ThinkSystem SN550 V2 Compute Node Setup Guide

Machine Type: 7Z69

Note

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

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

Contents

Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الآمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

.לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות

A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

ᠡ᠊᠊ᠨᠡ ᠊ᠨᠡ᠊᠊ ᠊᠊᠊ᠨ᠊ ᠊᠊᠊ ᠊᠊᠊᠊᠊ ᠊᠊᠊᠊᠊

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

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

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

Перед установкой продукта прочтите инструкции по
технике безопасности.

Pred inštaláciou tohto zariadenia si pečítaje Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

ཐོན་རྫས་འདི་བདེ་སྐྱིད་མ་བྱས་གོང་། སྐྱར་གྱི་ཡིད་གཟབ་
བྱ་འདུ་མིན་ཡོད་པའི་འོད་སྟེར་བལྟ་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۈر مەھسۇلاتنى ئورنتشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرنى ئوقۇپ چىقىڭ.

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

Safety inspection checklist

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

Notes:

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

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

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

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

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

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

   • Make sure that the power cord is the correct type.

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

     a. Go to:

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

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

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

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

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

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

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

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

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

Chapter 1. Introduction

Each Lenovo ThinkSystem SN550 V2 Type 7Z69 compute node supports up to two 2.5-inch hot-swap Serial Attached SCSI (SAS), Serial ATA (SATA), Non-Volatile Memory express (NVMe) drives, or supports up to six EDSFF drives.

When you receive your Lenovo ThinkSystem SN550 V2 Type 7Z69 compute node, refer to the *Setup Guide* to set up the compute node, install optional devices, and perform the initial configuration of the compute node. Meanwhile, the *Maintenance Manual* contains information to help you solve problems that might occur in your Lenovo ThinkSystem SN550 V2 Type 7Z69 compute node. It describes the diagnostic tools that come with the compute node, error codes and suggested actions, and instructions for replacing failing components.

The compute node 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

Notes:

1. The first generation Chassis Management Module (CMM1; 68Y7030) is not supported by the ThinkSystem SN550 V2 compute node.

2. The second generation Chassis Management Module (CMM2; 00FJ669) must be at firmware version 2.7.0 or greater to support the ThinkSystem SN550 V2 compute node. This applies to both CMMs that are installed in the Lenovo Flex System Enterprise Chassis.

3. Replace all the power supply units in Lenovo Flex System Enterprise Chassis with the power supply units that are listed in the latest Lenovo Flex System Enterprise Chassis ServerProven Program. For more information, contact Lenovo Support or see https://static.lenovo.com/serverproven/flex/8721_7893.shtml.

   - For detail information on PSU support, **make sure** to follow the instruction on https://pubs.lenovo.com/sn550-v2/sn550_v2_psu_flyer_pdf.pdf.

4. The illustrations in this document might differ slightly from your model.

Identifying your compute node

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

Record information about the compute node in the following table.

Table 1. Record of the system information

Product name	Machine Type (s)	Model number	Serial number
Lenovo ThinkSystem SN550 V2 Type 7Z69	7Z69		

The model number and serial number are on the ID label on the front of the compute node and the chassis, as shown in the following illustration.

Note: The illustrations in this document might differ slightly from your hardware.
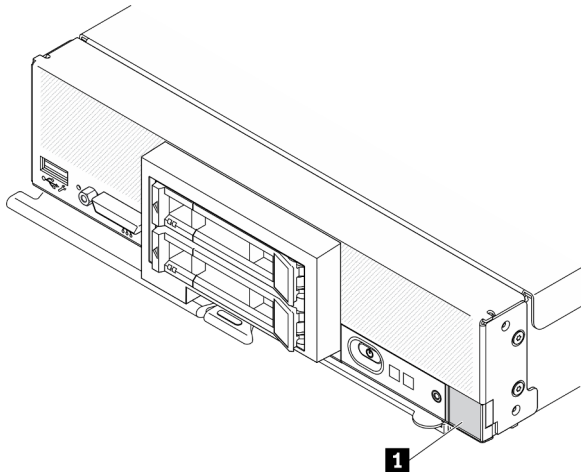
Figure 1. ID label on the front of the node

Table 2. ID label on the front of the node

1 ID label

Customer information tabs

The customer information tabs contain system-related information such as firmware level, administrator accounts and so forth.
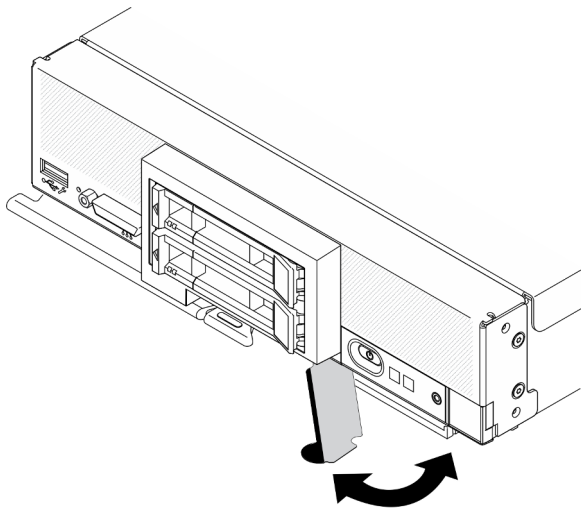
Figure 2. Location of customer information tabs

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

The following illustration shows the QR code (https://support.lenovo.com/p/servers/sn550)

Figure 3. QR code

Compute node package contents

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

The compute node package includes the following items:

- Compute node
- Printed documentation

Features

Performance, ease of use, reliability, and expansion capabilities were key considerations in the design of the compute node. 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 compute node implements the following features and technologies:

- **Features on Demand**

  If a Features on Demand feature is integrated in the compute node or in an optional device that is installed in the compute node, you can purchase an activation key to activate the feature. For information about Features on Demand, see https://fod.lenovo.com/lkms.

- **Lenovo XClarity Controller**

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

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

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

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

- **UEFI-compliant server firmware**

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

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

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

- **Large system-memory capacity**

  The compute node supports up to a maximum of 6.9 TB of system memory. The compute node supports industry-standard double-data-rate 4 DIMM (DDR4) , registered DIMM (RDIMM), load-reduced DIMM (LRDIMM), 3DS RDIMM, and Persistent Memory Module (PMEM).

- **Flexible network support**

  The compute node has connectors on the system board for optional expansion adapters for adding network communication capabilities to the compute node. You can install up to two I/O expansion adapters for network support. This provides the flexibility to install expansion adapters that support a variety of network communication technologies.

- **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.

  For more information on TPM configurations, see "Enable TPM/TCM" in the *Maintenance Manual*.

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

- **Drive support**

  The compute node supports up to two hot-swap drives. You can implement RAID 0 or RAID 1 for the drives. Additional drive types and RAID levels are supported when an optional drive backplane and RAID adapter are installed.

- **Light Path Diagnostics**

  Light Path Diagnostics provides light-emitting diodes (LEDs) to help you diagnose problems.

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

  The compute node provides a quick response (QR) code on the system service label, which is on the cover of the compute node, that you can scan using a QR code reader and scanner with a mobile device to get quick access to the Lenovo Service Information website. The Lenovo Service Information website provides additional information for parts installation and replacement videos, and error codes for compute node support. Information about the ThinkSystem SN550 V2 QR code can be found here: Chapter 1 "Introduction" on page 1.

- **Processor technology**

  The compute node supports up to two multi-core Intel Xeon processors.

  Note: The optional processors that Lenovo supports are limited by the capacity and capability of the compute node. Any processor that you install must have the same specifications as the processor that came with the compute node.

- **Power throttling**

  By enforcing a power policy known as power-domain oversubscription, the Lenovo Flex System Enterprise Chassis chassis can share the power load between two or more power supply modules to ensure sufficient power for each device in the Lenovo Flex System Enterprise Chassis chassis. This policy is enforced when the initial power is applied to the Lenovo Flex System Enterprise Chassis chassis or when a compute node is inserted into the Lenovo Flex System Enterprise Chassis chassis.

  The following settings for this policy are available:

  – Basic power management

- Power module redundancy

- Power module redundancy with compute node throttling allowed

You can configure and monitor the power environment by using the Chassis Management Module. For more information, see the Flex System Chassis Management Module: Command-Line Interface Reference Guide at https://pubs.lenovo.com/cmm2/dw1kt_cmm2_cli_book.pdf.

- **Lenovo XClarity Administrator**

  Lenovo XClarity Administrator is a centralized resource-management solution that enables administrators to deploy infrastructure faster and with less effort. The solution seamlessly integrates into ThinkSystem compute nodes, and NeXtScale compute nodes, as well as the Flex System converged infrastructure platform.

  Lenovo XClarity Administrator provides:

  - Automated discovery

  - Agent-free hardware management

  - Monitoring

  - Firmware updates and compliance

  - Pattern-based configuration management

  - Deployment of operating systems and hypervisors

  Administrators are able to find the right information and accomplish critical tasks faster through an uncluttered, dashboard-driven graphical user interface (GUI). Centralizing and automating foundational infrastructure deployment and lifecycle management tasks across large pools of systems frees up administrator time, and makes resources available to end-users faster.

  Lenovo XClarity is easily extended into the leading virtualization management platforms from Microsoft and VMware using software plug-ins, called Lenovo XClarity Integrators. The solution improves workload uptime and service-level assurance by dynamically relocating workloads from affected hosts in the cluster during rolling compute node reboots or firmware updates, or during predicted hardware failures.

  For more information about Lenovo XClarity Administrator, see the http://shop.lenovo.com/systems/software/systems-management/xclarity/ and the https://pubs.lenovo.com/lxca/.

- **Systems-management support**

  The compute node XClarity Controller provides a web interface for remote systems-management support. You can use the interface to view system status and to control systems-management functions and baseboard management settings.

  The XClarity Controller communicates with the Lenovo Flex System Chassis Management Module (CMM) and the Lenovo XClarity Administrator application (if installed).

  - The CMM is a hot-swap module that provides systems-management functions for all components in an Lenovo Flex System Enterprise Chassis chassis. It controls a serial port for remote connection and a 1 Gbps Ethernet remote-management connection. For more information, see the Flex System Chassis Management Module: Command-Line Interface Reference Guide at https://pubs.lenovo.com/cmm2/dw1kt_cmm2_cli_book.pdf.

  - The Lenovo XClarity Administrator is a virtual appliance that you can use to manage Lenovo Flex System Enterprise Chassis chassis in a secure environment. The Lenovo XClarity Administrator provides a central interface to perform the following functions for all managed endpoints:

    - User management

    - Hardware monitoring and management

    - Configuration management

– Operating system deployment

– Firmware management

For more information, see

https://datacentersupport.lenovo.com/products/solutions-and-software/software/lenovo-xclarity/solutions/ht115665.

Specifications

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

Table 3. Specifications

Specification	Description
Size	• Height: 55.9 mm (2.2 inches) • Depth: 507.3 mm (19.9 inches) • Width: 217.35 mm (8.5 inches)
Weight	Approximately 5.17 kg (11 lbs.) to 6.5 kg (14 lbs), depending on your configuration.

Processor (depending on the model)	Processor: Up to two multi-core Intel Xeon Scalable processors.
	
	• Use the Setup utility to determine the type and speed of the processors in the compute node.
	• Select processor heat sink according to processor TDP and placement in the compute node.
	  – If the processor TDP is lower than or equal to 165 watts, select front or rear standard heat sink.
	  – If the processor TDP is higher than 165 watts, select front or rear performance heat sink.
	    Note: When using Intel Xeon Gold 6334 8c 165W 3.6GHz processor, select performance heat sink.
	• The compute node supports one I/O expansion adapter when installed with one processor, and two I/O expansion adapters when installed with two processors. At least one I/O expansion adapter should be installed in the compute node.
	• EDSFF drive support guide regarding processor:
	  – EDSFF drive feature requires installing two processors in the compute node.
	  – EDSFF drive feature is not supported when the processor TDP is higher than 220 watts.
	  – EDSFF drive feature is not supported when Intel Xeon Gold 6334 8c 165W 3.6GHz processor is installed in the compute node.
	For a list of supported processors, see: https://serverproven.lenovo.com/

Table 3. Specifications (continued)

Specification	Description

Memory	See "Memory module installation rules and order" on page 32 for detailed information about memory configuration and setup.
	• Minimum: 16 GB
	• Maximum: 2 TB with 3DS RDIMM
	• Type:
	  – Error correcting code (ECC), Low-profile (LP) double-data rate (DDR4) RDIMM and 3DS RDIMM (mixing is not supported)
	  – Persistent Memory (PMEM)
	• Supports (depending on the model):
	  – 16 GB, 32 GB, and 64 GB RDIMM
	  – 128 GB 3DS RDIMM
	  – 128 GB Persistent Memory (PMEM)
	• Slots: 16 dual inline memory module (DIMM) connectors that support up to:
	  – 16 DRAM DIMMs
	  – 8 DRAM DIMMs and 8 PMEMs
	
	For a list of supported DIMMs, see: https://serverproven.lenovo.com/
	
	Note:
	Do not mix 32GB DRx4 8 bit RDIMM and 32GB DRx8 16 bit RDIMM in PMEM App Direct Mode and Memory Mode.

2.5-inch drive/backplane	• Supports up to two small form factor (SFF) drive bays. Drive bay can be either SAS/SATA or NVMe/SATA, depending on the model.
	• Supported 2.5-inch drives:
	  – Serial Attached SCSI (SAS)/Serial Advanced Technology Attachment (SATA) hot-swap hard disk drives/solid-state drives
	  – Non-Volatile Memory Express (NVMe) solid-state drives

EDSFF drive/backplane	• Supports up to six Enterprise and Datacenter SSD Form Factor (EDSFF) drive bays.
	• EDSFF drive feature supports software RAID.
	• EDSFF drive support guide regarding processor:
	  – EDSFF drive feature requires installing two processors in the compute node.
	  – EDSFF drive feature is not supported when the processor TDP is higher than 220 watts.
	  – EDSFF drive feature is not supported when Intel Xeon Gold 6334 8c 165W 3.6GHz processor is installed in the compute node.
	Attention: EDSFF drives requires specific ambient temperature, see the Environment section in the Specification table for more information.

M.2 drive/backplane	ThinkSystem M.2 with Mirroring Enablement Kit contains dual M.2 boot adapter that supports up to two identical M.2 drives. Supports three physical sizes of M.2 SATA drive: • 42 mm (2242) • 60 mm (2260) • 80 mm (2280) Supports two physical sizes of M.2 NVMe drive: • 80 mm (2280) • 110 mm (22110) **Note:** ThinkSystem M.2 Enablement Kit contains single M.2 backplane which is only supported in pre-configured models.

Table 3. Specifications (continued)

Specification	Description
RAID adapter	• RAID 530-4i adapter • RAID 930-4i-2GB adapter **Note:** Support for intermixing SAS and SATA HDDs and SSDs. Mixing SAS and SATA drives in the same array is not supported. Mixing of HDDs and SSDs in the same array is not supported.
Integrated functions	• One baseboard management controller (BMC) with integrated VGA controller (XClarity Controller or XCC) • Light Path Diagnostics • Automatic server restart (ASR) • Additional RAID levels supported when an optional RAID controller is installed • One external USB 3.2 Gen 1 port • Serial over LAN (SOL) • Wake on LAN (WOL) when an optional I/O adapter with WOL capability is installed.
Minimum configuration for debugging	• One processor in processor socket 1 • One memory module in slot 2
Operating systems	Supported and certified operating systems: • Ubuntu Server • Microsoft Windows Server • VMware ESXi • Red Hat Enterprise Linux • SUSE Linux Enterprise Server References: • Complete list of available operating systems: https://lenovopress.lenovo.com/osig. • OS deployment instructions: "Deploy the operating system" on page 91.
Predictive failure analysis (PFA) alerts	• Processors • Memory • Drives
Security	Fully compliant with NIST 800-131A. The security cryptography mode set by the managing device (CMM or Lenovo XClarity Administrator) determines the security mode in which the compute node operates.

Table 3. Specifications (continued)

Specification	Description

Environment	The ThinkSystem SN550 V2 compute node complies with ASHRAE Class A2 specifications. Depending on the hardware configuration, some models comply with ASHRAE Class A3 specifications. System performance may be impacted when operating temperature is above 35°C or fan failed condition. The Lenovo ThinkSystem SN550 V2 compute node is supported in the following environment:
	• Air temperature:
	  – Operating:
	    – ASHRAE Class A2: 10°C - 35°C (50°F - 95°F); decrease the maximum ambient temperature by 1°C for every 300 m (984 ft) increase in altitude above 900 m (2,953 ft).
	    – ASHRAE Class A3: 5°C - 40°C (41°F - 104°F); decrease the maximum ambient temperature by 1°C for every 175 m (574 ft) increase in altitude above 900 m (2,953 ft).
	  – Compute node off: 5°C to 45°C (41°F to 113°F)
	  – Shipment: -40°C to 60°C (-40°F to 140°F)
	  – Storage: -40°C to 60°C (-40 to 140°F)
	• Maximum altitude: 3,050 m (10,000 ft)
	• Relative Humidity (non-condensing):
	  – Operating:
	    – ASHRAE Class A2: 8% - 80%, maximum dew point: 21°C (70°F)
	    – ASHRAE Class A3: 8% - 85%, maximum dew point: 24°C (75°F)
	  – Shipment/Storage: 8% - 90%
	• Depending on the processor TDP, the compute node may support ASHRAE Class A3 or ASHRAE Class A2 specifications:
	  – When the TDP of the installed processor is lower than or equal to 165 watt, the compute node complies with ASHRAE Class A3 specifications.
	  – When the TDP of the installed processor is lower than 200 watt, the compute node complies with ASHRAE Class A2 specifications.
	Particulate contamination
	Attention: Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the server. For information about the limits for particulates and gases, see "Particulate contamination" on page 11.

Ambient temperature management	Adjust ambient temperature when specific components are installed: • Keep ambient temperature to 30°C or lower when processors with TDP of 200 watts or higher are installed. • Keep ambient temperature to 30°C or lower when Intel Xeon Gold 6334 8c 165W 3.6GHz processor is installed in the compute node. • Keep ambient temperature to 25°C or lower when Intel Xeon Gold 6342 24c 230W 2.8GHz processor is installed in the compute node. • Keep ambient temperature to 35°C or lower when Persistent Memory (PMEM) are installed. • Keep ambient temperature to 25°C or lower when EDSFF drives are installed

Limited maximal number of compute node in the same chassis

The following chart describes the maximal number of SN550 V2 compute node that can be installed in Flex chassis.

The exact maximal number of supported 1-bay nodes is determined by input voltage and power redundancy policy. See the following table for detailed combinations, or alternatively, refer to https://datacentersupport.lenovo.com/products/solutions-and-software/software/lenovo-capacity-planner/solutions/ht504651 for more details.

Note that the values in this table are based on power policy with compute node throttling allowed.

Table 4. Limited maximal number of SN550 V2 in the same chassis

Processor TDP	2500 W power output (200-208 V ac)				
	N+1 N=4 5 PSUs With throttle	N+1 N=3 4 PSUs With throttle	N+N N=3 6 PSUs With throttle	N+1 N=5 6 PSUs No throttle	N+N N=3 6 PSUs No throttle
105 W	14	14	14	14	9
120 W	14	13	14	14	8
135 W	14	12	13	13	8
140 W	14	12	13	13	8
150 W	14	12	12	12	7
165 W	14	11	11	12	7
185 W	13	10	10	11	6
195 W	13	9	9	10	6
205 W	13	9	9	10	6
230W	12	9	9	9	5
Processor TDP	2745 W power output (220-240 V ac)				
	N+1 N=4 5 PSUs With throttle	N+1 N=3 4 PSUs With throttle	N+N N=3 6 PSUs With throttle	N+1 N=5 6 PSUs No throttle	N+N N=3 6 PSUs No throttle
105 W	14	14	14	14	10
120 W	14	13	14	14	9
135 W	14	12	13	14	9
140 W	14	12	13	14	9
150 W	14	12	12	13	8
165 W	14	11	11	13	8
185 W	14	11	11	12	7
195 W	14	10	10	11	6
205 W	14	10	10	11	6
230W	13	9	9	10	6

Prerequisites for installing the compute node in the chassis

The information in this section describes the prerequisites for installing the SN550 V2 compute node in the Lenovo Flex System Enterprise Chassis.

Before installing the ThinkSystem SN550 V2 compute node in the Lenovo Flex System Enterprise Chassis , complete the following requirements to ensure proper operation of the compute node.

1. Update the Lenovo Flex System Enterprise Chassis CMM firmware to version 2.7.0 or greater. For more information, see https://pubs.lenovo.com/cmm2/.

2. Replace all the power supply units in Lenovo Flex System Enterprise Chassis with the power supply units that are listed in the latest Lenovo Flex System Enterprise Chassis ServerProven Program. For more information, contact Lenovo Support or see https://static.lenovo.com/serverproven/flex/8721_7893.shtml.

   - For detail information on PSU support, **make sure** to follow the instruction on https://pubs.lenovo.com/sn550-v2/sn550_v2_psu_flyer_pdf.pdf.

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 5. Limits for particulates and gases

Contaminant	Limits
Particulate	- The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2[1]. - Air that enters a data center must be filtered to 99.97% efficiency or greater, using high-efficiency particulate air (HEPA) filters that meet MIL-STD-282. - The deliquescent relative humidity of the particulate contamination must be more than 60%[2]. - The room must be free of conductive contamination such as zinc whiskers.
Gaseous	- Copper: Class G1 as per ANSI/ISA 71.04-1985[3] - Silver: Corrosion rate of less than 300 Å in 30 days
[1] ASHRAE 52.2-2008 - *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. [2] 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. [3] ANSI/ISA-71.04-1985. *Environmental conditions for process measurement and control systems: Airborne contaminants*. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.	

Management options

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

Overview

Options	Description
Lenovo XClarity Controller	Baseboard management controller. (BMC) Consolidates the service processor functionality, Super I/O, video controller, and remote presence capabilities into a single chip on the server system board. **Interface** • CLI application • Web GUI interface • Mobile application • REST API **Usage and downloads** https://pubs.lenovo.com/lxcc-overview/
Lenovo XClarity Administrator	Centralized interface for multi-server management. **Interface** • Web GUI interface • Mobile application • REST API **Usage and downloads** http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/aug_product_page.html
Lenovo XClarity Essentials toolset	Portable and light toolset for server configuration, data collection, and firmware updates. Suitable both for single-server or multi-server management contexts. **Interface** • **OneCLI**: CLI application • **Bootable Media Creator**: CLI application, GUI application • **UpdateXpress**: GUI application **Usage and downloads** https://pubs.lenovo.com/lxce-overview/

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

Functions

Options		Functions							
		Multi-system mgmt	OS deploy-ment	System configu-ration	Firm-ware up-dates[1]	Event-s/alert moni-toring	Inven-tory/ logs	Pow-er mgmt	Power planning
Lenovo XClarity Controller				√	$\sqrt{}^2$	√	$\sqrt{}^4$		
Lenovo XClarity Administrator		√	√	√	$\sqrt{}^2$	√	$\sqrt{}^4$		
Lenovo XClarity Essen-tials toolset	OneCLI	√		√	$\sqrt{}^2$	√	$\sqrt{}^4$		
	Bootable Media Creator			√	$\sqrt{}^2$		$\sqrt{}^4$		
	UpdateXpress			√	$\sqrt{}^2$				
Lenovo XClarity Provisioning Manager			√	√	$\sqrt{}^3$		$\sqrt{}^5$		
Lenovo XClarity Integrator		√	$\sqrt{}^6$	√	√	√	√	$\sqrt{}^7$	
Lenovo XClarity Energy Manager		√				√		√	
Lenovo Capacity Planner									$\sqrt{}^8$

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. Compute node components

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

Front view

Use this information to view the power features and functions of the controls and indicators on the front of the compute node.

Power, controls, and indicators

Use this information to view power features, turn on and turn off the compute node, and view the functions of the controls and indicators.

Compute node controls, connectors, and LEDs

Use this information for details about the controls, connectors, and LEDs on the control panel of the compute node.

The following illustration identifies the buttons, connectors, and LEDs on the control panel.

Figure 4. Two 2.5-inch drives compute node control panel buttons, connectors, and LEDs

Table 6. Compute node control panel buttons, connectors, and LEDs

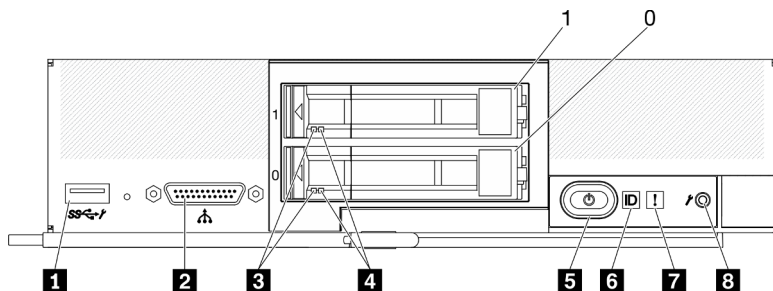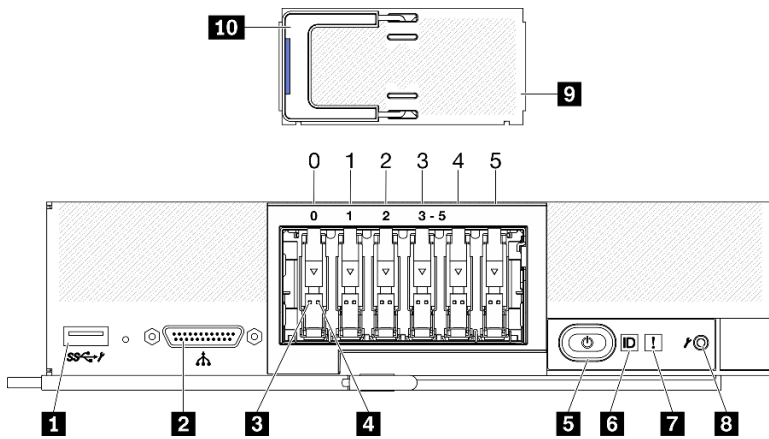|	
1 USB 3.2 Gen 1 connector USB 2.0 only when accessing Lenovo XClarity Controller via a mobile device.	**5** Power button/LED (green)
2 KVM cable connector (console breakout cable)	**6** Identification LED
3 Drive activity LED (green)	**7** Fault LED (yellow)
4 Drive status LED (yellow)	**8** USB management button

Figure 5. Six ESDFF drives compute node control panel buttons, connectors, and LEDs

Table 7. Compute node control panel buttons, connectors, and LEDs

1 USB 3.2 Gen 1 connector USB 2.0 only when accessing Lenovo XClarity Controller via a mobile device.	**6** Identification LED
2 KVM cable connector (console breakout cable)	**7** Fault LED (yellow)
3 Drive activity LED (green)	**8** USB management button
4 Drive status LED (yellow)	**9** EDSFF drive bezel
5 Power button/LED (green)	**10** EDSFF drive bezel handle

1 USB 3.2 Gen 1 connector

Connect a USB device to this USB 3.2 Gen 1 connector.

Through Lenovo XClarity Controller web interface, the USB 3.2 Gen 1 connector can be configured as shared mode, where the USB connector can switch between default mode and the Lenovo XClarity Controller management mode. Lenovo XClarity Controller management mode allows accessing the Lenovo XClarity Controller directly via a mobile device connected to the USB connector.

Notes:

- Connect an USB device in one compute node at a time in each Lenovo Flex System Enterprise Chassis.

- When switched to Lenovo XClarity Controller management mode, the USB 3.2 Gen 1 connector only support USB 2.0 devices.

2 KVM cable connector

Connect the KVM cable to this connector. See "KVM cable" on page 21 for more information. The KVM cable may also be referred to as the console breakout cable.

Attention: Use only the KVM cable that comes with the chassis. Attempting to connect other KVM cable types might damage the KVM cable and the compute node.

Note: It is best practice to connect the KVM cable to only one compute node at a time in each Lenovo Flex System Enterprise Chassis.

3 Drive activity LED (green)

Green LEDs are on all hot-swap drives. When this green LED is lit, it indicates that there is activity on the associated hard disk drive or solid-state drive.

- When this LED is flashing, it indicates that the drive is actively reading or writing data.

- For SAS and SATA drives, this LED is off when the drive is powered but not active.

- For NVMe (PCIe) SSDs and EDSFF, this LED is on solid when the drive is powered but not active.

Note: The drive activity LED might be in a different location on the front of the drive, depending on the drive type that is installed.

4 Drive status LED (yellow)

The state of this yellow LED indicates an error condition or the RAID status of the associated hard disk drive or solid-state drive:

- When the yellow LED is lit, it means an error has occurred with the associated drive. The LED turns off only after the error is corrected. You can check the CMM event log to determine the source of the condition.

- When the yellow LED flashes slowly, it indicates that the associated drive is being rebuilt.

- When the yellow LED flashes rapidly, it indicates that the associated drive is being located.

Note: The hard disk drive status LED might be in a different location on the front of the hard disk drive, depending on the drive type that is installed.

5 Power button/LED (green)

When the compute node is connected to power through the Lenovo Flex System Enterprise Chassis, press this button to turn on or turn off the compute node.

Note: The power button works only if local power control is enabled for the compute node. Local power control is enabled and disabled through the CMM **power** command and the CMM web interface.

- For more information about the CMM **power** command, see the https://pubs.lenovo.com/cmm2/cli_ command_power.

- From the CMM web interface, select **Compute Nodes** from the **Chassis Management** menu. For more information, see the *Flex System Chassis Management Module: User's Guide* at https:// pubs.lenovo.com/cmm2/cmm_user_guide. All fields and options are described in the CMM web interface online help.

After the compute node is removed from the chassis, press and hold this button to activate the system-board LEDs (Light Path Diagnostics). See the *ThinkSystem SN550 V2 Maintenance Manual* for more information.

This button is also the power LED. This green LED indicates the power status of the compute node:

- **Flashing rapidly (Four times per second)**: The LED flashes rapidly for one of the following reasons:
  - The compute node has been installed in a powered chassis. When you install the compute node, the LED flashes rapidly while the XClarity Controller in the compute node is initializing and synchronizing with the Chassis Management Module. The time required for a compute node to initialize varies by system configuration.
  - Power permissions have not been assigned to the compute node through the Chassis Management Module.
  - The Lenovo Flex System Enterprise Chassis does not have enough power to turn on the compute node.
  - The Lenovo XClarity Controller in the compute node is not communicating with the Chassis Management Module.

  The power LED blink rate slows when the compute node is ready to be turned on.

- **Flashing slowly (One time per second)**: The compute node is connected to power through the Lenovo Flex System Enterprise Chassis and is ready to be turned on.

- **Lit continuously**: The compute node is connected to power through the Lenovo Flex System Enterprise Chassis and is turned on.

When the compute node is on, pressing this button causes an orderly shutdown of the compute node so that it can be removed safely from the chassis. This includes shutting down the operating system (if possible) and removing power from the compute node.

Attention: If an operating system is running, you might have to press the button for approximately 4 seconds to initiate the shutdown. This forces the operating system to shut down immediately. Data loss is possible.

6 Identification LED (blue)

The system administrator can remotely light this blue LED to aid in visually locating the compute node. When this LED is lit, the identification LED on the Lenovo Flex System Enterprise Chassis is also lit. The identification LED can be lit and turned off through the CMM **led** command, the CMM web interface and the Lenovo XClarity Administrator application (if installed).

- There are four states of identification LED:

Table 8. Identification LED state

LED state	Description	Operation required for this state

Off	– When the USB connector is not in shared mode, this is the default state and no operation required.
	
	– When the USB connector is in shared mode, this indicates that the USB connector is available to be switched to Lenovo XClarity Controller management mode, where you can access the Lenovo XClarity Controller directly via a mobile device connected to the USB connector of the compute node.
		– When the USB connector is not in shared mode, no operation required.
		
		– When the USB connector is in shared mode, to switch the USB connector to Lenovo XClarity Controller management mode, do the following:
		
		  1. Press the USB management button for three seconds, or
		
		  2. Use the Lenovo XClarity Controller

Solid On	Compute node is in locally manual operation status.	– When the USB connector is not in shared mode, use CMM or Lenovo XClarity Controller to return the ID LED to Off state.
		
		– When the USB connector is in shared mode, to switch the USB connector to Lenovo XClarity Controller management mode, do the following:
		
		  1. Press the USB management button for three seconds, or
		
		  2. Use the Lenovo XClarity Controller

Blinking (blink one time per second)		
Slow blinking (blink one time every two seconds)	Compute node is power on. The USB connector is in shared mode and in Lenovo XClarity Controller management mode, where you can access the Lenovo XClarity Controller directly via a mobile device connected to the USB connector of the compute node. ID LED state change is not available in the state.	To Switch the USB port to default mode, do the following: – Press USB management button for three seconds, or – Use the Lenovo XClarity Controller

- For more information about the CMM **led** command, see https://pubs.lenovo.com/cmm2/cli_command_led.

- From the CMM web interface, select **Compute Nodes** from the **Chassis Management** menu. For more information, see https://pubs.lenovo.com/cmm2/cmm_user_guide. All fields and options are described in the CMM web interface online help.

- For more information about the Lenovo XClarity Administrator application, see https://datacentersupport.lenovo.com/products/solutions-and-software/software/lenovo-xclarity/solutions/ht115665.

7 Fault LED (yellow)

When this yellow LED is lit, it indicates that a system error has occurred in the compute node. In addition, the fault LED on the chassis system LED panel is lit. You can check the CMM event log and the Light Path Diagnostics LEDs to determine the source of the condition. See "Light Path Diagnostics" on page 19 for more information about the LEDs on the compute node.

The fault LED turns off only after the error is corrected.

Note: When the fault LED turns off, you should also clear the Lenovo XClarity Controller event log. Use the Setup utility to clear the Lenovo XClarity Controller event log.

8 USB management button

Access this button by using a small pointed device.
After configuring the USB connector to shared mode in the Lenovo XClarity Controller web interface, you can press the button and held for 3 seconds to switch the USB 3.2 Gen 1 port between default mode and Lenovo XClarity Controller management mode.

Notes:

- Connect an USB device in one compute node at a time in each Lenovo Flex System Enterprise Chassis.

- When switched to Lenovo XClarity Controller management mode, the USB 3.2 Gen 1 connector only support USB 2.0 devices.

9 EDSFF drive bezel

The six EDSFF drive compute node should always operate with the EDSFF drive bezel installed.

Note: The EDSFF drive bezel is present only for compute node with EDSFF drives.

10 EDSFF drive bezel handle

Use this handle to assist EDSFF drive bezel removal and installation.

Note: The blue strip on the handle must be on the left side when the EDSFF drive bezel is installed on the EDSFF drive cage.

Light Path Diagnostics

Use this information as an overview of Light Path Diagnostics.

Light Path Diagnostics is a system of LEDs above the control panel and on various internal components of the compute node. When an error occurs, LEDs can be lit throughout the compute node to help identify the source of the error.

Light Path Diagnostics panel LEDs

Use this information to diagnose possible errors that are indicated by the Light Path Diagnostics panel LEDs.

The following illustration and table describe the LEDs on the Light Path Diagnostics panel and the Light Path Diagnostics LEDs on the system board.

See the *ThinkSystem SN550 V2 Maintenance Manual* for information about lighting the LEDs.

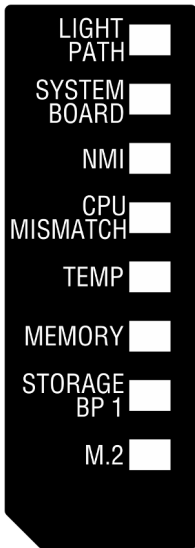**Note:** Additional information about error conditions is in the CMM event log.

Figure 6. Light Path Diagnostics panel LEDs

Table 9. Light Path Diagnostics LEDs

Light Path Diagnostics LED	Description
Light path	The power source for the Light Path Diagnostics LEDs is charged.
System board	The system board has failed.
NMI	The system board has failed.
CPU Mismatch	The processors are mismatched.
Temperature	The system temperature has exceeded a threshold level.
Memory	A memory error has occurred.
Storage BP 1	A drive backplane error has occurred.
M.2	A M.2 boot adapter error has occurred.

System-board LEDs
Use this information to locate the system-board LEDs.

The following illustration shows the locations of the LEDs on the system board.
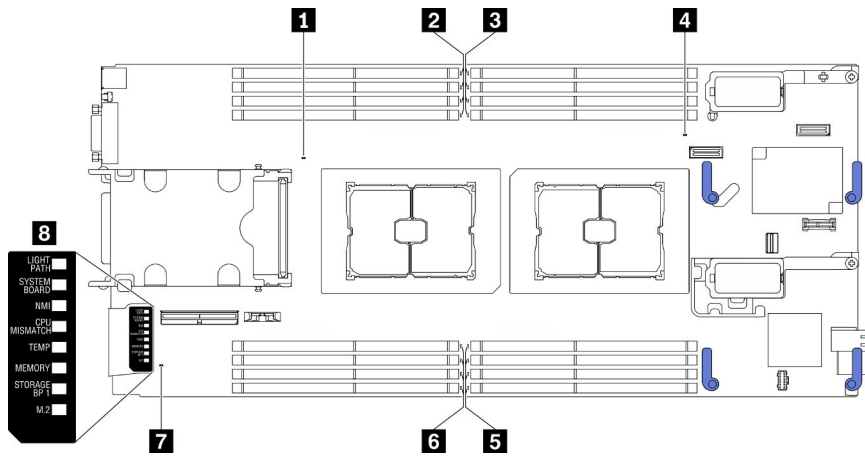
Figure 7. System-board LEDs

Table 10. System-board LEDs

1 Processor 2 error LED	**5** Memory module error 5–8 LEDs
2 Memory module error 9–12 LEDs	**6** Memory module error 13–16 LEDs
3 Memory module error 1–4 LEDs	**7** M.2 signal connector
4 Processor 1 error LED	**8** Light path diagnostics panel LEDs

See "Light Path Diagnostics panel LEDs" on page 19 for information about how to interpret the light path diagnostics panel LEDs.

KVM cable

Use this information for details about the KVM cable.

Use the KVM cable to connect external I/O devices to the compute node. The KVM cable connects through the KVM connector (see "Compute node controls, connectors, and LEDs" on page 15). The KVM cable has connectors for a display device (video), two USB 2.0 connectors for a USB keyboard and mouse, and a serial interface connector.

The KVM cable may also be referred to as the console breakout cable.

The following illustration identifies the connectors and components on the KVM cable.
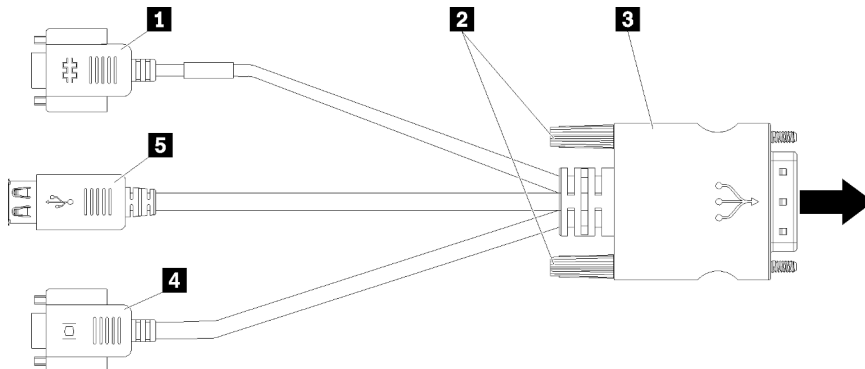

Figure 8. Connectors and components on the KVM cable

Table 11. Connectors and components on the KVM cable

1 Serial connector	**4** Video connector (blue)
2 Captive screws	**5** Two USB 2.0 connectors
3 Connecting to the KVM connector on the front panel of the compute node.	

System-board layout

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

System board connectors

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

The following illustration shows the system board components, including connectors for users to install optional devices in the compute node.
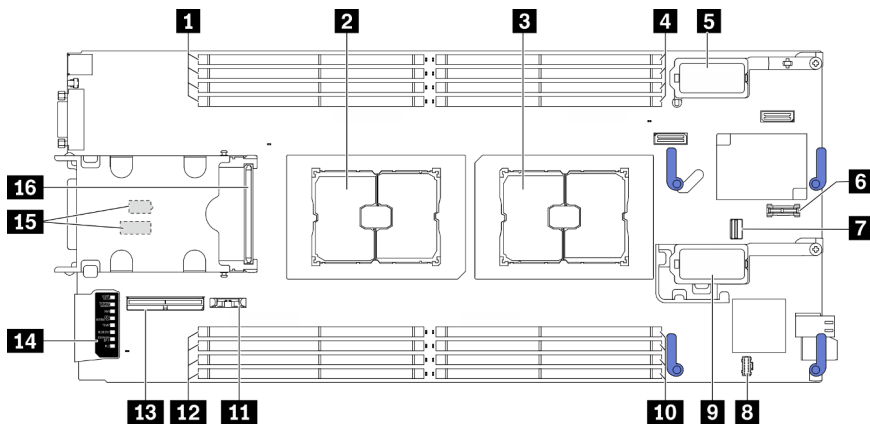

Figure 9. System-board connectors

Table 12. System-board connectors

1 Memory module slots 9–12	**9** I/O expansion adapter 2 connector **Note:** Ethernet I/O expansion adapter and fiber channel I/O expansion adapter.
2 Processor socket 2	**10** Memory module slots 5–8
3 Processor socket 1	**11** CMOS battery - CR2032
4 Memory module slots 1–4	**12** Memory module slots 13–16
5 I/O expansion adapter 1 connector. **Note:** Ethernet I/O expansion adapter only.	**13** EDSFF backplane cable connector
6 Trusted Platform Module (TPM) connector	**14** Light Path Diagnostics panel
7 M.2 signal socket	**15** Switch blocks **Note:** The switch blocks are located on the bottom side of the compute node.
8 M.2 power socket	**16** Hot-swap drive backplane connector

System-board switches

Use this information to locate the system-board switches.

Important:

1. Before you change any switch settings or move any jumpers, turn off the compute node; then, disconnect all power cords and external cables. Review the following information:

   - https://pubs.lenovo.com/safety_documentation/
   - "Installation Guidelines" on page 30, "Handling static-sensitive devices" on page 32
   - "Power off the compute node" on page 81

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

Attention: The switch blocks are located on the bottom side of the compute node. Remove the compute node from the chassis and carefully place it at the up-side-down orientation to access the switch blocks. To remove the compute node, see "Remove the compute node from chassis" on page 45.

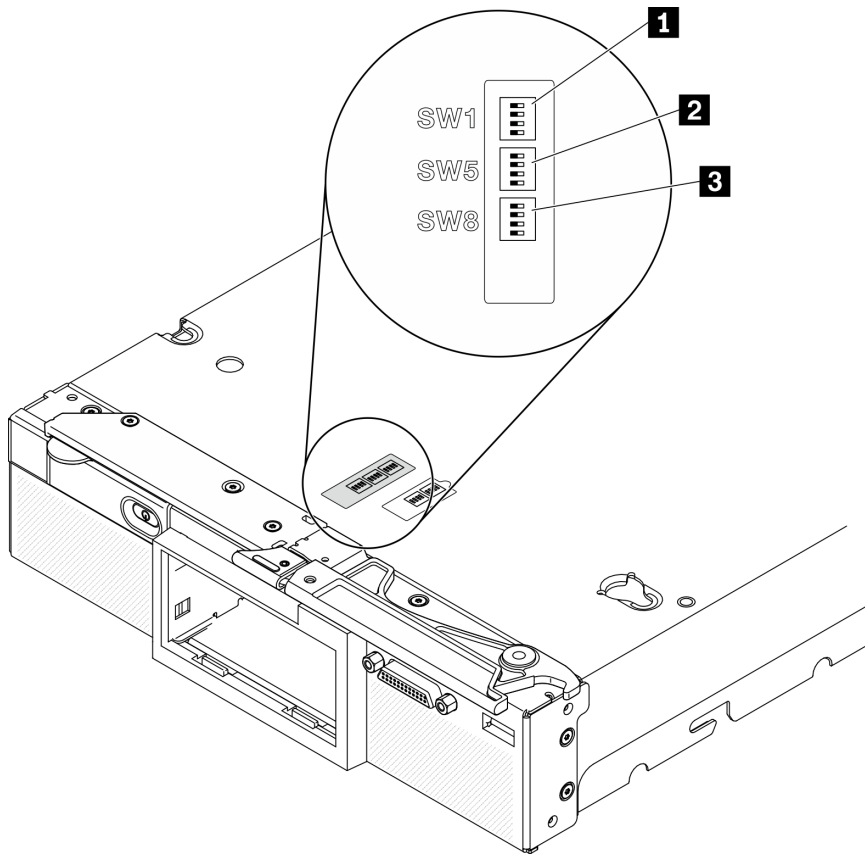The following illustration shows the location of the switch blocks on the bottom side of the compute node.

Figure 10. System-board switches

Table 13. System-board switch blocks

1 SW 1 switch block
2 SW 5 switch block
3 SW 8 switch block

Switch and jumper functions are as follows:

- All jumpers on the system board are reserved and should be removed.
- The following table describes the functions of the switches on switch block SW1.

Table 14. System-board switch block SW1

Switch number	**Description**	**Definition**
SW1–1	ME recovery	The default position is Off. Changing the switch to the On position to enable ME boots to recovery
SW1–2	ME firmware security override	The default position is Off. For debug only.
SW1–3	Power permission	The default position is Off. Changing this switch to the On position enables Power On
SW1-4	BMC reset	The default position is Off. Changing this switch to the On position forces the compute node to reset the BMC.

- The following table describes the functions of the switches on switch block SW5.

Table 15. System-board switch block SW5

Switch number	**Description**	**Definition**
SW5-1	Password override	The default position is Off. Changing this switch to the On position overrides the power-on password.
SW5-2	Reserved and should be kept in the off position.	
SW5-3	Real time clock (RTC) reset	The default position is Off. Changing this switch to the On position resets the RTC. A momentary toggle is all that is required. To avoid excessive CMOS battery drain, do not leave this switch in the On position.
SW5-4	Serial select	The default position is Off (send the serial input output (SIO) to the front serial port). Changing this switch to the On position sends the BMC to the serial port.

- The following table describes the functions of the switches on switch block SW8.

Table 16. System-board switch block SW8

Switch number	Description	Definition
SW8-1	Boot backup XClarity Controller	When the switch is in the default Off position, the compute node will boot by using the primary XClarity Controller firmware. When the switch is in the On position, the compute node will boot by using a backup of the XClarity Controller firmware.
SW8-2	Reserved and should be kept in the off position.	
SW8-3	iBMC force update	The default position is Off. Changing this switch to the On position bypasses the operational firmware image and performs a BMC firmware update, if the normal firmware update procedure results in an inoperative BMC. **Note:** Use this switch only if the normal firmware update procedure fails and the operational firmware image is corrupted. Use of this switch disables normal baseboard management controller operation.
SW8-4	Reserved and should be kept in the off position.	

Parts list

Use the parts list to identify each of the components that are available for the compute node.

For more information about ordering the parts shown in Figure 11 "Compute node components" on page 26:

https://datacentersupport.lenovo.com/products/servers/thinksystem/sn550v2/7z69/parts
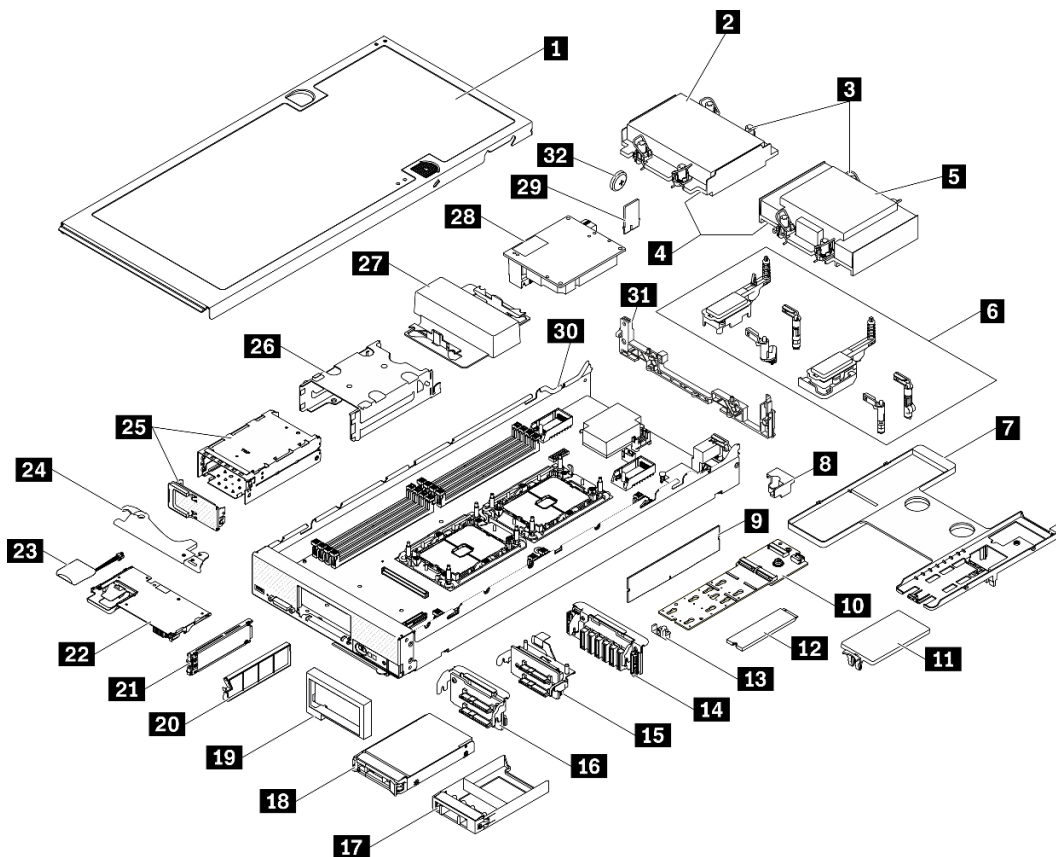
Figure 11. Compute node components

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 17. Parts list

Index	Description	Consumable and Structural part	Tier 1 CRU	Tier 2 CRU	FRU
For more information about ordering the parts shown in Figure 11 "Compute node components" on page 26, see https://datacentersupport.lenovo.com/products/servers/thinksystem/sn550v2/7z69/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	Compute node cover	√			
2	Front heat sink				√

Table 17. Parts list (continued)

Index	Description	Consumable and Structural part	Tier 1 CRU	Tier 2 CRU	FRU
3	Heat sink Torx T30			√	
4	Processor				√
5	Rear heat sink				√
6	Adapter retention assembly		√		
7	Air baffle	√	√		
8	Processor key		√		
9	Memory module		√		
10	M.2 backplane		√		
11	M.2 filler	√	√		
12	M.2 drive		√		
13	M.2 retainer		√		
14	EDSFF drive backplane		√		
15	2.5-inch drive backplane with lever		√		
16	2.5-inch drive backplane		√		
17	2.5 inch drive filler	√			
18	2.5-inch drive		√		
19	Front bezel	√			
20	EDSFF drive filler	√			
21	EDSFF drive		√		
22	RAID adapter		√		
23	Flash power module		√		
24	Front handle	√			
25	EDSFF drive cage with door	√	√		
26	Hot-swap drive cage	√	√		
27	Processor filler	√			
28	I/O expansion adapter		√		
29	Trusted Platform Module (TPM)				√
30	System board				√
31	Bulkhead	√			
32	CMOS battery (CR2032)	√			

Chapter 3. Compute node hardware setup

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

Compute node setup checklist

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

The compute node setup procedure varies depending on the configuration of the compute node when it was delivered. In some cases, the compute node is fully configured and you just need to connect the compute node to the network and an ac power source, and then you can power on the compute node. In other cases, the compute node 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 compute node:

1. Unpack the compute node package. See "Compute node package contents" on page 3.
2. Set up the compute node hardware.
    a. Install the required compute node components. See the related topics in "Install compute node hardware options" on page 44.
    b. Install the compute node into the chassis.
    c. Make sure the chassis is connected to power.

        Important: Make sure to check if the power supplies that are installed in the chassis support ThinkSystem SN550 V2. If not, replace them with compatible PSUs.
    d. Connect the management controller to the network.
    e. Power on the compute node.

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

        "Opening and Using the XClarity Controller Web Interface" section in the XCC documentation version compatible with your server at https://pubs.lenovo.com/lxcc-overview/.
    f. Validate that the compute node hardware was set up successfully. See "Validate compute node setup" on page 81.
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 83.
    b. Update the firmware for the compute node, if necessary. See "Update the firmware" on page 84.
    c. Configure the firmware for the compute node. See "Configure the firmware" on page 88.

        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 91.

 e. Back up the compute node configuration. See "Back up the server configuration" on page 92.

 f. Install the applications and programs for which the compute node is intended to be used.

Notes:

- The first generation Chassis Management Module (CMM1; 68Y7030) is not supported by the ThinkSystem SN550 V2 compute node.

- The second generation Chassis Management Module (CMM2; 00FJ669) must be at firmware level 1.6.1 or above to support the ThinkSystem SN550 V2 compute node. This applies to both CMMs that are installed in the chassis.

Installation Guidelines

Use the installation guidelines to install components in your server.

Before installing optional devices, read the following notices carefully:

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

- Read the safety information and guidelines to ensure that you work safely.

 – A complete list of safety information for all products is available at:

  https://pubs.lenovo.com/safety_documentation/

 – The following guideline are available as well: "Handling static-sensitive devices" on page 32.

- Make sure the components you are installing are supported by the server. For a list of supported optional components for the server, see https://serverproven.lenovo.com/.

- When you install a new server, download and apply the latest firmware. This will help ensure that any known issues are addressed, and that your server is ready to work with optimal performance. Go to ThinkSystem SN550 V2 Drivers and Software at http://datacentersupport.lenovo.com/products/servers/thinksystem/SN550v2 to download firmware updates for your server.

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

- Before you remove a compute node from the Lenovo Flex System Enterprise Chassis, you must shut down the operating system and turn off the compute node. You do not have to shut down the chassis itself.

- 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.

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

- Have the following list of screwdrivers available.

  - Small flat-blade screwdriver.
  - T8 torx screwdriver.
  - T10 torx screwdriver.
  - T15 torx screwdriver.
  - T30 torx screwdriver.

- To view the error LEDs on the system board and internal components, press and hold the power button on the control panel on the front of the compute node.

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

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

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

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

System reliability guidelines

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

Make sure the following requirements are met:

- To ensure proper cooling, the Flex System chassis is not operated without a compute node or node bay filler in each node bay.
- When the server comes with redundant power, a power supply must be installed in each power-supply bay.
- Adequate space around the server must be spared to allow server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place any object in front of the fans.
- For proper cooling and airflow, refit the server cover before you turn the power on. Do not operate the server for more than 30 minutes with the server cover removed, for it might damage server components.
- Cabling instructions that come with optional components must be followed.
- A failed fan must be replaced within 48 hours since malfunction.
- A removed hot-swap fan must be replaced within 30 seconds after removal.
- A removed hot-swap drive must be replaced within two minutes after removal.
- A removed hot-swap power supply must be replaced within two minutes after removal.

- Every air baffle that comes with the server must be installed when the server starts (some servers might come with more than one air baffle). Operating the server with a missing air baffle might damage the processor.
- All processor sockets must contain either a socket cover or a processor with heat sink.
- When more than one processor is installed, fan population rules for each server must be strictly followed.

Handling static-sensitive devices

Use this information to handle static-sensitive devices.

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

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

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.

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

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

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

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

Specific information about the required installation order of memory modules in your compute node based on the system configuration and memory mode that you are implementing is shown below.
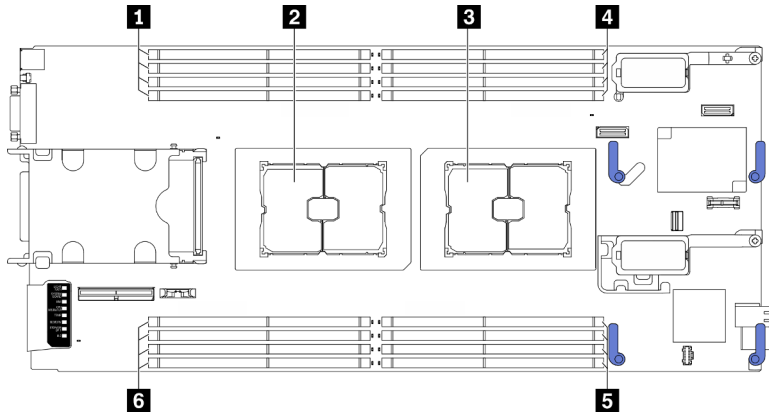
Figure 12. Memory module and processor location

Table 18. Memory module and processor location

1 Memory module slot 9–12	**4** Memory module slot 1–4
2 Processor socket 2	**5** Memory module slot 5–8
3 Processor socket 1	**6** Memory module slot 13–16

The memory-channel configuration table below shows the relationship between the processors, memory controllers, memory channels, and memory module slot numbers.

Table 19. Channel and slot information of DIMMs around a processor

Processor	Processor 1								Processor 2							
Channel	B	A	D	C	G	H	E	F	F	E	H	G	C	D	A	B
Memory module slot number	1	**2**	3	**4**	**5**	6	**7**	8	9	**10**	11	**12**	**13**	14	**15**	16

Memory module installation guideline

- Two types of configurations are supported. Consider corresponding rules and population sequence accordingly:

  – "DRAM memory module installation order" on page 34 (RDIMMs or 3DS RDIMMs)

  – "PMEM and DRAM DIMM installation order" on page 38

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

- At least one DIMM is required for each processor. Install at least eight DIMMs per processor for good performance.

- When you replace a DIMM, the server provides automatic DIMM enablement capability without requiring you to use the Setup utility to enable the new DIMM manually.

Attention:

- Mixing x4 and x8 DIMMs in the same channel is allowed.

- Install DIMMs of the same speed for optimal performance. Otherwise, the BIOS will find and run the lowest speed among all channels.

DRAM memory module installation order

This section contains information of how to install DRAM memory modules properly.

DRAM memory module installation order includes independent memory mode and memory mirroring mode.

Independent memory mode

Independent memory mode provides high performance memory capability. The memory channels can be populated with memory module in any order in independent mode. You can populate all eight channels on each processor in any order with no matching requirements. Individual channels can run at different memory module timings, but all channels must run at the same interface frequency.

Population rules

1. Do not mix RDIMMs and 3DS RDIMMs.
2. There should be at least one memory module per processor.
3. There should be equal number of memory module for each memory type.
4. Identical memory populations on all processors.
5. x4 and x8 memory modules can be mixed in the same channel.

Memory module capacity guideline

In independent memory mode, the system can be installed with up to two types of memory capacity.

Attention: Memory module numbers are divided into two groups, each should be populated with memory modules of the same capacity:

- Group of memory module slot number 2, 4, 5, 7, 10, 12, 13, and 15.
- Group of memory module slot number 1, 3, 6, 8, 9, 11, 14, and 16.

  See Table 19 "Channel and slot information of DIMMs around a processor" on page 33 for more information.

In independent memory mode, there are four types of memory module population sequences as listed below. See the memory module configuration sequence that matches your compute node configuration.

- "Independent mode memory module population sequence for one processor with same capacity memory modules" on page 34
- "Independent mode memory module population sequence for one processor with different capacity memory modules" on page 35
- "Independent mode memory module population sequence for two processors with same capacity memory modules" on page 35
- "Independent mode memory module population sequence for two processors with different capacity memory modules" on page 36

With one processor and same capacity memory modules

The following table shows memory population sequence of independent mode for **one** processor and **same** capacity memory modules.

Table 20. Independent mode memory module population sequence for one processor with same capacity memory modules

Processor		Processor 1							
Memory module slot number		1	**2**	3	**4**	**5**	6	**7**	8
Total number of memory module	1		2						
	2		2		4				
	4*		2		4	5		7	
	6	1	2		4	5		7	8
	8*†	1	2	3	4	5	6	7	8

Note:
*Sub NUMA Clustering (SNC2) feature can only be enabled when DIMMs are populated in this specified sequence. The SNC2 feature can be enabled via UEFI.

†DIMM configurations that support Software Guard Extensions (SGX), see "Enable Software Guard Extensions (SGX)" on page 90 to enable this feature.

With one processor and different capacity memory modules

The following table shows memory population sequence of independent mode for **one** processor and **different** capacity memory modules.

Attention: Memory module numbers are divided into two groups, each should be populated with memory modules of the same capacity:

- Group of memory module slot number 2, 4, 5, 7, 10, 12, 13, and 15.
- Group of memory module slot number 1, 3, 6, 8, 9, 11, 14, and 16.

  See Table 19 "Channel and slot information of DIMMs around a processor" on page 33 for more information.

Table 21. Independent mode memory module population sequence for one processor with different capacity memory modules

Processor		Processor 1							
Memory module slot number		1	**2**	3	**4**	**5**	6	**7**	**8**
Total number of memory module	2		2	3					
	4		2	3			6	7	

With two processor and same capacity memory modules

The following table shows memory population sequence of independent mode for **two** processors and **same** capacity memory modules.

Processor		Processor 1								Processor 2							
Memory module slot number		1	**2**	3	**4**	**5**	6	**7**	8	9	**10**	11	**12**	**13**	14	**15**	16
Total number of memory module	2		2													15	
	4		2		4									13		15	
	8*		2		4	5		7			10		12	13		15	
	12	1	2		4	5		7	8	9	10		12	13		15	16
	16*†	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

Note:
*Sub NUMA Clustering (SNC2) feature can only be enabled when DIMMs are populated in this specified sequence. The SNC2 feature can be enabled via UEFI.

†DIMM configurations that support Software Guard Extensions (SGX), see "Enable Software Guard Extensions (SGX)" on page 90 to enable this feature.

With two processor and different capacity memory modules

The following table shows memory population sequence of independent mode for **two** processors and **different** capacity memory modules.

Attention: Memory module numbers are divided into two groups, each should be populated with memory modules of the same capacity:

- Group of memory module slot number 2, 4, 5, 7, 10, 12, 13, and 15.
- Group of memory module slot number 1, 3, 6, 8, 9, 11, 14, and 16.

  See Table 19 "Channel and slot information of DIMMs around a processor" on page 33 for more information.

Table 23. Independent mode memory module population sequence for two processors with different capacity memory modules

Processor		Processor 1								Processor 2							
Memory module slot number		1	**2**	3	**4**	**5**	6	**7**	8	9	**10**	11	**12**	**13**	14	**15**	c
Total number of memory module	4		2	3											14	**15**	
	8		2	3			6	7			10	11			14	**15**	

Memory mirroring mode

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 memory modules on the primary channel to the memory modules on the backup channel. The memory module installation order for memory mirroring varies based on the number of processors and memory modules installed in the server.

Population rules

- Mirroring can be configured across two channels.

- The total memory size of primary and secondary channels must be the same. Identical memory modules installation required.
- For mirrored-channel mode, the memory module pair must be identical in size, type, and rank count.
- DRAM Memory Module Mirroring Mode is not supported in Persistent Memory App Direct Mode.

With one processor

The following table shows memory population sequence of mirroring mode for **one** processor.

Table 24. *Mirroring mode memory module population sequence for one processor*

Processor		Processor 1							
Memory module slot number		1	2	3	4	5	6	7	8
Total memory module	8	1	2	3	4	5	6	7	8

With two processors

The following table shows memory population sequence of mirroring mode for **two** processors.

Table 25. *Mirroring mode memory module population sequence for two processor*

Processor		Processor 1								Processor 2							
Memory module slot number		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Total memory module	16	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

PMEM and DRAM DIMM installation order

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

When PMEMs and DRAM DIMMs are mixed in the system, the following modes are supported:

- "App Direct Mode" on page 43
- "Memory Mode" on page 44

See the following topics to learn how to set up and configure PMEMs.

- "PMEM rules" on page 38
- "Setting up the system for PMEM for the first time" on page 38
- "PMEM Management options" on page 38
- "Adding or replacing PMEMs in App Direct Mode" on page 41

PMEM rules

Make sure to meet the following requirements when applying PMEMs in the system.

- All the PMEMs 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 with the same part number.
- Supported types of DRAM DIMMs and capacity vary with processors:

  - Processors with model name ending in **H**:

    - DRAM: 32/64 GB RDIMMs
    - PMEM: 128 GB

  - Processors with model name ending in **HL**:

    - DRAM: 128 GB 3DS RDIMMs
    - PMEM: 128, 256 or 512 GB

Setting up the system for PMEM for the first time

Complete the following steps when installing PMEMs to the system for the first time.

1. Consider "PMEM rules" on page 38 and acquire the PMEMs and DRAM DIMMs that meet the requirements.
2. Remove all the memory modules that are presently installed (see "Remove a memory module" in *Maintenance Manual*).
3. Follow the adopted combination to install all the PMEMs and DRAM DIMMs (see "Install a memory module" on page 63).
4. Disable security on all the installed PMEMs (see "PMEM Management options" on page 38).
5. Make sure the PMEM 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).
6. Configure the PMEMs so that the capacity is available for use (see "PMEM Management options" on page 38).

PMEM Management options

PMEMs can be managed with the following tools:

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

To open LXPM, power on the system and press the key specified in the on-screen instructions as soon as the logo screen appears. If a password has been set, enter the password to unlock LXPM. For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.

Go to **UEFI Setup ➙ System Settings ➙ Intel Optane PMEMs** to configure and manage PMEMs.

For more details, see the "UEFI setup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.

Note: If the text-based interface of Setup Utility opens instead of LXPM, go to **System Settings ➙ <F1> Start Control** and select **Tool Suite**. Then, reboot the system, and as soon as the logo screen appears, press the key specified in the on-screen instructions to open LXPM. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.)

- **Setup Utility**

  To enter Setup Utility:

  1. Power on the system and press the key specified in the on-screen instructions to open LXPM.

     (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.)

  2. Go to **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 as soon as the logo screen appears, press the key specified in the on-screen instructions.

  Go to **System Configuration and Boot Management ➙ System Settings ➙ Intel Optane PMEMs** to configure and manage PMEMs.

- **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://pubs.lenovo.com/lxce-onecli/download_use_onecli to learn how to download and use Lenovo XClarity Essentials OneCLI.

Following are the available management options:

- **Intel Optane PMEMs details**

  Select this option to view the following details concerning each of the installed PMEMs:

  – Number of Intel Optane PMEMs detected
  – Total raw capacity
  – Total memory capacity
  – Total App Direct capacity
  – Total unconfigured capacity
  – Total inaccessible capacity
  – Total reserved capacity

  Alternatively, view PMEM details with the following command in OneCLI:

  ```
  OneCli.exe config show IntelOptanePMEM --bmc XCC_Account:XCC_Password@XCC_IP
  ```

  Notes:
  – *XCC_Account* stands for XCC user ID.
  – *XCC_Password* stands for XCC user password.
  – *XCC_IP* stands for XCC IP address.

- **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 per processor.

- **Namespaces**

  App Direct capacity of PMEMs 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 *powershell* command. To create a namespace, use Windows Server 2019 or later versions.

  - 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, PMEM 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.

    PMEMs can be secured with passphrases. Two types of passphrase protection scope are available for PMEM:

  - **Platform:** Choose this option to run security operation on all the installed PMEM units at once. A platform passphrase is stored and automatically applied to unlock PMEMs 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 IntelOptanePMEM.SecurityOperation "Enable Security" --imm USERID:
           PASSWORD@10.104.195.86
           ```
        2. Set the security passphrase.
           ```
           onecli.exe config set IntelOptanePMEM.SecurityPassphrase "123456" --imm USERID:
           PASSWORD@10.104.195.86 --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 IntelOptanePMEM.SecurityOperation "Disable Security" --imm USERID:
           PASSWORD@10.104.195.86
           ```
        2. Enter passphrase.
           ```
           onecli.exe config set IntelOptanePMEM.SecurityPassphrase "123456" --imm USERID:
           PASSWORD@10.104.195.86
           ```
        3. Reboot the system.

- **Single PMEM:** Choose this option to run security operation on one or more selected PMEM units.

    Notes:

    - Single PMEM 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 PMEMs 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 PMEMs enter "exceeded" state with a system warning message, and the PMEM 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`

- **PMEM Configuration**

  PMEM 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 "Diagnostics" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/). 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 IntelOptanePMEM.PercentageRemainingThresholds 20 --imm USERID:PASSWORD@10.104.195.86`

  Where _20_ is the selectable percentage.

Adding or replacing PMEMs in App Direct Mode

Complete the following steps before adding or replacing PMEMs in App Direct Mode.

1. Back up stored data in PMEM namespaces.

2. Disable PMEM security with one of the following options:

- **LXPM**

  Go to **UEFI Setup ➙ System Settings ➙ Intel Optane PMEMs ➙ Security ➙ Press to Disable Security**, and input passphrase to disable security.

- **Setup Utility**

  Go to **System Configuration and Boot Management ➙ System Settings ➙ Intel Optane PMEMs ➙ Security ➙ Press to Disable Security**, and input passphrase to disable security.

3. Delete namespaces with command corresponding to the operating system that is installed:

- **Linux** command:
  `ndctl destroy-namespace all -f`

- **Windows** Powershell command:
  `Get-PmemDisk | Remove-PmemDisk`

4. Clear Platform Configuration Data (PCD) and Namespace Label Storage Area (LSA) with the following ipmctl command (for both Linux and Windows).
   `ipmctl delete -pcd`

   Notes: See the following links to learn how to download and use impctl in different operating systems:

- Windows: https://datacentersupport.lenovo.com/us/en/videos/YTV101407

- Linux: https://datacentersupport.lenovo.com/us/en/solutions/HT508642

5. Reboot the system.

App Direct Mode

In this mode, PMEMs act as independent and persistent memory resources directly accessible by specific applications, and DRAM memory modules act as system memory.

With one processor

Table 26. Memory population in App Direct Mode with one processor

• **D: DRAM memory modules with 16 GB or larger capacity**								
• **P: Persistent Memory Module (PMEM)**								

Configuration	Processor 1							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
4 PMEMs and 4 DRAM memory modules	D	**P**	D	**P**	**P**	D	**P**	D
1 PMEMs and 6 DRAM memory modules*	D	D	**P**	D	D		D	D

Note: * Not-interleaved mode only. Does not support 100% interleaved mode.

With two processors

Table 27. Memory population in App Direct Mode with two processors

• **D: DRAM memory modules with 16 GB or larger capacity**															
• **P: Persistent Memory Module (PMEM)**															

Configuration	Processor 1								Processor 2							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
8 PMEMs and 8 DRAM memory modules	D	**P**	D	**P**	**P**	D	**P**	D	D	**P**	D	**P**	**P**	D	**P**	D
2 PMEMs and 12 DRAM memory modules*	D	D	**P**	D	D		D	D	D	D		D	D	**P**	D	D

Note: * Not-interleaved mode only. Does not support 100% interleaved mode.

Memory Mode

In this mode, PMEMs act as volatile system memory, while DRAM memory modules act as cache.

With one processor

Table 28. Memory population in Memory Mode with one processor

• D: DRAM memory modules with 16 GB or larger capacity • P: Persistent Memory Module (PMEM)								
Configuration	**Processor 1**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
4 PMEMs and 4 DRAM memory modules	D	**P**	D	**P**	**P**	D	**P**	D

With two processors

Table 29. Memory population in Memory Mode with two processors

• D: DRAM memory modules with 16 GB or larger capacity • P: Persistent Memory Module (PMEM)																
Configuration	**Processor 1**								**Processor 2**							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**
8 PMEMs and 8 DRAM memory modules	D	**P**	D	**P**	**P**	D	**P**	D	D	**P**	D	**P**	**P**	D	**P**	D

Install compute node hardware options

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

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

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

- Make sure the components you are installing are supported by the server. For a list of supported optional components for the server, see https://serverproven.lenovo.com/.

- 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 SN550 V2 Drivers and Software at http://datacentersupport.lenovo.com/products/servers/thinksystem/SN550v2 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 compute node from chassis

Use this information to install the compute node in the Lenovo Flex System Enterprise Chassis chassis.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
- Make note of the number of the node bay from which you are removing the compute node.
- Make sure you have a node bay filler available if a compute node will not be immediately reinstalled to the node bay.

Procedure
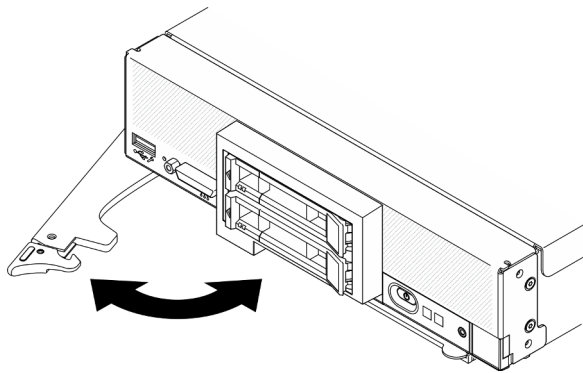
Figure 13. Compute node removal from chassis

Step 1. Release and rotate the front handle as shown in the illustration. The compute node moves out of the node bay approximately 0.6 cm (0.25 inch).

   Attention:

   - To maintain proper system cooling, do not operate the Lenovo Flex System Enterprise Chassis without a compute node or node bay filler installed in each node bay.
   - When you remove the compute node, note the node bay number. Reinstalling a compute node into a different node bay from the one it was removed from can have unintended consequences. Some configuration information and update options are established according to the node bay number. If you reinstall the compute node into a different node bay, you might have to reconfigure the compute node.

Step 2. Remove the compute node.

   a. Pull the compute node out about half way out of the node bay.

   b. Hold the compute node on both sides.

   c. Pull the compute node entirely out of the node bay.

Step 3. Carefully lay the compute node on a flat, static-protective surface, orienting its bezel pointing toward you.

Step 4. Install either a node bay filler or another compute node in the node bay within 1 minute.

Demo video

Watch the procedure on YouTube

Remove the compute node cover

Remove the top cover by pulling up the cover-release latch and sliding the cover toward the rear of the compute node.

S014

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

S033

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

About this task

Attention: Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

Procedure

Step 1.   Remove the top cover.

      a.   ❶ Press the release button.

      b.   ❷ Slide the cover toward the rear of the compute node; then, lift up the cover.
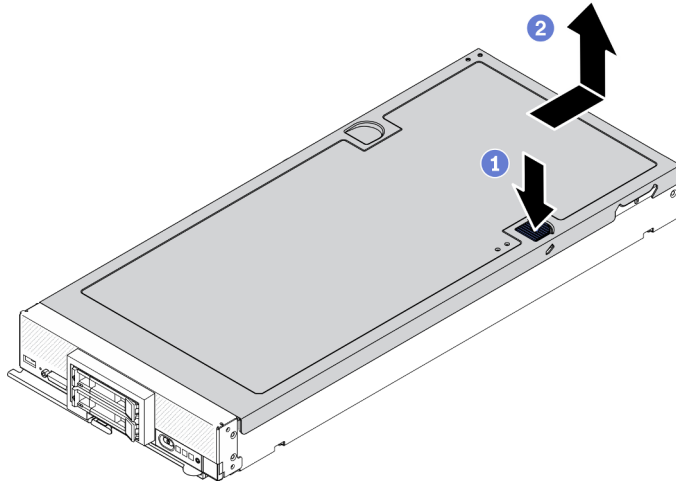
Figure 14. Compute node cover removal

Step 2. Lay the cover flat or store it for future use.

> **Attention:** You cannot insert the compute node into the Lenovo Flex System Enterprise Chassis until the cover is installed and closed. Do not attempt to override this protection.

Demo video

Watch the procedure on YouTube

Remove the air baffle

If you intend to install memory modules in the compute node, you must first remove the air baffle from the compute node. Remove the air baffle by placing your fingers under the air baffle and lifting it out of the compute node.

About this task

Attention: Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

Procedure

Step 1. If there is an M.2 backplane assembly installed on the air baffle, disconnect the M.2 cables from the M.2 backplane. See "Remove the M.2 adapter assembly" in *ThinkSystem SN550 V2 Maintenance Manual*.

Step 2. Lift up the air baffle and set it aside.
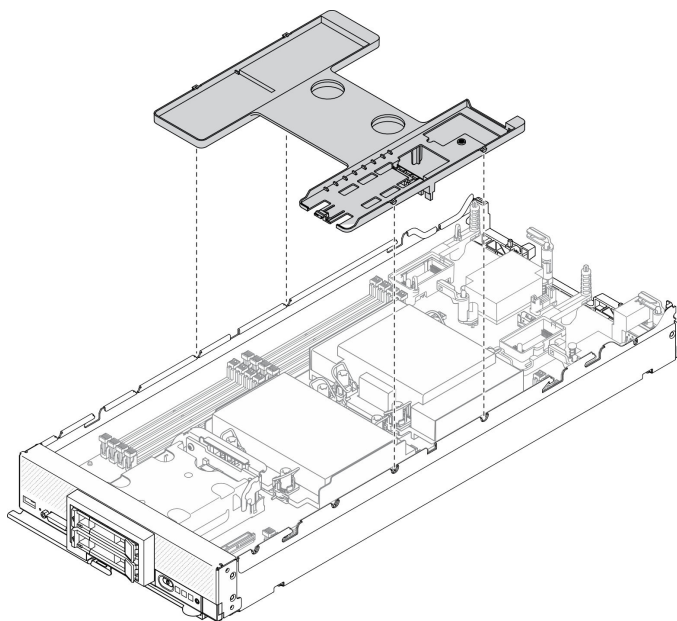
Figure 15. Air baffle removal

After you finish

Attention:

- For proper cooling and airflow, reinstall the air baffle before you turn on the compute node. Operating the compute node without the air baffle installed might damage compute node components.
- To maintain proper system cooling, do not operate the compute node without an M.2 backplane assembly or an M.2 backplane assembly filler installed on the air baffle.

Demo video

Watch the procedure on YouTube

Remove a hot-swap drive

Use the following information to remove a hot-swap drive.

Remove a 2.5-inch hot-swap drive

Use this information to remove a 2.5-inch drive.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.
- If one or more NVMe solid-state drives are to be removed, it is recommended to disable them beforehand via the operating system.
- Before you make changes to the drives, drive controllers, drive backplanes, or drive cables, make sure to back up all important data stored in drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

- Make sure you have the drive bay filler available if no drives are going to be installed after the removal.

Procedure

Step 1. Make a note of the number of the drive bay from which you removing the drive from. Drives must be installed in the bay from which they were removed.

Step 2. Remove the 2.5-inch hot-swap drive.

    a. ❶ Pull the release latch on the drive.

    b. ❷ Hold the handle to pull the drive slightly out.

    c. ❸ Pull the drive out of the drive bay.
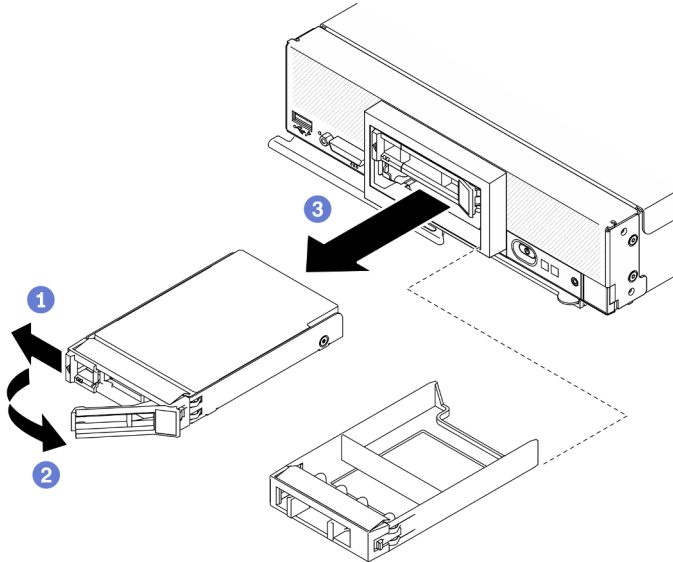
Figure 16. 2.5-inch hot-swap drive removal

Step 3. If no drives are going to be installed in the drive bay, insert filler into the drive bay.
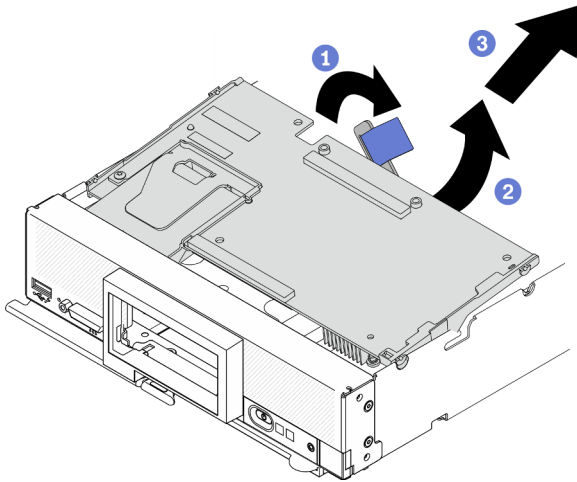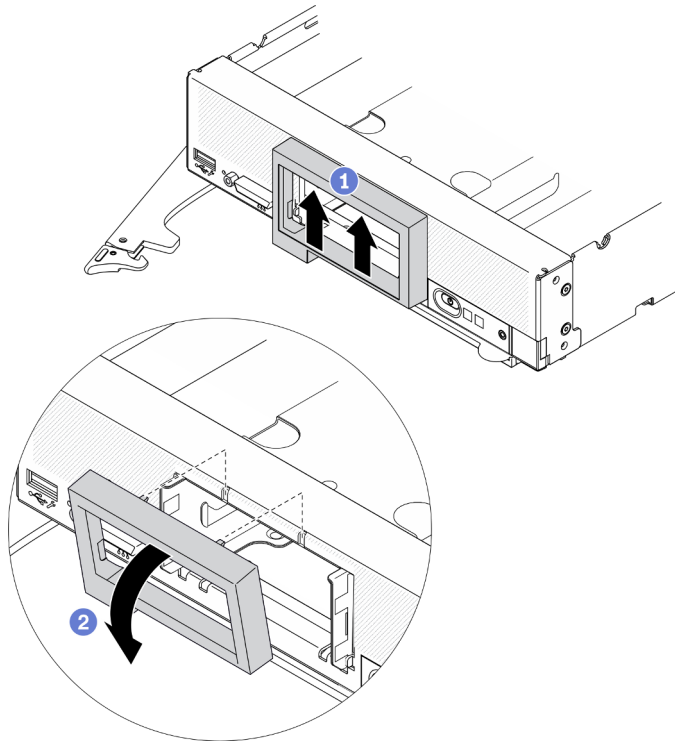
After you finish

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

Demo video

Watch the procedure on YouTube

Remove an EDSFF hot-swap drive

Use this information to remove a EDSFF hot-swap drive.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.
- If one or more EDSFF drives are to be removed, it is recommended to disable them beforehand via the operating system.

- Before you make changes to the drives, drive controllers, drive backplanes, or drive cables, make sure to back up all important data stored in drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.
- Make sure you have the drive bay filler available if no EDSFF drives are going to be installed after the removal.

Important: **Only** touch and hold the EDSFF drive handle when removing EDSFF drive from the compute node. EDSFF drive may be damaged if you touch parts other than the handle before the EDSFF drive is completely removed out of the compute node.
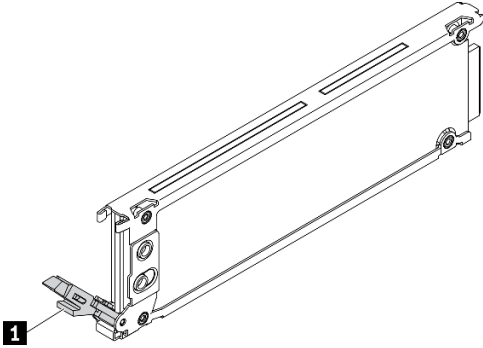
Figure 17. EDSFF drive handle

Table 30. EDSFF drive handle

1 EDSFF drive handle

Procedure

Step 1. Make a note of the number of the drive bay from which your are removing the drive. Drives must be installed in the bay from which they were removed.

Step 2. Hold the handle of the EDSFF drive cage bezel and pull it out of the compute node to access the EDSFF drives.
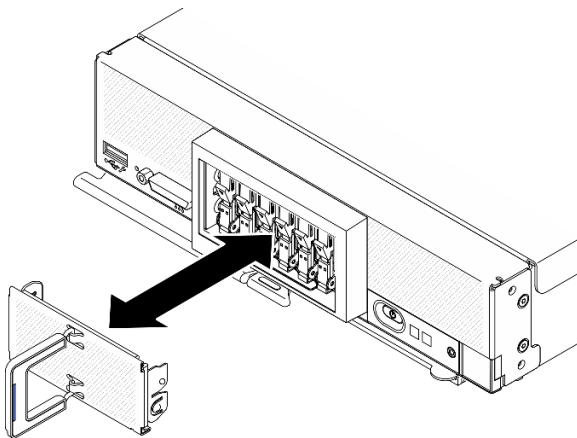
Figure 18. EDSFF drive cage bezel removal

Step 3. Remove the EDSFF hot-swap drive.

    a. ❶ Slightly press down the handle on the EDSFF drive.

b. ❷ Rotate the handle to the open position.

c. ❸ Hold the handle to remove the drive out of the drive bay.

Attention: Only touch and hold the EDSFF drive handle when removing EDSFF drive from the compute node. EDSFF drive may be damaged if you touch parts other than the handle before the EDSFF drive is completely removed out of the compute node.
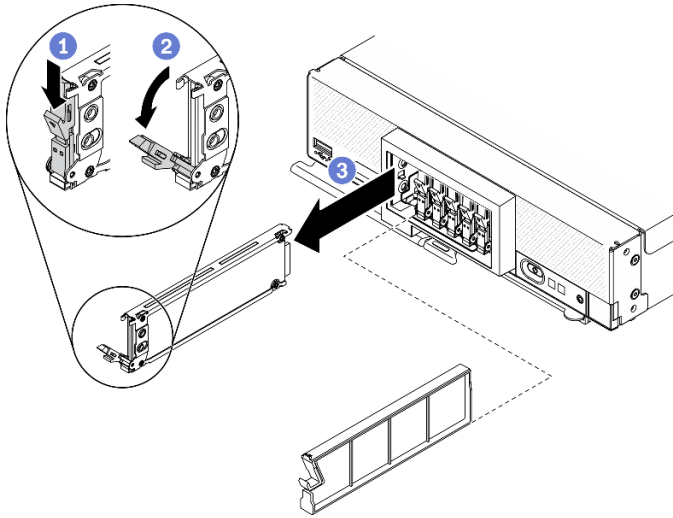
Figure 19. EDSFF hot-swap drive removal

After you finish

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

Demo video

Watch the procedure on YouTube

Remove the RAID adapter

Use this information to remove the RAID adapter.

About this task

Attention: Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

Procedure

Step 1.   Remove the RAID adapter.

a. ❶ Rotate the lever on the 2.5-inch drive backplane.

b. ❷ The RAID adapter disengages from the connector on the backplane.

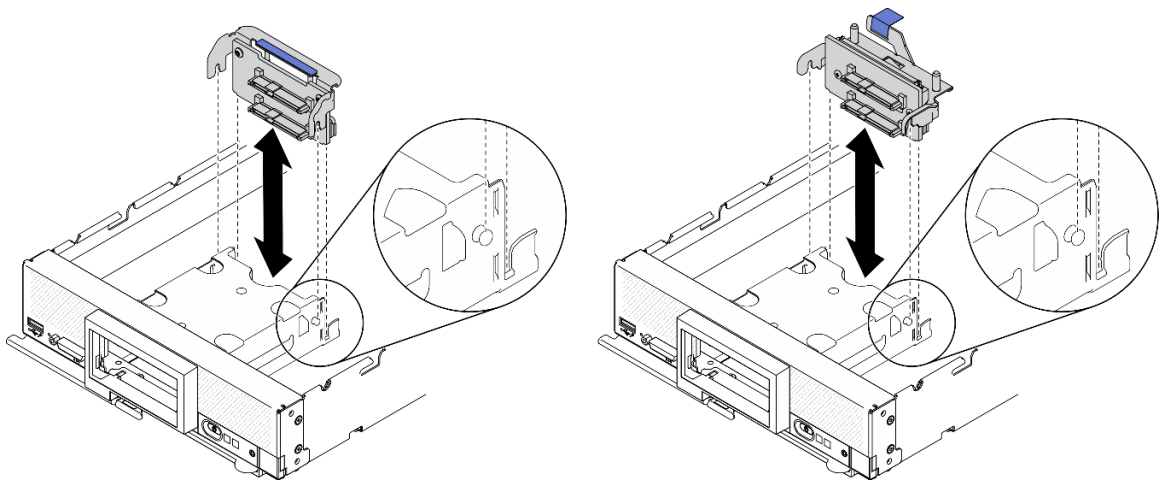c. ❸ Lift up the RAID adapter and remove it from the compute node.

Figure 20. RAID adapter removal

After you finish

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

Demo video

Watch the procedure on YouTube

Remove the front bezel

Use this information to remove the front bezel

About this task

Attention: Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

Procedure

Step 1.   Rotate the front handle of the computer node to the open position.

Step 2.   Install the front bezel to the compute node.

      a.   ❶ Press from the underneath of front bezel's top edge.

      b.   ❷ Rotate the front bezel outward and remove it away from the compute node.

Figure 21. Front bezel removal

After you finish

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

Demo video

Watch the procedure on YouTube

Remove the EDSFF drive cage

Use this information to remove the EDSFF drive cage

About this task

Attention: Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

Procedure

Step 1. Remove the EDSFF drive cage.

    a. ❶ Press and hold the release latch on the EDSFF drive cage.

    b. ❷ Pull the EDSFF drive cage out of the compute node.
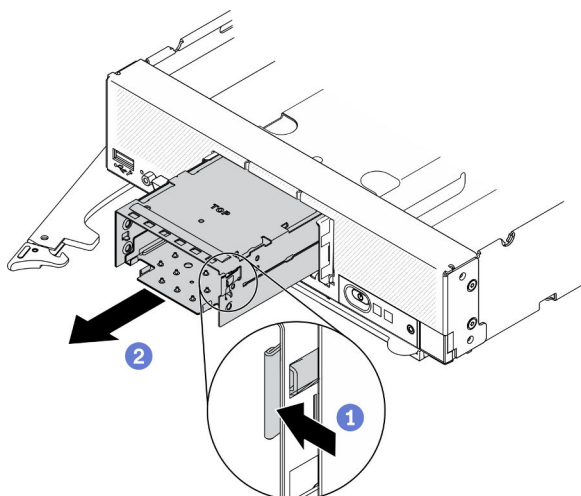
Figure 22. EDSFF drive cage removal

After you finish

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

Demo video

Watch the procedure on YouTube

Remove the hot-swap drive backplane

Use the following information to remove the storage drive backplane.

Remove the 2.5-inch hot-swap drive backplane

Use this information to remove the 2.5-inch hot-swap drive backplane.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.
- Before you make changes to the drives, drive controllers, drive backplanes, or drive cables, make sure to back up all important data stored in drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

Note: Several different types of 2.5-inch drive backplanes can be installed in the compute node. For example, some 2.5-inch drive backplanes come with a lever, while others don't (refer to the illustrations below). All are removed and installed in a similar manner.

Procedure

Step 1. Pull the drives and fillers out slightly from the drive bays to disengage them from the backplane.

Step 2. Lift up the backplane.

Figure 23. 2.5-inch drive backplane removal

After you finish

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

Demo video

Watch the procedure on YouTube

Remove the EDSFF hot-swap drive backplane

Use this information to remove the EDSFF hot-swap drive backplane.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.
- Before you make changes to the drives, drive controllers, drive backplanes, or drive cables, make sure to back up all important data stored in drives.
- Before you remove any component of a RAID array (drive, RAID card, etc.), back up all RAID configuration information.

Note: Several different types of 2.5-inch drive backplanes can be installed in the compute node. For example, some 2.5-inch drive backplanes come with a lever, while others don't (refer to the illustrations below). All are removed and installed in a similar manner.

Procedure

Step 1.   Remove the backplane assembly.

        a.   ❶ Press the latch on cable and disconnect the cable from system board.

        b.   ❷ Lift up the backplane from the connector on system board and remove the backplane away from the compute node.
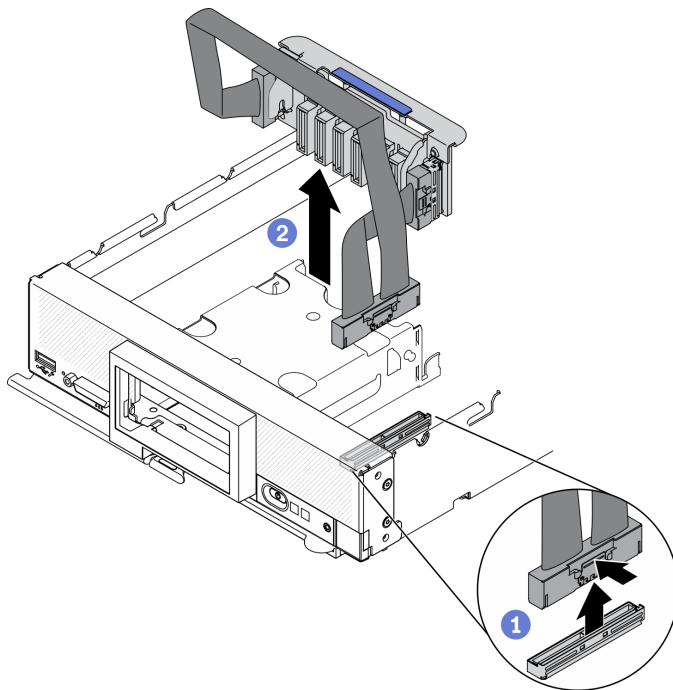
Figure 24. EDSFF drive backplane assembly removal

Attention: Strictly observe the following instructions to avoid damaging cable sockets on the system board. Any damage to the cable sockets might require replacing the system board.

- Connect cable connectors vertically or horizontally in alignment with the orientations of the corresponding cable sockets, avoiding any tilt.
- To disconnect cables from the system board, do as follows:
  1. Press and hold all latches, release tabs, or locks on cable connectors to release the cable connectors.
  2. Remove the cable connectors vertically or horizontally in alignment with the orientations of the corresponding cable sockets, avoiding any tilt.

     Note: The cable connectors might look different from those in the illustration, but the removal procedure is the same.
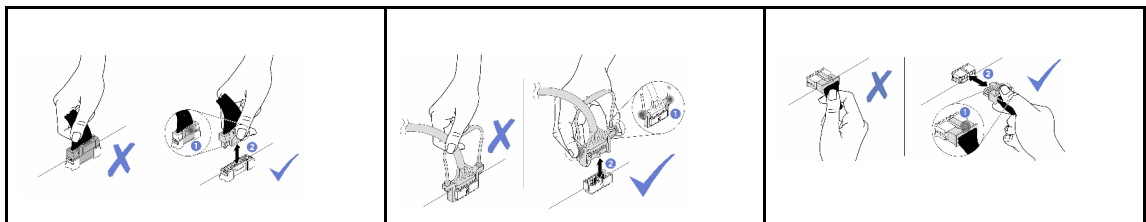
Step 2. Disconnect the cable from the backplane.
   a. ❶ Press the latches on both ends of the cable.
   b. ❷ Pull the connector away from the backplane.
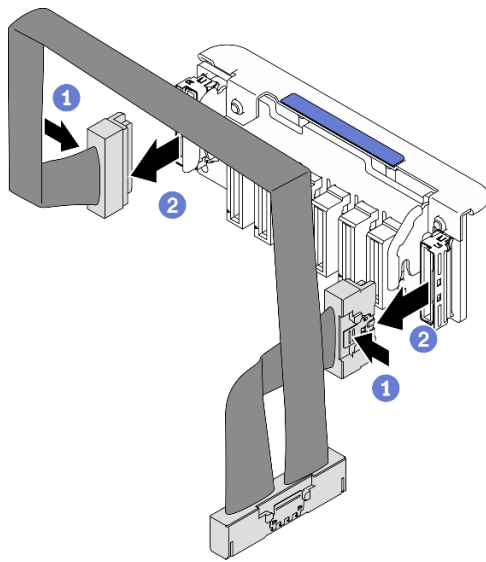
Figure 25. Disconnecting cable from EDSFF backplane

After you finish

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

Demo video

Watch the procedure on YouTube

Install a processor-heat-sink module

This task has instructions for installing an assembled processor and heat sink, known as a processor-heat-sink module (PHM). This task requires a Torx T30 driver. This procedure must be executed by a trained technician.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.
- 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.
- 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.
- 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 the electrical connectors in the processor socket.
- Remove and install only one PHM at a time.

- Make sure you have an alcohol cleaning pad (part number 00MP352), thermal grease, and Torx T30 screwdriver available.

Important: Make sure to install the processor option in processor socket 2.

Notes:
1. The compute node supports one I/O expansion adapter when installed with one processor, and two I/O expansion adapters when installed with two processors. At least one I/O expansion adapter should be installed in the compute node.
2. EDSFF drive feature requires installing two processors in the compute node.
3. Empty processor socket must always contain a socket cover and a filler before the compute node is powered on.
4. Select processor heat sink according to processor TDP and placement in the compute node.
   - If the processor TDP is lower than or equal to 165 watts, select front standard heat sink.
   - If the processor TDP is higher than 165 watts, select front performance heat sink.

The following illustration shows the PHM locations on system board.
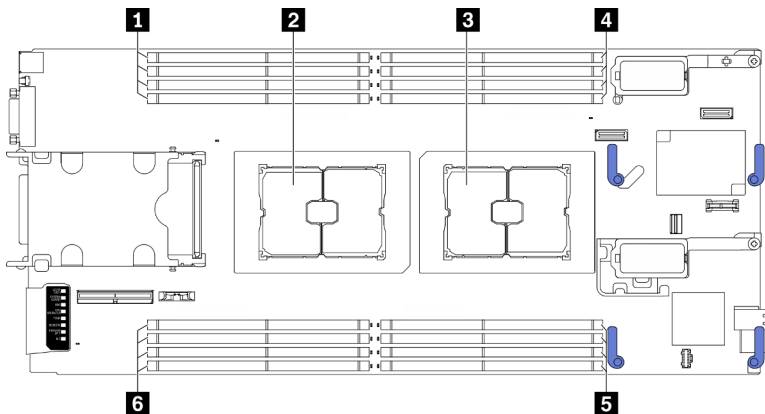
Figure 26. Location of memory modules and processor sockets

Table 31. Location of memory modules and processors

▪1 Memory module slots 9–12	▪4 Memory module slots 1–4
▪2 Processor socket 2	▪5 Memory module slots 5–8
▪3 Processor socket 1	▪6 Memory module slots 13–16

Note: Processor option can only be installed in processor socket 2.

The following illustration shows the components of the PHM.
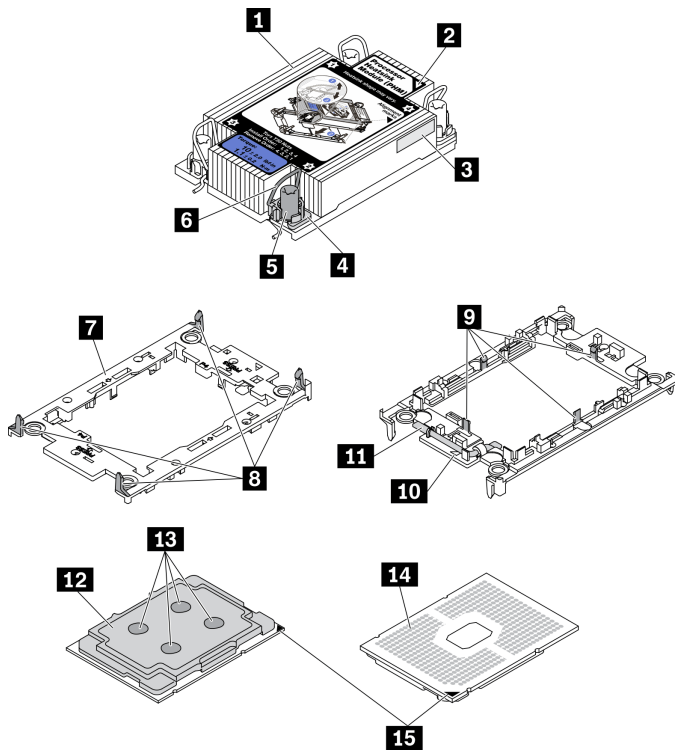
Figure 27. PHM components

1 Heat sink		**9** Clips to secure processor in carrier	
2 Heat sink triangular mark		**10** Carrier triangular mark	
3 Processor identification label		**11** Processor ejector handle	
4 Nut and wire bail retainer		**12** Processor heat spreader	
5 Torx T30 nut		**13** Thermal grease	
6 Anti-tilt wire bail		**14** Processor contacts	
7 Processor carrier		**15** Processor triangular mark	
8 Clips to secure carrier to heat sink			

Notes:

- The heat sink, processor, and processor carrier for your system might be different from those shown in the illustrations.

- PHMs are keyed for the socket where they can be installed and for their orientation in the socket.

- See https://serverproven.lenovo.com/ 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 84.

Procedure

Step 1. If you are replacing a processor and reusing the heat sink,

a. Remove the processor identification label from the heat sink and replace it with the new label that comes with the replacement processor.

b. If there is any old thermal grease on the heat sink, wipe the thermal grease from the bottom of the heat sink with an alcohol cleaning pad.

   Note: Afterwards, proceed to Step 3.

Step 2. If you are replacing a heat sink and reusing the processor.

   a. Remove the processor identification label from the old heat sink and place it on the new heat sink in the same location. The label is on the side of the heat sink closest to the triangular alignment mark.

   Note: If you are unable to remove the label and place it on the new heat sink, or if the label is damaged during transfer, write the processor serial number from the processor identification label on the new heat sink in the same location as the label would be placed using a permanent marker.

   b. Install processor in new carrier.

   Note: Replacement heat sinks come with both gray and black processor carriers. Make sure to use the carrier with the same color as the one you discarded earlier.

   1. ❶ Make sure the handle on the carrier is in the closed position.
   2. ❷ Align the processor on the new carrier so that the triangular marks align; then, insert the marked end of the processor into the carrier.
   3. ❸ Hold the inserted end of the processor in place; then, pivot the unmarked end of the carrier down and away from the processor.
   4. ❹ Press the processor and secure the unmarked end under the clip on the carrier.
   5. ❺ Carefully pivot the sides of the carrier down and away from the processor.
   6. ❻ Press the processor and secure the sides under the clips on the carrier.

   Note: To prevent the processor from falling out of the carrier, keep the processor-contact side up and hold the processor-carrier assembly by the sides of the carrier.
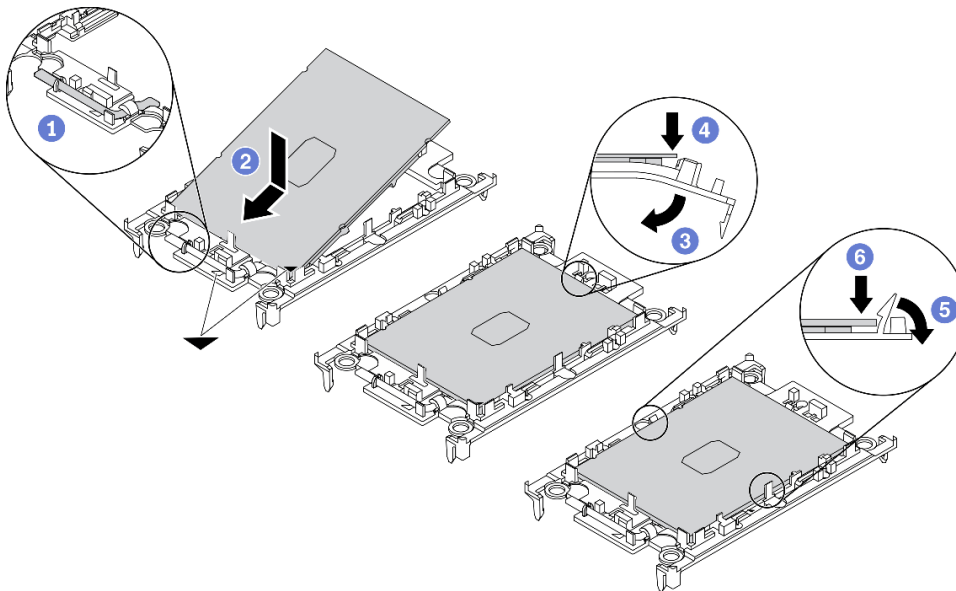
Figure 28. Processor carrier installation

Step 3. Apply thermal grease.

a. Carefully place the processor and carrier in the shipping tray with the processor-contact side down. Make sure the triangular mark on the carrier is aligned with the triangular mark in the shipping tray.

b. If there is any old thermal grease on the processor, gently wipe the top of the processor with an alcohol cleaning pad.

   Note: Make sure the alcohol has fully evaporated before applying new thermal grease.

c. Apply the thermal grease on the top of the processor with syringe by forming four uniformly spaced dots, while each dot consists of about 0.1 ml of thermal grease.
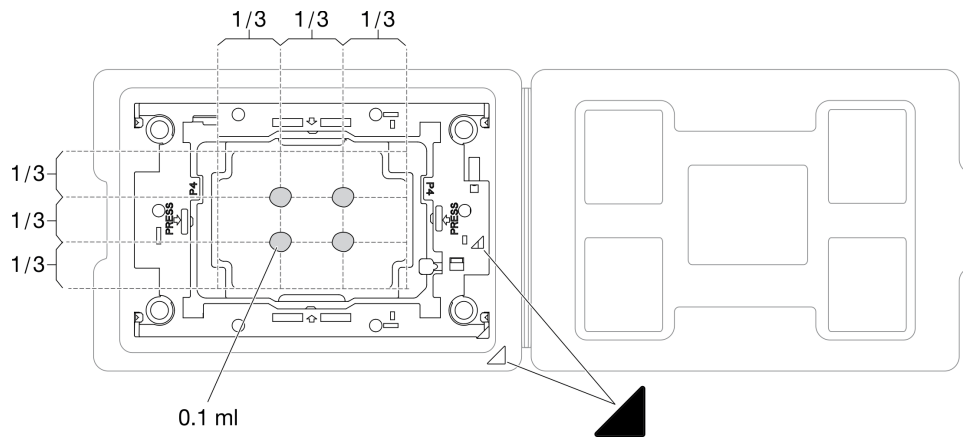
Figure 29. Thermal grease application with processor in shipping tray

Step 4. Assemble the processor and heat sink.

a. Turn your heat sink over and place it on a flat surface.

b. Hold the processor-carrier assembly by the sides of the carrier with the processor-contact side up.

c. Align the triangular mark on the processor carrier and processor with the triangular mark or notched corner on the heat sink.

d. Install the processor-carrier assembly onto the heat sink.

e. Press the carrier into place until the clips at all four corners engage.
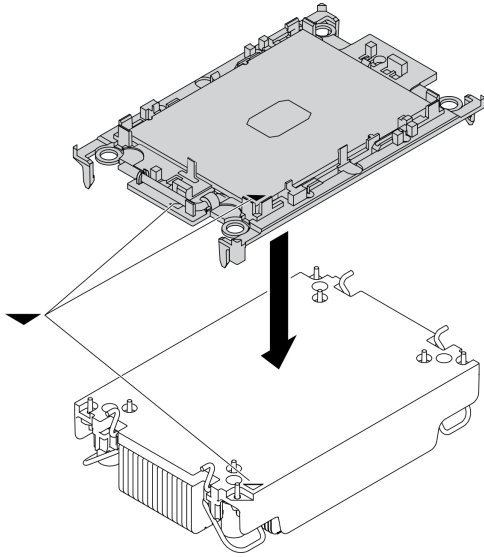
Figure 30. Assembling the PHM

Step 5. Install the processor-heat-sink module into the system board socket.

a. ❶ Turn over the heat sink. Rotate the anti-tilt wire bails on the heat sink inward.

b. ❷ Align the triangular mark and four Torx T30 nuts on the PHM with the triangular mark and threaded posts of the processor socket; then, insert the PHM into the processor socket.

c. ❸ Rotate the anti-tilt wire bails outward until they engage with the hooks in the socket.

d. ❹ Fully tighten the Torx T30 nuts *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 fasteners to fully tighten is 1.1 newton-meters, 10 inch-pounds).
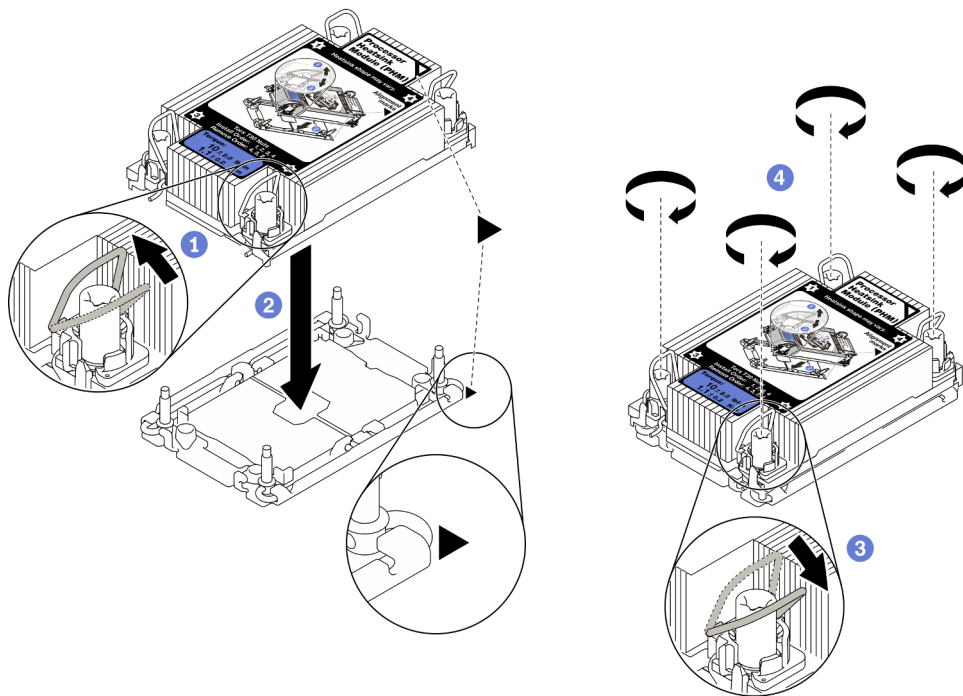
Figure 31. PHM installation

After you finish

Attention: Empty processor socket must always contain a socket cover and a filler before the compute node is powered on.

Demo video

Watch the procedure on YouTube

Install a memory module

Use this information to install a memory module option.

About this task

See "Memory module installation rules and order" on page 32 for detailed information about memory configuration and setup.

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.
- Make sure to adopt one of the supported configurations listed in "Memory module installation rules and order" on page 32.
- Memory modules are sensitive to static discharge and require special handling. Refer to the standard guidelines at "Handling static-sensitive devices" on page 32:
  - 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 do not touch each other. 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.
- Do not use any metal tools (such as jigs or clamps) to handle the memory modules, because the rigid metals may damage the memory modules.
- Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.

Important: Remove or install memory modules for one processor at a time.

Procedure

Step 1. If any of the modules to be installed is PMEM, make sure to complete the following procedure before physically installing the module:

1. Back up stored data in PMEM namespaces.

2. Disable PMEM security with one of the following options:

   - **LXPM**

     Go to **UEFI Setup → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.

   - **Setup Utility**

     Go to **System Configuration and Boot Management → System Settings → Intel Optane PMEMs → Security → Press to Disable Security**, and input passphrase to disable security.

3. Delete namespaces with command corresponding to the operating system that is installed:

   - **Linux** command:
     ```
     ndctl destroy-namespace all -f
     ```
   - **Windows** Powershell command:
     ```
     Get-PmemDisk | Remove-PmemDisk
     ```

4. Clear Platform Configuration Data (PCD) and Namespace Label Storage Area (LSA) with the following ipmctl command (for both Linux and Windows).
   ```
   ipmctl delete -pcd
   ```

   Notes: See the following links to learn how to download and use impctl in different operating systems:

   - Windows: https://datacentersupport.lenovo.com/us/en/videos/YTV101407
   - Linux: https://datacentersupport.lenovo.com/us/en/solutions/HT508642

5. Reboot the system.

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

Step 3. Locate the required memory module slot on the system board.

   Note:

   - Remove or install memory modules for one processor at a time.

- Ensure that you observe the installation rules and sequence order in "Memory module installation rules and order" on page 32.
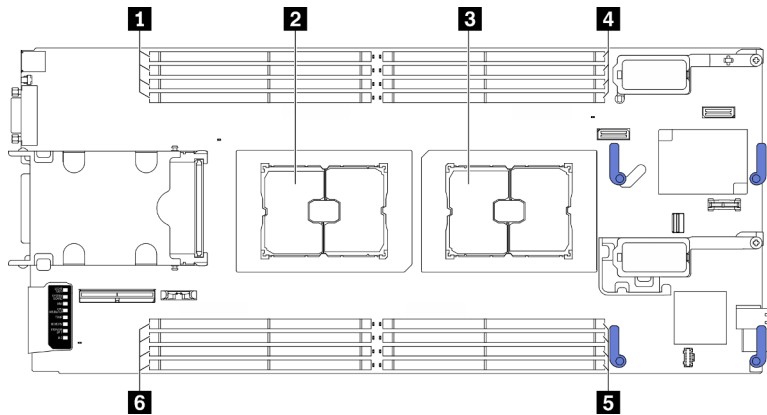

Figure 32. Location of memory module slots and processor sockets

Table 32. Location of memory modules and processors

1 Memory module slots 9–12	**4** Memory module slots 1–4
2 Processor socket 2	**5** Memory module slots 5–8
3 Processor socket 1	**6** Memory module slots 13–16

Step 4. Install the memory module into the slot.

    a.   ❶ Carefully use a common tool to press the retaining clips.

    b.   ❷ Push the retaining clips outward on each end of the memory module slot.

    c.   ❸ Align the memory module with the slot, and gently place the memory module on the slot with both hands. Firmly press both ends of the memory module straight down into the slot until the retaining clips snap into the locked position.

Attention:

- To avoid breaking the retaining clips or damaging the memory module slots, open and close the clips gently.
- If there is a gap between the memory module and the retaining clips, the memory module has not been correctly inserted. In this case, open the retaining clips, remove the memory module, and then reinsert it.
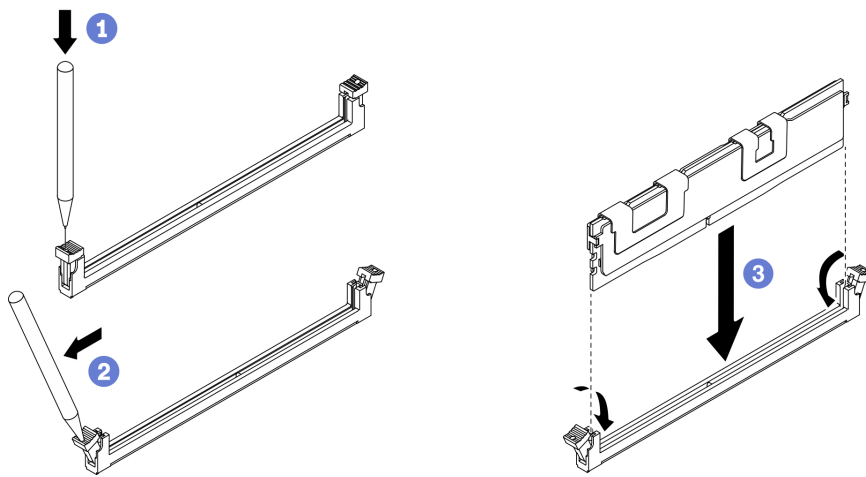
Figure 33. Memory module installation

After you finish

Note: Change and save the new configuration information by using the Setup utility. When you turn on the compute node, a message indicates that the memory configuration has changed. Start the Setup utility and select **Save Settings** to save changes. See the *ThinkSystem SN550 V2 Setup Guide* for more information.

Demo video

Watch the procedure on YouTube

Install the hot-swap drive backplane

Use the following information to install the hot-swap drive backplane.

Install the 2.5-inch hot-swap drive backplane

Use this information to install the 2.5-inch hot-swap drive backplane option.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

Notes:

- Several different types of 2.5-inch drive backplanes can be installed in the compute node. For example, some 2.5-inch drive backplanes come with a lever, while others don't (refer to the illustrations below). All are removed and installed in a similar manner.

- See the documentation that comes with an optional 2.5-inch drive backplane for device-specific information and information about installing other components that might be included as part of the option or about other components or modules that must be installed to use the option. For example, some optional 2.5-inch drive backplanes might require installation of a second processor.

Procedure
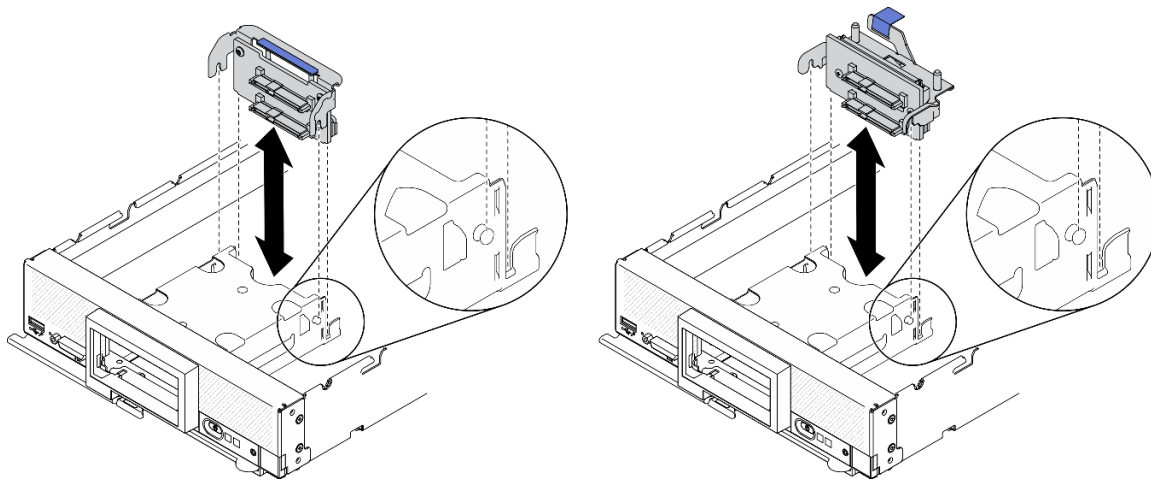
Figure 34. 2.5-inch drive backplane installation

Step 1. Adjust the backplane position

    a. Align the slots on backplane with the pins on the sides of the storage cage.

    b. Align the backplane connector with the connector on system board.

Step 2. Lower the backplane into the compute node and press it until fully seated in the connector on system board.

Demo video

Watch the procedure on YouTube

Install the EDSFF hot-swap drive backplane assembly

Use this information to install the EDSFF hot-swap drive backplane option.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

Note: Make sure you have the EDSFF backplane cable available.

Procedure

Step 1. Connecting cable to the EDSFF drive backplane.

    a. ❶ Press the latches on both ends of the cable.

    b. ❷ Insert cable connector into the slots on backplane.
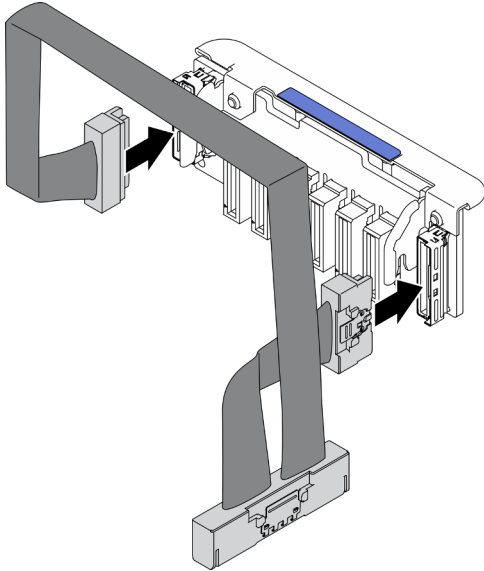
Figure 35. Connecting cable to the EDSFF drive backplane

Step 2. Install the backplane assembly.

    a. ❶ Align the slots on backplane with the pins on the sides of the storage cage

    b. ❷ Align the backplane connector with the connector on system board.

    c. ❸ Insert the latch on the cable into the connector on system board.
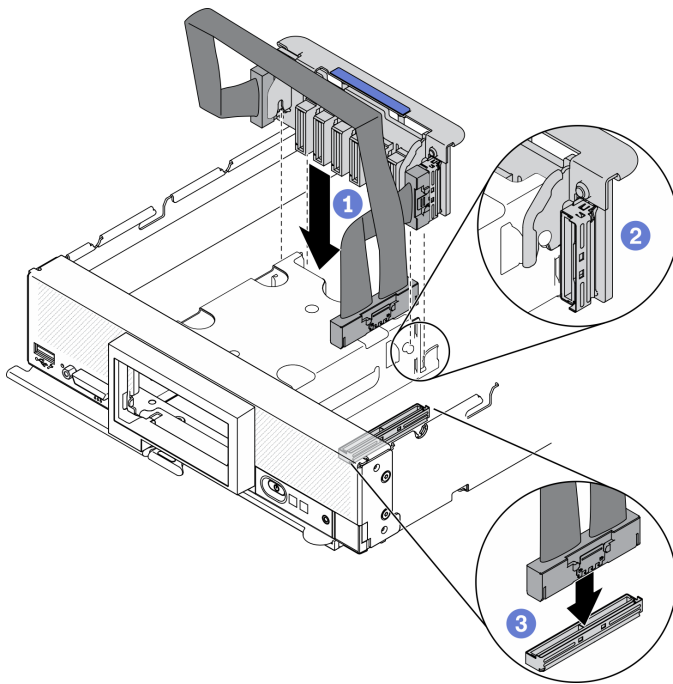
Figure 36. EDSFF backplane assembly installation

Demo video

Watch the procedure on YouTube

Install the EDSFF drive cage

Use this information to install the EDSFF drive cage.

About this task

Attention:

• Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

Procedure

Step 1. Install the EDSFF drive cage.

       a. Align the EDSFF drive cage with the hot-swap drive cage.

       b. Push the EDSFF drive cage into the hot-swap drive cage until hearing a click sound.
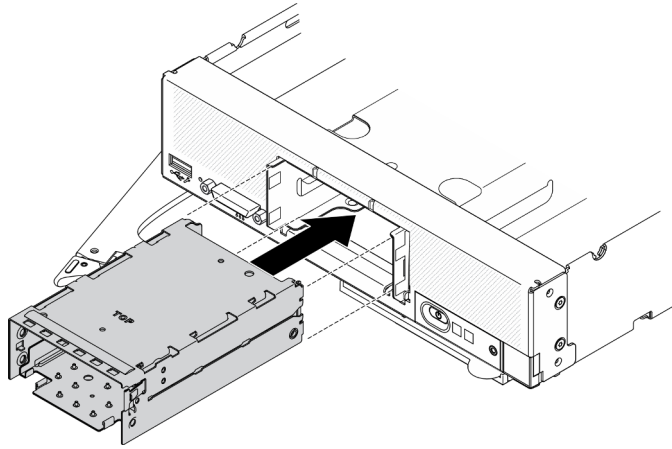
Figure 37. EDSFF storage cage installation

Demo video

Watch the procedure on YouTube

Install the front bezel

Use this information to install the front bezel.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

Note: Several different types of front bezel can be installed in the compute node: all are removed and installed in a similar manner. The front bezel shown in the illustrations might differ slightly from the front bezel installed in your compute node.

Procedure

Step 1.   Install the front bezel.

     a.   ❶ Tilt the front bezel and hook its bottom and up clips to the holes on the front panel.

     b.   ❷ Rotate the front bezel toward the front panel. Press the front bezel firmly until it clicks into place.
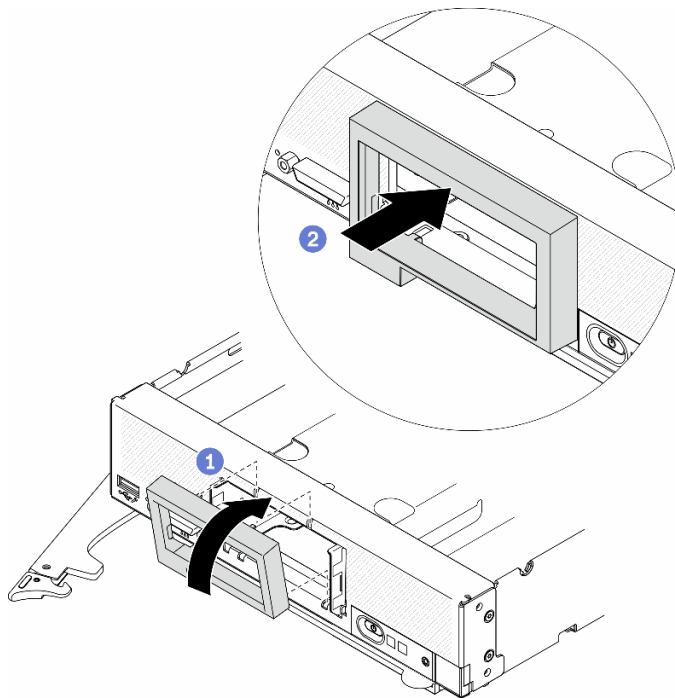
Figure 38. Front bezel installation

Demo video

Watch the procedure on YouTube

Install a hot-swap drive

Use the following information to install a hot-swap storage drive.

Install a 2.5-inch hot-swap drive

Use this information to install a 2.5-inch drive.

About this task

Attention:

• Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

Note: There are two 2.5-inch drive bays in the compute node. If the compute node is already equipped with one 2.5-inch drive, you can install an additional 2.5-inch drive. RAID level-0 (striping) can be configured on a compute node with a single drive installed. A minimum of two disk drives of the same interface type must be installed to implement and manage RAID level-1 (mirroring) arrays. See the *ThinkSystem SN550 V2 Setup Guide* for more information.

Procedure

Step 1. Locate the drive bay in which you are installing the drive.

Step 2. If a drive bay filler is installed in the drive bay, remove it by pulling the release lever and sliding the filler away from the compute node.

Step 3. Touch the static-protective package that contains the hot-swap drive to any *unpainted* metal surface on the Lenovo Flex System Enterprise Chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the drive from the package.

Step 4. Install the 2.5-inch hot-swap drive.

    a. ❶ Keep the handle on the drive open, then slide the drive into drive bay until the drive handle catches on the bezel.

    b. ❷ Rotate the handle and secure it to the latch. The drive will be seated fully in the bay.
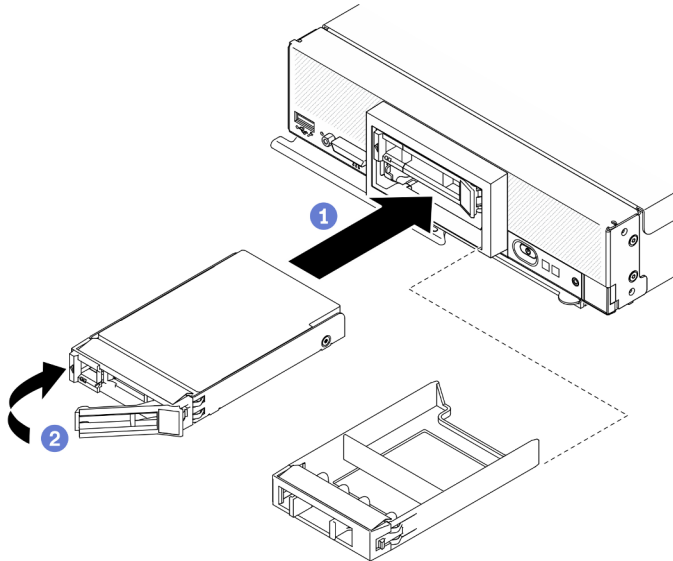
Figure 39. 2.5-inch hot-swap drive installation

Demo video

Watch the procedure on YouTube

Install an EDSFF hot-swap drive

Use this information to install an EDSFF drive backplane option.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

- Install EDSFF drives in drive bays marked as NVMe.

Notes:

- EDSFF drive support guide regarding processor:

  – EDSFF drive feature requires installing two processors in the compute node.

  – EDSFF drive feature is not supported when the processor TDP is higher than 220 watts.

  – EDSFF drive feature is not supported when Intel Xeon Gold 6334 8c 165W 3.6GHz processor is installed in the compute node.

Important: When pushing the EDSFF drives into the drive bay, touch **only** the EDSFF drive handle and carefully avoid touching other parts of the EDSFF drive. Touching parts of the EDSFF drive other than its handle when installed may cause damages to the drive.
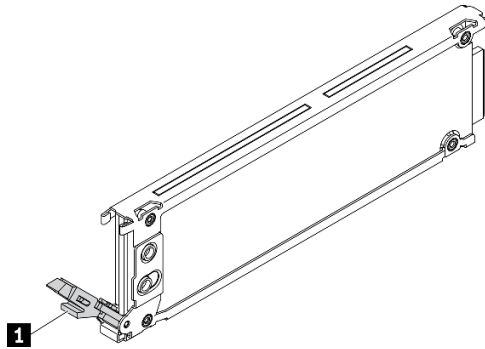
Figure 40. EDSFF drive handle

Table 33. EDSFF drive handle

1 EDSFF drive handle

Procedure

Step 1.   Hold the handle of the EDSFF drive cage bezel and pull it out of the compute node to access the EDSFF drives.
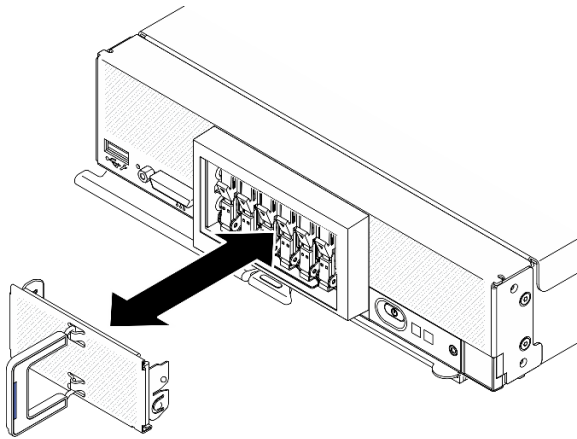
Figure 41. EDSFF drive cage bezel removal

Step 2.   Identify the drive bay in which you plan to install the hot-swap drive. If a drive bay filler is installed, remove it from the compute node by pressing the handle and sliding the filler away from the compute node.

Step 3.   Touch the static-protective package that contains the hot-swap drive to any *unpainted* metal surface on the Lenovo Flex System Enterprise Chassis or any *unpainted* metal surface on any other grounded rack component; then, remove the drive from the package.

Step 4.   Install the EDSFF hot swap drive.

   a.   ❶ Keep the handle on the drive in open position and insert the drive into the drive bay; then, hold the drive handle **only** to push the drive until it stops.

   b.   ❷ Slightly press down the handle; then, rotate the handle to lock the drive in place.

Attention: When pushing the EDSFF drives into the drive bay, touch **only** the EDSFF drive handle and carefully avoid touching other parts of the EDSFF drive. Touching parts of the EDSFF drive other than its handle when installed may cause damages to the drive.
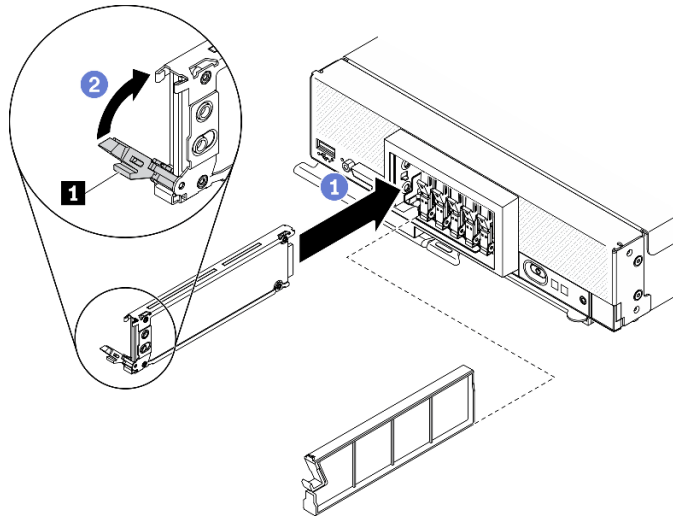
Figure 42. EDSFF hot-swap drive installation

1 EDSFF drive handle

Step 5.   Make sure the black bar under the latch is visible when seen from the front. If not, the EDSFF drive latch is not hooked correctly. Adjust the EDSFF drive handle and latch until the black bar is visible.
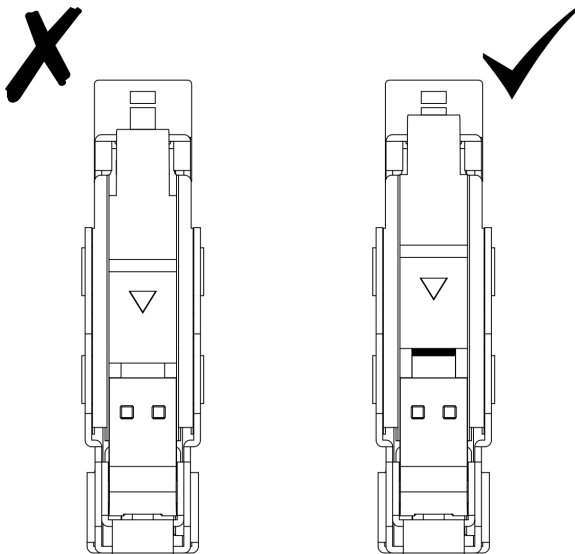
Figure 43. EDSFF drive latch adjustment

Step 6.   Keep the blue strip on the handle of EDSFF drive cage bezel on the left side; then, install the bezel back to the compute node.
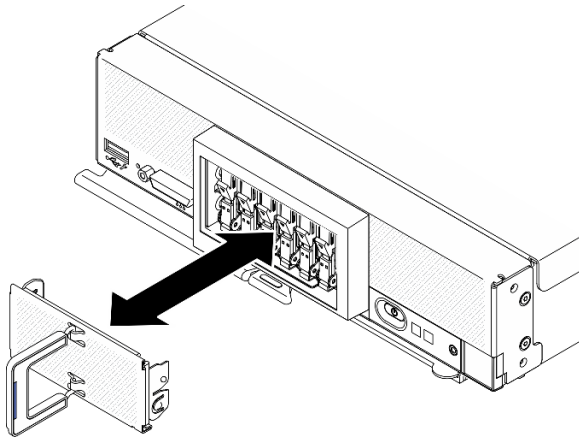
Figure 44. EDSFF drive cage bezel installation

After you finish

If the compute node is operating (power on), check the drive status LEDs to make sure that the drive is operating correctly. See "Compute node controls, connectors, and LEDs" on page 15.

Demo video

Watch the procedure on YouTube

Install the RAID adapter

Use this information to install the RAID adapter option

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.
- If you are installing both the RAID adapter and 2.5-inch drive backplane, first install the backplane in the system-board assembly.
- For the Lenovo ThinkSystem RAID 930-4i-2GB 2 Drive Adapter Kit, make sure that the flash power module is installed on the RAID adapter prior to installing the RAID adapter in the compute node. See "Install the flash power module" in *ThinkSystem SN550 V2 Maintenance Guide*.

Procedure

Step 1. Make sure the 2.5-inch drive backplane installed in the compute node supports RAID adapter installation. If not, replace it with the correct backplane. See "Install the 2.5-inch hot-swap drive backplane" on page 66.

Step 2. Touch the static-protective package that contains the RAID adapter to an *unpainted* metal surface on any grounded rack component; then, remove the RAID adapter from the package.

Step 3. Install the RAID adapter.

   a. Locate the RAID adapter connector on the drive backplane, and orient the connector on the RAID adapter with the connector on the drive backplane.

   b. Rotate the RAID adapter at an angle and insert the adapter to the back of the front panel. with the connector on the drive backplane.

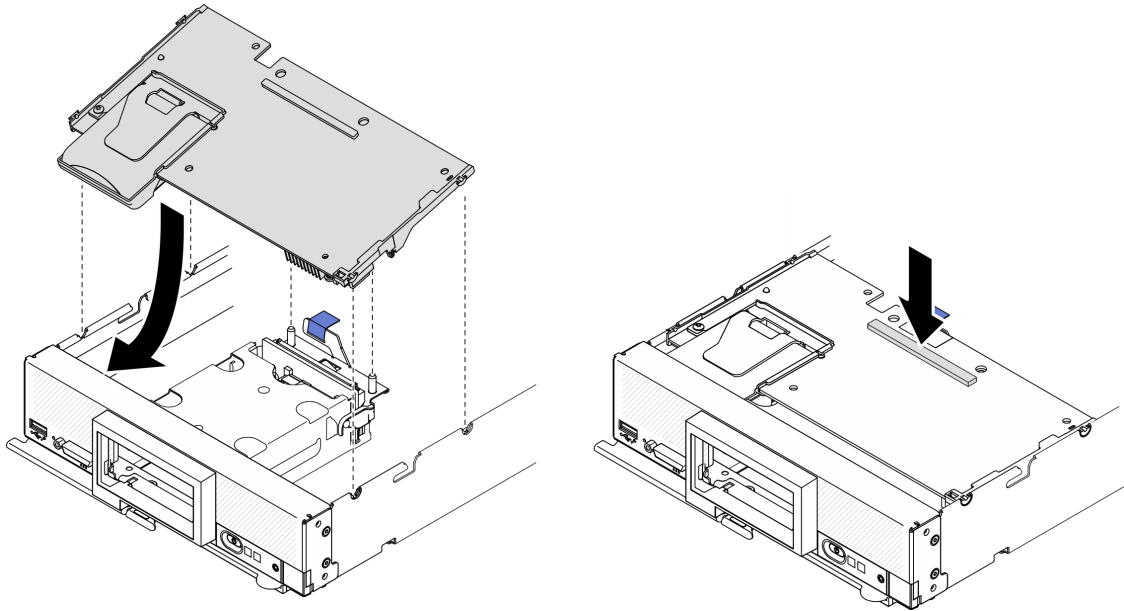c. Place down the RAID adapter, and firmly press on the foam to seat the RAID adapter into the connector.

Figure 45. RAID adapter installation

Demo video

Watch the procedure on YouTube

Install the air baffle

Use this procedure to install the air baffle.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

Procedure

Step 1. Make sure to close the retaining clips on each end of all the memory module connectors.

Step 2. Install the air baffle.

    a. Align the pins on air baffle with the pin holes on the sides of the compute node.

    b. Lower the air baffle into the compute node.

    c. Press the air baffle down until it is securely seated.
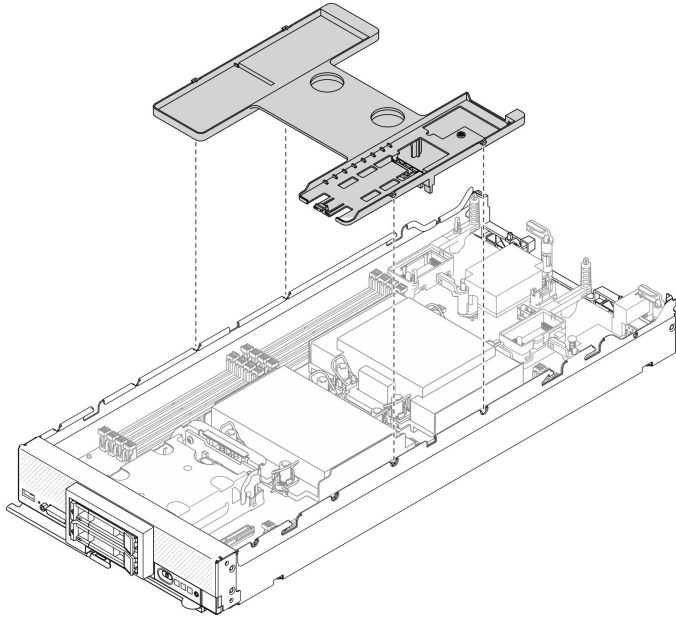
Figure 46. Installing the air baffle

Attention:

- For proper cooling and airflow, reinstall the air baffle before you turn on the compute node. Operating the compute node without the air baffle installed might damage compute node components.
- To maintain proper system cooling, do not operate the compute node without an M.2 backplane assembly or an M.2 backplane assembly filler installed on the air baffle.

1. Make sure either an M.2 backplane assembly or an M.2 backplane assembly filler is installed on the air baffle.

   - To install the M.2 backplane assembly or to connect M.2 backplane assembly cables to M.2 backplane, see "Install the M.2 backplane assembly" in *ThinkSystem SN550 V2 Maintenance Manual*.

   - To install the M.2 backplane assembly filler, see "Install the M.2 backplane assembly filler" in *ThinkSystem SN550 V2 Maintenance Manual*.

2. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside the compute node.

Demo video

Watch the procedure on YouTube

Install the compute node cover

Use this procedure to install the compute node cover.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.

- If you are replacing the cover, make sure that you have the system service label kit on hand for use during the replacement procedure. See "Parts list" on page 25 for more information.
- You cannot insert the compute node into the Lenovo Flex System Enterprise Chassis until the cover is installed and closed. Do not attempt to override this protection.

Procedure

Step 1. Make sure that all components have been reassembled correctly and that no tools or loose screws are left inside the compute node.

Step 2. Make sure the retention clips for the I/O expansion adapters are all in closed position.

Step 3. Make sure the air baffle is installed. See "Install the air baffle" on page 76.

Step 4. Install the top cover.

   a. Align the posts inside the cover with the slots on the sides of compute node.

   b. Place down the cover on the compute node.

   c. Hold the front of the compute node and slide the cover forward to the closed position, until it clicks into place.
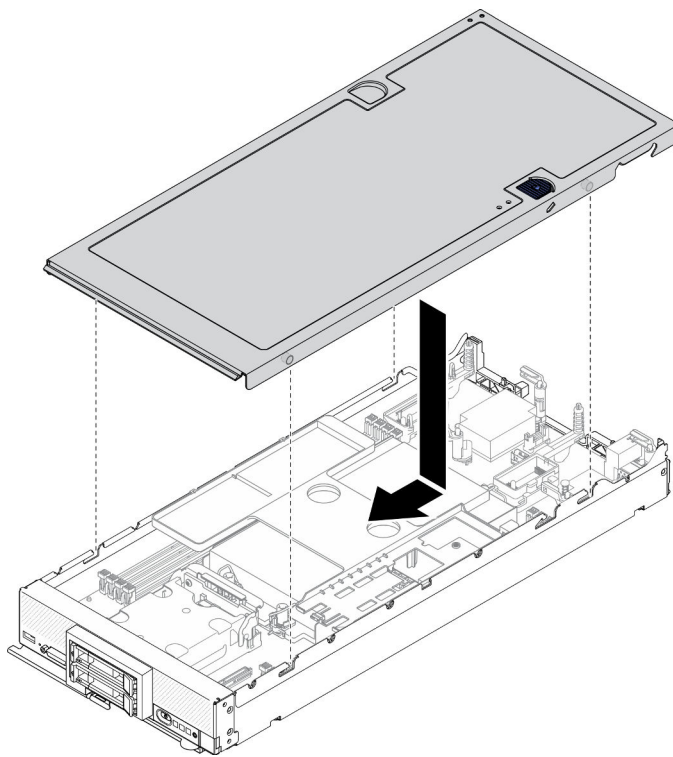
Figure 47. Compute node cover installation

Demo video

Watch the procedure on YouTube

Install the compute node in chassis

Use this information to install the compute node in the chassis.

About this task

Attention:

- Read "Safety inspection checklist" on page iv and "Installation Guidelines" on page 30 to ensure that you work safely.
- If you are reinstalling a compute node that you removed, you must install it in the same node bay from which you removed it. Some compute node configuration information and update options are established according to node bay number. Reinstalling a compute node into a different node bay can have unintended consequences. If you reinstall the compute node into a different node bay, you might have to reconfigure the compute node.
- The exact maximal number of supported 1-bay nodes is determined by input voltage and power redundancy policy. See "Limited maximal number of compute node in the same chassis" on page 9 for more information.

Procedure

Step 1. Select the node bay.

> **Note:** To maintain proper system cooling, do not operate the Lenovo Flex System Enterprise Chassis without a compute node or a node bay filler in each node bay.
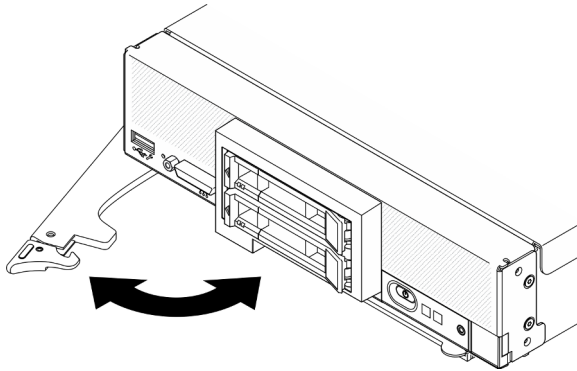

Figure 48. Compute node installation to chassis

Step 2. Rotate the front handle to fully opened position.

Step 3. Slide the compute node into the node bay until it stops.

> **Attention:** You cannot insert the compute node into the Lenovo Flex System Enterprise Chassis until the cover is installed and closed. Do not attempt to override this protection.

Step 4. Push the front handle to the closed position so that the compute node will be seated in place.

Step 5. Locate the Power LED on front panel of the compute node. The Power LED will flash rapidly initially. Wait until the Power LED flashes slowly.

> **Note:** After the compute node is installed, the Lenovo XClarity Controller in the compute node initializes and synchronizes with the Chassis Management Module. The time required for a compute node to initialize varies by system configuration. The power LED flashes rapidly; the power button on the compute node does not respond until the power LED flashes slowly, indicating that the initialization process is complete

Step 6. When the power LED flashes slowly, turn on the compute node. See "Power on the compute node" on page 80 for instruction.

> **Important:** If an Attention label is on the front panel of the compute node above the power button, read it; then, remove the label and discard it before turning on the compute node.

Step 7. Make sure that the power LED on the compute node control panel is lit continuously, indicating that the compute node is receiving power and is turned on.

Step 8. Reconfigure the compute node if needed.

- If this is the initial installation of the compute node in the chassis, you must configure the compute node through the Setup utility and install the compute node operating system.
  - See the *ThinkSystem SN550 V2 Setup Guide* of the compute node for details.
- If you have changed the configuration or if you are installing a different compute node from the one that you removed, configure the compute node through the Setup utility, and install the operating system.
  - See the *ThinkSystem SN550 V2 Setup Guide* of the compute node for details.

After you finish

Notes:

- For instructions related to the Flex System Enterprise chassis, see https://pubs.lenovo.com/enterprise-chassis/installing_components.
- For instructions related to the Flex System Carrier-Grade chassis, see https://pubs.lenovo.com/carrier-grade-chassis/installing_components.

Demo video

Watch the procedure on YouTube

Power on the compute node

Use this information for details about power on the compute node.

After you connect the compute node to power through the Lenovo Flex System Enterprise Chassis , the compute node can be started in any of the following ways.

Important: If an Attention label is on the front panel of the compute node above the power button, read it; then, remove the label and discard it before turning on the compute node.

- You can press the power button on the front of the compute node to start the compute node. The power button works only if local power control is enabled for the compute node. Local power control is enabled and disabled through the CMM **power** command and the CMM web interface.
  - For more information about the CMM **power** command, see the *Flex System Chassis Management Module: Command-Line Interface Reference Guide* at https://pubs.lenovo.com/cmm2/cli_command_power.
  - From the CMM web interface, select **Compute Nodes** from the **Chassis Management** menu. For more information, see the *Flex System Chassis Management Module: User's Guide* at https://pubs.lenovo.com/cmm2/cmm_user_guide. All fields and options are described in the CMM web interface online help.

Notes:

1. Wait until the power LED on the compute node flashes slowly before you press the power button. While the Lenovo XClarity Controller in the compute node is initializing and synchronizing with the Chassis Management Module, the power LED flashes rapidly, and the power button on the compute node does not respond. The time required for a compute node to initialize varies by system configuration; however, the power LED blink rate slows when the compute node is ready to be turned on.

2. While the compute node is starting, the power LED on the front of the compute node is lit and does not flash.

- If a power failure occurs, the Lenovo Flex System Enterprise Chassis and the compute node can be configured through the CMM **power** command and the CMM web interface to start automatically when power is restored.

  – For more information about the CMM **power** command, see https://pubs.lenovo.com/cmm2/cli_ command_power.

  – From the CMM web interface, select **Compute Nodes** from the **Chassis Management** menu. For more information, see the *Flex System Chassis Management Module: User's Guide* at https:// pubs.lenovo.com/cmm2/cmm_user_guide. All fields and options are described in the CMM web interface online help.

- You can turn on the compute node through the CMM **power** command, the CMM web interface and the Lenovo XClarity Administrator application (if installed).

  – For more information about the CMM **power** command, see https://pubs.lenovo.com/cmm2/cli_ command_power.

  – From the CMM web interface, select **Compute Nodes** from the **Chassis Management** menu. For more information, see the *Flex System Chassis Management Module: User's Guide* at https:// pubs.lenovo.com/cmm2/cmm_user_guide. All fields and options are described in the CMM web interface online help.

  – For more information about the Lenovo XClarity Administrator application, see https:// datacentersupport.lenovo.com/products/solutions-and-software/software/lenovo-xclarity/solutions/ ht115665.

- You can turn on the compute node through the Wake on LAN (WOL) feature when an optional I/O adapter with WOL capability is installed. The compute node must be connected to power (the power LED is flashing slowly) and must be communicating with the Chassis Management Module. The operating system must support the Wake on LAN feature, and the Wake on LAN feature must be enabled through the Chassis Management Module interface.

Validate compute node setup

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

Power off the compute node

Use this information for details about turning off the compute node.

When you turn off the compute node, it is still connected to power through the Lenovo Flex System Enterprise Chassis. The compute node can respond to requests from the Lenovo XClarity Controller, such as a remote request to turn on the compute node. To remove all power from the compute node, you must remove it from the Lenovo Flex System Enterprise Chassis

Before you turn off the compute node, shut down the operating system. See the operating-system documentation for information about shutting down the operating system.

The compute node can be turned off in any of the following ways:

- You can press the power button on the compute node. This starts an orderly shutdown of the operating system, if this feature is supported by the operating system.
- If the operating system stops functioning, you can press and hold the power button for more than four seconds to turn off the compute node.

Attention: Pressing the power button for 4 seconds forces the operating system to shut down immediately. Data loss is possible.

- You can turn off the compute node through the CMM **power** command, the CMM web interface and the Lenovo XClarity Administrator application (if installed).

  – For more information about the CMM **power** command, see https://pubs.lenovo.com/cmm2/cli_command_power.

  – From the CMM web interface, select **Compute Nodes** from the **Chassis Management** menu. For more information, see the *Flex System Chassis Management Module: User's Guide* at https://pubs.lenovo.com/cmm2/cmm_user_guide. All fields and options are described in the CMM web interface online help.

  – For more information about the Lenovo XClarity Administrator application, see https://datacentersupport.lenovo.com/products/solutions-and-software/software/lenovo-xclarity/solutions/ht115665.

Chapter 4. System configuration

Complete these procedures to configure your system.

Notes: The minimum supported configuration for debugging this compute node is as follows:

- One processor in processor socket 1
- One memory module in slot 2

Set the network connection for the Lenovo XClarity Controller

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

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

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

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

  1. Start the server.
  2. Press the key specified in the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.)

     Note: If the text-based interface for UEFI Setup opens instead of the Lenovo XClarity Provisioning Manager, select **Launch Graphical System Setup** on the UEFI page to connect the server to the Lenovo XClarity Provisioning Manager.

  3. Go to **LXPM ➙ UEFI Setup ➙ BMC Settings** to specify how the Lenovo XClarity Controller will connect to the network.

     - If you choose a static IP connection, make sure that you specify an IPv4 or IPv6 address that is available on the network.
     - If you choose a DHCP connection, make sure that the MAC address for the server has been configured in the DHCP server.

  4. Click **OK** to apply the setting and wait for two to three minutes.
  5. Use an IPv4 or IPv6 address to connect Lenovo XClarity Controller.

     Important: The Lenovo XClarity Controller is set initially with a user name of USERID and password of PASSW0RD (with a zero, not the letter O). This default user setting has Supervisor access. It is required to change this user name and password during your initial configuration for enhanced security.

- If no monitor is attached to the server, you can set the network connection through the Chassis Management Module 2 management network connector.

  1. Make sure that the subnet of your computer is set to the same value as the CMM 2 (the default CMM 2 subnet is 255.255.255.0). The IP address of the CMM 2 must also be in the same local domain as the client computer. To connect to the CMM 2 for the first time, you might have to change the Internet Protocol properties on the client computer.

2. Connect an Ethernet cable from your laptop to the management port on the CMM 2.

3. Open a web browser on the client computer, and direct it to the CMM 2 IP address. For the first connection to the CMM 2, use the default IP address of the CMM 2; if a new IP address has been assigned to the CMM 2, use that one instead.

   Note: The manufacturing default static IPv4 IP address is 192.168.70.100, the default IPv4 subnet address is 255.255.255.0, and the default host name is MM*xxxxxxxxxxxx*, where *xxxxxxxxxxxx* is the burned-in MAC address. The MAC address is on a label on the CMM 2, below the reset button (see CMM 2 controls and indicators for the reset button location). See IPv6 addressing for initial connection for information about determining IPv6 addressing for the initial connection.

4. After logging in to the CMM 2, click **Chassis Management ➙ Compute Nodes** to set the IP address of the compute node.

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

  Note: The Lenovo XClarity Controller USB connector mode must be set to manage the Lenovo XClarity Controller (instead of normal USB mode). To switch from normal mode to Lenovo XClarity Controller management mode, press and hold the USB management button on the front of the server for at least 3 seconds until the ID LED flashes slowly (blink one time every two seconds).

  To connect using the Lenovo XClarity Administrator Mobile app:

  1. Connect the USB cable of your mobile device to the Lenovo XClarity Administrator USB connector on the front panel.

  2. On your mobile device, enable USB tethering.

  3. On your mobile device, launch the Lenovo XClarity Administrator mobile app.

  4. If automatic discovery is disabled, click **Discovery** on the USB Discovery page to connect to the Lenovo XClarity Controller.

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

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

Update the firmware

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

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

- Best practices related to updating firmware is available at the following site:
  - http://lenovopress.com/LP0656
- The latest firmware can be found at the following site:
  - http://datacentersupport.lenovo.com/products/servers/thinksystem/SN550v2
- You can subscribe to product notification to stay up to date on firmware updates:
  - https://datacentersupport.lenovo.com/tw/en/solutions/ht509500

UpdateXpress System Packs (UXSPs)

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

firmware for both the Lenovo XClarity Controller and UEFI, update the firmware for Lenovo XClarity Controller first.

Update method terminology

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

Firmware updating tools

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

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

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

- **Lenovo XClarity Provisioning Manager**

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

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

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

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

- **Lenovo XClarity Controller**

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

  Notes:

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

  For additional information about configuring Ethernet over USB, see:

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

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

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

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

- **Lenovo XClarity Essentials OneCLI**

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

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

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

- **Lenovo XClarity Essentials UpdateXpress**

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

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

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

- **Lenovo XClarity Essentials Bootable Media Creator**

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

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

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

- **Lenovo XClarity Administrator**

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

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

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

- **Lenovo XClarity Integrator offerings**

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

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

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

Configure the firmware

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

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

- **Lenovo XClarity Provisioning Manager**

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

    Notes: The Lenovo XClarity Provisioning Manager provides a Graphical User Interface to configure a server. The text-based interface to system configuration (the Setup Utility) is also available. From Lenovo XClarity Provisioning Manager, you can choose to restart the server and access the text-based interface. In addition, you can choose to make the text-based interface the default interface that is displayed when you 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://pubs.lenovo.com/lxpm-overview/
    - *UEFI User Guide*

        - https://pubs.lenovo.com/uefi-overview/
- **Lenovo XClarity Essentials OneCLI**

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

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

    https://pubs.lenovo.com/lxce-onecli/onecli_c_settings_info_commands
- **Lenovo XClarity Administrator**

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

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

    http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/server_configuring.html
- **Lenovo XClarity Controller**

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

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

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

Memory module configuration

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

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

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

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

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

Specific information about the required installation order of memory modules in your compute node based on the system configuration and memory mode that you are implementing is shown below.
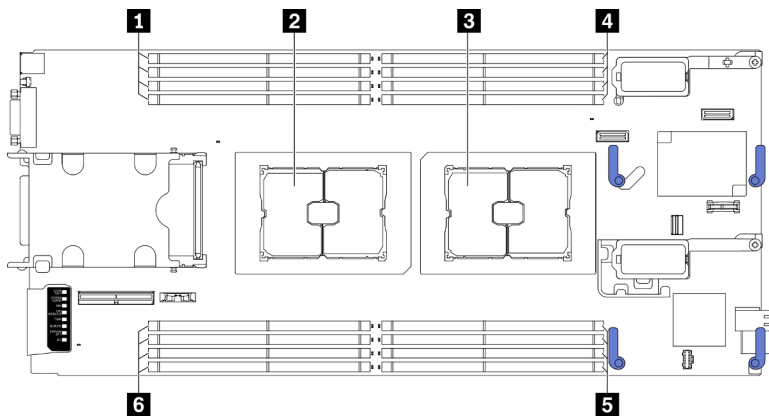
Figure 49. Memory module and processor location

Table 34. Memory module and processor location

1 Memory module slot 9–12	**4** Memory module slot 1–4
2 Processor socket 2	**5** Memory module slot 5–8
3 Processor socket 1	**6** Memory module slot 13–16

The memory-channel configuration table below shows the relationship between the processors, memory controllers, memory channels, and memory module slot numbers.

Table 35. Channel and slot information of DIMMs around a processor

Processor	Processor 1								Processor 2							
Channel	B	A	D	C	G	H	E	F	F	E	H	G	C	D	A	B
Memory module slot number	1	**2**	3	**4**	**5**	6	**7**	8	9	**10**	11	**12**	**13**	14	**15**	16

Memory module installation guideline

- Two types of configurations are supported. Consider corresponding rules and population sequence accordingly:
  - "DRAM memory module installation order" on page 34 (RDIMMs or 3DS RDIMMs)
  - "PMEM and DRAM DIMM installation order" on page 38
- A label on each DIMM identifies the DIMM type. This information is in the format **xxxxx *n*Rxxx PC4-xxxxx-xx-xx-xxx**. Where **n** indicates if the DIMM is single-rank (n=1) or dual-rank (n=2).
- At least one DIMM is required for each processor. Install at least eight DIMMs per processor for good performance.
- When you replace a DIMM, the server provides automatic DIMM enablement capability without requiring you to use the Setup utility to enable the new DIMM manually.

Attention:

- Mixing x4 and x8 DIMMs in the same channel is allowed.
- Install DIMMs of the same speed for optimal performance. Otherwise, the BIOS will find and run the lowest speed among all channels.

Enable Software Guard Extensions (SGX)

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

Complete the following steps to enable SGX.

Step 1. Make sure you follow the memory module population sequence for SGX configurations in "Independent memory mode" on page 34. (DIMM configuration must be at least 8 DIMMs per socket to support SGX).

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

Step 3. Go to **System settings ➙ Processors ➙ UMA-Based Clustering** and disable the option.

Step 4. Go to **System settings ➙ Processors ➙ Total Memory Encryption (TME)** and enable the option.

Step 5. Save the changes, then go to **System settings ➙ Processors ➙ SW Guard Extension (SGX)** and enable the option.

Note: For more information, see https://lenovopress.lenovo.com/lp1471.pdf.

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

Notes:

- Before setting up RAID for NVMe drives, follow the below steps to enable VROC:
    1. Restart the system. Before the operating system starts up, press the key specified in the on-screen instructions to enter the Setup Utility. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.)
    2. Go to **System settings ➔ Devices and I/O Ports ➔ Intel VMD** and enable the option.
    3. Save the changes and reboot the system.
- VROC Intel-SSD-Only supports RAID levels 0, 1, 5, and 10 with Intel NVMe drives.
- VROC Premium requires an activation key and supports RAID levels 0, 1, 5, and 10 with non-Intel NVMe drives. For more information about acquiring and installing the activation key, see https://fod.lenovo.com/lkms

Deploy the operating system

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

Available operating systems

- Ubuntu Server
- Microsoft Windows Server
- VMware ESXi
- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server

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

Tool-based deployment

- **Multi-server**

    Available tools:

    – Lenovo XClarity Administrator

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

    – Lenovo XClarity Essentials OneCLI

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

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

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

- **Single-server**

Available tools:

– Lenovo XClarity Provisioning Manager

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

– Lenovo XClarity Essentials OneCLI

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

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

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

Manual deployment

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

1. Go to https://datacentersupport.lenovo.com/solutions/server-os.

2. Select an operating system from the navigation pane and click **Resources**.

3. Locate the "OS Install Guides" area and click the installation instructions. Then, follow the instructions to complete the operation system deployment task.

Back up the server configuration

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

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

- **Management processor**

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

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

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

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

- **Operating system**

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

Update the Vital Product Data (VPD)

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

Update the Universal Unique Identifier (UUID)

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

There are two methods available to update the UUID:

- From Lenovo XClarity Provisioning Manager

  To update the UUID from Lenovo XClarity Provisioning Manager:

1. Start the server and press 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://pubs.lenovo.com/lxpm-overview/.) 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 createuuid SYSTEM_PROD_DATA.SysInfoUUID [access_method]
        ```

        Where:

        [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 createuuid SYSTEM_PROD_DATA.SysInfoUUID --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 createuuid SYSTEM_PROD_DATA.SysInfoUUID
                ```

                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 createuuid SYSTEM_PROD_DATA.SysInfoUUID --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 the key specified in 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 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 `aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa`, where *aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa* is the asset tag number.

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

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

>   Where:

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

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

>   Example command is as follows:

>   `onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --bmc-username <xcc_user_id> --bmc-password <xcc_password>`

> – Online KCS access (unauthenticated and user restricted):

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

>   Example command is as follows:

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

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

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

>   Where:

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

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

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

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

>   Example command is as follows:

>   `onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> --bmc <xcc_user_id>:<xcc_password>@<xcc_external_ip>`

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

Chapter 5.   Resolving installation issues

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

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

- "Single server does not power on" on page 97
- "The compute node immediately displays the POST Event Viewer when it is turned on" on page 97
- "Server cannot recognize a hard drive" on page 98
- "Displayed system memory is less than installed physical memory" on page 98
- "A Lenovo optional device that was just installed does not work" on page 99
- "Voltage planar fault is displayed in the event log" on page 99

Single server does not power on

Complete the following steps until the problem is resolved:

1. If you recently installed, moved, or serviced the server, reseat the server in the bay. If the server was not recently installed, moved, or serviced, perform a virtual reseat through the CMM **service** command. For more information about the CMM **service** command, see the https://pubs.lenovo.com/cmm2/cli_command_service.
2. Check the event log on the CMM 2 for any events that are related to the server and solve them.
3. Make sure that the CMM 2 can recognize the server. Log in to the CMM 2 user interface and verify that the server appears in the chassis view. If the CMM 2 cannot recognize the server, remove it, and inspect the server and the back of the node bay to make sure that there is no physical damage to the connectors.
4. Make sure that the power policy that is implemented on the CMM 2 is sufficient to enable the server node to power on. You can view the power policy using theCMM 2 **pmpolicy** command or the CMM 2 web interface.

   - For more information about the CMM 2 **pmpolicy** command, see the https://pubs.lenovo.com/cmm2/cli_command_pmpolicy.
   - From the CMM 2 web interface, select **Power Modules and Management** from the Chassis Management menu. For more information, see the https://pubs.lenovo.com/cmm2/cmm_user_guide. All fields and options are described in the CMM 2 web interface online help.
5. Replace the system-board assembly (see "System-board assembly replacement" in *Maintenance Manual*).

   Note: Until you are able to replace the system-board assembly, you can attempt to power on the server from the CMM 2.

The compute node 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 compute node 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 compute node, see https://serverproven.lenovo.com/.

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

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

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

    a. (Trained technician only) Processor

    b. (Trained technician only) System board

Server cannot recognize a hard drive

Complete the following steps until the problem is solved.

1. Verify that the drive is supported for the server. See https://serverproven.lenovo.com/ for a list of supported hard drives.

2. Make sure that the drive is seated in the drive bay properly and that there is no physical damage to the drive connectors.

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

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

    Based on those tests:

    a. If the drive fails the diagnostic test, replace the drive.

    b. If the drive passes the diagnostic tests but is still not recognized, complete the following steps:

        1) Replace the drive.

        2) Replace the hard drive backplane (see "2.5-inch drive backplane replacement" or "EDSFF drive backplane assembly replacement" section in the system *Maintenance Manual*).

        3) Replace the system-board assembly (see "System-board assembly replacement" in the system *Maintenance Manual*).

Displayed system memory is less than installed physical memory

Complete the following steps until the problem is solved.

1. Make sure that:

    a. You have installed the correct type of memory (see "Install a memory module" on page 63).

    b. Memory mirroring or memory sparing mode does not account for the discrepancy.

        To determine the status of a DIMM, restart the server and press the key specified in the on-screen instructions to display theLXPM interface. Then, click **System settings ➜ Memory**. (For more information, see the "Startup" section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.)

2. If new memory has recently been installed, make sure that no configuration events are reported in the event log. If there are any events, resolve them.

    Note: DIMMs are verified as authentic Lenovo or IBM modules by the UEFI software. If any non-authentic DIMMs are detected, an informational message appears in the system event log and memory performance might be limited. Non-authentic DIMMs are not covered by your Lenovo warranty.

3. If the compute node was recently installed, moved, or serviced, make sure that the DIMMs are correctly seated in the connectors (see "Install a memory module" on page 63).

4. Make sure that all DIMMs are enabled. The compute node might have automatically disabled a DIMM when it detected a problem, or a DIMM might have been manually disabled.

   To determine the status of a DIMM, restart the server and press the key specified in the on-screen instructions to display the LXPM interface. Then, click **System settings ➙ Memory**.

5. Run memory diagnostics. When you start a server and press the key specified in the on-screen instructions, the LXPM interface is displayed by default. You can perform memory diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic ➙ Memory test**.

6. Remove DIMMs until the compute node is showing the correct amount of memory. Install one DIMM at a time until you can determine which DIMM is not working properly. Remove that DIMM and replace it with a good DIMM (see [LINK]DIMM replacement[LINK]).

   Note: After you install or remove a DIMM, you must change and save the new configuration information by using the Setup utility. When you turn on the compute node, a message indicates that the memory configuration has changed. Press the key specified in the on-screen instructions to display the LXPM interface. Then, save the configuration.

7. If the problem remains, contact Lenovo Support.

A Lenovo optional device that was just installed does not work

1. Make sure that:
   - The device is supported for the server (see https://serverproven.lenovo.com/).
   - You followed the installation instructions that came with the device and the device is installed correctly.
   - You have not loosened any other installed devices or cables.
   - You updated the configuration information in the Setup utility. Whenever memory or any other device is changed, you must update the configuration.

2. Reseat the device that you have just installed.

3. Replace the device that you have just installed.

Voltage planar fault is displayed in the event log

Complete the following steps until the problem is solved.

1. Revert the system to the minimum configuration. See "Specifications" on page 6 for the minimally required number of processors and DIMMs.

2. Restart the system.

   - If the system restarts, add each of the removed items one at a time and restart the system each time until the error occurs. Replace the item for which the error occurs.

   - If the system does not restart, suspect the system board.

Appendix A. Getting help and technical assistance

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

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

http://datacentersupport.lenovo.com

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

Before you call

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

Attempt to resolve the problem yourself

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

You can find the product documentation for your ThinkSystem products at https://pubs.lenovo.com/

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

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

Gathering information needed to call Support

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

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

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

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

Collecting service data

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

Service data can be collected through the following tools:

- **Lenovo XClarity Provisioning Manager**

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

- **Lenovo XClarity Controller**

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

  – For more information about using the web interface to collect service data, see the "Downloading service data" section in the XCC documentation version compatible with your server at https:// pubs.lenovo.com/lxcc-overview/.

  – For more information about using the CLI to collect service data, see the "ffdc command" section in the XCC documentation version compatible with your server at https://pubs.lenovo.com/lxcc-overview/.

- **Chassis Management Module 2 (CMM 2)**

  Use the Download Service Data function of the CMM 2 to collect service data for compute nodes.

  For more information about downloading service data from the CMM 2, see https://pubs.lenovo.com/ cmm2/cmm_ui_service_and_support.

- **Lenovo XClarity Administrator**

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

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

- **Lenovo XClarity Essentials OneCLI**

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

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

Contacting Support

You can contact Support to obtain help for your issue.

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

Index