for slot 16 to 17, disconnect and label all cables connected to adapters in the I/O tray; then, remove the I/O tray. See [“Remove the I/O tray” on page 334](#).

Complete the following steps to remove the riser for slot 16 to 17.

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

- [YouTube](#)
- [Youku](#)

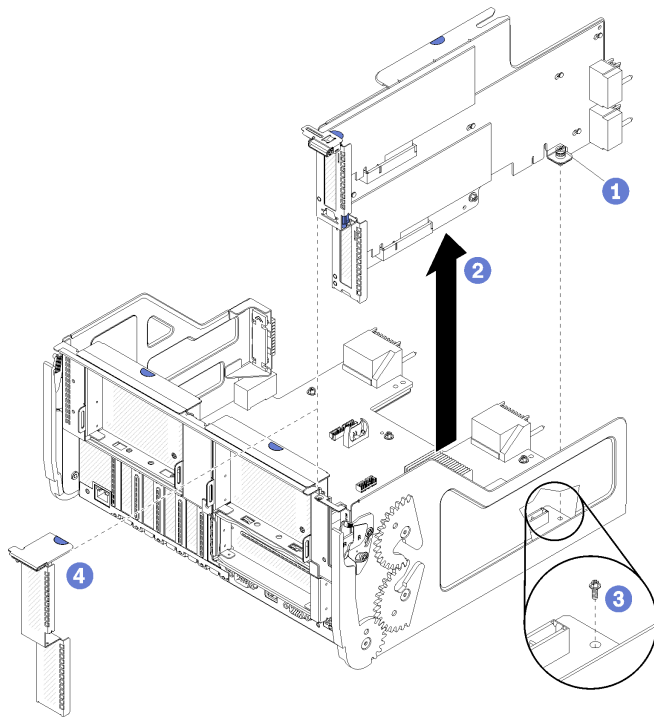


Figure 113. Riser for slot 16 to 17 removal

Step 1. Loosen the captive screw (item 1 in preceding figure) that secures the riser to the I/O tray board.

Step 2. Lift the riser up and out of the I/O tray.

After you remove the riser:

- If you are removing the riser and are not installing a replacement:
 1. Install the screw that secures the I/O tray board to the I/O tray (item 3 in the figure). This screw replaces the captive screw on the rear edge of the riser below the midplane connectors. Screw location is labelled “Remove screw before installing riser” on the I/O board.
 2. Install the I/O tray fillers in adapter slot 16 to 17 (item 4 in the figure).

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

Install the riser for slot 1 to 4 (riser 1)

The riser for adapter slot 1 to 4 (riser 1) is in the I/O tray that is accessed from the rear of the server. After installing adapters in the riser, insert the riser in the I/O tray and secure it with two captive screws.

S002



CAUTION:

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



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power cords
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” on page 254

Before you install the riser for slot 1 to 4:

1. Make sure that there is no screw (item 2 in following figure) securing the I/O tray board to the I/O tray in a location where a captive riser screw will be installed.
2. Make sure that there are no I/O tray fillers installed in riser slot 1 to 4.
3. Install adapters in the riser. See “[Install a PCIe adapter in slot 1 to 4](#)” on page 299.
4. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.

Complete the following steps to install the riser for slot 1 to 4.

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

-  [YouTube](#)
-  [Youku](#)

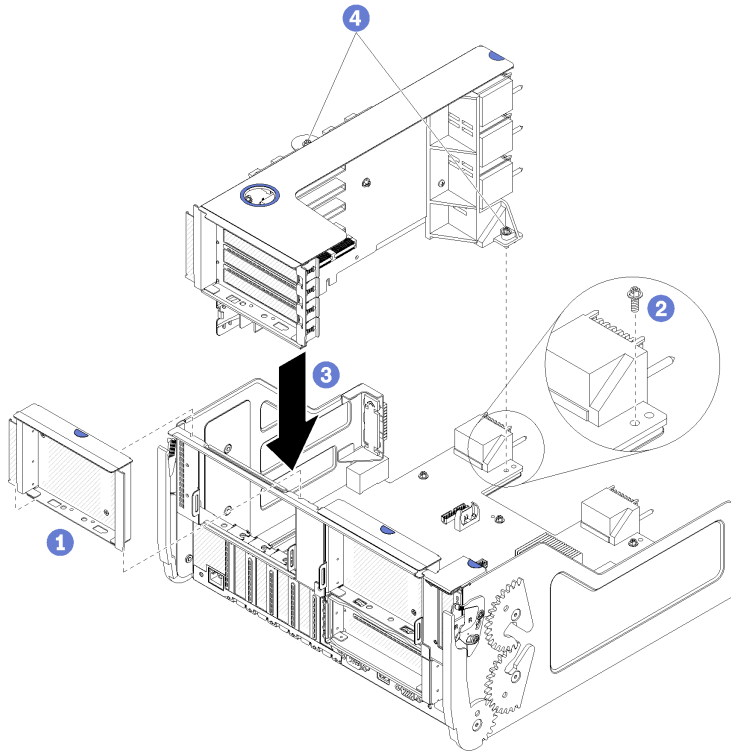


Figure 114. Riser for slot 1 to 4 (riser 1) installation

- Step 1. Align the riser with the I/O tray and insert it; then, press the riser into the I/O tray until the connector is fully seated.
- Step 2. Tighten the two captive screws (items 4 in preceding figure) that secure the riser to the I/O tray board.

If you have no other operations to perform on the I/O tray after installing the riser for slot 1 to 4, install the I/O tray in the chassis and connect all cables. See [“Install the I/O tray” on page 335](#).

Install the riser for slot 10 to 15 (riser 2)

The riser for adapter slot 10 to 15 (riser 2) is in the I/O tray that is accessed from the rear of the server. After installing adapters in the riser, insert the riser in the I/O tray and secure it with two captive screws.

S002



CAUTION:

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



**Read the
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**Power off
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disconnect all
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Before you install the riser for slot 10 to 15:

1. Make sure that there is no screw (item 2 in following figure) securing the I/O tray board to the I/O tray in a location where a captive riser screw will be installed.
2. Make sure that there are no I/O tray fillers installed in riser slot 10 to 15.
3. Install the slot 14 to 15 bracket, if one was removed from the old riser. See “[Install the riser bracket for slot 14 to 15 \(riser 2\)](#)” on page 367.
4. Install adapters in the riser. See “[Install a PCIe adapter in slot 10 to 15](#)” on page 302.
5. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.

Complete the following steps to install the riser for slot 10 to 15.

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

- [YouTube](#)
- [Youku](#)

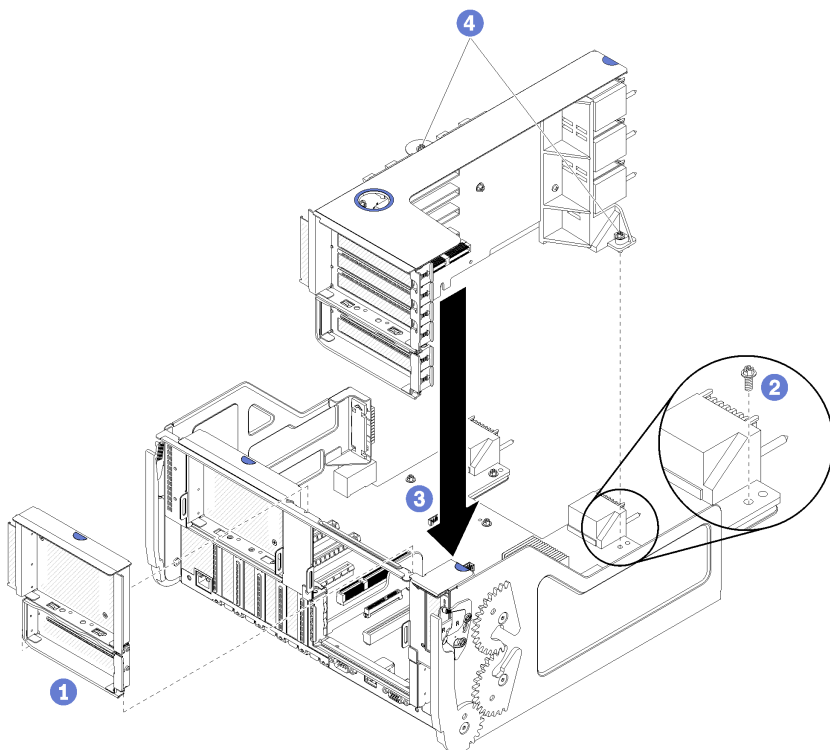


Figure 115. Riser for slot 10 to 15 (riser 2) installation

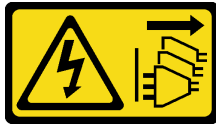
- Step 1. Align the riser with the I/O tray and insert it; then, press the riser into the I/O tray until the connector is fully seated.
- Step 2. Tighten the two captive screws (items 4 in preceding figure) that secure the riser to the I/O tray board.

If you have no other operations to perform on the I/O tray after installing the riser for slot 10 to 15, install the I/O tray in the chassis and connect all cables. See [“Install the I/O tray” on page 335](#).

Install the riser bracket for slot 14 to 15 (riser 2)

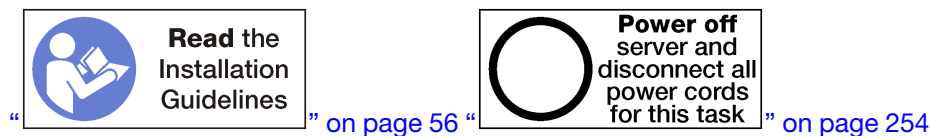
The riser bracket for slot 14 to 15 is attached to the slot 10 to 15 I/O tray riser that is accessed from the rear of the server. After removing the I/O tray and the riser for slot 10 to 15 (riser 2), slide the bracket onto the riser until the retaining clips engage.

S002



CAUTION:

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



Before you install the riser bracket, make sure that there is no filler installed on the I/O tray for slot 14 to 15.

Complete the following steps to install the riser bracket.

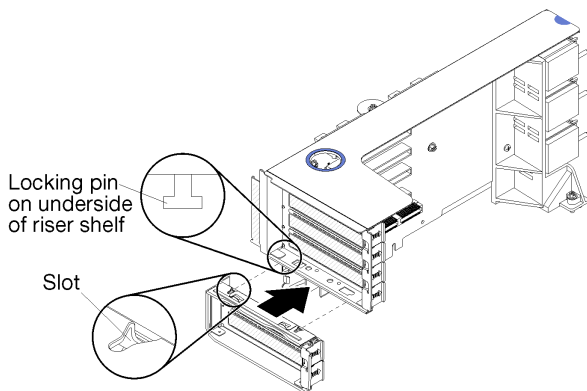


Figure 116. Riser bracket installation (slot 14 to 15)

Step 1. Align the slots on the riser bracket with the pins on the riser and slide it in place; then, press the bracket onto the riser until the retaining clips engage.

If you have no other operations to perform on the riser after installing an adapter in slot 10 to 15:

1. Install adapters in the riser. See [“Install a PCIe adapter in slot 10 to 15” on page 302](#).
2. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.
3. Install the riser in the I/O tray. See [“Install the riser for slot 10 to 15 \(riser 2\)” on page 365](#).

4. Install the I/O tray in the chassis and connect all cables. See [“Install the I/O tray” on page 335](#).

Install the riser for slot 16 to 17 (riser 3)

The riser for adapter slot 16 to 17 is in the I/O tray that is accessed from the rear of the server. After installing adapters in the riser, insert the riser in the I/O tray and secure it with the captive screw.

S002



CAUTION:

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



**Read the
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Attention: Do *not* use the riser for slot 16 to 17 with four socket storage rich configurations.

Before you install the riser for slot 16 to 17:

1. Make sure that there is no screw (item 2 in following figure) securing the I/O tray board to the I/O tray in a location where a captive riser screw will be installed.
2. Make sure that there are no I/O tray fillers installed in adapter slot 16 to 17.
3. Install adapters in the riser. See [“Install an I/O adapter in slot 16 to 17” on page 304](#).
4. If any of the adapters in the riser have internal cables, make sure that they are connected before installing the riser in the I/O tray.

Complete the following steps to install the riser for slot 16 to 17.

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

-  [YouTube](#)
-  [Youku](#)

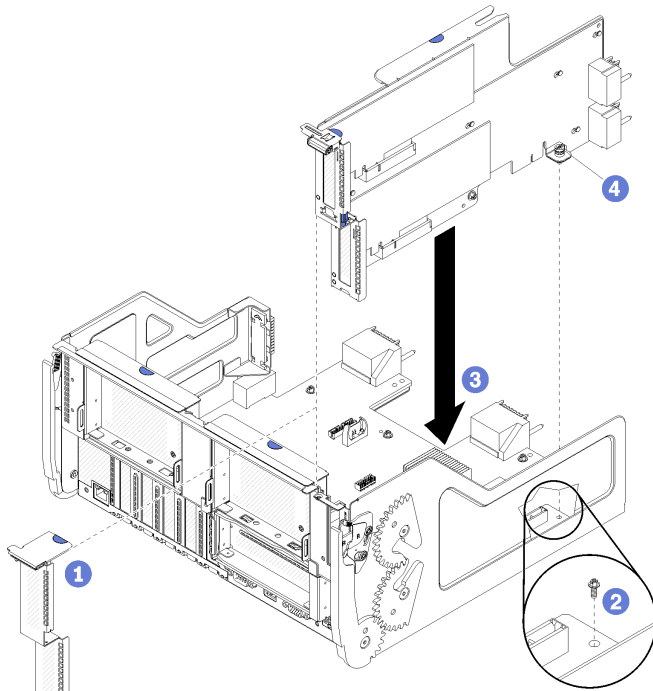


Figure 117. Riser for slot 16 to 17 installation

- Step 1. Align the riser with the I/O tray, making sure that the sides of the riser fit into the guides on the I/O tray, and insert the riser; then, press the riser into the I/O tray until the connector is fully seated.
- Step 2. Tighten the captive screw (item 4 in preceding figure) that secures the riser to the I/O tray board.

If you have no other operations to perform on the I/O tray after installing the riser for slot 16 to 17, install the I/O tray in the chassis and connect all cables. See [“Install the I/O tray” on page 335](#).

Storage interposer replacement

Storage interposers are in the upper and lower trays that are accessed from the front of the server. Procedures for removing and installing storage interposers in the upper and lower trays are different.

Remove a storage interposer (upper tray)

The upper storage interposer is in the upper compute tray or optional storage tray that is accessed from the front of the server. After removing the upper tray and fan cage, disconnect the RAID card from the storage interposer and lift it out of the way; then, remove the screw securing the storage interposer and remove the storage interposer from the tray.

S002

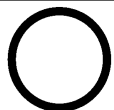


CAUTION:

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



**Read the
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**Power off
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power cords
for this task**

” on page 56

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove an upper storage interposer:

1. Remove the front cover. See “[Remove the front cover](#)” on page 322.
2. Remove the upper compute tray or storage tray. See “[Remove a compute tray](#)” on page 305 or “[Remove a storage tray](#)” on page 375.
3. If you removed a compute tray and it has one or more compute system boards installed or a system board filler, remove the system boards or system board filler. See “[Remove a system board](#)” on page 309.
4. Turn the tray upside down and remove the upper fan cage. See “[Remove a fan cage \(upper tray\)](#)” on page 314.

Complete the following steps to remove an upper storage interposer.

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

-  [YouTube](#)
-  [Youku](#)

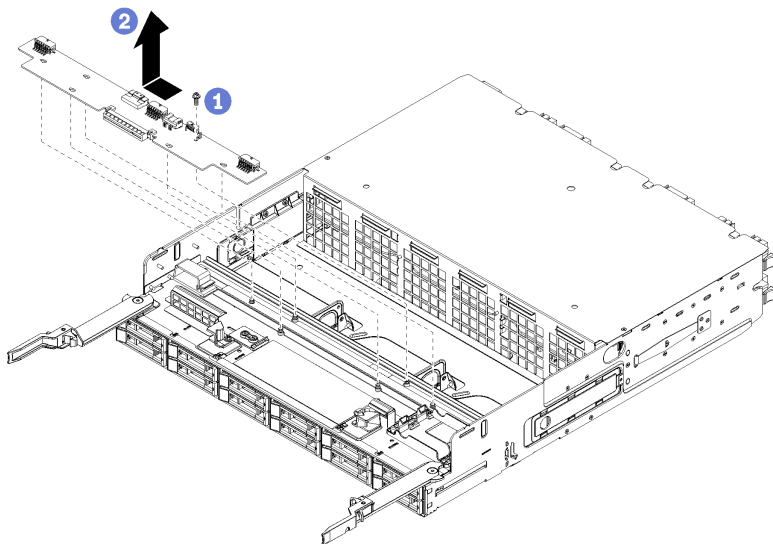


Figure 118. Upper storage interposer removal

- Step 1. Disconnect all power and data cables from the storage interposer.
- Step 2. Slide the RAID card forward to disconnect the RAID card from the storage interposer; then, rotate the RAID card upward. (Leave the three cables connected to the RAID card.)
- Step 3. Remove the screw securing the storage interposer in place.
- Step 4. Slide the storage interposer to the left and remove it from the tray.

If you are instructed to return the storage interposer, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Remove a storage interposer (lower tray)

The lower storage interposer is in the lower compute tray that is accessed from the front of the server. After removing the lower compute tray and fan cage, disconnect the RAID card from the storage interposer and lift it out of the way; then, remove the screw securing the storage interposer and remove the storage interposer from the compute tray.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove an lower storage interposer:

1. Remove the front cover. See [“Remove the front cover” on page 322](#).
2. Remove the lower compute tray or extract it to the maintenance position. See [“Remove a compute tray” on page 305](#).
3. Remove the lower fan cage. See [“Remove a fan cage \(lower tray\)” on page 316](#).

Complete the following steps to remove a lower storage interposer.

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

-  [YouTube](#)
-  [Youku](#)

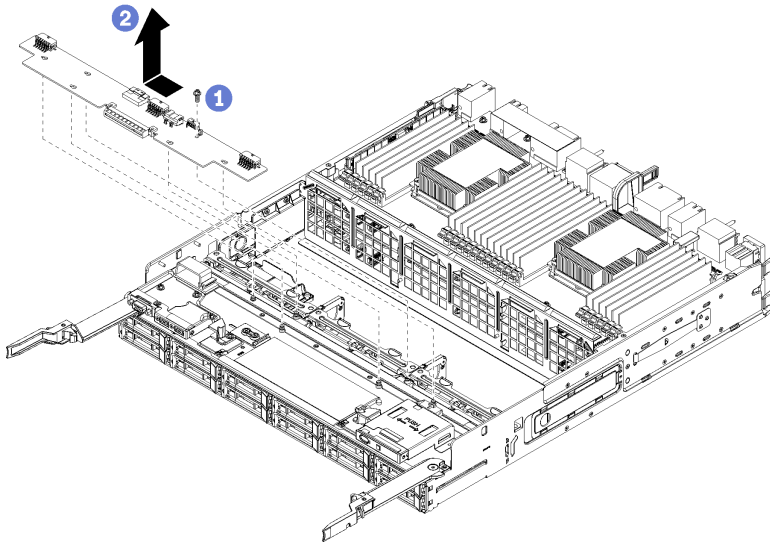


Figure 119. Lower storage interposer removal

- Step 1. Disconnect all power and data cables from the storage interposer.
- Step 2. Slide the RAID card forward to disconnect the RAID card from the storage interposer; then, rotate the RAID card upward. (Leave the three cables connected to the RAID card.)
- Step 3. Remove the screw securing the storage interposer in place.
- Step 4. Slide the storage interposer to the left and remove it from the compute tray.

If you are instructed to return the storage interposer, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install a storage interposer (upper tray)

The upper storage interposer is in the upper compute tray or optional storage tray that is accessed from the front of the server. Insert the storage interposer in the upper tray and secure it with the screw; then, connect the RAID card to the storage interposer and install the fan cage and upper tray.

S002



CAUTION:

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

	<p>Read the Installation Guidelines</p>		<p>Power off server and disconnect all power cords for this task</p>
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“ on page 56 ”

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Complete the following steps to install an upper tray storage interposer:

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

-  [YouTube](#)
-  [Youku](#)

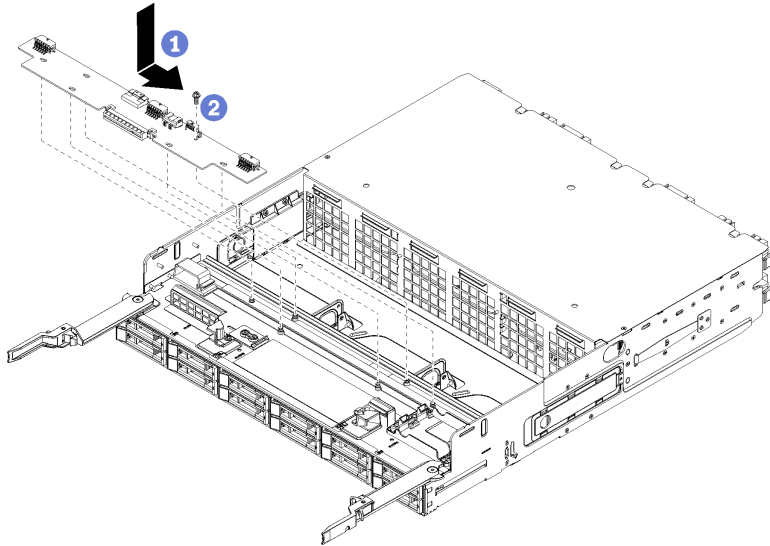


Figure 120. Upper tray storage interposer installation

- Step 1. Position the storage interposer over the pins on the tray; then, slide the storage interposer to the right.
- Step 2. Secure the storage interposer with the screw.
- Step 3. Rotate the RAID card down and align it with the connector on the storage interposer; then, insert the RAID card in the storage interposer connector.
- Step 4. Connect the power and data cables to the storage interposer.

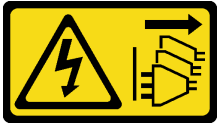
After you have installed the upper storage interposer:

1. Install the upper fan cage. See [“Install a fan cage \(upper tray\)” on page 317](#).
2. Turn the tray right-side up.
3. If you removed one or more system boards or a compute system board filler from a compute tray, install the system boards or system board filler. See [“Install a system board” on page 310](#).
4. Install the upper compute tray or storage tray. See [“Install a compute tray” on page 307](#) or [“Install the storage tray \(fully removed\)” on page 377](#).
5. Install the front cover. See [“Install the front cover” on page 322](#).

Install a storage interposer (lower tray)

The lower storage interposer is in the lower compute tray that is accessed from the front of the server. Insert the storage interposer in the lower compute tray and secure it with the screw; then, connect the RAID card to the storage interposer and install the fan cage and lower compute tray.

S002

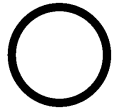


CAUTION:

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



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**Power off
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disconnect all
power cords
for this task**

“ on page 56 ”

CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Complete the following steps to install a lower storage interposer:

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

-  [YouTube](#)
-  [Youku](#)

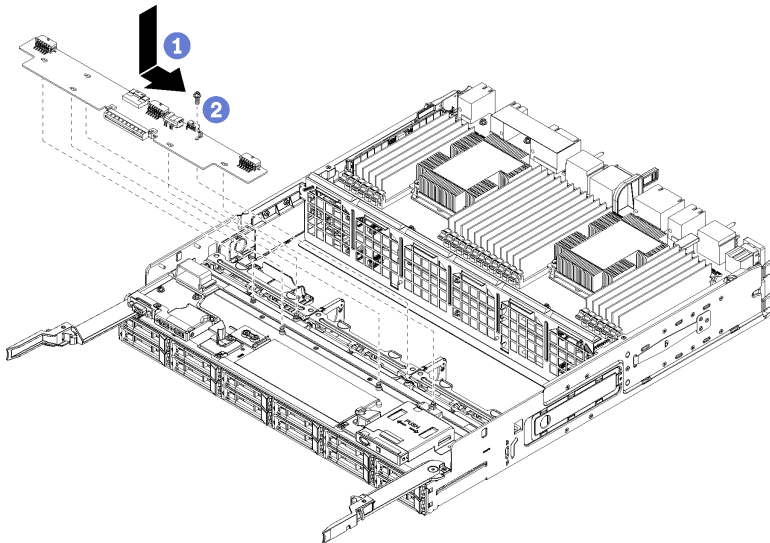


Figure 121. Lower storage interposer installation

- Step 1. Position the storage interposer over the pins on the compute tray; then, slide the storage interposer to the right.
- Step 2. Secure the storage interposer with the screw.
- Step 3. Rotate the RAID card down and align it with the connector on the storage interposer; then, insert the RAID card in the storage interposer connector.
- Step 4. Connect the power and data cables to the storage interposer.

After you have installed the lower storage interposer:

1. Install the lower fan cage. See [“Install a fan cage \(lower tray\)” on page 320](#).
2. Install the lower compute tray or place it in the normal operating position; then, install the front cover. See [“Install a compute tray” on page 307](#) and [“Install the front cover” on page 322](#).

Storage tray replacement

The storage tray is in the upper bay that is accessed from the front of the server. This optional device is used only in storage-rich server configurations.

Remove a storage tray

The storage tray is accessed from the front of the server. Open the release levers to extract the storage tray, pressing the release tabs when it stops to remove the tray fully from the chassis.

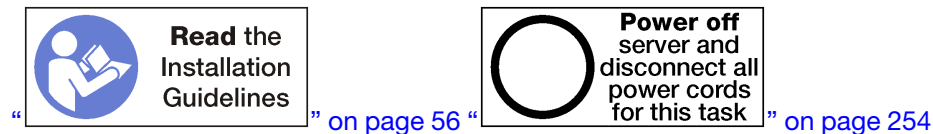
Attention: If you are removing a storage tray and do not plan to replace it, relocate or backup data that is on the hard disk drives in the storage tray before removing it.

S002



CAUTION:

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



CAUTION:

Make sure that all server power cords are disconnected from their power sources before performing this procedure.

Before you remove an optional storage tray, remove the front cover. See [“Remove the front cover” on page 322](#).

Complete the following steps to remove a storage tray.

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

-  [YouTube](#)
-  [Youku](#)

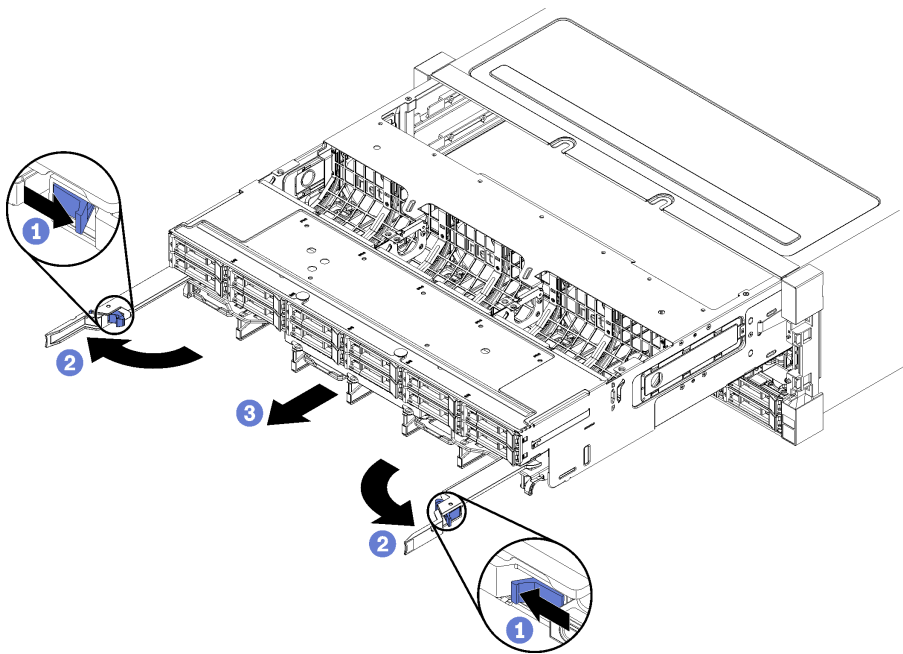


Figure 122. Storage tray removal to stop position

- Step 1. Press the button on each release lever; then, simultaneously rotate the release levers until they are perpendicular to the chassis.
- Step 2. Pull storage tray forward evenly until it stops; then, close the release levers.
- Step 3. Press the release tabs on either side of the tray; then, slide the tray fully forward evenly and remove it from the chassis.

Attention:

- Be prepared to support the full weight of the storage tray when you remove it from the chassis.
- Do not use the release levers as handles to support the storage tray.

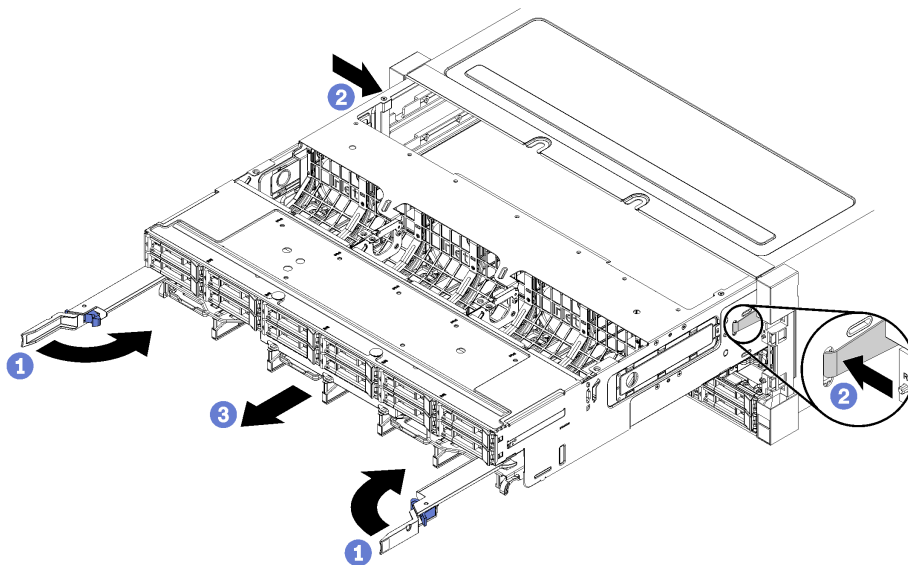


Figure 123. Storage tray removal from chassis

After you remove the storage tray:

- If you are instructed to return the storage tray, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

Install the storage tray (fully removed)

Install the storage tray when it is fully removed by inserting it in the front of the chassis, pushing it in until it stops, and closing the release levers.

S002



CAUTION:

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



Before you install an optional storage tray:

1. Make sure that all cables, adapters, and other components are installed and seated correctly and that you have not left loose tools or parts inside the server.
2. Make sure that all internal cables are correctly routed. See [“Internal cable routing” on page 35](#).

Complete the following steps to install a storage tray when it is fully removed from the chassis:

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

-  [YouTube](#)
-  [Youku](#)

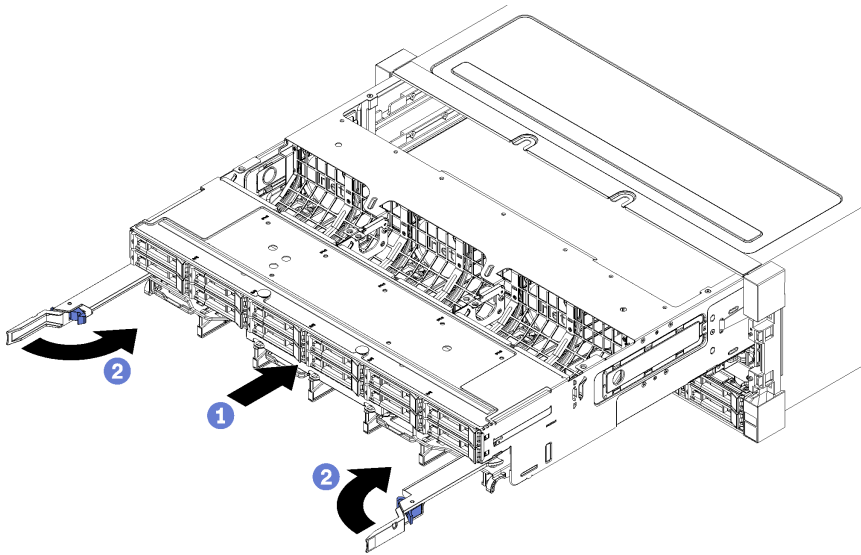


Figure 124. Storage tray installation (fully removed)

- Step 1. Align the storage tray with its opening in the upper bay at the front of the chassis and insert.
- Step 2. Fully open the storage tray release levers and push the tray into the chassis until it stops.
- Step 3. Rotate the storage tray release levers until they lock, fully closed.

If you are done performing installation or maintenance procedures at the front of the chassis, install the front cover. See [“Install the front cover” on page 322](#).

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