



# ThinkSystem SN550 V2 Compute Node Maintenance Manual



**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/](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>

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# Safety

Before installing this product, read the Safety Information.

قبل تركيب هذا المنتج، يجب قراءة الملاحظات الأمنية

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

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

**A termék telepítése előtt olvassa el a Biztonsági előírásokat!**

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ  
بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

ཐོན་ཁུངས་འདི་བདེ་སྤྱོད་མ་བྱས་གོང་། རྒྱུ་རྒྱུ་ཡིན་གཟུགས་  
བྱ་འདྲ་མིན་ཡོད་པའི་འོད་སྤེར་བཟང་དགོས།

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

مەزكۇر مەھسۇلاتنى ئورنىتىشتىن بۇرۇن بىخەتەرلىك ئۇچۇرلىرىنى ئوقۇپ چىقىڭ.

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

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## 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.



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# 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) or Non-Volatile Memory express (NVMe) drives or up to six EDSFF hot-swap 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](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](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.

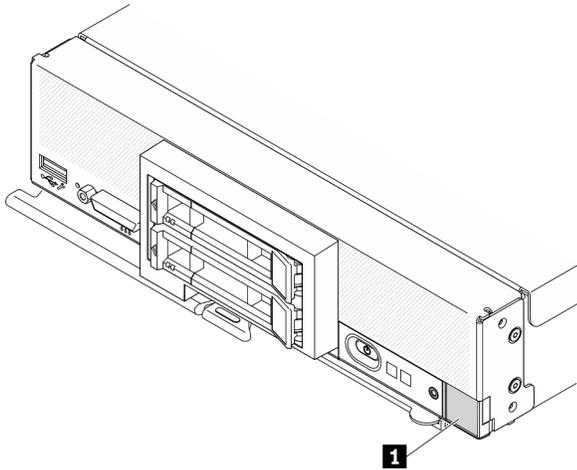


Figure 1. ID label on the front of the node

Table 2. ID label on the front of the node

<p><b>1</b> ID label</p>
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### Customer information tabs

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

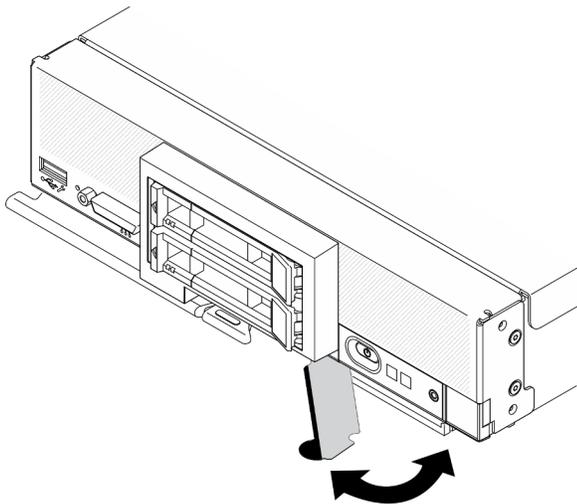


Figure 2. Location of customer information tabs

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## 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	<ul style="list-style-type: none"> <li>• Height: 55.9 mm (2.2 inches)</li> <li>• Depth: 507.3 mm (19.9 inches)</li> <li>• Width: 217.35 mm (8.5 inches)</li> </ul>
Weight	Approximately 5.17 kg (11 lbs.) to 6.5 kg (14 lbs), depending on your configuration.
Processor (depending on the model)	<p>Processor: Up to two multi-core Intel Xeon Scalable processors.</p> <ul style="list-style-type: none"> <li>• Use the Setup utility to determine the type and speed of the processors in the compute node.</li> <li>• Select processor heat sink according to processor TDP and placement in the compute node. <ul style="list-style-type: none"> <li>– If the processor TDP is lower than or equal to 165 watts, select front or rear standard heat sink.</li> <li>– If the processor TDP is higher than 165 watts, select front or rear performance heat sink.</li> </ul> </li> </ul> <p><b>Note:</b> When using Intel Xeon Gold 6334 8c 165W 3.6GHz processor, select performance heat sink.</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• EDSFF drive support guide regarding processor: <ul style="list-style-type: none"> <li>– EDSFF drive feature requires installing two processors in the compute node.</li> <li>– EDSFF drive feature is not supported when the processor TDP is higher than 220 watts.</li> <li>– EDSFF drive feature is not supported when Intel Xeon Gold 6334 8c 165W 3.6GHz processor is installed in the compute node.</li> </ul> </li> </ul> <p>For a list of supported processors, see: <a href="https://serverproven.lenovo.com/">https://serverproven.lenovo.com/</a></p>
Memory	<p>See “Memory module installation order” in <i>Setup Guide</i> for detailed information about memory configuration and setup.</p> <ul style="list-style-type: none"> <li>• Minimum: 16 GB</li> <li>• Maximum: 2 TB with 3DS RDIMM</li> <li>• Type: <ul style="list-style-type: none"> <li>– Error correcting code (ECC), Low-profile (LP) double-data rate (DDR4) RDIMM and 3DS RDIMM (mixing is not supported)</li> <li>– Persistent Memory (PMEM)</li> </ul> </li> <li>• Supports (depending on the model): <ul style="list-style-type: none"> <li>– 16 GB, 32 GB, and 64 GB RDIMM</li> <li>– 128 GB 3DS RDIMM</li> <li>– 128 GB Persistent Memory (PMEM)</li> </ul> </li> <li>• Slots: 16 dual inline memory module (DIMM) connectors that support up to: <ul style="list-style-type: none"> <li>– 16 DRAM DIMMs</li> <li>– 8 DRAM DIMMs and 8 PMEMs</li> </ul> </li> </ul> <p>For a list of supported DIMMs, see: <a href="https://serverproven.lenovo.com/">https://serverproven.lenovo.com/</a></p> <p><b>Note:</b> Do not mix 32GB DRx4 8 bit RDIMM and 32GB DRx8 16 bit RDIMM in PMEM App Direct Mode and Memory Mode.</p>

Table 3. Specifications (continued)

Specification	Description
2.5-inch drive/backplane	<ul style="list-style-type: none"> <li>• Supports up to two small form factor (SFF) drive bays. Drive bay can be either SAS/SATA or NVMe/SATA, depending on the model.</li> <li>• Supported 2.5-inch drives: <ul style="list-style-type: none"> <li>– Serial Attached SCSI (SAS)/Serial Advanced Technology Attachment (SATA) hot-swap hard disk drives/solid-state drives</li> <li>– Non-Volatile Memory Express (NVMe) solid-state drives</li> </ul> </li> </ul>
EDSFF drive/backplane	<ul style="list-style-type: none"> <li>• Supports up to six Enterprise and Datacenter SSD Form Factor (EDSFF) drive bays.</li> <li>• EDSFF drive feature supports software RAID.</li> <li>• EDSFF drive support guide regarding processor: <ul style="list-style-type: none"> <li>– EDSFF drive feature requires installing two processors in the compute node.</li> <li>– EDSFF drive feature is not supported when the processor TDP is higher than 220 watts.</li> <li>– EDSFF drive feature is not supported when Intel Xeon Gold 6334 8c 165W 3.6GHz processor is installed in the compute node.</li> </ul> </li> </ul> <p><b>Attention:</b> EDSFF drives requires specific ambient temperature, see the Environment section in the Specification table for more information.</p>
M.2 drive/backplane	<p>ThinkSystem M.2 with Mirroring Enablement Kit contains dual M.2 boot adapter that supports up to two identical M.2 drives.</p> <p>Supports three physical sizes of M.2 SATA drive:</p> <ul style="list-style-type: none"> <li>• 42 mm (2242)</li> <li>• 60 mm (2260)</li> <li>• 80 mm (2280)</li> </ul> <p>Supports two physical sizes of M.2 NVMe drive:</p> <ul style="list-style-type: none"> <li>• 80 mm (2280)</li> <li>• 110 mm (22110)</li> </ul> <p><b>Note:</b></p> <p>ThinkSystem M.2 Enablement Kit contains single M.2 backplane which is only supported in pre-configured models.</p>
RAID adapter	<ul style="list-style-type: none"> <li>• RAID 530-4i adapter</li> <li>• RAID 930-4i-2GB adapter</li> </ul> <p><b>Note:</b> 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.</p>
Integrated functions	<ul style="list-style-type: none"> <li>• One baseboard management controller (BMC) with integrated VGA controller (XClarity Controller or XCC)</li> <li>• Light Path Diagnostics</li> <li>• Automatic server restart (ASR)</li> <li>• Additional RAID levels supported when an optional RAID controller is installed</li> <li>• One external USB 3.2 Gen 1 port</li> <li>• Serial over LAN (SOL)</li> <li>• Wake on LAN (WOL) when an optional I/O adapter with WOL capability is installed.</li> </ul>
Minimum configuration for debugging	<ul style="list-style-type: none"> <li>• One processor in processor socket 1</li> <li>• One memory module in slot 2</li> </ul>

Table 3. Specifications (continued)

Specification	Description
Operating systems	<p>Supported and certified operating systems:</p> <ul style="list-style-type: none"> <li>• Ubuntu Server</li> <li>• Microsoft Windows Server</li> <li>• VMware ESXi</li> <li>• Red Hat Enterprise Linux</li> <li>• SUSE Linux Enterprise Server</li> </ul> <p>References:</p> <ul style="list-style-type: none"> <li>• Complete list of available operating systems: <a href="https://lenovopress.lenovo.com/osig">https://lenovopress.lenovo.com/osig</a>.</li> <li>• OS deployment instructions: “Deploy the operating system” in <i>Setup Guide</i>.</li> </ul>
Predictive failure analysis (PFA) alerts	<ul style="list-style-type: none"> <li>• Processors</li> <li>• Memory</li> <li>• Drives</li> </ul>
Security	<p>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.</p>

Table 3. Specifications (continued)

Specification	Description
Environment	<p>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:</p> <ul style="list-style-type: none"> <li>• Air temperature: <ul style="list-style-type: none"> <li>– Operating: <ul style="list-style-type: none"> <li>– 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).</li> <li>– 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).</li> </ul> </li> <li>– Compute node off: 5°C to 45°C (41°F to 113°F)</li> <li>– Shipment: -40°C to 60°C (-40°F to 140°F)</li> <li>– Storage: -40°C to 60°C (-40 to 140°F)</li> </ul> </li> <li>• Maximum altitude: 3,050 m (10,000 ft)</li> <li>• Relative Humidity (non-condensing): <ul style="list-style-type: none"> <li>– Operating: <ul style="list-style-type: none"> <li>– ASHRAE Class A2: 8% - 80%, maximum dew point: 21°C (70°F)</li> <li>– ASHRAE Class A3: 8% - 85%, maximum dew point: 24°C (75°F)</li> </ul> </li> <li>– Shipment/Storage: 8% - 90%</li> </ul> </li> <li>• Depending on the processor TDP, the compute node may support ASHRAE Class A3 or ASHRAE Class A2 specifications: <ul style="list-style-type: none"> <li>– When the TDP of the installed processor is lower than or equal to 165 watt, the compute node complies with ASHRAE Class A3 specifications.</li> <li>– When the TDP of the installed processor is lower than 200 watt, the compute node complies with ASHRAE Class A2 specifications.</li> </ul> </li> </ul> <p>Particulate contamination  <b>Attention:</b> 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 8.</p>
Ambient temperature management	<p>Adjust ambient temperature when specific components are installed:</p> <ul style="list-style-type: none"> <li>• Keep ambient temperature to 30°C or lower when processors with TDP of 200 watts or higher are installed.</li> <li>• Keep ambient temperature to 30°C or lower when Intel Xeon Gold 6334 8c 165W 3.6GHz processor is installed in the compute node.</li> <li>• Keep ambient temperature to 25°C or lower when Intel Xeon Gold 6342 24c 230W 2.8GHz processor is installed in the compute node.</li> <li>• Keep ambient temperature to 35°C or lower when Persistent Memory (PMEM) are installed.</li> <li>• Keep ambient temperature to 25°C or lower when EDSFF drives are installed</li> </ul>

## Limited maximal number of compute node in the same chassis

The following table describes the maximal number of SN550 V2 compute node that can be installed in the Lenovo Flex System Enterprise 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

2500 W power output (200-208 V ac)					
Processor TDP	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	<b>9</b>
120 W	14	<b>13</b>	14	14	<b>8</b>
135 W	14	<b>12</b>	<b>13</b>	<b>13</b>	<b>8</b>
140 W	14	<b>12</b>	<b>13</b>	<b>13</b>	<b>8</b>
150 W	14	<b>12</b>	<b>12</b>	<b>12</b>	<b>7</b>
165 W	14	<b>11</b>	<b>11</b>	<b>12</b>	<b>7</b>
185 W	<b>13</b>	<b>10</b>	<b>10</b>	<b>11</b>	<b>6</b>
195 W	<b>13</b>	<b>9</b>	<b>9</b>	<b>10</b>	<b>6</b>
205 W	<b>13</b>	<b>9</b>	<b>9</b>	<b>10</b>	<b>6</b>
230W	<b>12</b>	<b>9</b>	<b>9</b>	<b>9</b>	<b>5</b>
2745 W power output (220-240 V ac)					
Processor TDP	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	<b>10</b>
120 W	14	<b>13</b>	14	14	<b>9</b>
135 W	14	<b>12</b>	<b>13</b>	14	<b>9</b>
140 W	14	<b>12</b>	<b>13</b>	14	<b>9</b>
150 W	14	<b>12</b>	<b>12</b>	<b>13</b>	<b>8</b>
165 W	14	<b>11</b>	<b>11</b>	<b>13</b>	<b>8</b>
185 W	14	<b>11</b>	<b>11</b>	<b>12</b>	<b>7</b>
195 W	14	<b>10</b>	<b>10</b>	<b>11</b>	<b>6</b>
205 W	14	<b>10</b>	<b>10</b>	<b>11</b>	<b>6</b>
230W	<b>13</b>	<b>9</b>	<b>9</b>	<b>10</b>	<b>6</b>

## 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/87217893.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](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	<ul style="list-style-type: none"> <li>• The room air must be continuously filtered with 40% atmospheric dust spot efficiency (MERV 9) according to ASHRAE Standard 52.2<sup>1</sup>.</li> <li>• 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.</li> <li>• The deliquescent relative humidity of the particulate contamination must be more than 60%<sup>2</sup>.</li> <li>• The room must be free of conductive contamination such as zinc whiskers.</li> </ul>
Gaseous	<ul style="list-style-type: none"> <li>• Copper: Class G1 as per ANSI/ISA 71.04-1985<sup>3</sup></li> <li>• Silver: Corrosion rate of less than 300 Å in 30 days</li> </ul>
<p><sup>1</sup> ASHRAE 52.2-2008 - <i>Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size</i>. Atlanta: American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.</p> <p><sup>2</sup> The deliquescent relative humidity of particulate contamination is the relative humidity at which the dust absorbs enough water to become wet and promote ionic conduction.</p> <p><sup>3</sup> ANSI/ISA-71.04-1985. <i>Environmental conditions for process measurement and control systems: Airborne contaminants</i>. Instrument Society of America, Research Triangle Park, North Carolina, U.S.A.</p>	

## Firmware updates

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
<b>Lenovo XClarity Provisioning Manager (LXPM)</b>	In-band <sup>2</sup> On-Target	√		√		
<b>Lenovo XClarity Controller (XCC)</b>	Out-of-band Off-Target	√	Selected I/O devices	√		
<b>Lenovo XClarity Essentials OneCLI (OneCLI)</b>	In-band Out-of-band On-Target Off-Target	√	All I/O devices		√	√

Tool	Update Methods Supported	Core System Firmware Updates	I/O Devices Firmware Updates	Graphical user interface	Command line interface	Supports UXSPs
<b>Lenovo XClarity Essentials UpdateXpress (LXCE)</b>	In-band Out-of-band On-Target Off-Target	√	All I/O devices	√		√
<b>Lenovo XClarity Essentials Bootable Media Creator (BoMC)</b>	In-band Out-of-band Off-Target	√	All I/O devices	√ (BoMC application)	√ (BoMC application)	√
<b>Lenovo XClarity Administrator (LXCA)</b>	In-band <sup>1</sup> Out-of-band <sup>2</sup> Off-Target	√	All I/O devices	√		√
<b>Lenovo XClarity Integrator (LXCI) for VMware vCenter</b>	Out-of-band Off-Target	√	Selected I/O devices	√		
<b>Lenovo XClarity Integrator (LXCI) for Microsoft Windows Admin Center</b>	In-band Out-of-band On-Target Off-Target	√	All I/O devices	√		√
<b>Lenovo XClarity Integrator (LXCI) for Microsoft System Center Configuration Manager</b>	In-band On-Target	√	All I/O devices	√		√
<b>Notes:</b>						
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/>

**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 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/>

**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/>.

- **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](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/Invo-bomc>

- **Lenovo XClarity Administrator**

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

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

[http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/update\\_fw.html](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/>

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## Tech Tips

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

To find the Tech Tips available for your server:

1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
2. Click on **How to's** from the navigation pane.
3. Click **Article Type** → **Solution** from the drop-down menu.

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

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## Security advisories

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

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

[https://datacentersupport.lenovo.com/product\\_security/home](https://datacentersupport.lenovo.com/product_security/home)

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## 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](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](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](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](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](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](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.

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## 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](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](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>.

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## Chapter 2. Compute node components

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

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### Front view

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

### 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.

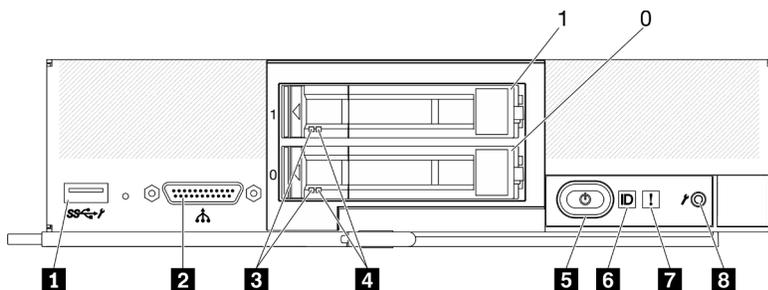


Figure 3. Two 2.5-inch drives compute node control panel buttons, connectors, and LEDs

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

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

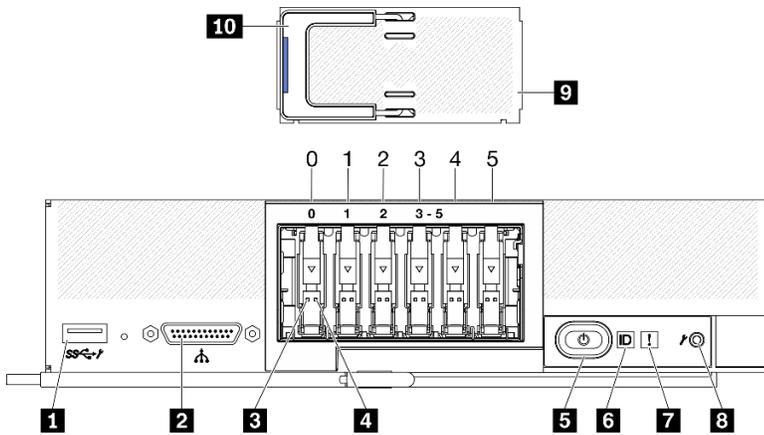


Figure 4. Six ESDFF drives compute node control panel, buttons, connectors, and LEDs

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

<b>1</b> USB 3.2 Gen 1 connector USB 2.0 only when accessing Lenovo XClarity Controller via a mobile device.	<b>6</b> Identification LED
<b>2</b> KVM cable connector (console breakout cable)	<b>7</b> Fault LED (yellow)
<b>3</b> Drive activity LED (green)	<b>8</b> USB management button
<b>4</b> Drive status LED (yellow)	<b>9</b> EDSFF drive bezel
<b>5</b> Power button/LED (green)	<b>10</b> 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 23 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](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](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 panel). See “Viewing the Light Path Diagnostics LEDs” on page 129 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	<ul style="list-style-type: none"> <li>– When the USB connector is not in shared mode, this is the default state and no operation required.</li> <li>– 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.</li> </ul>	<ul style="list-style-type: none"> <li>– When the USB connector is not in shared mode, no operation required.</li> <li>– When the USB connector is in shared mode, to switch the USB connector to Lenovo XClarity Controller management mode, do the following:               <ol style="list-style-type: none"> <li>1. Press the USB management button for three seconds, or</li> <li>2. Use the Lenovo XClarity Controller</li> </ol> </li> </ul>
Solid On	Compute node is in locally manual operation status.	<ul style="list-style-type: none"> <li>– When the USB connector is not in shared mode, use CMM or Lenovo XClarity Controller to return the ID LED to Off state.</li> <li>– When the USB connector is in shared mode, to switch the USB connector to Lenovo XClarity Controller management mode, do the following:               <ol style="list-style-type: none"> <li>1. Press the USB management button for three seconds, or</li> <li>2. Use the Lenovo XClarity Controller</li> </ol> </li> </ul>
Blinking (blink one time per second)		
Slow blinking (blink one time every two seconds)	<p>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.</p> <p>ID LED state change is not available in the state.</p>	<p>To Switch the USB port to default mode, do the following:</p> <ul style="list-style-type: none"> <li>– Press USB management button for three seconds, or</li> <li>– Use the Lenovo XClarity Controller</li> </ul>

- For more information about the CMM **led** command, see [https://pubs.lenovo.com/cmm2/cli\\_command\\_led](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](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 129 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.

---

## 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.

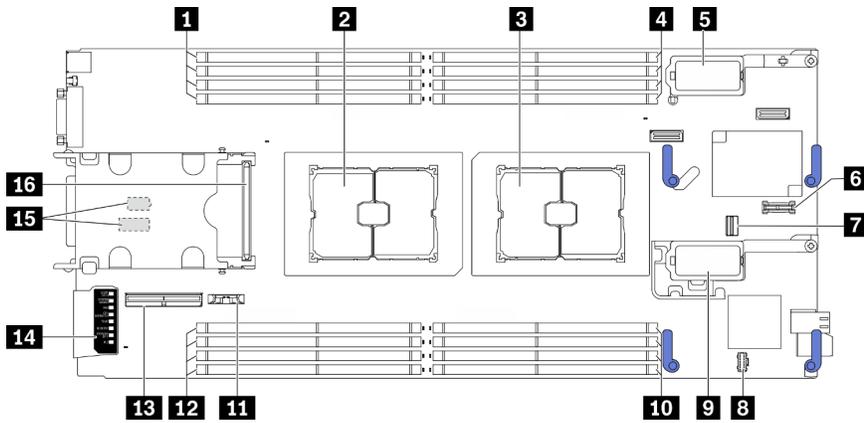


Figure 5. System-board connectors

Table 9. System-board connectors

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

## System-board switches

Use this information to locate the system-board switches.

### Important:

- 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/](https://pubs.lenovo.com/safety_documentation/)
  - “Installation Guidelines” on page 27, “Handling static-sensitive devices” on page 29
  - “Power off the compute node” on page 13
- 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 30.

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

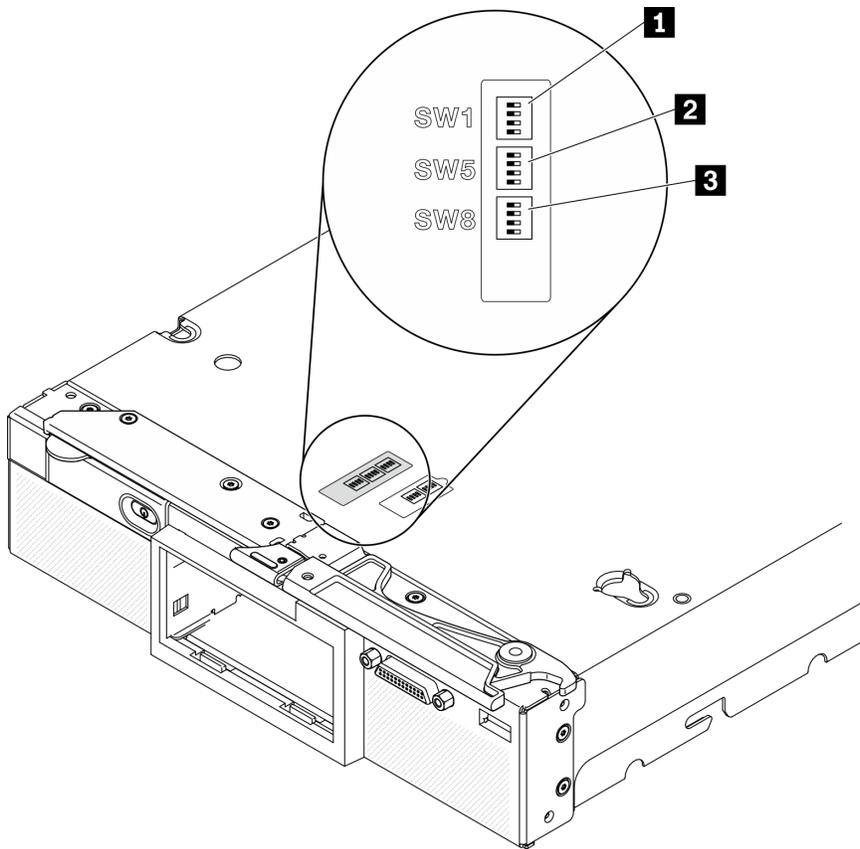


Figure 6. System-board switches

Table 10. System-board switch blocks

<b>1</b> SW 1 switch block
<b>2</b> SW 5 switch block
<b>3</b> 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 11. 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.

Table 11. System-board switch block SW1 (continued)

Switch number	Description	Definition
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 12. 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 13. 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.	

Table 13. System-board switch block SW8 (continued)

Switch number	Description	Definition
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. <b>Note:</b> 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.	

## 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.

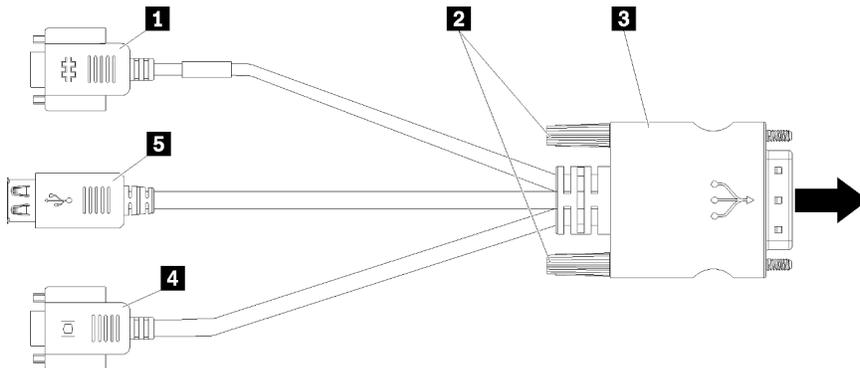


Figure 7. Connectors and components on the KVM cable

Table 14. Connectors and components on the KVM cable

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

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## 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 8 “Compute node components” on page 24:

<https://datacentersupport.lenovo.com/products/servers/thinksystem/sn550v2/7z69/parts>

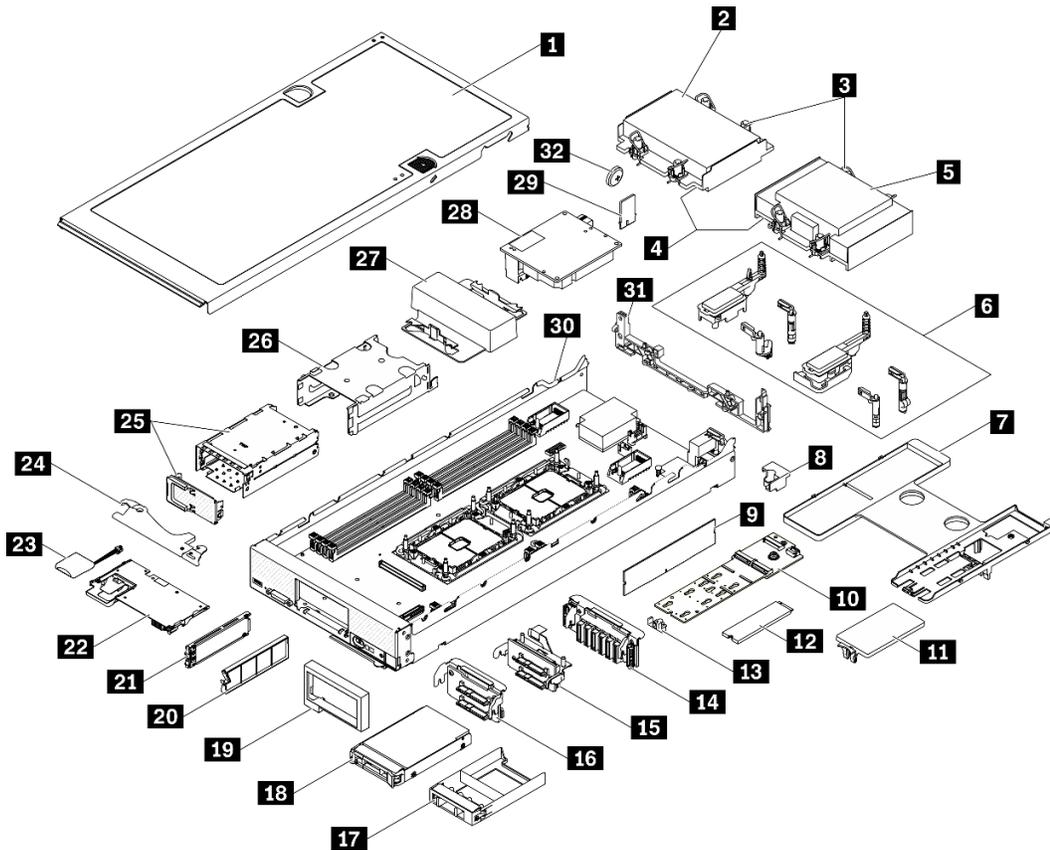


Figure 8. Compute node components

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 15. Parts list

Index	Description	Consumable and Structural part	Tier 1 CRU	Tier 2 CRU	FRU
<p>For more information about ordering the parts shown in Figure 8 “Compute node components” on page 24, see <a href="https://datacentersupport.lenovo.com/products/servers/thinksystem/sn550v2/7z69/parts">https://datacentersupport.lenovo.com/products/servers/thinksystem/sn550v2/7z69/parts</a>                      It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.</p>					
<b>1</b>	Compute node cover	√			
<b>2</b>	Front heat sink				√
<b>3</b>	Heat sink Torx T30			√	
<b>4</b>	Processor				√
<b>5</b>	Rear heat sink				√
<b>6</b>	Adapter retention assembly		√		
<b>7</b>	Air baffle	√	√		
<b>8</b>	Processor key		√		
<b>9</b>	Memory module		√		
<b>10</b>	M.2 backplane		√		
<b>11</b>	M.2 filler	√	√		
<b>12</b>	M.2 drive		√		
<b>13</b>	M.2 retainer		√		
<b>14</b>	EDSFF drive backplane		√		
<b>15</b>	2.5-inch drive backplane with lever		√		
<b>16</b>	2.5-inch drive backplane		√		
<b>17</b>	2.5 inch drive filler	√			
<b>18</b>	2.5-inch drive		√		
<b>19</b>	Front bezel	√			
<b>20</b>	EDSFF drive filler	√			
<b>21</b>	EDSFF drive		√		
<b>22</b>	RAID adapter		√		
<b>23</b>	Flash power module		√		
<b>24</b>	Front handle	√			
<b>25</b>	EDSFF drive cage with door	√	√		
<b>26</b>	Hot-swap drive cage	√	√		
<b>27</b>	Processor filler	√			
<b>28</b>	I/O expansion adapter		√		

Table 15. Parts list (continued)

Index	Description	Consumable and Structural part	Tier 1 CRU	Tier 2 CRU	FRU
<b>29</b>	Trusted Platform Module (TPM)				√
<b>30</b>	System board				√
<b>31</b>	Bulkhead	√			
<b>32</b>	CMOS battery (CR2032)	√			

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## Chapter 3. Hardware replacement procedures

This section provides installation and removal procedures for all serviceable system components. Each component replacement procedure references any tasks that need to be performed to gain access to the component being replaced.

For more information about ordering parts:

1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your compute node.
2. Click **Service Parts**.
3. Enter the serial number to view a listing of parts for your compute node.

**Note:** If you replace a part, such as an adapter, that contains firmware, you might also need to update the firmware for that part. For more information about updating firmware, see “Firmware updates” on page 8.

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### Installation Guidelines

Before installing components in your server, read the installation guidelines.

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/](https://pubs.lenovo.com/safety_documentation/)
  - The following guideline are available as well: “Handling static-sensitive devices” on page 29.
- 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.

To help ensure proper system cooling and system reliability, make sure that the following requirements are met:

- Each of the drive bays has a drive or a filler panel and electromagnetic compatibility (EMC) shield installed in it.
- Each of the power-supply bays has a power supply or a filler installed in it.
- If the server has redundant power, each of the power-supply bays has a power supply installed in it.
- There is adequate space around the server to allow the 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 objects in front of the fans. For proper cooling and airflow, replace the server cover before you turn on the server. Operating the server for extended periods of time (more than 30 minutes) with the server cover removed might damage server components.

- You do not operate the server without the air baffle installed. Operating the server without the air baffle might cause the processor to overheat.
- All processor sockets must contain either a socket cover and a filler or a processor with heat sink.
- Follow the *Lenovo Flex System Enterprise Chassis Service Guide* for fan installation guidance. See for more information at <https://pubs.lenovo.com/enterprise-chassis/>.

## Handling static-sensitive devices

Review these guidelines before you handle static-sensitive devices to reduce the possibility of damage from electrostatic discharge.

**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.

## Returning a device or component

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

## Updating the compute node configuration

Use this information to update the compute node configuration.

When the compute node starts for the first time after you add or remove an internal device, you might receive a message that the configuration has changed. See the *ThinkSystem SN550 V2 Setup Guide* for more information.

Some devices have device drivers that you must install. See the documentation that comes with each device for information about installing device drivers.

If you replace a part, such as an adapter, that contains firmware, you might also need to update the firmware for that part. For more information about updating firmware, see “Firmware updates” on page 8.

Update the UEFI configuration if necessary.

Reconfigure the disk arrays if you have installed or removed a hot-swap drive or a RAID adapter. See the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.

The compute node operates as a symmetric multiprocessing (SMP) compute node, regardless of how many processors are installed. For optimum performance, you must upgrade the operating system to support SMP. See your operating-system documentation for additional information.

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## Compute node replacement

Use the following procedures to remove and install the compute node from a chassis.

### S021



#### **CAUTION:**

**Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.**

## Remove the compute node from chassis

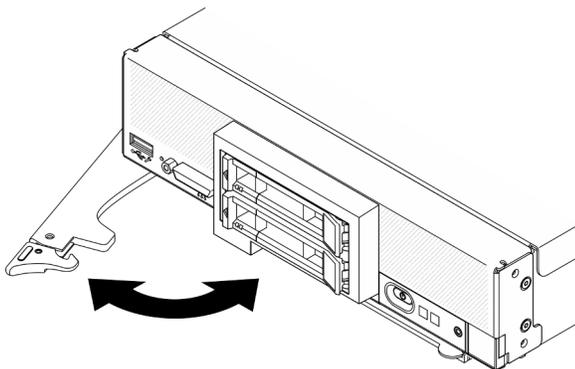
Use this information to remove the compute node from the Lenovo Flex System Enterprise Chassis.

### About this task

#### **Attention:**

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 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 9. 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.

## 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 the compute node in chassis

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

### About this task

**Attention:**

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 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 6 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.

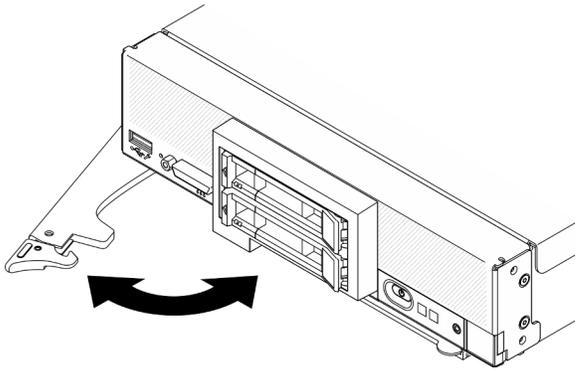


Figure 10. Compute node installation to chassis

- 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 12 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.
- Step 9. If you have other compute nodes to install, do so now.

## After you finish

### Notes:

- For instructions related to the Flex System Enterprise chassis, see [https://pubs.lenovo.com/enterprise-chassis/installing\\_components](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](https://pubs.lenovo.com/carrier-grade-chassis/installing_components).

### Demo video

Watch the procedure on YouTube

---

## 2.5-inch hot-swap drive replacement

Use the following information to remove and install a 2.5-inch hot-swap drive.

### Remove a 2.5-inch hot-swap drive

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

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 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. ① Pull the release latch on the drive.
  - b. ② Hold the handle to pull the drive slightly out.
  - c. ③ Pull the drive out of the drive bay.

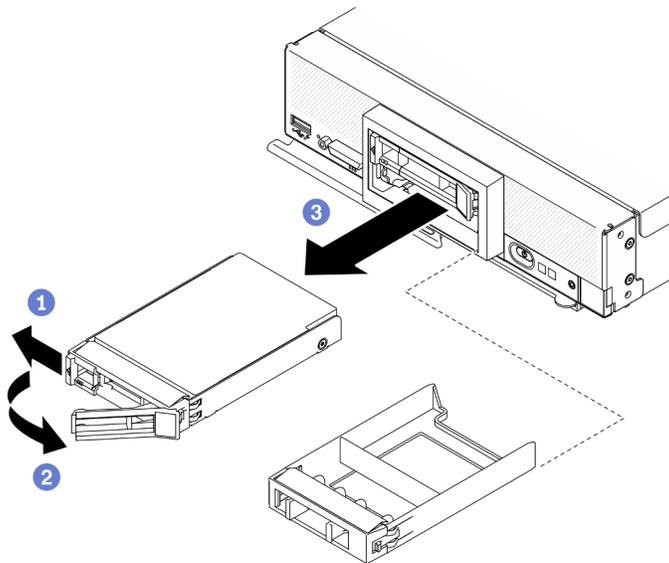


Figure 11. 2.5-inch hot-swap drive removal

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

## Install a 2.5-inch hot-swap drive

Use this information to install a 2.5-inch hot-swap drive.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 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.
- 1 Keep the handle on the drive open, then slide the drive into drive bay until the drive handle catches on the bezel.
  - 2 Rotate the handle and secure it to the latch. The drive will be seated fully in the bay.

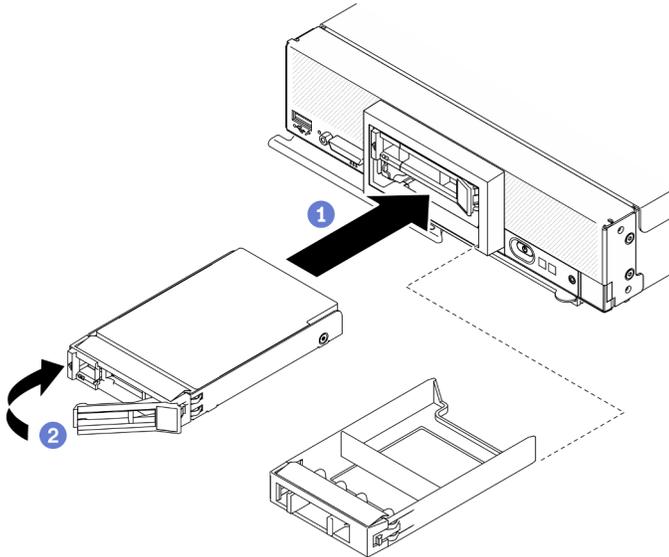


Figure 12. 2.5-inch hot-swap drive installation

## 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

---

## 2.5-inch drive backplane replacement

Use the following information to remove and install a 2.5-inch drive backplane.

### Remove the 2.5-inch drive backplane

Use this information to remove the 2.5-inch drive backplane

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.

- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
- 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. Make preparations for your node.

- Remove the compute node cover. See "Remove the compute node cover" on page 50.
- If there is a RAID adapter installed in the computer node, remove it from the computer node. See "Remove the RAID adapter" on page 110.

Step 2. Pull the drives and fillers out slightly from the drive bays to disengage them from the backplane.

Step 3. Lift up the backplane.

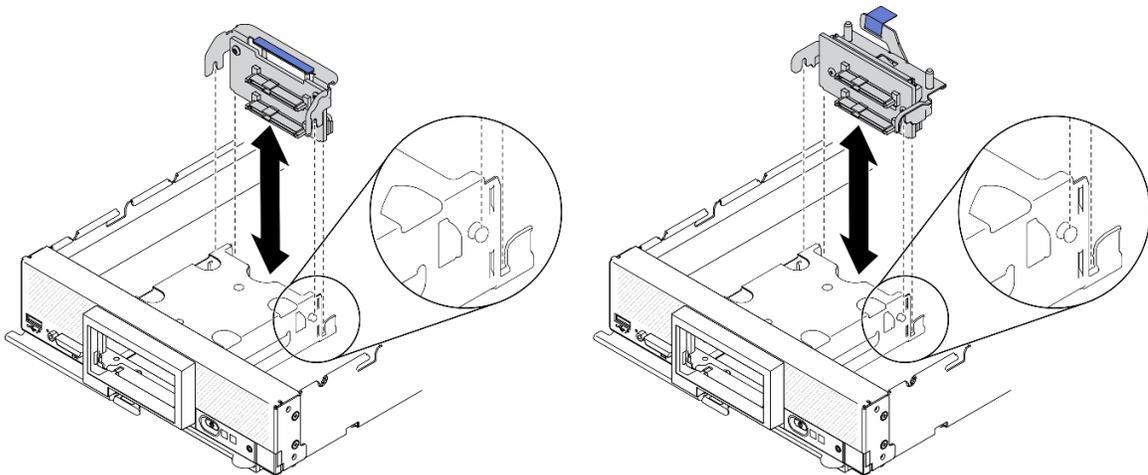


Figure 13. 2.5-inch drive backplane removal

## 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

## Install the 2.5-inch drive backplane

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

## About this task

**Attention:**

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 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.

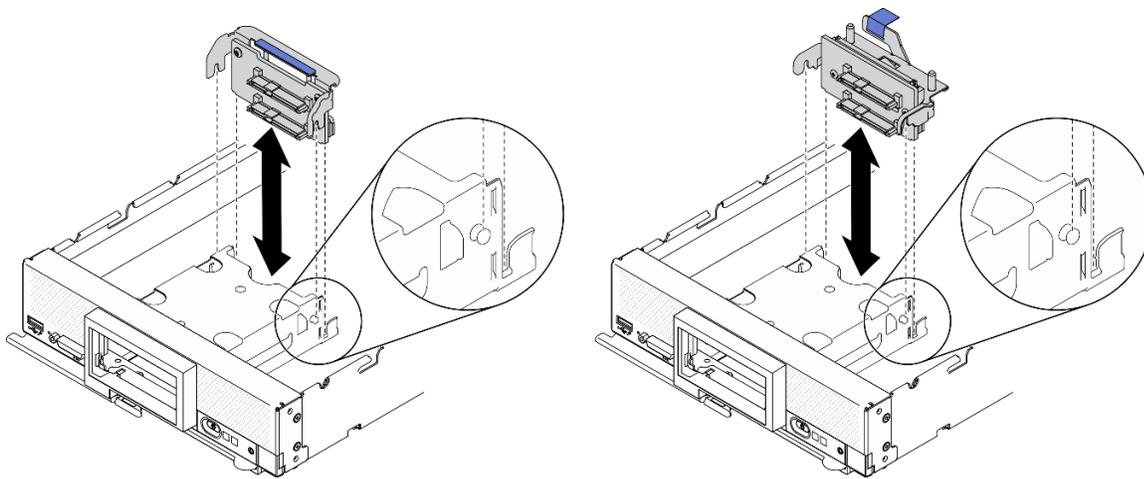
**Procedure**

Figure 14. 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.

**After you finish**

1. Reinstall the 2.5-inch drives and fillers. See “Install a 2.5-inch hot-swap drive” on page 34.
2. Reinstall the RAID adapter if needed. See “Install the RAID adapter” on page 111.
3. Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

**Demo video**

Watch the procedure on YouTube

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**Adapter-retention assembly replacement**

Use the following information to remove and install the adapter-retention assembly.

## Remove the adapter-retention assembly

Use this information to remove the adapter-retention assembly.

### About this task

#### Attention:

1. Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
2. Power off the corresponding compute node that you are going to perform the task on.
3. Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
4. Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
5. Make sure you have a T10 Torx screwdriver available.

**Note:** The adapter-retention assembly consists of 12 separate parts. You can replace only the parts that you choose and save the unused parts for future use.

### Procedure

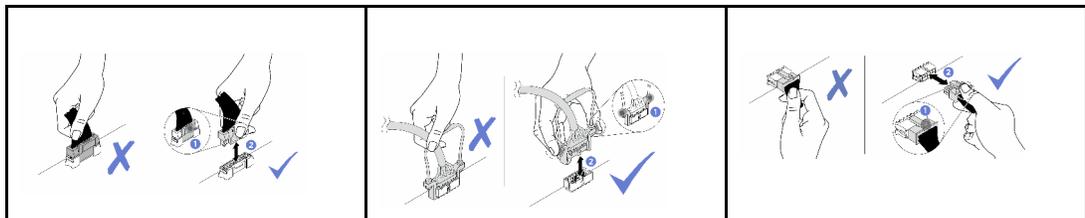
Step 1. Make preparations for your compute node.

- a. Remove the compute node cover. See “Remove the compute node cover” on page 50.
- b. Remove the air baffle. See “Remove the air baffle” on page 42.
- c. If present, remove the I/O expansion adapters from the system board. See “Remove an I/O expansion adapter” on page 78.
- d. If present, disconnect M.2 cables from the system board. See Step 2 in “Remove the M.2 backplane assembly” on page 81.

**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. Carefully place the compute node on its side, making sure the protruding part of the handle is at the top so that the compute node is stable.

**Attention:** If you place the compute node on its side, with the protruding part of the handle at the bottom, the compute node will not be stable and might fall over.

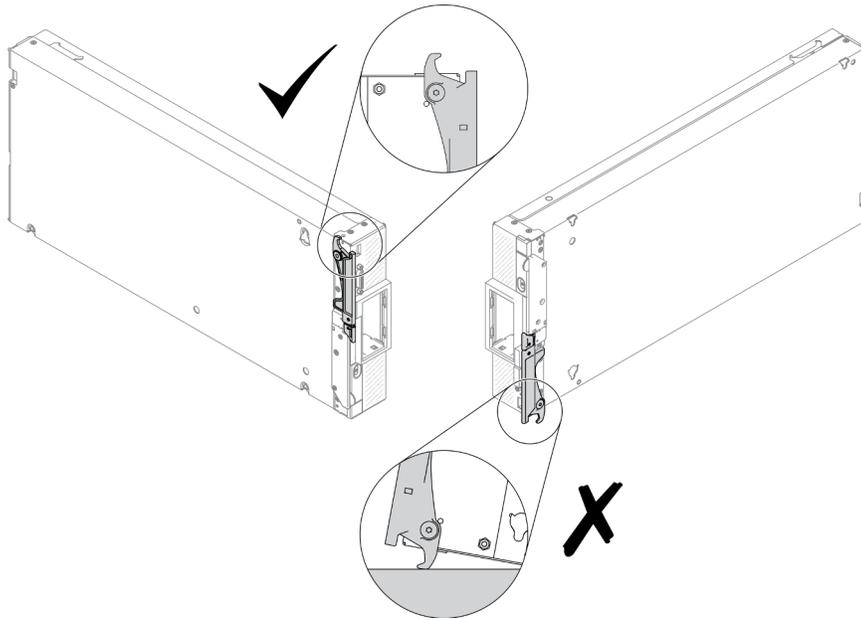


Figure 15. Compute node positioning direction

Step 3. Using a T10 Torx screwdriver, remove the screws that secure the adapter-retention assembly. Remove the adapter-retention assembly away from the system board.

**Note:** All adapter-attention assembly parts are shown. Replace the parts that are needed and save the unused parts for future use.

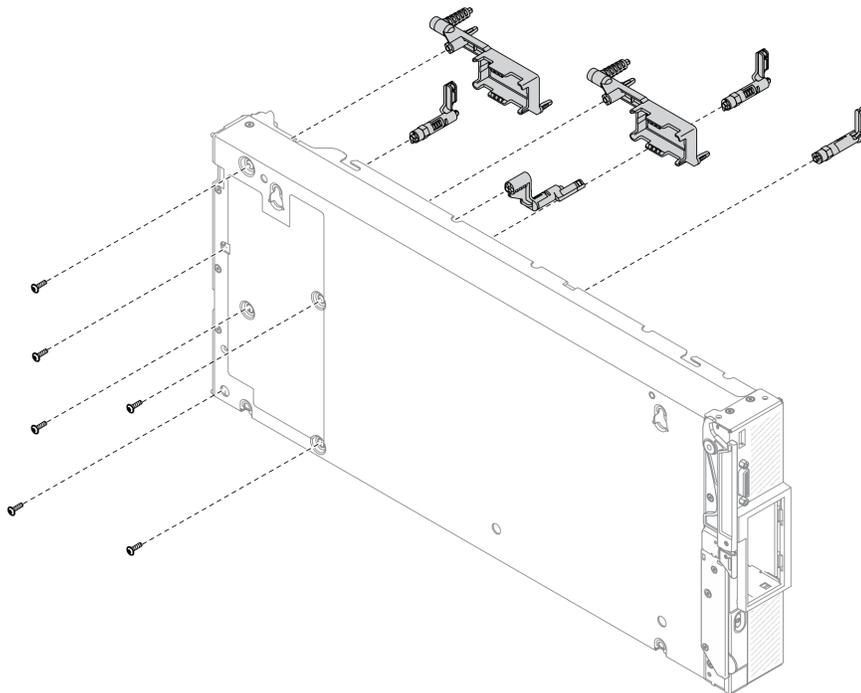


Figure 16. Adapter-retention assembly removal

Step 4. Carefully return the compute node to the bottom-side-down orientation.

## 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.

## Install the adapter-retention assembly

Use this information to install the adapter-retention assembly.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Make sure you have a T10 Torx screwdriver available.

**Note:** The adapter-retention assembly consists of 12 separate parts. You can install only the parts that you choose and save the unused parts for future use.

### Procedure

Step 1. Carefully place the compute node on its side, making sure the protruding part of the handle is at the top so that the compute node is stable.

**Attention:** If you place the compute node on its side, with the protruding part of the handle at the bottom, the compute node will not be stable and might fall over.

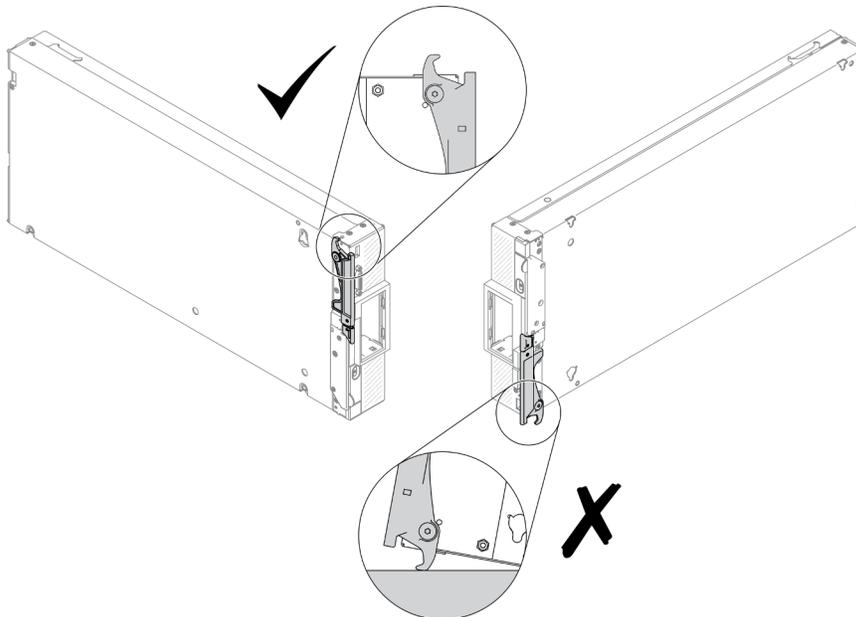


Figure 17. Compute node positioning direction

- Step 2. Install the adapter-retention assembly.
- a. Align each part of the adapter-retention assembly with the system board.

- b. Using a T10 Torx screwdriver, install the screws that secure each part of the adapter-retention assembly that you are installing.

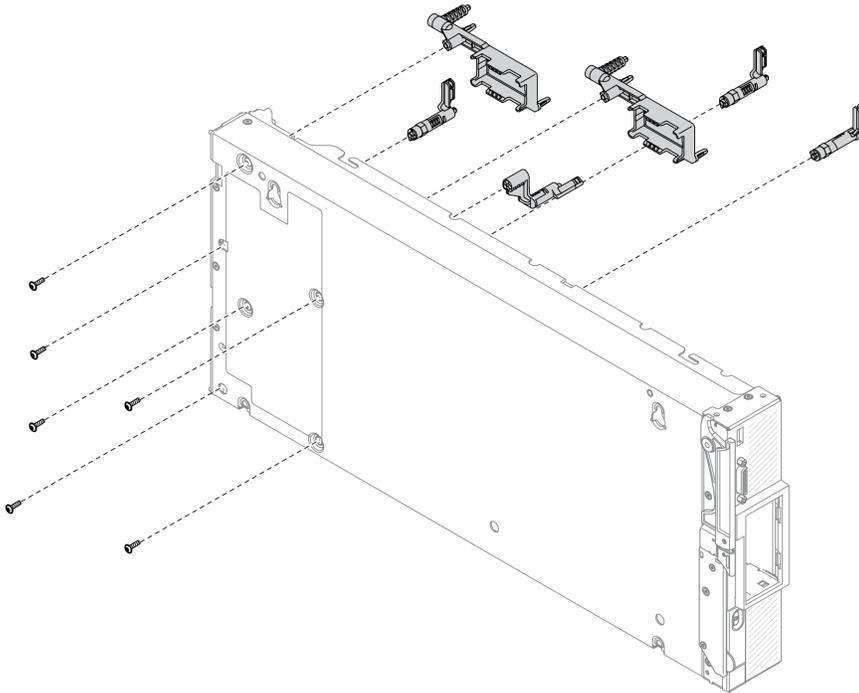


Figure 18. Adapter retention assembly installation

**Note:** All adapter-attention assembly parts are shown. Replace the parts that are needed and save the unused parts for future use.

Step 3. Carefully return the compute node to the bottom-side-down orientation.

### After you finish

1. If necessary, reinstall the M.2 cables to the system board. See “Install the M.2 backplane assembly” on page 84.
2. If necessary, reinstall the I/O expansion adapters. See “Install an I/O expansion adapter” on page 79.
3. Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

---

## Air baffle replacement

Use the following information to remove and install the air baffle.

### S012



**CAUTION:**  
Hot surface nearby.

## Remove the air baffle

Use this information to remove the air baffle.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

### Procedure

- Step 1. Remove the compute node cover to make preparations for your compute node. See “Remove the compute node cover” on page 50
- Step 2. If there is an M.2 backplane assembly installed on the air baffle, disconnect the M.2 cables from the M.2 backplane. See Step 3 in “Remove the M.2 backplane assembly” on page 81.
- Step 3. Lift up the air baffle and set it aside.

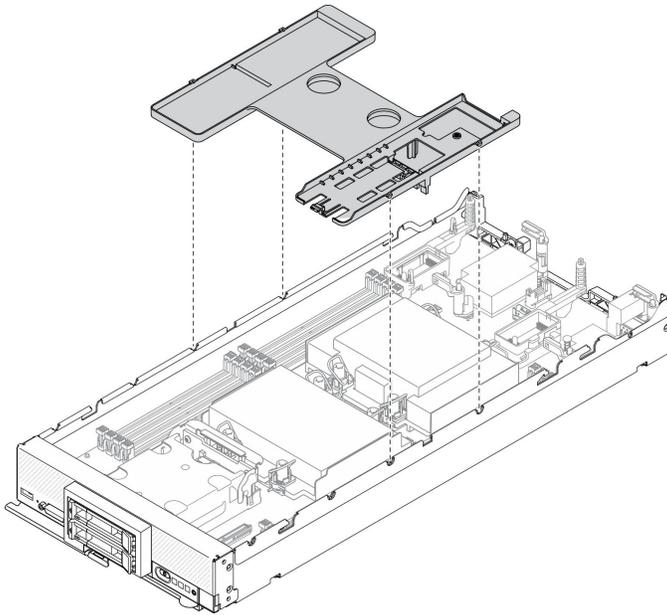


Figure 19. Air baffle removal

### 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.

#### 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

## Install the air baffle

Use this information to install the air baffle.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 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.

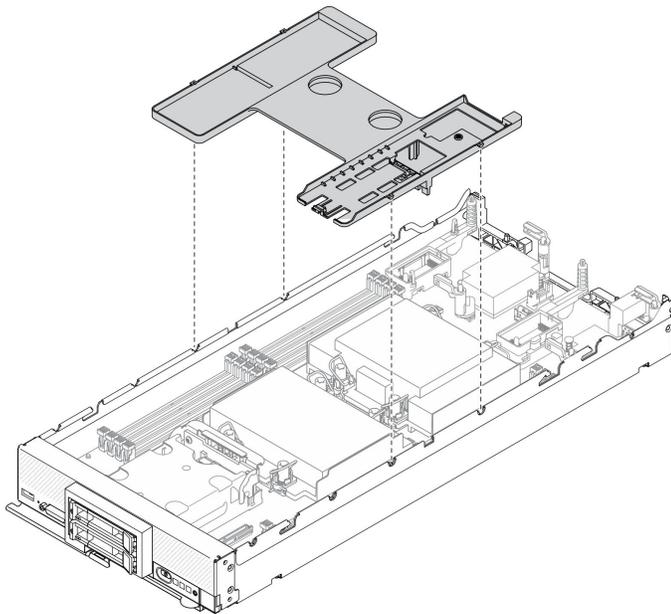


Figure 20. Installing the air baffle

#### 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.

## After you finish

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” on page 84.
  - To install the M.2 backplane assembly filler, see “Install the M.2 backplane assembly filler” on page 87 “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.
3. Reinstall the compute node cover. See “Install the compute node cover” on page 51.
4. Reinstall the compute node back to the chassis. See “Install the compute node in chassis” on page 31.
5. Power on the compute node. See “Power on the compute node” on page 12.

## Demo video

Watch the procedure on YouTube

---

## Bulkhead replacement

Use the following information to remove and install the bulkhead.

### Remove the bulkhead

Use this information to remove the bulkhead.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
- Make sure you have a T8 Torx screwdriver available.

### Procedure

Step 1. Make preparations for your compute node.

- a. Remove the compute node cover. See “Remove the compute node cover” on page 50.
- b. Remove the air baffle. See “Remove the air baffle” on page 42.
- c. Remove the I/O expansion adapters. See “Remove an I/O expansion adapter” on page 78.

Step 2. Remove the bulkhead.

- a. Carefully place the compute node to the up-side-down orientation.
- b. Using a T8 Torx screwdriver, remove the five screws securing the bulkhead.

- c. Remove the bulkhead from the compute node.

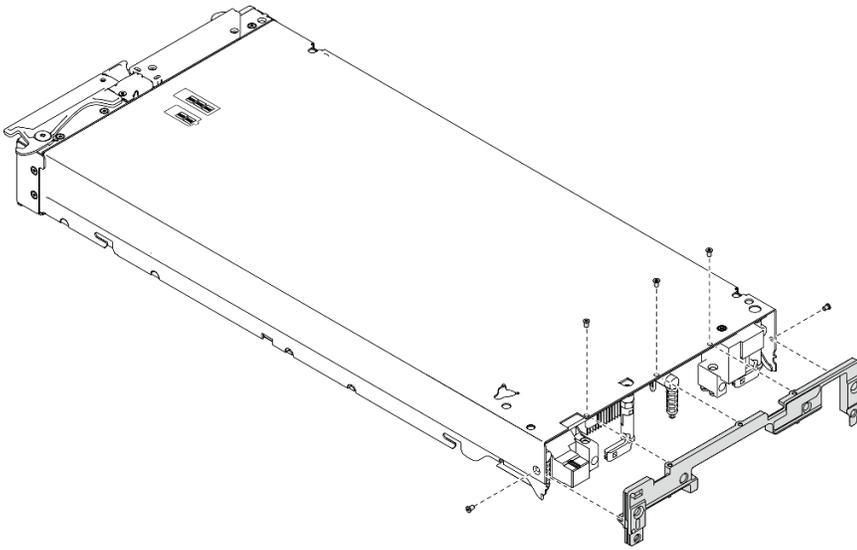


Figure 21. Bulkhead removal

## 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.

## Install the bulkhead

Use this information to install the bulkhead.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Make sure you have a T8 Torx screwdriver available.

## Procedure

Step 1. Install the bulkhead:

- a. Place the compute node to the up-side-down orientation.
- b. Align the bulkhead to the rear end of the compute node.
- c. Using a T8 Torx screwdriver, install the screws that secures the bulkhead to the sides of the compute node.
- d. Carefully return the node to the bottom-side-down orientation.

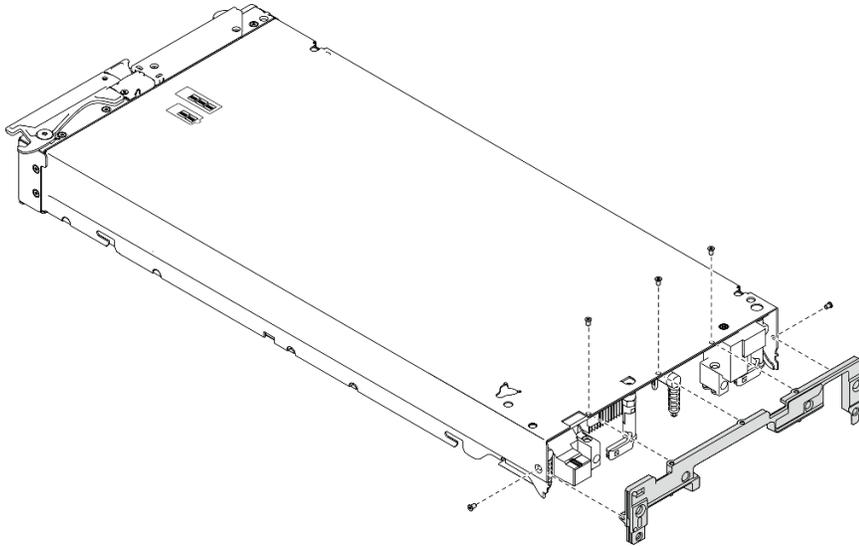


Figure 22. Bulkhead installation

### After you finish

1. Reinstall the I/O expansion adapters. See “Install an I/O expansion adapter” on page 79.
2. Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

---

## CMOS battery - CR2032 replacement

Use the following information to remove and install the CMOS battery - CR2032.

### Remove the CMOS battery - CR2032

Use this information to remove the CMOS battery - CR2032.

#### S004



#### **CAUTION:**

**When replacing the lithium battery, use only Lenovo specified part number or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.**

*Do not:*

- **Throw or immerse into water**
- **Heat to more than 100°C (212°F)**
- **Repair or disassemble**

**Dispose of the battery as required by local ordinances or regulations.**

#### S005

**CAUTION:**

The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the approved part. Recycle or discard the battery as instructed by local regulations.

**About this task****Attention:**

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

**Procedure**

Step 1. Make preparations for your compute node.

- a. Remove the compute node cover. See “Remove the compute node cover” on page 50.

Step 2. Remove the CMOS battery - CR2032.

- a. Locate the CMOS battery - CR2032 socket on the system board. See “System board connectors” on page 19.
- b. If a cover is over the CMOS battery - CR2032, remove the cover.
- c. Pivot the CMOS battery - CR2032 toward the memory module slots.

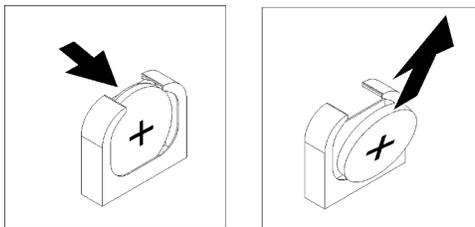


Figure 23. CMOS battery - CR2032 removal

- d. Lift the CMOS battery - CR2032 from the socket.

**After you finish**

Dispose the component with compliance to local regulations.

**Demo video**

Watch the procedure on YouTube

**Install the CMOS battery - CR2032**

Use this information to install the CMOS battery - CR2032.

## S004



### **CAUTION:**

When replacing the lithium battery, use only Lenovo specified part number or an equivalent type battery recommended by the manufacturer. If your system has a module containing a lithium battery, replace it only with the same module type made by the same manufacturer. The battery contains lithium and can explode if not properly used, handled, or disposed of.

*Do not:*

- Throw or immerse into water
- Heat to more than 100°C (212°F)
- Repair or disassemble

Dispose of the battery as required by local ordinances or regulations.

## S005



### **CAUTION:**

The battery is a lithium ion battery. To avoid possible explosion, do not burn the battery. Exchange it only with the approved part. Recycle or discard the battery as instructed by local regulations.

## **About this task**

### **Attention:**

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

**Important:** The following notes describe information that you must consider when you are replacing the CMOS battery - CR2032 in the compute node:

- You must replace the CMOS battery - CR2032 with a lithium CMOS battery - CR2032 of the same type.
- After you replace the CMOS battery - CR2032, you must reconfigure the compute node and reset the system date and time.

## **Procedure**

Step 1. Follow any special handling and installation instructions that come with the CMOS battery - CR2032.

**Attention:** Touching the CMOS battery - CR2032 on a metal surface, such as the side of the compute node, when you replace the CMOS battery - CR2032 can cause it to fail.

Step 2. Locate the CMOS battery - CR2032 socket on the system board. See “System-board layout” on page 19.

- Step 3. Orient the CMOS battery - CR2032 so that the positive (+) side faces toward the memory module slots.
- Step 4. Install the CMOS battery - CR2032.
- Pivot the CMOS battery - CR2032 so that you can insert it into the socket.
  - Slide the CMOS battery - CR2032 in place.
  - Press the top of the CMOS battery - CR2032 into the socket.

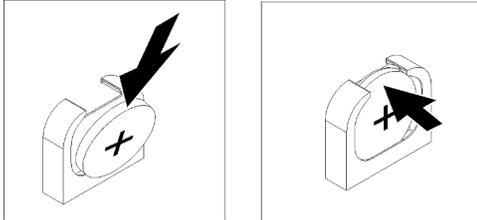


Figure 24. CMOS battery - CR2032 installation

- Step 5. If you removed a cover from the battery, install the cover.

## After you finish

**Attention:** Reconfigure the compute node and reset the system date and time.

- Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

## Demo video

Watch the procedure on YouTube

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## Compute node cover replacement

Use the following information to remove and install the compute node cover.

### S012



**CAUTION:**  
Hot surface nearby.

### S021



**CAUTION:**  
Hazardous energy is present when the blade is connected to the power source. Always replace the blade cover before installing the blade.

## Remove the compute node cover

Use this information to remove the cover from 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 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

## Procedure

Step 1. Remove the top cover.

- a. ① Press the release button.
- b. ② Slide the cover toward the rear of the compute node; then, lift up the cover.

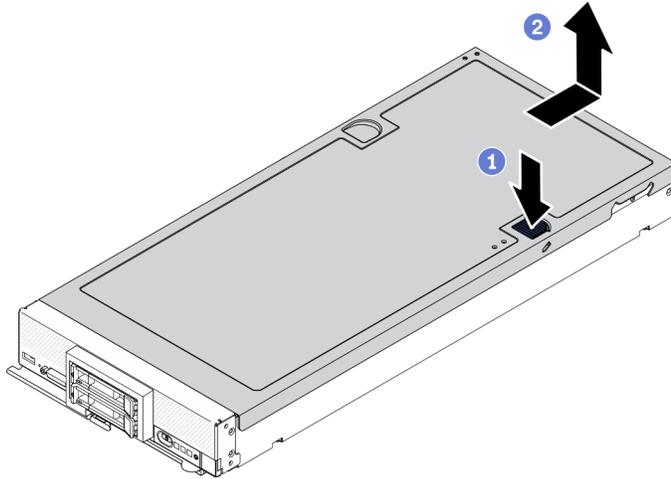


Figure 25. Compute node cover removal

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.

## 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 the compute node cover

Use this information to install the compute node cover.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 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 24 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 43.
- 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.

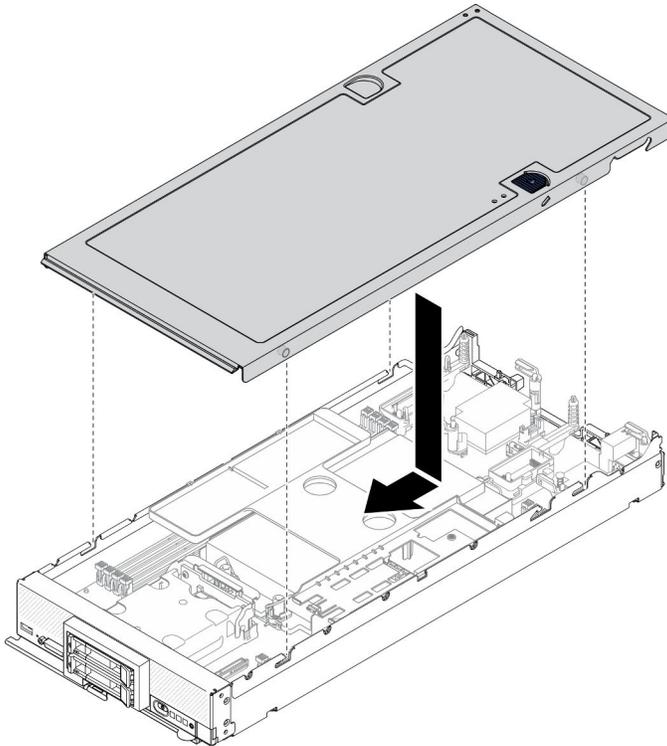


Figure 26. Compute node cover installation

### After you finish

- Reinstall the compute node back to the chassis. See “Install the compute node in chassis” on page 31.
- Power on the compute node. See “Power on the compute node” on page 12.

### Demo video

Watch the procedure on YouTube

---

## Drive cage replacement

Use the following information to remove and install the drive cage.

### Remove the drive cage

Use this information to remove the drive cage.

### About this task

#### Attention:

1. Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

2. Power off the corresponding compute node that you are going to perform the task on.
3. Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
4. Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

## Procedure

Step 1. Make preparations for your compute node.

- a. Remove the compute node cover. See “Remove the compute node cover” on page 50.
- b. Remove drives or drive bay filler. See:
  - “Remove a 2.5-inch hot-swap drive” on page 33
  - “Remove an EDSFF hot-swap drive” on page 55

**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.

- c. If present, remove the RAID adapter. See “Remove the RAID adapter” on page 110.
- d. Remove the drive backplane. See:
  - “Remove the 2.5-inch drive backplane” on page 35
  - “Remove the EDSFF drive backplane assembly” on page 61
- e. Remove the front bezel. See “Remove the front bezel” on page 69.
- f. If present, remove the EDSFF drive cage. See “Remove the EDSFF drive cage” on page 65.

Step 2. Using a T10 Torx screwdriver, remove the four screws from the cage and rotate the cage from under the compute node front panel; then, remove the cage from the compute node at an angle.

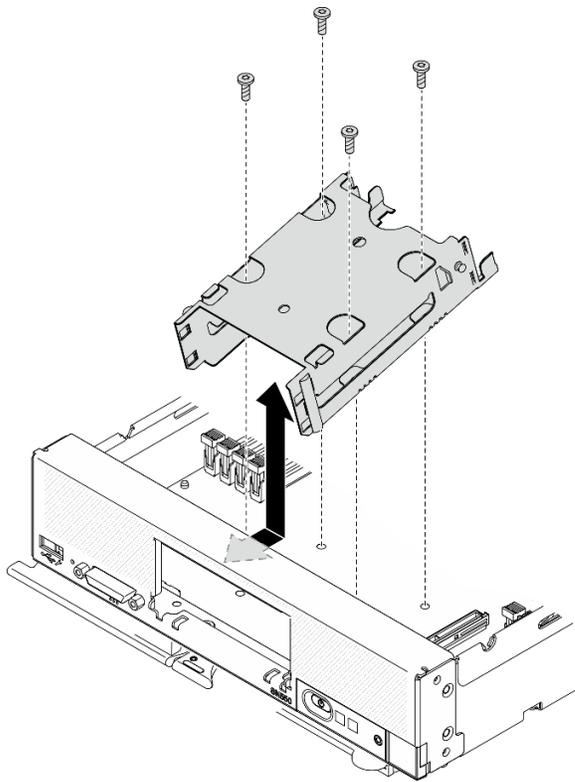


Figure 27. Removing the drive cage

## 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.

## Install the drive cage

Use this information to install the drive cage.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

## Procedure

- Step 1. Position the cage in the compute node front panel at an angle and rotate the cage into position on the system board.
- Step 2. Align the cage with the screw holes on the system board.
- Step 3. Using a T10 Torx screwdriver, insert the four screws and secure the cage in the compute node.

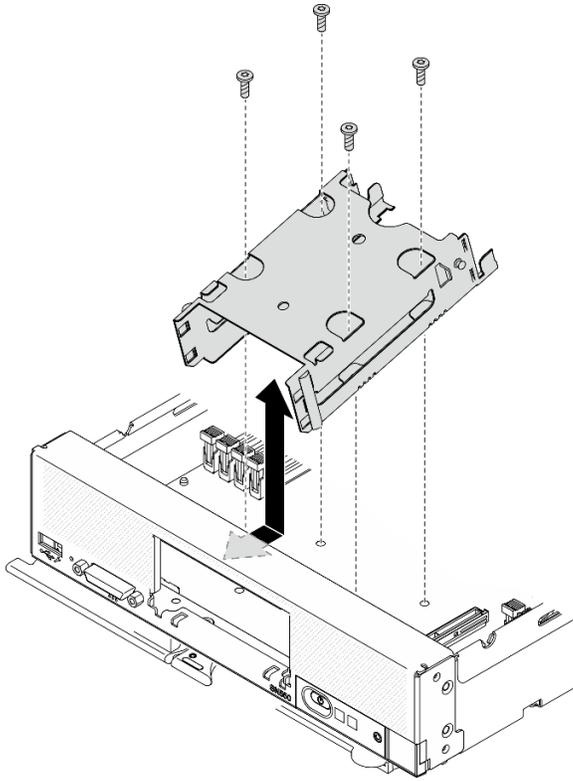


Figure 28. Installing the drive cage

### After you finish

1. If applicable, reinstall the EDSFF drive cage. See “Install the EDSFF drive cage” on page 66.
2. Reinstall the front bezel. See “Install the front bezel” on page 71.
3. Reinstall the drive backplane. See:
  - “Install the 2.5-inch drive backplane” on page 36
  - “Install the EDSFF drive backplane assembly” on page 63
4. If applicable, reinstall the RAID adapter. See “Install the RAID adapter” on page 111.
5. Reinstall the hot-swap drives or drive bay fillers. See:
  - “Install a 2.5-inch hot-swap drive” on page 34
  - “Install the EDSFF drive backplane assembly” on page 63
6. Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

---

## EDSFF hot-swap drive replacement

Use the following information to remove and install an EDSFF hot-swap drive.

### Remove an EDSFF hot-swap drive

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

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 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.

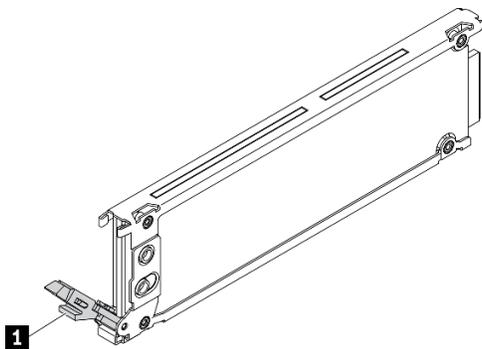


Figure 29. EDSFF drive handle

Table 16. EDSFF drive handle

<b>1 EDSFF drive handle</b>
-----------------------------

## 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.

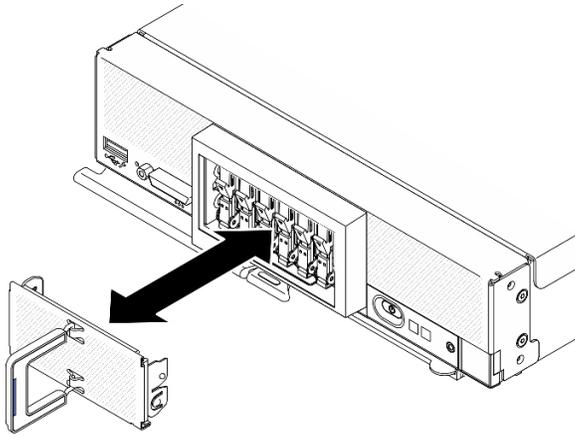


Figure 30. EDSFF drive cage bezel removal

- Step 3. Remove the EDSFF hot-swap drive.
- a. ① Slightly press down the handle on the EDSFF drive.
  - b. ② Rotate the handle to the open position.
  - c. ③ 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.

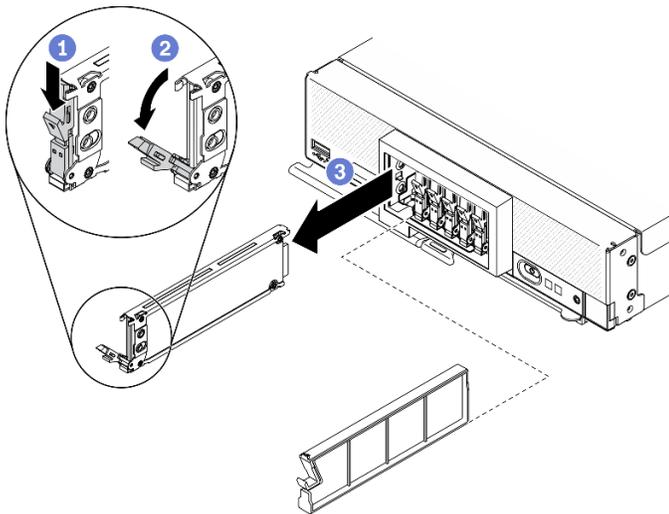


Figure 31. EDSFF hot-swap drive removal

## After you finish

- If no drives are going to be installed in the drive bays, complete the following steps:
  1. Insert fillers into the drive bays.
  2. 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.
- 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 an EDSFF hot-swap drive

Use this information to install an EDSFF hot-swap drive.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 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.

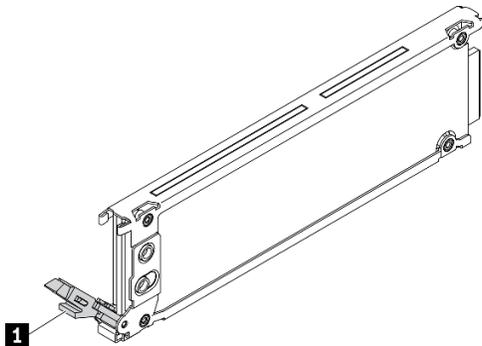


Figure 32. EDSFF drive handle

Table 17. EDSFF drive handle

<b>1 EDSFF drive handle</b>
-----------------------------

## 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.

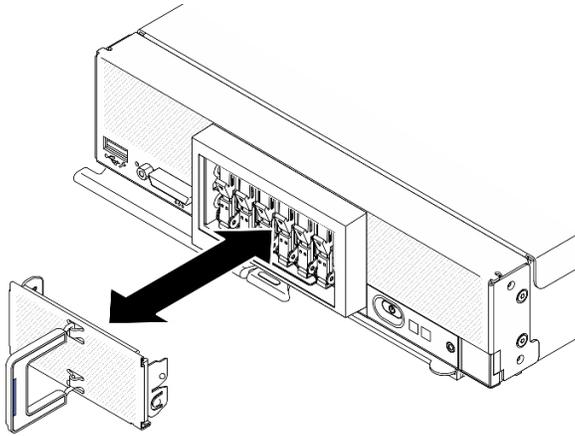


Figure 33. EDSFF drive cage bezel removal

- 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. ① 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. ② 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.

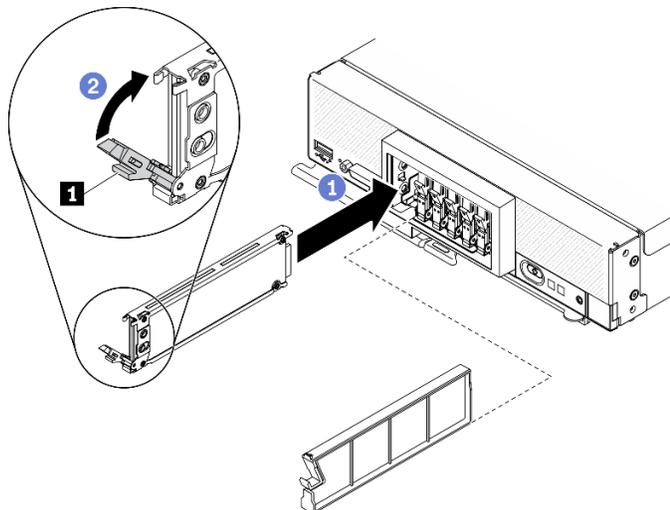


Figure 34. EDSFF hot-swap drive installation

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.

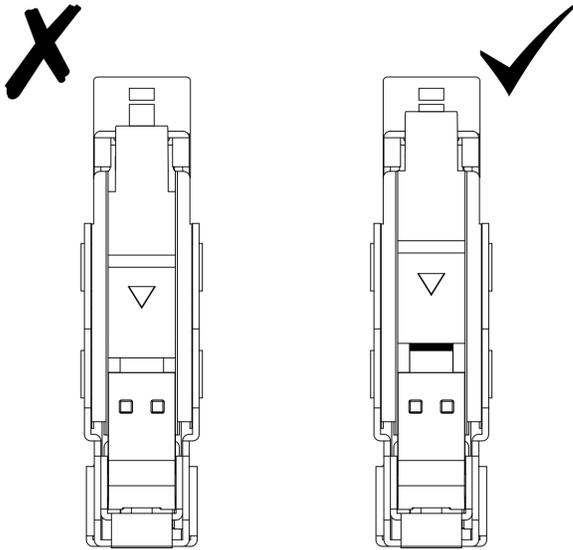


Figure 35. EDSFF drive latch adjustment

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.

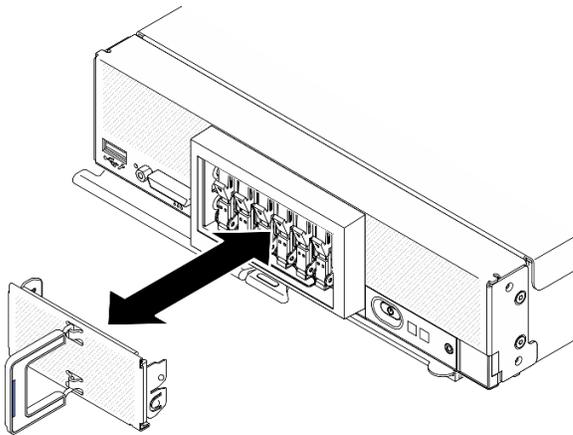


Figure 36. EDSFF drive cage bezel installation

## 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

---

## EDSFF drive backplane assembly replacement

Use the following information to remove and install the EDSFF drive backplane assembly.

### Remove the EDSFF drive backplane assembly

Use this information to remove the EDSFF drive backplane assembly

#### About this task

##### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
- 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.

#### Procedure

Step 1. Make preparations for your compute node.

- a. Remove the compute node cover. See “Remove the compute node cover” on page 50.
- b. Remove the EDSFF drive cage bezel to access the EDSFF drives.
- c. Pull the EDSFF drives and fillers out slightly from the bays to disengage them from the backplane.

**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.

Step 2. Remove the backplane assembly.

- a. ① Press the latch on cable and disconnect the cable from system board.
- b. ② Lift up the backplane from the connector on system board and remove the backplane away from the compute node.

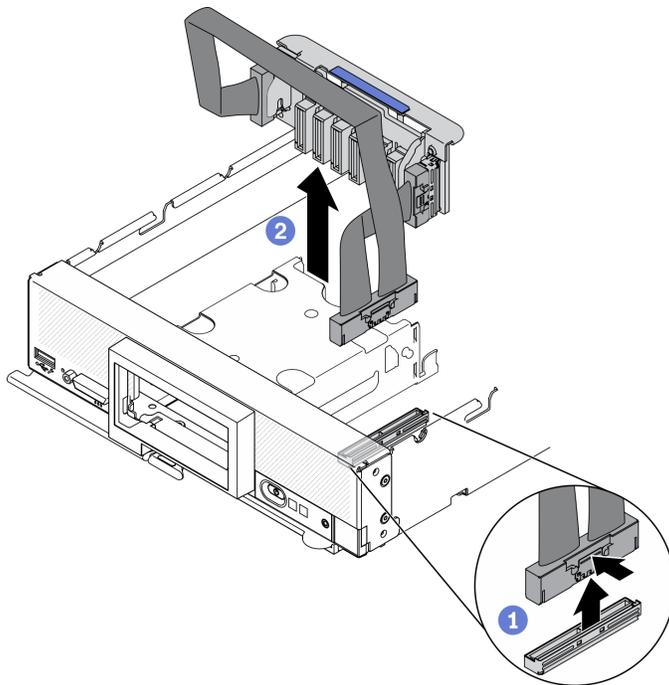
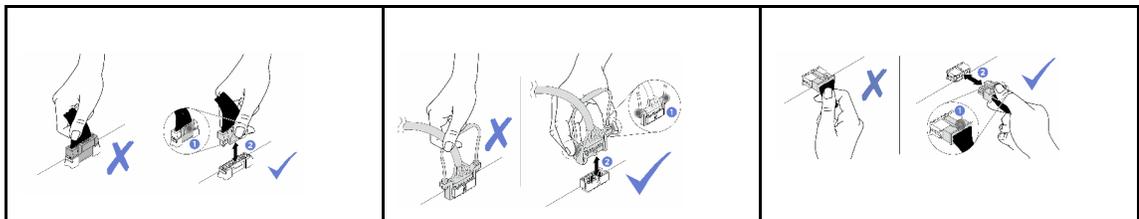


Figure 37. EDSFF drive backplane assembly removal

**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 3. Disconnect the cable from the backplane.
- a. ① Press the latches on both ends of the cable.
  - b. ② Pull the connector away from the backplane.

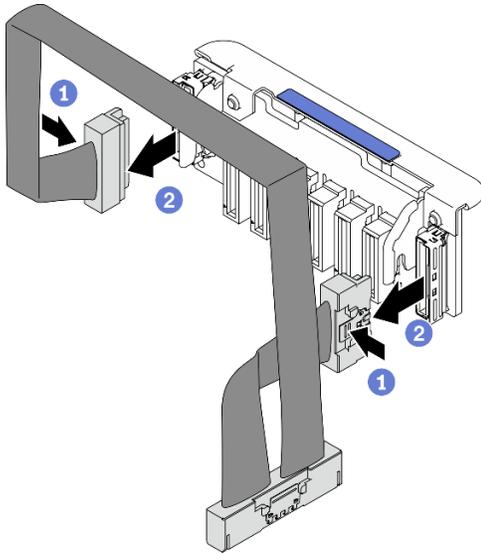


Figure 38. Disconnecting cable from EDSFF backplane

## 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 the EDSFF drive backplane assembly

Use this information to install the EDSFF drive backplane assembly.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 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. ① Press the latches on both ends of the cable.
- b. ② Insert cable connector into the slots on backplane.

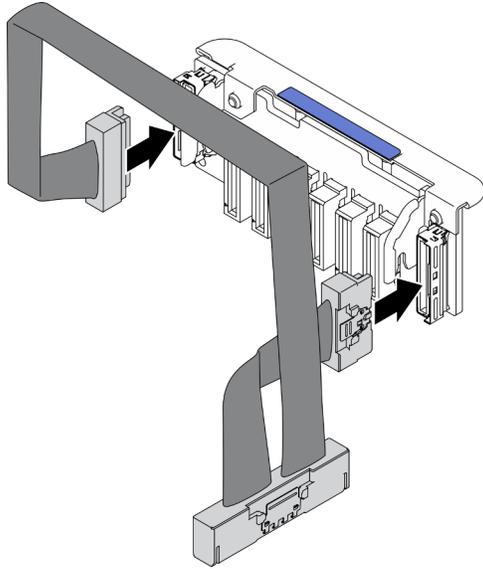


Figure 39. Connecting cable to the EDSFF drive backplane

Step 2. Install the backplane assembly.

- a. ① Align the slots on backplane with the pins on the sides of the storage cage
- b. ② Align the backplane connector with the connector on system board.
- c. ③ Insert the latch on the cable into the connector on system board.

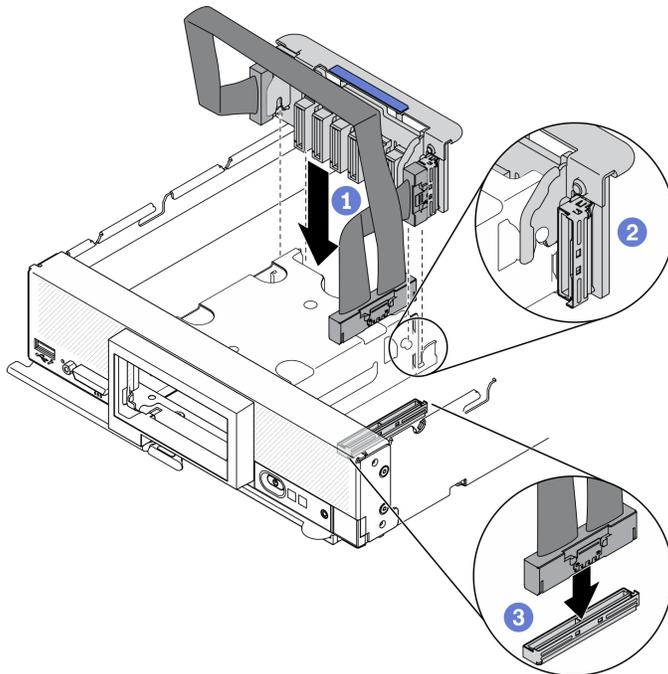


Figure 40. EDSFF backplane assembly installation

### After you finish

1. Reinstall the EDSFF drives and fillers. See “Install an EDSFF hot-swap drive” on page 58.

**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.

2. Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

### Demo video

Watch the procedure on YouTube

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## EDSFF drive cage replacement

Use the following information to remove and install the EDSFF drive cage.

### 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 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

#### Procedure

Step 1. Make preparations for your compute node.

- a. Remove the compute node cover. See “Remove the compute node cover” on page 50.
- b. Remove any EDSFF drive or EDSFF drive bay filler. See “Remove an EDSFF hot-swap drive” on page 55.

**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.

- c. Remove the front bezel. See “Remove the front bezel” on page 69.

Step 2. Remove the EDSFF drive cage.

- a. ① Press and hold the release latch on the EDSFF drive cage.
- b. ② Pull the EDSFF drive cage out of the compute node.

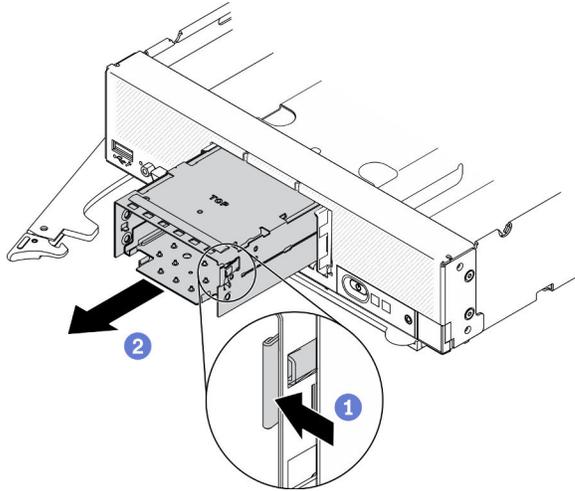


Figure 41. EDSFF drive cage removal

## 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

## 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 27 to ensure that you work safely.

## Procedure

- Step 1. Make sure the EDSFF drive backplane is installed in the compute node. See “Install the EDSFF drive backplane assembly” on page 63.
- Step 2. 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.

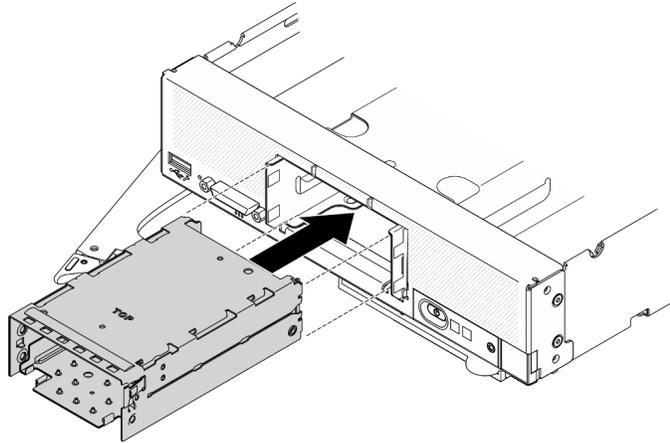


Figure 42. EDSFF storage cage installation

### After you finish

1. Reinstall the front bezel. See “Install the front bezel” on page 71.
2. Reinstall the EDSFF drives and fillers. See “Install an EDSFF hot-swap drive” on page 58.

**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.

3. Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

### Demo video

Watch the procedure on YouTube

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## Flash power module replacement

Use the following information to remove and install the flash power module on the RAID adapter.

### Remove the flash power module

Use this information to remove the flash power module on the RAID adapter.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

**Note:** This section only applies to RAID adapters that come with a flash power module.

### Procedure

Step 1. Make preparations for your compute node.

- a. Remove the compute node cover. See “Remove the compute node cover” on page 50.
- b. Remove the RAID adapter. See “Remove the RAID adapter” on page 110.

Step 2. Remove the flash power module.

- a. ① Press the rear of the flash power module.
- b. ② Slide the flash power module out of its holder on the RAID adapter.
- c. ③ Disconnect the flash power module cable on the RAID adapter.

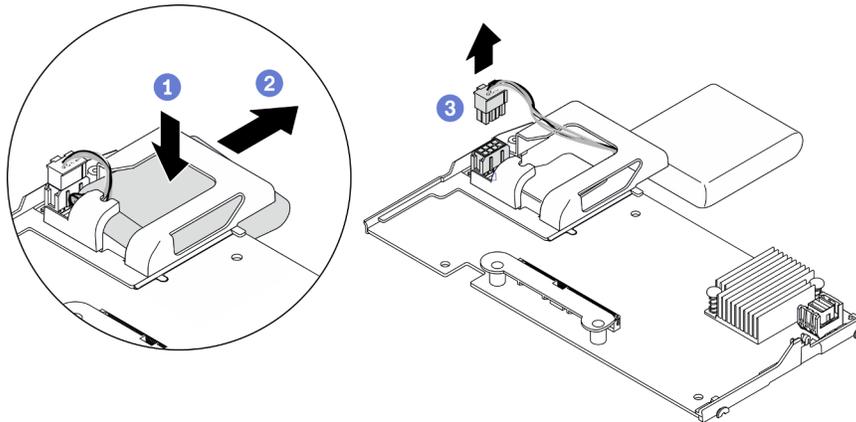


Figure 43. Flash power module removal

**Attention:** To prevent any damage to the flash power module cable or connector, it is important to first slide out the flash power module. This provides more space for your fingers to better grip the flash power module cable and remove it from the connector.

## 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 the flash power module

Use this information to install the flash power module on the RAID adapter.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

**Note:** This section only applies to RAID adapters that come with a flash power module.

## Procedure

Step 1. Install the flash power module.

- a. ① Feed the cable up through the flash power module holder then slide the flash power module in the holder.

- b. 2 Connect the flash power module cable to its connector on the RAID adapter until the connector retaining clip clicks into place.

**Attention:** Route the flash power module cable through the notch in the holder to prevent the cable from catching on the memory module slot retaining clips.

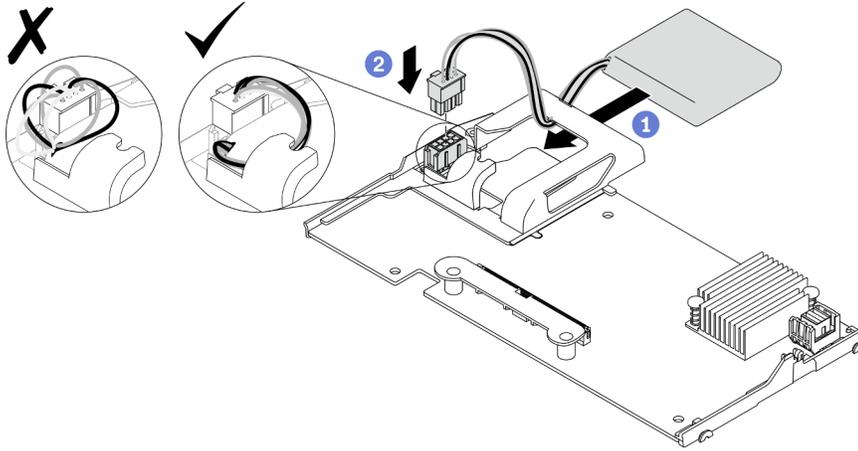


Figure 44. Flash power module installation

### After you finish

1. Reinstall the RAID adapter to the compute node. See “Install the RAID adapter” on page 111.
2. Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

### Demo video

Watch the procedure on YouTube

---

## Front bezel replacement

Use the following information to remove and install the front bezel.

### 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 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.

**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 bezel installed in your compute node.

### Procedure

Step 1. If any hot-swap drives or drive bay fillers are installed, remove them from the compute node. See the following section that matches your compute node configuration for instructions.

- “Remove a 2.5-inch hot-swap drive” on page 33
- “Remove an EDSFF hot-swap drive” on page 55

**Note:** When removing the hot-swap drives, make note of the drive bay from which the drive was removed so that you can install the drive back in to the same 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.

Step 2. Rotate the front handle of the computer node to the open position.

Step 3. Install the front bezel to the compute node.

- a. ① Press from the underneath of front bezel's top edge.
- b. ② Rotate the front bezel outward and remove it away from the compute node.

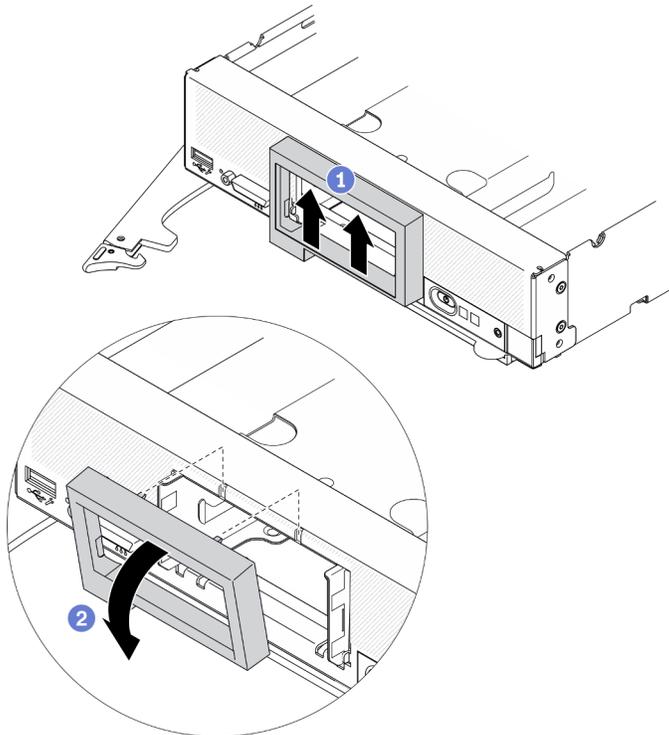


Figure 45. Front bezel removal

## 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

## 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 27 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.

- 1 Tilt the front bezel and hook its bottom and up clips to the holes on the front panel.
- 2 Rotate the front bezel toward the front panel. Press the front bezel firmly until it clicks into place.

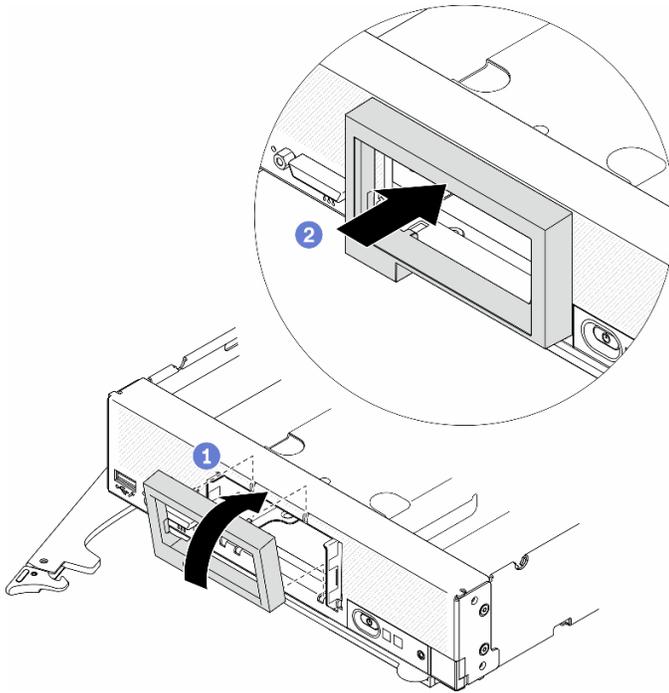


Figure 46. Front bezel installation

### After you finish

1. Reinstall the hot-swap drives or drive bay fillers. See the following section that matches your compute node configuration for instructions.
  - “Install a 2.5-inch hot-swap drive” on page 34.
  - “Install an EDSFF hot-swap drive” on page 58.

**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.

2. Reinstall the compute node back to the chassis. See “Install the compute node in chassis” on page 31.
3. Power on the compute node. See “Power on the compute node” on page 12.

### Demo video

Watch the procedure on YouTube

---

## Front handle replacement

Use the following information to remove and install the front handle.

### Remove the front handle

Use this information to remove the front handle.

#### About this task

##### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Make sure you have a T15 Torx screwdriver available.

#### Procedure

- Step 1. Carefully turn the compute node to the upside down orientation.
- Step 2. With a T15 Torx screwdriver, remove the screw that secures the front handle to the chassis; then, remove the handle.

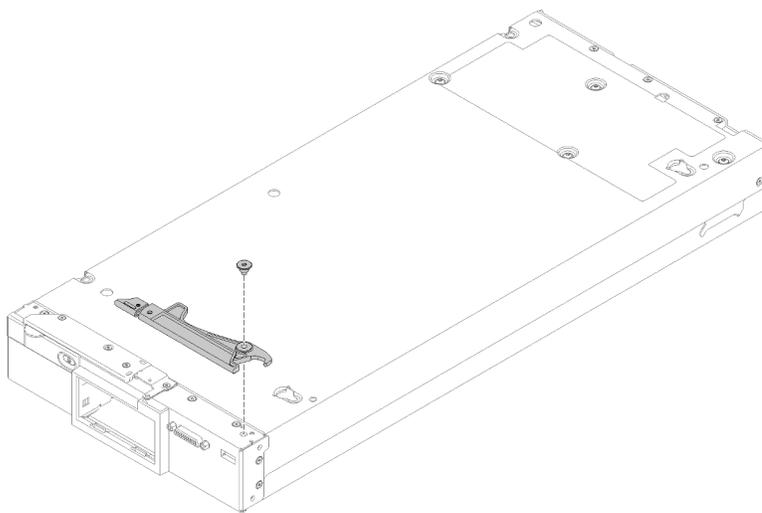


Figure 47. Front handle removal

### 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.

## Install the front handle

Use this information to install the front handle.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

### Procedure

Step 1. Carefully turn the compute node to the upside down orientation.

Step 2. Install the front handle.

- a. Orient the front handle so that the release latch is toward the middle of the compute node. See the following illustration for reference.
- b. Align the hole on the front handle with the hole on the compute node.
- c. Install a new screw to secure the front handle with a T15 Torx screwdriver.

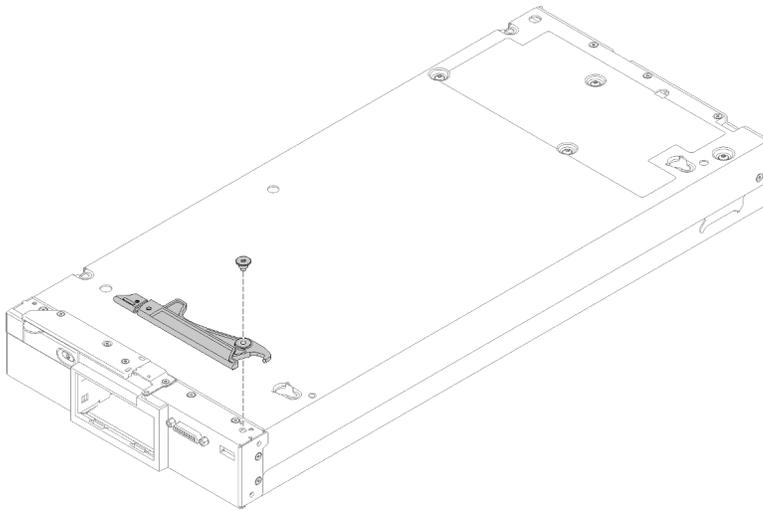


Figure 48. Front handle installation

### After you finish

Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

---

## Heat sink Torx T30 nut replacement

Use this information to remove and install a heat sink Torx T30 nut.

### Remove a heat sink Torx T30 nut

This task has instructions for removing a PEEK (Polyether ether ketone) Torx T30 nut on the heat sink.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
- 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.
- Do not touch the processor contacts. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.

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

### Procedure

Step 1. Make preparations for your compute node.

- a. Remove the compute node cover. See “Remove the compute node cover” on page 50.
- b. Remove the air baffle. See “Remove the air baffle” on page 42.
- c. Remove the PHM. See “Remove a processor and heat sink” on page 97.

Step 2. Remove the Torx T30 nut.

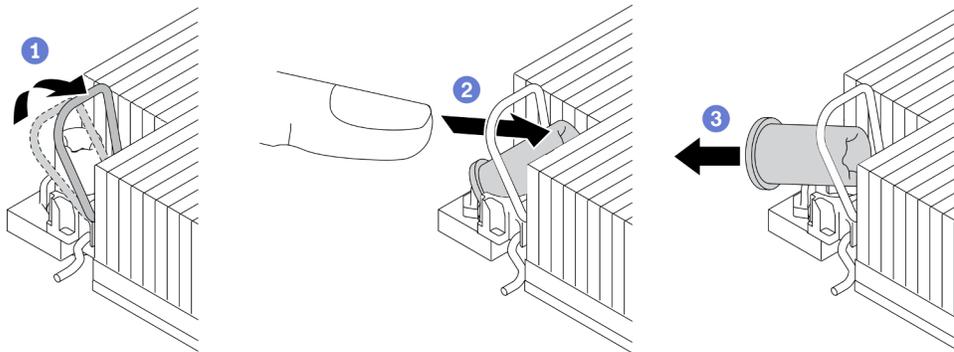


Figure 49. Removing a Torx T30 nut from the heat sink

**Note:** Do not touch the gold contacts on the bottom of the processor.

- a. 1 Rotate the anti-tilt wire bail inwards.
- b. 2 Push the upper edge of the Torx T30 nut towards the center of the heat sink until it disengages.
- c. 3 Remove the Torx T30 nut.

**Attention:** Visually inspect the removed Torx T30 nut, if the nut is cracked or damaged, make sure no debris or broken pieces are left inside your server.

### After you finish

1. Install a new Torx T30 nut. See “Install a heat sink Torx T30 nut” on page 75.
2. If you are instructed to return the defective component, please package the part to prevent any shipping damage. Reuse the packaging the new part arrived in and follow all packaging instructions.

### Demo video

Watch the procedure on YouTube

## Install a heat sink Torx T30 nut

This task has instructions for installing a PEEK (Polyether ether ketone) Torx T30 nut on the heat sink.

### About this task

#### Attention:

- Read “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the server and disconnect all power cords for this task.
- 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.
- Do not touch the processor contacts. Contaminants on the processor contacts, such as oil from your skin, can cause connection failures.

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

### Procedure

Step 1. Install the Torx T30 nut.

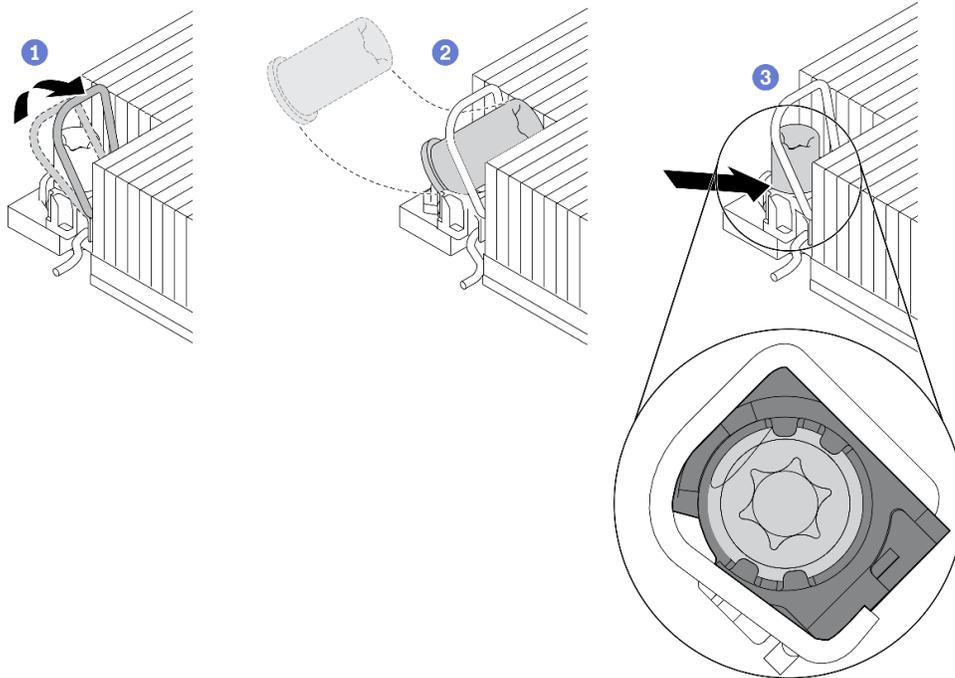


Figure 50. Installing a Torx T30 nut into the heat sink

**Note:** Do not touch the gold contacts on the bottom of the processor.

- a. ① Rotate the anti-tilt wire bail inwards.
- b. ② Orient the Torx T30 nut under the anti-tilt wire bail; then, align the Torx T30 nut with the socket at an angle as shown.
- c. ③ Push the lower edge of the Torx T30 nut into the socket until it clicks into place. Make sure the Torx T30 nut is secured under the four clips in the socket.

### After you finish

1. Reinstall the PHM. See “Install a processor and heat sink” on page 102.
2. Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

### Demo video

Watch the procedure on YouTube

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## ID label plate replacement

Use the following information to remove and install the ID label plate.

### Remove the ID label plate

Use this information to remove the identification (ID) label plate from the front panel.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

### Procedure

Step 1. Remove the ID label plate from the front panel.

- a. ① Push the outer edge of the ID label plate away from the front panel.
- b. ② Rotate the ID label plate then remove it from the front panel.

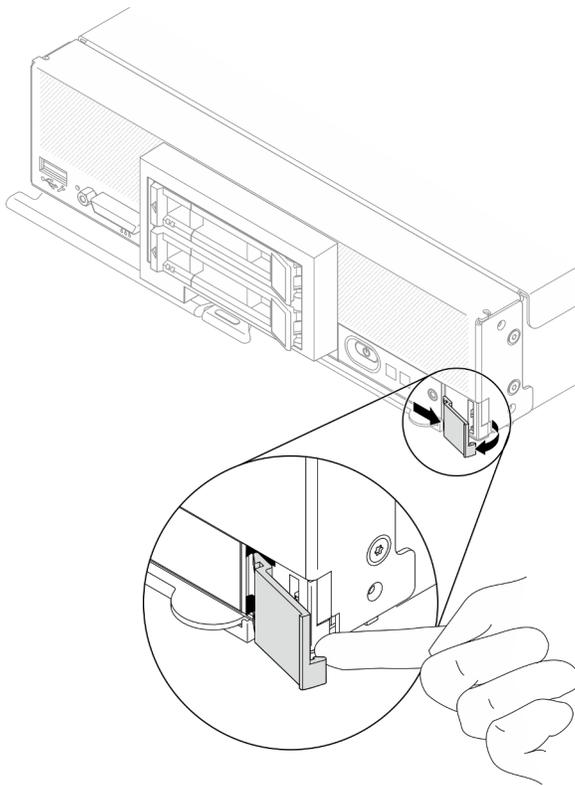


Figure 51. ID label plate removal

## 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

## Install the ID label plate

Use this information to install the identification (ID) label plate on the front panel.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

## Procedure

Step 1. Install the ID label plate to the front panel.

- 1 Slightly tilt the ID label plate, and insert its clips to the slots on the front panel.
- 2 Rotate the outer edge of the ID label plate toward the front panel, then press it to ensure it is installed firmly.

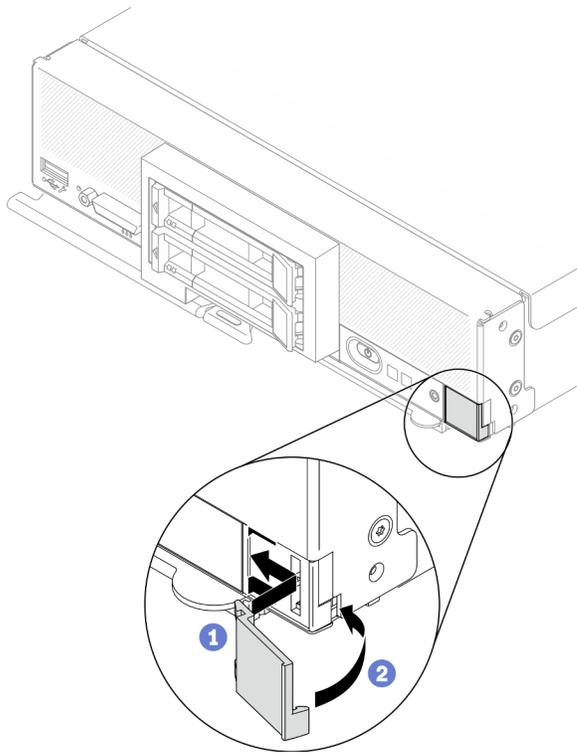


Figure 52. ID label plate installation

### After you finish

1. Reinstall the compute node back to the chassis. See “Install the compute node in chassis” on page 31.
2. Power on the compute node. See “Power on the compute node” on page 12.

### Demo video

Watch the procedure on YouTube

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## I/O expansion adapter replacement

Use the following information to remove and install an I/O expansion adapter.

### Remove an I/O expansion adapter

Use this information to remove an I/O expansion adapter.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

## Procedure

Step 1. Make preparations for your compute node.

- a. Remove the compute node cover. See “Remove the compute node cover” on page 50.

Step 2. Remove the I/O expansion adapter.

- a. Rotate the retention clips outward.
- b. Rock the adapter back and forth to pull the adapter out from the connector on the system board.
- c. Repeat the steps for removing the other I/O expansion adapter.

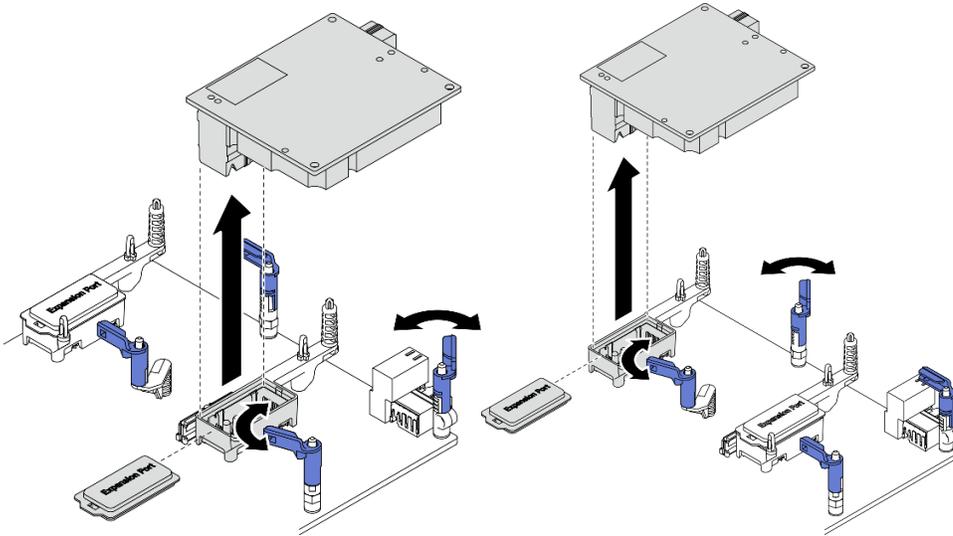


Figure 53. I/O expansion adapter removal

## 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

## Install an I/O expansion adapter

Use this information to install an I/O expansion adapter.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

**Notes:** Follow the I/O expansion adapter guidelines listed below:

- At least one I/O expansion adapter should be installed in the compute node.

- 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.
- When installing the I/O expansion adapter, start with I/O expansion adapter connector 1 on system board.
- Connector 1 supports Ethernet I/O expansion adapter. Connector 2 supports Ethernet I/O expansion adapter and fiber channel I/O expansion adapter.
- When installing an I/O expansion adapter, make sure the numbers in the Hexagon and Pentagon on the I/O expansion connectors correspond to the particular shape and numbering of the I/O module bay on the Lenovo Flex System Enterprise Chassis. If the correlation is incorrect, communication with the chassis may fail. See the service labeling on top of the compute node cover for details.

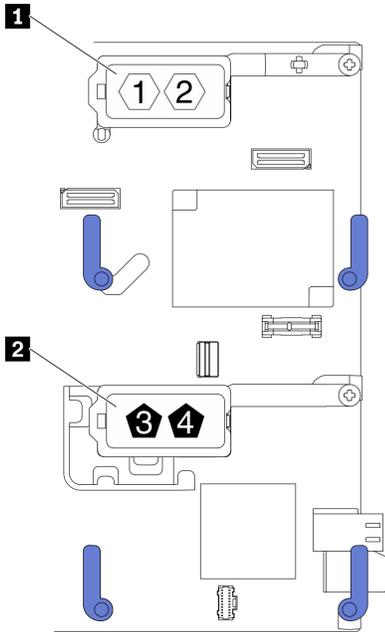


Figure 54. I/O expansion adapter connectors numbering and shape

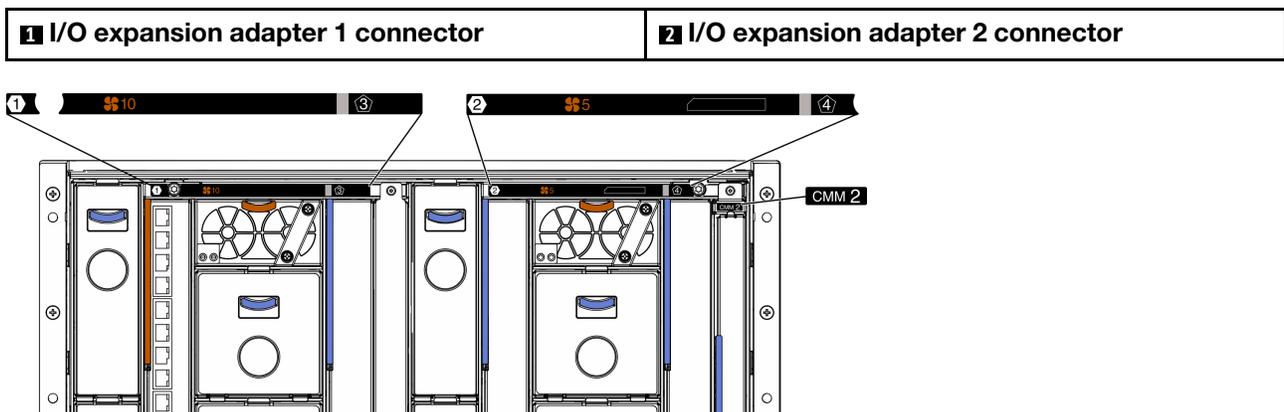


Figure 55. Service labeling on the rear of the chassis

## Procedure

Step 1. Locate the I/O expansion adapter connector.

- Step 2. Touch the static-protective package that contains the expansion adapter 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 expansion adapter from the package.
- Step 3. Install the I/O expansion adapter.
- Make sure the retention clips are rotated outward.
  - Orient the connector on the expansion adapter with the I/O expansion connector and alignment pins on the system board; then, lower the I/O expansion adapter to system board.
  - Press on the I/O expansion adapter so that it is firmly seated in the I/O expansion connector on system board.
  - Rotate the retention clips inward to secure the I/O expansion adapter.

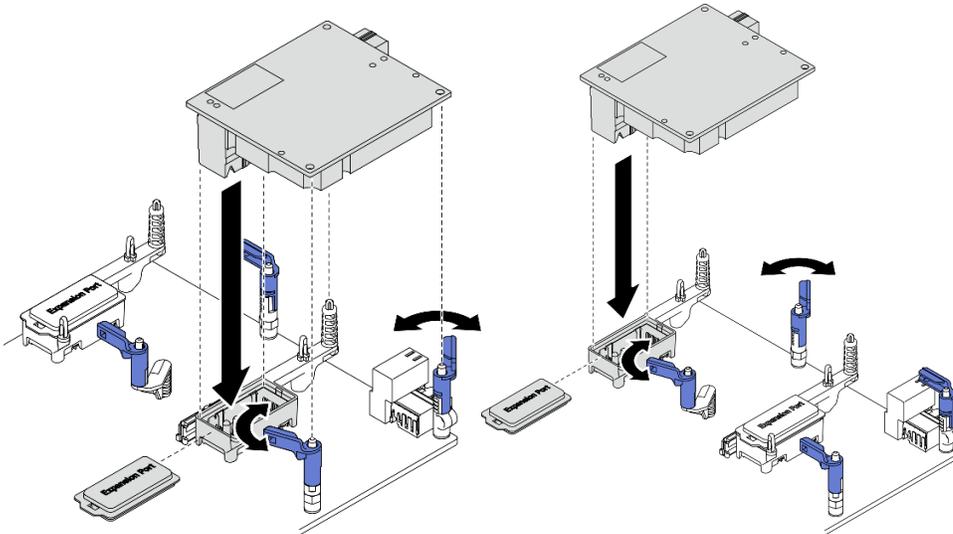


Figure 56. I/O expansion adapter installation

## After you finish

- Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

## Demo video

Watch the procedure on YouTube

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## M.2 backplane assembly replacement

Use the following information to remove and install the M.2 backplane assembly.

### Remove the M.2 backplane assembly

Use this information to remove the M.2 backplane assembly.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.

- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- 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 M.2 backplane assembly filler available if no M.2 backplane assembly is going to be installed after the removal.

## Procedure

Step 1. Make preparations for your compute node.

- Remove the compute node cover. See “Remove the compute node cover” on page 50.
- If there is an I/O expansion adapter installed in I/O expansion connector 2, remove it from the compute node. See “System-board layout” on page 19 and “Remove an I/O expansion adapter” on page 78.

Step 2. Disconnect the M.2 backplane assembly cables from system board.

- 1 Press and hold the latches on the M.2 cables.
- 2 Disconnect the cables from system board.

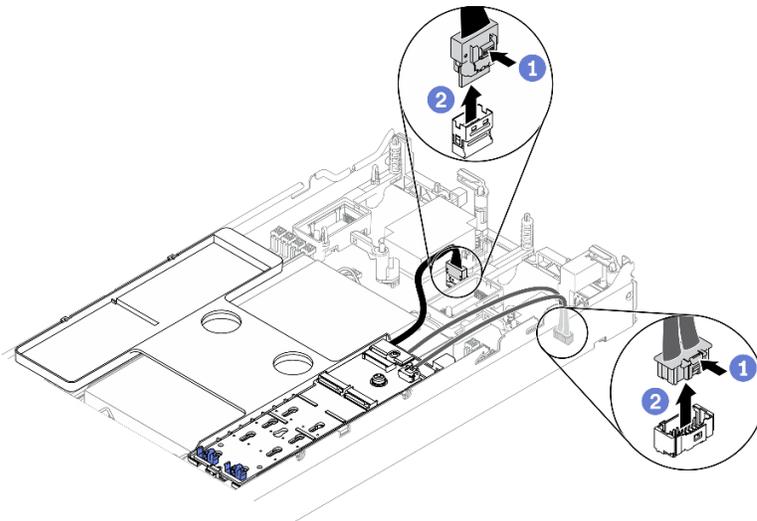
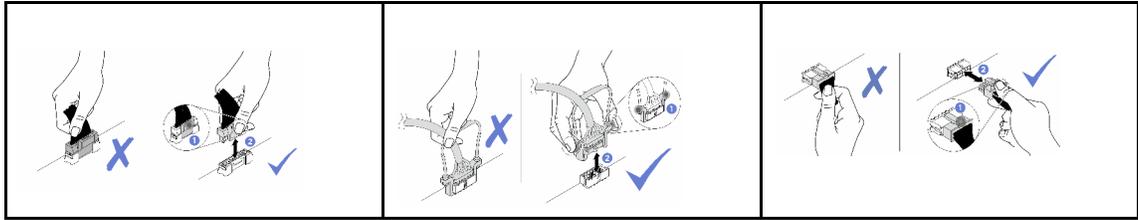


Figure 57. Disconnecting M.2 backplane assembly cables from system board

**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 3. Disconnect the M.2 backplane assembly cables from the M.2 backplane.
- 1 Loosen the screw that secures the signal cable to the M.2 backplane.
  - 2 Tilt the connector.
  - 3 Remove the connector.
  - 4 Remove the power cable.

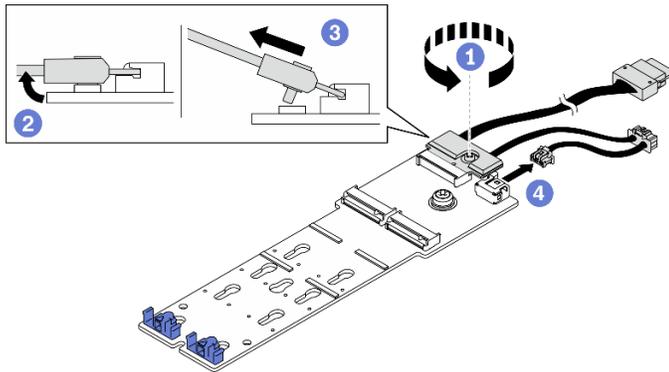


Figure 58. Disconnecting M.2 backplane assembly cables from M.2 backplane

- Step 4. Remove the M.2 backplane from the air baffle.
- 1 Loosen the screw that secures the M.2 backplane to air baffle.
  - 2 Slide the M.2 backplane forward and lift it up from the air baffle.

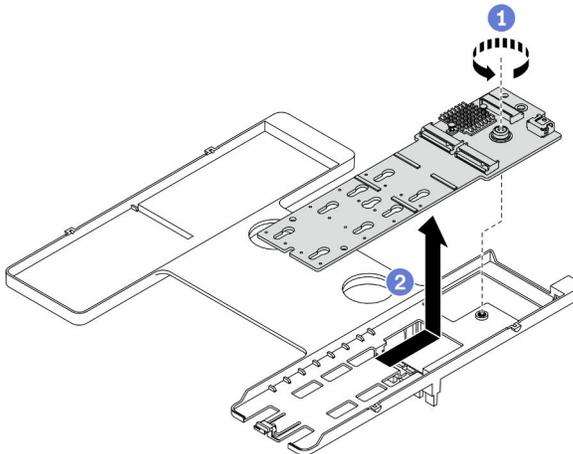


Figure 59. M.2 backplane removal

**Attention:** 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.

## After you finish

- If no M.2 backplane assembly is going to be installed to the air baffle, complete the following:
  1. Reinstall the removed I/O expansion adapter back to I/O expansion adapter connector 2 if needed. See “System-board layout” on page 19 and “Install an I/O expansion adapter” on page 79.
  2. Install the M.2 backplane assembly filler on the air baffle. See “Install the M.2 backplane assembly filler” on page 87.
- 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 the M.2 backplane assembly

Use this information to install the M.2 backplane assembly.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Make sure air baffle is installed in the compute node. See “Install the air baffle” on page 43.
- Make sure you have the M.2 backplane assembly cables available.

## Procedure

- Step 1. If there is an I/O expansion adapter installed in I/O expansion connector 2, remove it from the compute node. See “System-board layout” on page 19 and “Remove an I/O expansion adapter” on page 78.
- Step 2. Connect the M.2 backplane assembly cables to the M.2 backplane.
- a. ① Tilt the connector at an angle of 20 degrees or lower, and insert it until its bottom surface reaches the ramp.
  - b. ② Press the connector down flat.
  - c. ③ Tighten the screw on the signal cable.
  - d. ④ Connect the power cable.

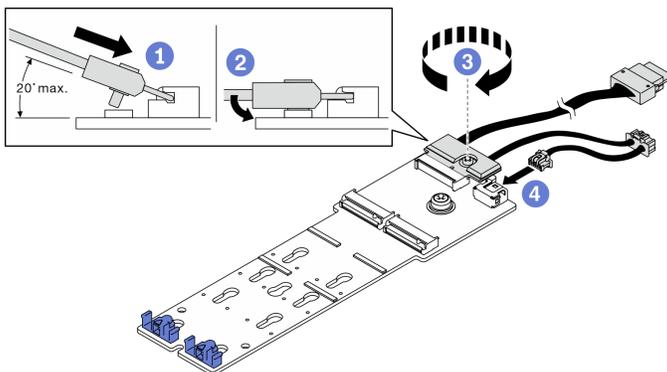


Figure 60. Connecting the M.2 backplane cables to M.2 backplane

Step 3. Install the M.2 backplane assembly.

- a. ① Place the M.2 backplane assembly on air baffle and slide it into the clip on the edge of the air baffle.
- b. ② Tighten the screw to secure the M.2 backplane assembly to the air baffle.

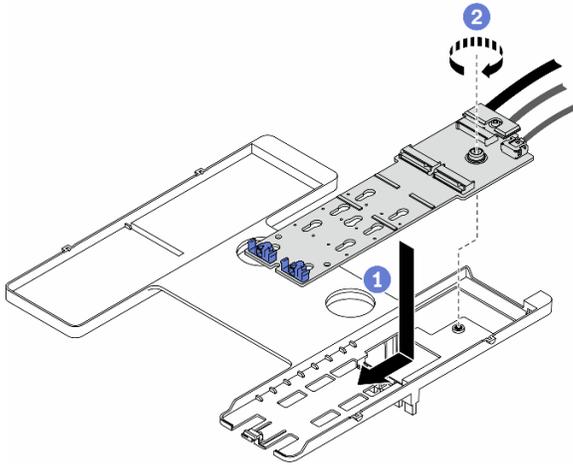


Figure 61. M.2 backplane assembly installation

Step 4. Connect M.2 backplane assembly cables to system board according to the routing guidance shown below.

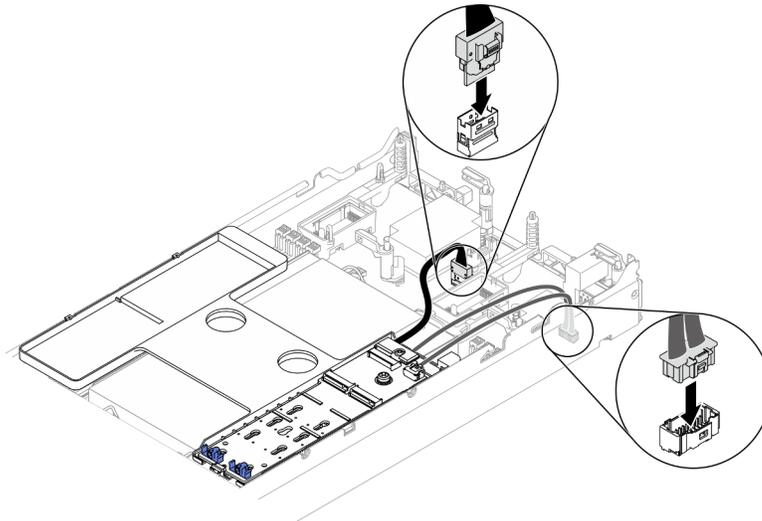


Figure 62. Connecting M.2 backplane assembly cables to system board

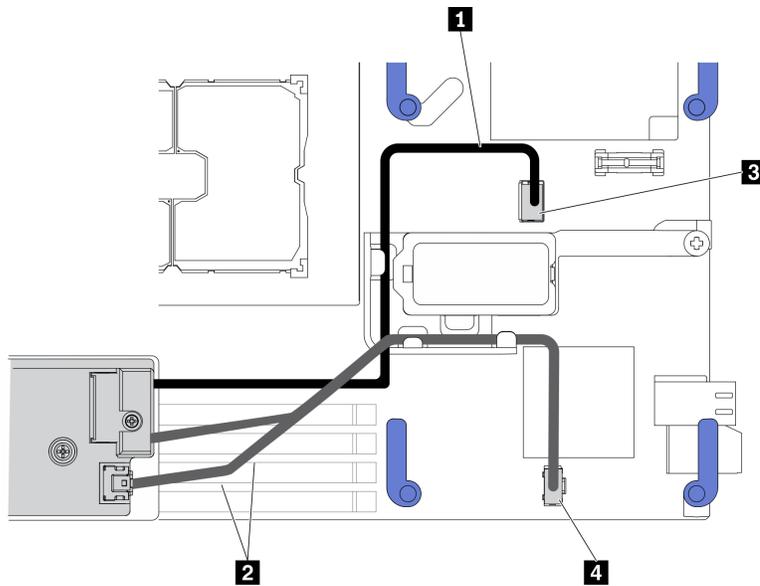


Figure 63. M.2 backplane assembly cable routing guidance

Table 18. M.2 adapter cable routing guidance

<b>1</b> Signal cable	<b>3</b> M.2 signal connector
<b>2</b> Power cable	<b>4</b> M.2 power connector

### After you finish

1. Reinstall the removed I/O expansion adapter back to I/O expansion adapter connector 2 if needed. See “System-board layout” on page 19 and “Install an I/O expansion adapter” on page 79.
2. Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

### Demo video

Watch the procedure on YouTube

---

## M.2 backplane assembly filler replacement

Use the following information to remove and install the M.2 backplane assembly filler.

### Remove the M.2 backplane assembly filler

Use this information to remove the M.2 backplane assembly filler.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.

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

## Procedure

- Step 1. Remove the compute node cover to make preparations for your compute node. See “Remove the compute node cover” on page 50.
- Step 2. Remove the M.2 backplane assembly filler.
  - a. 1 Press the clip on the filler.
  - b. 2 Rotate the filler upward and remove it from the air baffle.

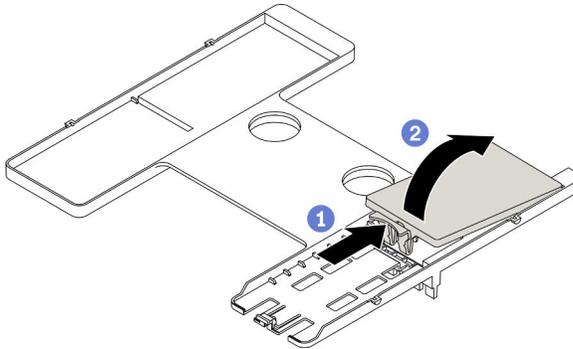


Figure 64. M.2 backplane assembly filler removal

**Attention:** 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.

## After you finish

- To install the M.2 backplane assembly, see “Install the M.2 backplane assembly” on page 84.
- 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 the M.2 backplane assembly filler

Use this information to install the M.2 backplane assembly filler.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

## Procedure

- Step 1. If there is a M.2 backplane assembly installed on the air baffle, remove it. See “Remove the M.2 backplane assembly” on page 81.
- Step 2. Install the M.2 backplane assembly filler.

- a. ① Tilt the rear of the filler slightly upward, and place its front against the upper right and left corners of the air baffle.
- b. ② Press down the filler to insert its clip into the air baffle.

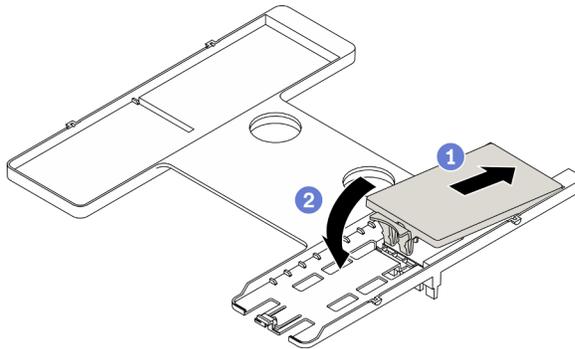


Figure 65. M.2 backplane assembly filler installation

## After you finish

Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

## Demo video

Watch the procedure on YouTube

---

## M.2 drive replacement

Use the following information to remove and install an M.2 drive.

### Remove an M.2 drive

Use this information to remove an M.2 drive.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
- 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.

### Procedure

- Step 1. Remove the compute node cover to make preparations for your compute node. See “Remove the compute node cover” on page 50.

Step 2. Locate the M.2 backplane assembly on the air baffle.

Step 3. Remove the M.2 drive.

- a. ① Press the retainers from the sides.
- b. ② Slide the retainer backward and away from the M.2 drive.
- c. ③ Rotate the rear end of M.2 drive to an angle.
- d. ④ Remove the M.2 drive from the M.2 backplane.

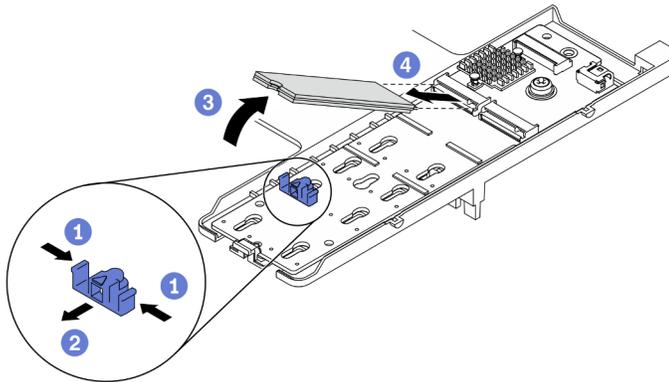


Figure 66. M.2 drive removal

## 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

## Install an M.2 drive

Use this information to install an M.2 drive.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

**Note:** Install the M.2 drive in slot 0 first.

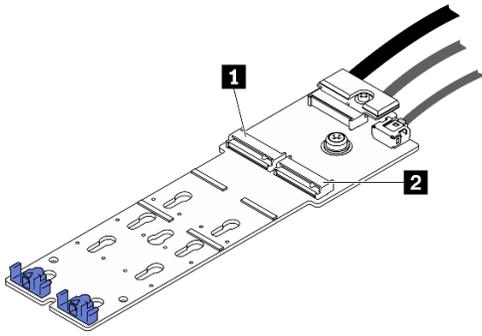


Figure 67. M.2 drive slot numbering

Table 19. M.2 drive slot numbering

<b>1 Slot 0</b>	<b>2 Slot 1</b>
-----------------	-----------------

## Procedure

- Step 1. Locate the connector you want to install the M.2 drive on the M.2 backplane.
- Step 2. If needed, adjust the position of the M.2 drive retainer so that it is compatible with the size of the M.2 drive you are installing. See “Adjust position of the M.2 drive retainer” on page 90.
- Step 3. Slide the M.2 retainer backward to ensure enough space for the M.2 drive installation.
- Step 4. Install an M.2 drive.
  - a. ① Position the M.2 drive at an angle and insert it to the M.2 connector.
  - b. ② Place down the M.2 drive on the M.2 backplane.
  - c. ③ Push the M.2 retainer forward to secure the M.2 drive in place.

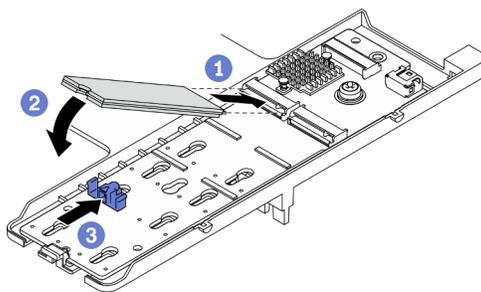


Figure 68. M.2 drive installation

## After you finish

Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

## Demo video

Watch the procedure on YouTube

## Adjust position of the M.2 drive retainer

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

## About this task

**Attention:**

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

**Procedure**

- Step 1. Locate the M.2 retainer you are going to adjust position. If this retainer is securing an M.2 drive, remove the M.2 drive. See “Remove an M.2 drive” on page 88
- Step 2. Select the correct keyhole that can accommodate the particular size of the M.2 drive you are installing.
- Step 3. Adjust the position of the M.2 retainer.
- 1 Press the sides of the retainer.
  - 2 Slide the retainer forward until it is in the large opening of the keyhole.
  - 3 Lift up the retainer from the M.2 backplane.
  - 4 Insert the retainer into the selected keyhole.
  - 5 Press the sides of the retainer.
  - 6 Slide the retainer backwards until it is seated in place.

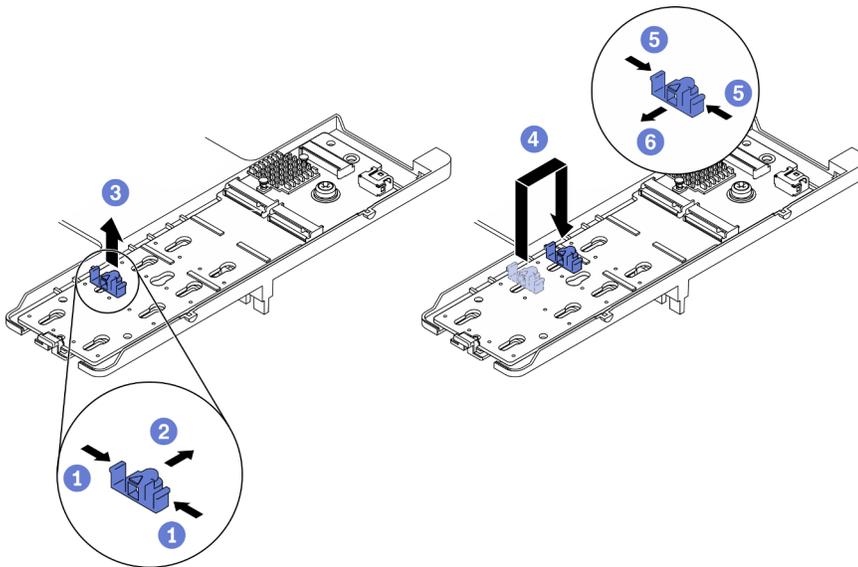


Figure 69. M.2 drive retainer position adjustment

**After you finish**

Install the M.2 drive, see “Install an M.2 drive” on page 89.

---

**Memory module replacement**

Use the following procedures to remove and install a memory module.

**Remove a memory module**

Use this information to remove a memory module.

**About this task**

**Attention:**

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
- If you are not installing a replacement memory module to the same slot, make sure you have memory module filler available.
- Memory modules are sensitive to static discharge and require special handling. Refer to the standard guidelines for “Handling static-sensitive devices” on page 29.
  - 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.
- After you install or remove a memory module, 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. Start the Setup utility and select **Save Settings** to save changes. (see the *Lenovo ThinkSystem SN550 V2 Type 7Z69 Setup Guide* for more information.)

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

**Procedure**

Step 1. Make preparations for your compute node.

- a. Remove the compute node cover. See “Remove the compute node cover” on page 50.
- b. Remove the air baffle. See “Remove the air baffle” on page 42.
- c. Locate the memory module slots and determine which memory module you want to remove from the compute node. See “System board connectors” on page 19.
- d. If a RAID adapter is blocking the memory module slots you are removing the memory module from, remove the RAID adapter. See “Remove the RAID adapter” on page 110.

Step 2. Remove the memory module from the slot.

- a. ① Carefully use a common tool to press the retaining clips.
- b. ② Push the retaining clips outward on each end of the memory module slot.
- c. ③ Grasp the memory module at both ends and carefully lift it out of the slot.

**Attention:**

- Remove or install memory modules for one processor at a time.
- To avoid breaking the retaining clips or damaging the memory module slots, handle the clips gently.

**Notes:**

- The retaining clips for adjacent memory module slots of processor 1 and processor 2 can not be open at the same time. Remove or install the memory module for each processor one at a time and close the retaining clips after removing a memory module.
- If necessary, due to space constraints, you can use a pointed tool to open the retaining clips. Place the tip of the tool in the recess on the top of the retaining clip; then, carefully rotate the retaining clip away from the memory module slot. Make sure you use firm and solid pointed tool to open the latch. Do not use pencils or other fragile tools.

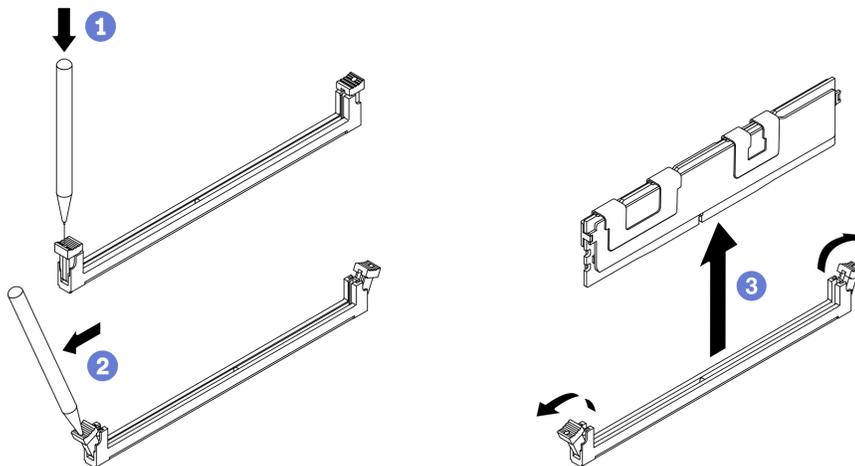


Figure 70. Memory module removal

**After you finish**

1. A memory module slot must be installed with a memory module or a memory module filler. See “Install a memory module” on page 94.
2. 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 Setting** to save changes. (see the *Lenovo ThinkSystem SN550 V2 Type 7Z69 Setup Guide* for more information)
3. 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 memory module

Use this information to install a memory module.

### About this task

See “Memory module installation order” in *Setup Guide* for detailed information about memory configuration and setup.

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Make sure to adopt one of the supported configurations listed in “Memory module installation rules and order” in the *ThinkSystem SN550 V2 Setup Guide*.
- Memory modules are sensitive to static discharge and require special handling. Refer to the standard guidelines at “Handling static-sensitive devices” on page 29:
  - 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 ipmctl 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” in the *ThinkSystem SN550 V2 Setup Guide*.

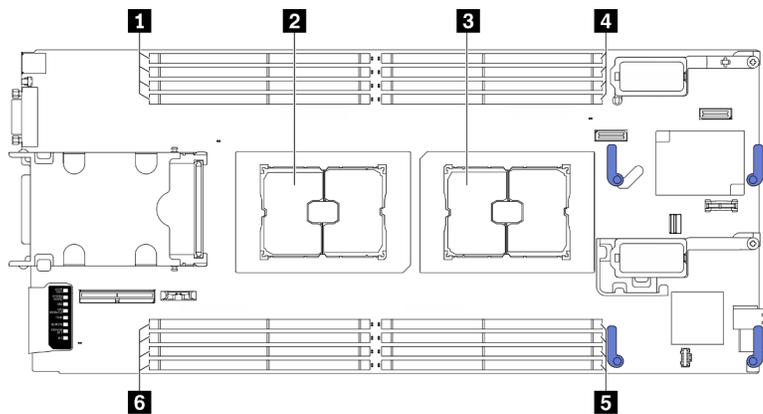


Figure 71. Location of memory module slots and processor sockets

Table 20. Location of memory modules and processors

<b>1</b> Memory module slots 9–12	<b>4</b> Memory module slots 1–4
<b>2</b> Processor socket 2	<b>5</b> Memory module slots 5–8
<b>3</b> Processor socket 1	<b>6</b> Memory module slots 13–16

Step 4. Install the memory module into the slot.

- a. ① Carefully use a common tool to press the retaining clips.
- b. ② Push the retaining clips outward on each end of the memory module slot.
- c. ③ 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.

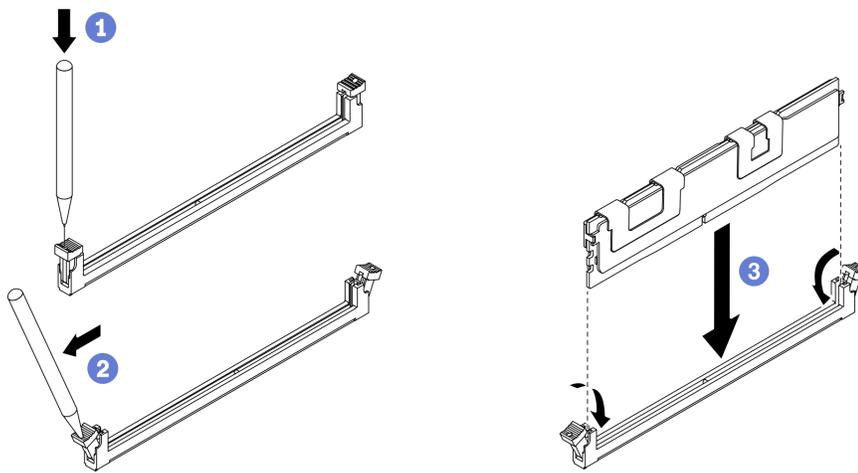


Figure 72. Memory module installation

## 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.

- Reinstall the removed RAID adapter if needed. See “Install the RAID adapter” on page 111.
- Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

## Demo video

Watch the procedure on YouTube

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## Processor and heat sink replacement

Use the following procedures to replace an assembled processor and heat sink, known as a processor-heat-sink module (PHM), a processor, or a heat sink.

**Attention:** Before you begin replacing a processor, make sure that you have an alcohol cleaning pad and thermal grease.

**Important:** The processor in your server can throttle in response to thermal conditions, temporarily lowering its speed to reduce heat output. In instances where a few processor cores are throttled for an extremely short time period (100 ms or less), the only indication might be an entry in the operating system event log with no corresponding entry in the system XCC event log. If this situation occurs, the event can be ignored and processor replacement is not required.

## Remove a processor and heat sink

This task has instructions for removing an assembled processor and heat sink, known as a processor-heat-sink module (PHM), a processor, and a heat sink. All of these tasks require a Torx T30 driver.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
- 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.
- Install the PHM starting from processor socket 1.

#### 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.

The following illustration shows the PHM locations on system board.

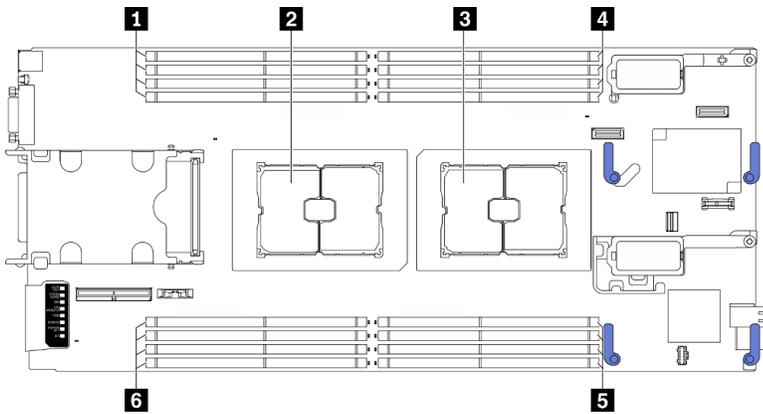


Figure 73. Location of memory modules and processor sockets

Table 21. Location of memory modules and processors

<b>1</b> Memory module slots 9–12	<b>4</b> Memory module slots 1–4
<b>2</b> Processor socket 2	<b>5</b> Memory module slots 5–8
<b>3</b> Processor socket 1	<b>6</b> Memory module slots 13–16

The following illustration shows the components of the PHM.

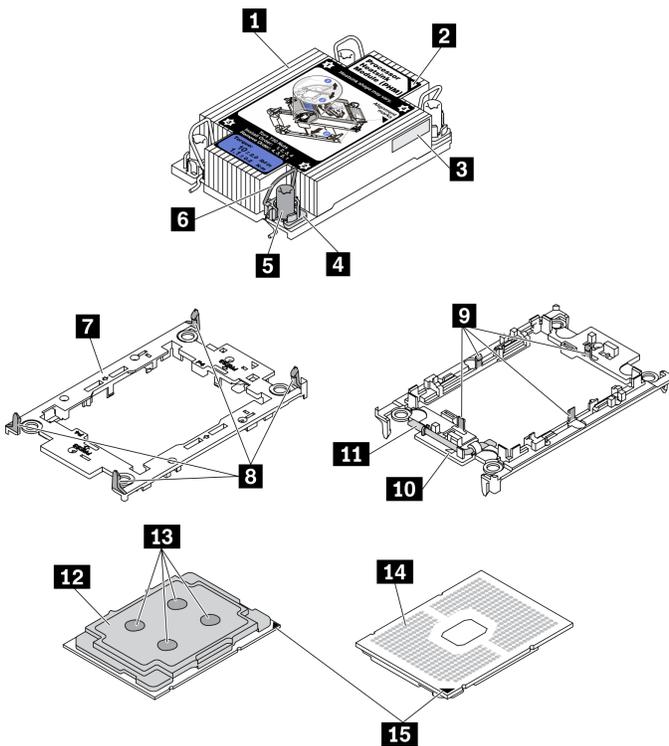


Figure 74. PHM components

<b>1</b> Heat sink	<b>9</b> Clips to secure processor in carrier
<b>2</b> Heat sink triangular mark	<b>10</b> Carrier triangular mark

<b>3</b> Processor identification label	<b>11</b> Processor ejector handle
<b>4</b> Nut and wire bail retainer	<b>12</b> Processor heat spreader
<b>5</b> Torx T30 nut	<b>13</b> Thermal grease
<b>6</b> Anti-tilt wire bail	<b>14</b> Processor contacts
<b>7</b> Processor carrier	<b>15</b> Processor triangular mark
<b>8</b> Clips to secure carrier to heat sink	

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

## Procedure

- Step 1. Make preparations for your compute node.
- a. Remove the compute node cover. See “Remove the compute node cover” on page 50.
  - b. Remove the air baffle. See “Remove the air baffle” on page 42.

Step 2. Remove the PHM from the system board.

- a. ① Fully loosen the Torx T30 nuts on the PHM *in the removal sequence shown* on the heat sink label.
- b. ② Rotate the anti-tilt wire bails on the heat sink inward.
- c. ③ Carefully lift the PHM from the processor socket. If the PHM cannot be fully lifted out of the socket, further loosen the Torx T30 nuts and try lifting the PHM again.
- d. Place the PHM upside down with the processor-contact side up.

**Notes:**

- Do not touch the contacts on the processor.
- Keep the processor socket clean from any object to prevent possible damages.

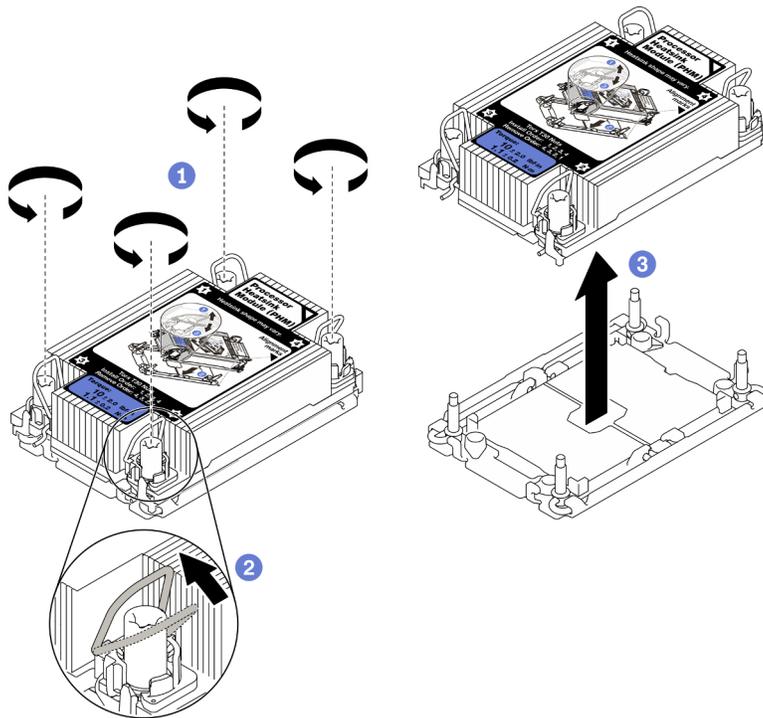


Figure 75. PHM removal

**After you finish**

- Empty processor socket must always contain a socket cover and a filler before the compute node is powered on.
- If you are removing the PHM as part of a system board replacement, set the PHM aside.
- If you are reusing the processor or heat sink, separate the processor from its carrier. See “Separate the processor from carrier and heat sink” on page 101
- If you are instructed to return the defective component, package the part to prevent any shipping damage. Reuse the packaging the new part arrived in and follow all packaging instructions.

**Demo video**

Watch the procedure on YouTube

## Separate the processor from carrier and heat sink

This task has instructions for separating a processor and its carrier from an assembled processor and heat sink, known as a processor-heat-sink module (PHM). 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 27 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.
- Do not touch the processor contacts. 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.

**Important:** Make sure you have the alcohol cleaning pad (part number 00MP352) available.

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

### Procedure

- Step 1. Remove the processor heat sink module, if one is installed. See “Remove a processor and heat sink” on page 97.
- Step 2. Separate the processor from the heat sink and carrier.
  - a. ① Lift the handle to release the processor from the carrier.
  - b. ② Hold the processor by its edges; then, lift the processor from the heat sink and carrier.
  - c. ③ Without putting the processor down, wipe the thermal grease from the top of the processor with an alcohol cleaning pad; then, place the processor on a static protective surface with the processor-contact side up.

**Note:** Do not touch the contacts on the processor.

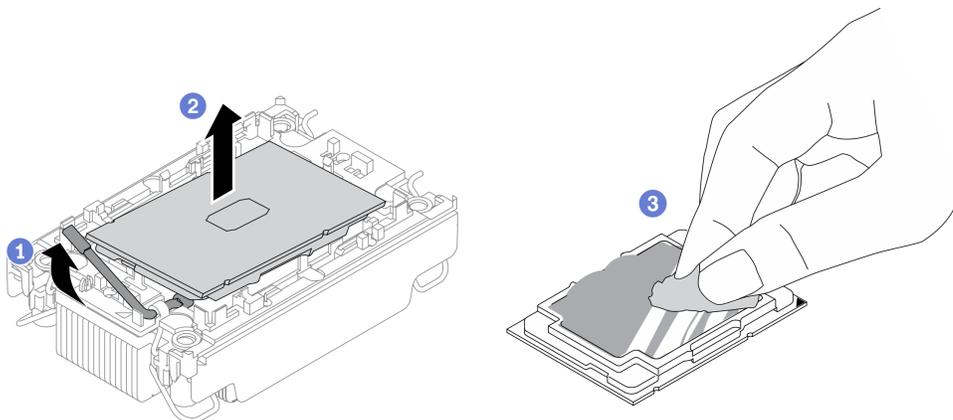


Figure 76. Separating a processor from the heat sink and carrier

Step 3. Separate the processor carrier from the heat sink.

- a. ① Release the retaining clips from the heat sink.
- b. ② Lift the carrier from the heat sink.
- c. ③ Wipe the thermal grease from the bottom of the heat sink with an alcohol cleaning pad.

**Note:** The processor carrier will be discarded and replaced with a new one. Make note of the color of the discarded carrier since replacement carrier needs to be of the same color.

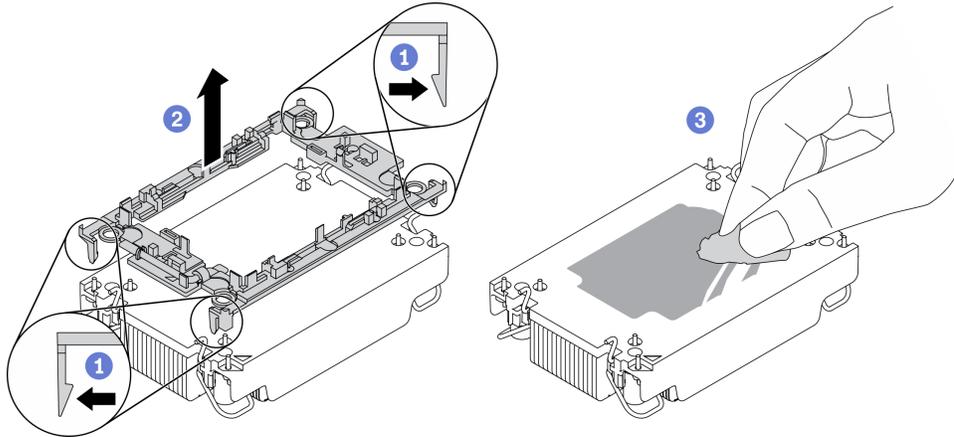


Figure 77. Separating a processor carrier the from heat sink

## After you finish

- Install a replacement processor or heat sink. See “Install a processor and heat sink” on page 102.
- If you are instructed to return the defective component, package the part to prevent any shipping damage. Reuse the packaging the new part arrived in and follow all packaging instructions.

## Demo video

Watch the procedure on YouTube

## Install a processor and heat sink

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 27 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.
- Install the PHM starting from processor socket 1.

**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. Empty processor socket must always contain a socket cover and a filler before the compute node is powered on.
3. 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.

- 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.

The following illustration shows the PHM locations on system board.

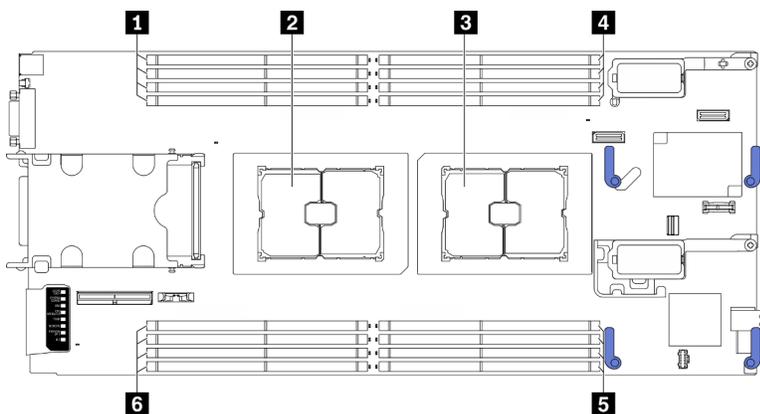


Figure 78. Location of memory modules and processor sockets

Table 22. Location of memory modules and processors

<b>1</b> Memory module slots 9–12	<b>4</b> Memory module slots 1–4
<b>2</b> Processor socket 2	<b>5</b> Memory module slots 5–8
<b>3</b> Processor socket 1	<b>6</b> Memory module slots 13–16

The following illustration shows the components of the PHM.

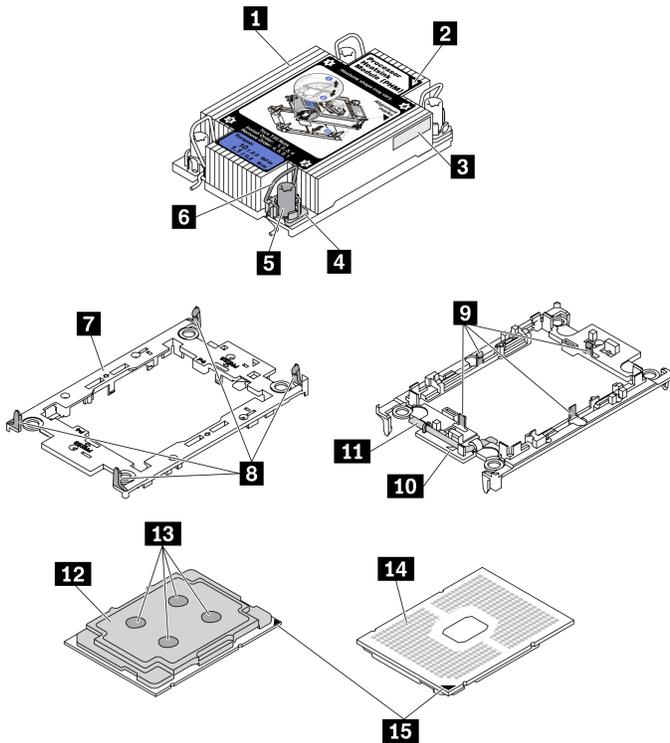


Figure 79. PHM components

<b>1</b> Heat sink	<b>9</b> Clips to secure processor in carrier
<b>2</b> Heat sink triangular mark	<b>10</b> Carrier triangular mark
<b>3</b> Processor identification label	<b>11</b> Processor ejector handle
<b>4</b> Nut and wire bail retainer	<b>12</b> Processor heat spreader
<b>5</b> Torx T30 nut	<b>13</b> Thermal grease
<b>6</b> Anti-tilt wire bail	<b>14</b> Processor contacts
<b>7</b> Processor carrier	<b>15</b> Processor triangular mark
<b>8</b> 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” in the *ThinkSystem SN550 V2 Setup Guide*.

## 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. ① Make sure the handle on the carrier is in the closed position.
2. ② 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. ③ Hold the inserted end of the processor in place; then, pivot the unmarked end of the carrier down and away from the processor.
4. ④ Press the processor and secure the unmarked end under the clip on the carrier.
5. ⑤ Carefully pivot the sides of the carrier down and away from the processor.
6. ⑥ 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.

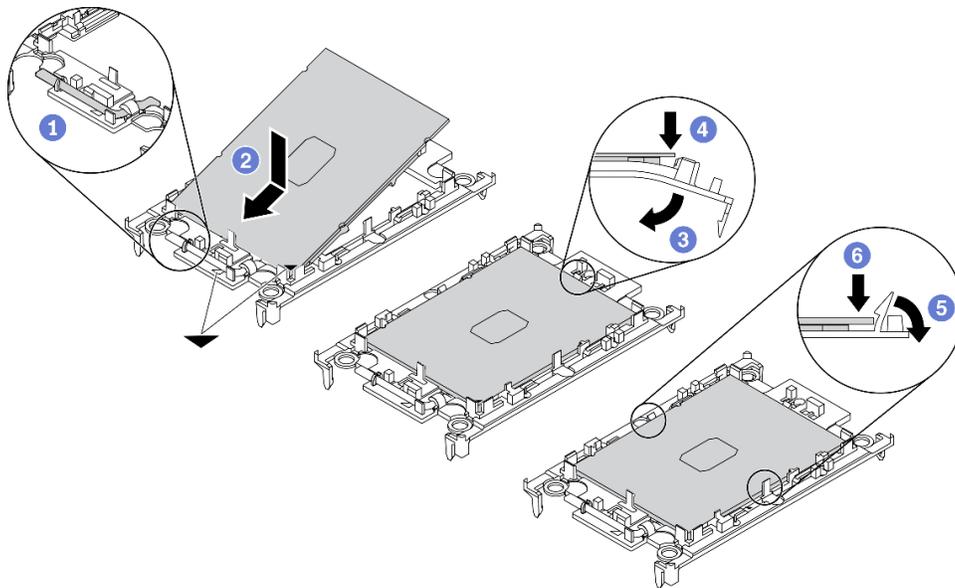


Figure 80. Processor carrier installation

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.

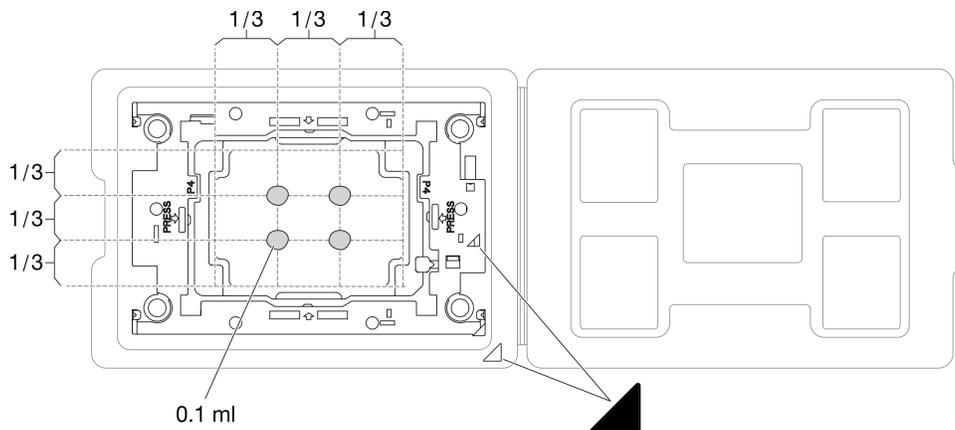


Figure 81. Thermal grease application with processor in shipping tray

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.

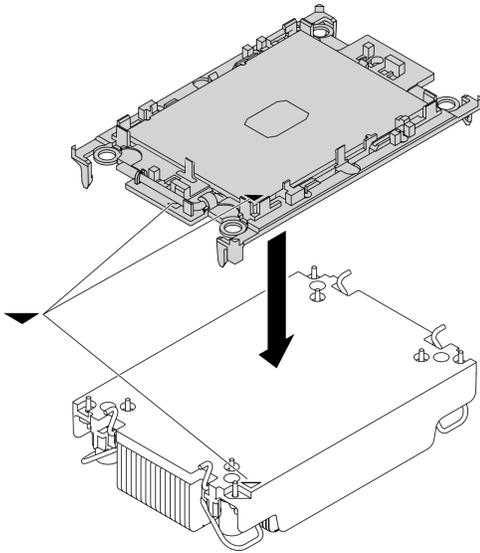


Figure 82. Assembling the PHM

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

- a. ① Turn over the heat sink. Rotate the anti-tilt wire bails on the heat sink inward.
- b. ② 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. ③ Rotate the anti-tilt wire bails outward until they engage with the hooks in the socket.
- d. ④ 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).

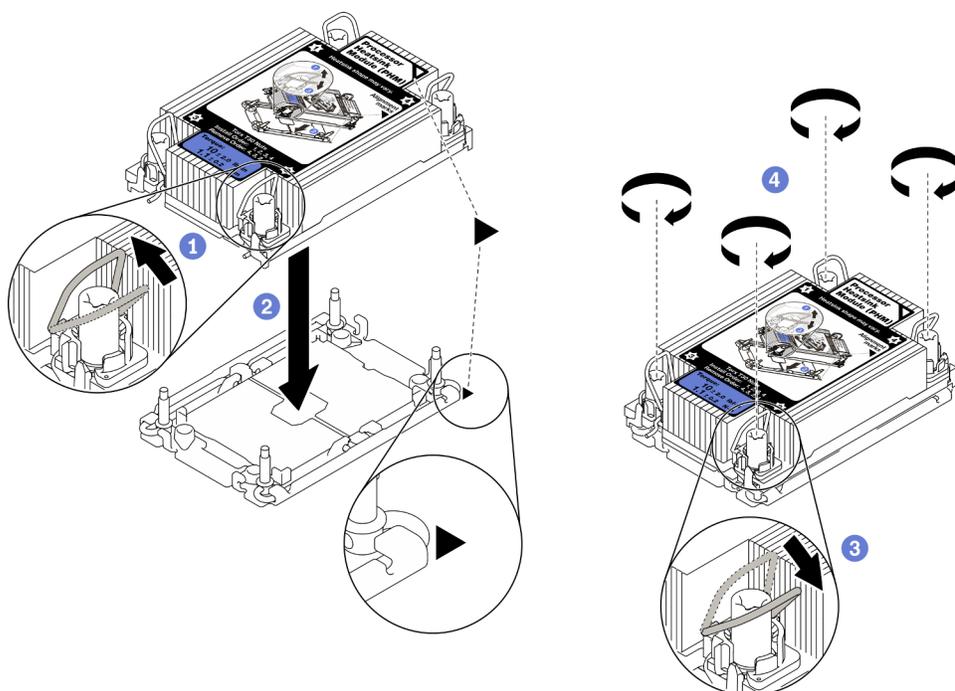


Figure 83. PHM installation

### After you finish

1. Empty processor socket must always contain a socket cover and a filler before the compute node is powered on.
2. Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

### Demo video

Watch the procedure on YouTube

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## Processor key replacement

Use the following information to remove and install a processor key.

### Remove the processor key

Use this information to remove the processor key.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

### Procedure

- Step 1. Make preparations for your compute node.
  - a. Remove the compute node cover. See “Remove the compute node cover” on page 50.
  - b. Remove the air baffle. See “Remove the air baffle” on page 42.
  - c. Remove processor 2 from the compute node. See “Remove a processor and heat sink” on page 97.
- Step 2. Unfasten the screw that secures the processor key to the system board; then, remove the processor key from the compute node.

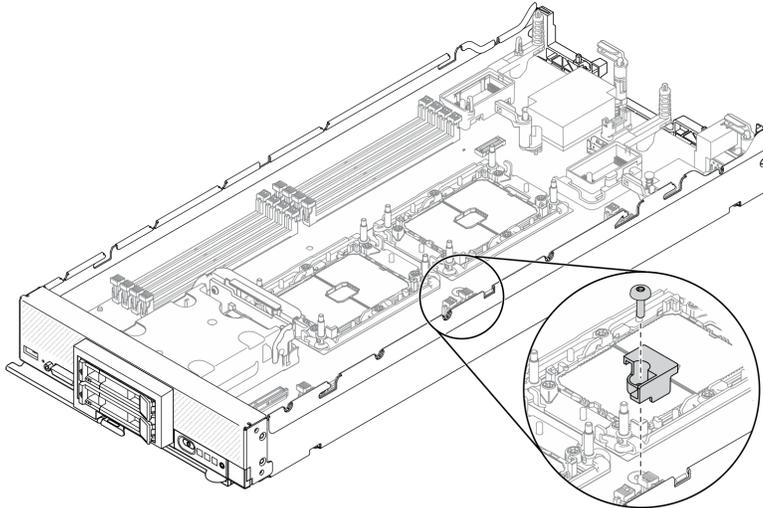


Figure 84. Removing the processor key

## 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.

## Install the processor key

Use this information to install the processor key.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

## Procedure

- Step 1. Align the processor key guide pins with the two guide holes on the system board, and insert the processor key into the guide holes.
- Step 2. Fasten the screw to secure the processor key to the system board.

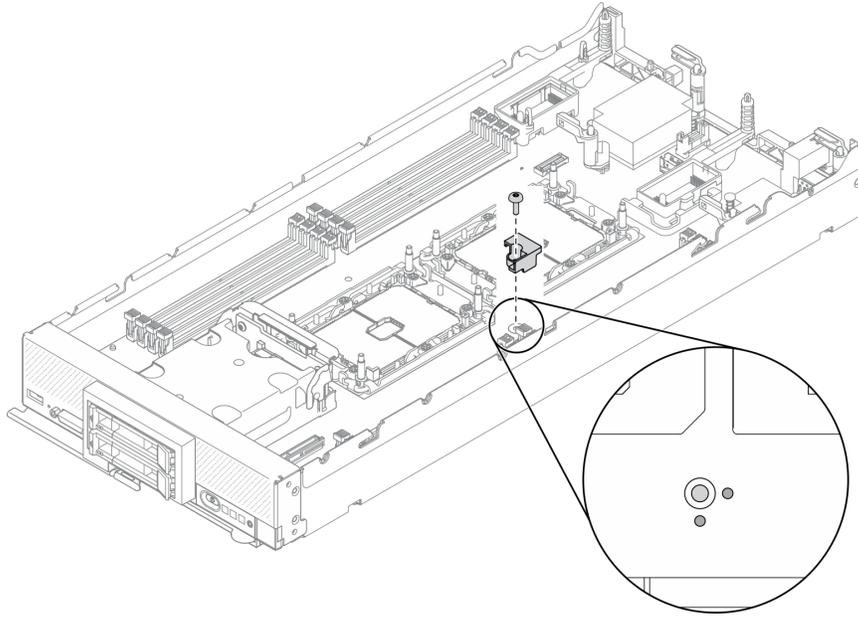


Figure 85. Installing the processor key

### After you finish

1. Reinstall the processor 2. See “Install a processor and heat sink” on page 102.
2. Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

---

## RAID adapter replacement

Use the following information to remove and install a RAID adapter.

### 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 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

### Procedure

- Step 1. Remove the compute node cover to make preparations for your compute node. See “Remove the compute node cover” on page 50.
- Step 2. Remove the RAID adapter.
  - a. 1 Rotate the lever on the 2.5-inch drive backplane.
  - b. 2 The RAID adapter disengages from the connector on the backplane.

- c. ③ Lift up the RAID adapter and remove it from the compute node.

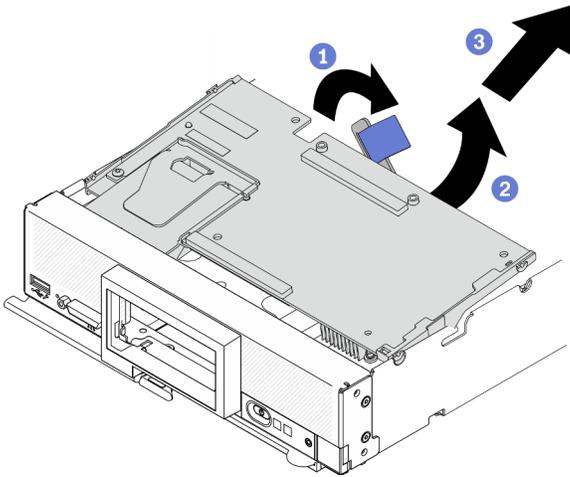


Figure 86. RAID adapter removal

## After you finish

- If you are removing the RAID adapter for the following purposes, there is no need to remove the 2.5-inch drive backplane.
  - You are removing the RAID adapter to access components on the system board, for example memory module slots 9–16.
  - You are removing the RAID adapter only to replace it.
- If you are replacing the flash power module, see “Flash power module replacement” on page 67.
- 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 the RAID adapter

Use this information to install the RAID adapter.

## About this task

### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 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” on page 68.

## 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 “2.5-inch drive backplane replacement” on page 35.
- 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.
- Locate the RAID adapter connector on the drive backplane, and orient the connector on the RAID adapter with the connector on the drive backplane.
  - 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.
  - Place down the RAID adapter, and firmly press on the foam to seat the RAID adapter into the connector.

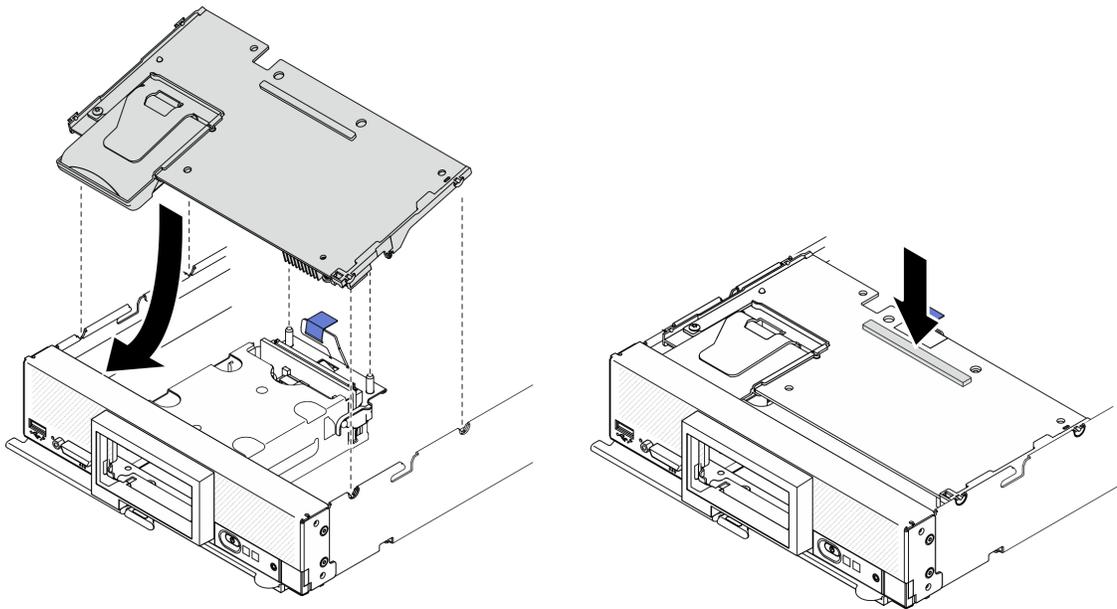


Figure 87. RAID adapter installation

## After you finish

Proceed to complete the parts replacement. See “Complete the parts replacement” on page 125.

## Demo video

Watch the procedure on YouTube

---

## RFID tag replacement

Use the following information to remove and install the RFID tag.

### Remove the RFID tag

Use this information to remove the RFID tag from the front panel.

### About this task

**Attention:**

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
- Make sure you have a pliers available.

**Procedure**

- Step 1. If the RFID is attached to the hinge, open the RFID tag.
- Step 2. Using the pliers, carefully grip the RFID hinge and gently pull and twist the base of the RFID tag to remove it from the ID label plate on the front panel of the compute node. Hold the ID label plate in place while removing the RFID tag.

**Important:** Carefully remove the RFID tag to avoid damage to the ID label plate.

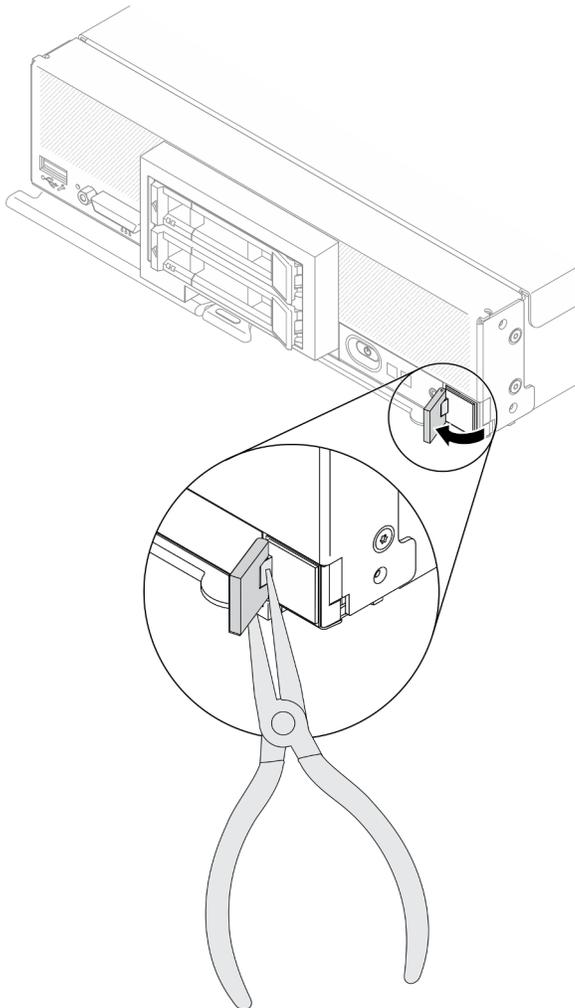


Figure 88. RFID tag removal

## 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

## Install the RFID tag

Use this information to install the RFID tag on the front panel.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.

### Procedure

Step 1. Make sure the surface you are installing the tag is thoroughly clean and dry.

Step 2. Install the RFID tag.

- a. Open the RFID tag; then, remove the backing from the base of the RFID tag to expose adhesive.
- b. Position the RFID tag over the ID label plate on the front panel of the compute node.
- c. Press the RFID tag securely against the ID label plate and hold the RFID tag firmly for 30 seconds.

#### Notes:

- Allow 30 minutes before closing or opening the RFID tag.
- Allow 24 hours to achieve near maximum adhesion.

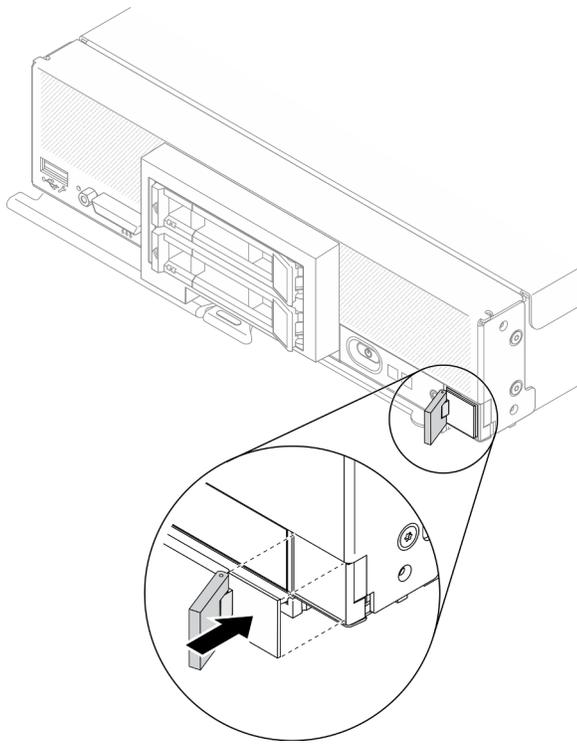


Figure 89. RFID tag installation

### After you finish

- Reinstall the compute node back to the chassis. See “Install the compute node in chassis” on page 31.
- Power on the compute node. See “Power on the compute node” on page 12.

### Demo video

Watch the procedure on YouTube

---

## System-board assembly replacement

Use the following information to remove and install the system-board assembly.

**Important:** Before you return the defective system-board assembly, make sure that you install the processor socket covers from the replacement system-board assembly. To replace a processor socket cover:

1. Take a socket cover from the processor socket assembly on the replacement system-board assembly and orient it correctly above the processor socket assembly on the defective system-board assembly.
2. Gently press down the socket cover legs to the processor socket assembly, pressing on the edges to avoid damage to the socket pins. You might hear a click meaning the socket cover is securely attached.
3. **Make sure** that the socket cover is securely attached to the processor socket assembly.

## Remove and replace the system-board assembly

### Notes:

- This procedure should be performed only by trained service technicians.

- If possible, back up all compute node settings, including the settings for any options installed in the compute node.

## About this task

### Attention:

1. Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
2. Power off the corresponding compute node that you are going to perform the task on.
3. Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
4. Carefully lay the replacement system-board assembly (system board FRU) and the defective system-board assembly (defective node) side-by-side on a flat, static-protective surface.
5. See “System-board layout” on page 19 for more information about the locations of the connectors, switches, and LEDs on the system board.

**Important:** When you replace the system-board assembly, you must update the compute node with the latest firmware or restore the pre-existing firmware. Make sure that you have the latest firmware or a copy of the preexisting firmware before you proceed (see “Firmware updates” on page 8 for more information).

## Procedure

**Important:** To avoid damage when replacing a defective system-board assembly, transfer internal components between the defective system-board assembly and the replacement system-board assembly one at a time. Unless otherwise noted, install each internal component in the replacement system-board assembly immediately after removing it from the defective system-board assembly.

Step 1. Remove the covers from both the replacement system-board assembly and the defective system-board assembly. See “Remove the compute node cover” on page 50. Keep the cover that comes with the replacement system-board assembly for reference and re-install it on the defective system-board assembly prior to returning the defective system-board assembly.

Step 2. For 2.5-inch drive compute node, complete the following steps then proceed to step 4. For Six EDSFF drives compute node, proceed to step 3.

- a. Remove any hot-swap drives, optional drive components, and hot-swap drive bay fillers from the defective system-board assembly and set them aside on a static-protective surface. See “Remove a 2.5-inch hot-swap drive” on page 33.

**Note:** When removing the hot-swap drives, make note of the number of the drive bay from which you are removing the drive. Drives must be installed in the bay from which they were removed.

- b. Remove the front bezel from the defective system-board assembly. See “Remove the front bezel” on page 69.
- c. If a RAID adapter is installed in the defective system-board assembly, remove it and set it aside on a static-protective surface. See “Remove the RAID adapter” on page 110.
- d. Remove the hot-swap drive backplane from the defective system-board assembly and immediately install it in the replacement system-board assembly. See “2.5-inch drive backplane replacement” on page 35.
- e. Install the front bezel to the replacement system-board assembly. See “Install the front bezel” on page 71.
- f. Install any removed hot-swap drives, optional drive components, and hot-swap drive bay fillers into the replacement system-board assembly. See “Install a 2.5-inch hot-swap drive” on page 34.

Step 3. For six EDSFF drives compute node, complete the following steps.

- a. Remove any hot-swap drives, optional drive components, and hot-swap drive bay fillers from the defective system-board assembly and set them aside on a static-protective surface. See “Remove an EDSFF hot-swap drive” on page 55.

**Note:** When removing the hot-swap drives, make note of the number of the drive bay from which you are removing the drive. Drives must be installed in the bay from which they were removed.

- b. Remove the front bezel from the defective system-board assembly. See “Remove the front bezel” on page 69.
- c. Remove the EDSFF drive cage from the defective system-board assembly. See “Remove the EDSFF drive cage” on page 65.
- d. Remove the hot-swap drive backplane from the defective system-board assembly and immediately install it in the replacement system-board assembly. See “EDSFF drive backplane assembly replacement” on page 61.
- e. Install the EDSFF cage to the replacement system-board assembly. See “Install the EDSFF drive cage” on page 66.
- f. Install the front bezel to the replacement system-board assembly. See “Install the front bezel” on page 71.
- g. Install any removed hot-swap drives, optional drive components, and hot-swap drive bay fillers into the replacement system-board assembly. See “Install an EDSFF hot-swap drive” on page 58.

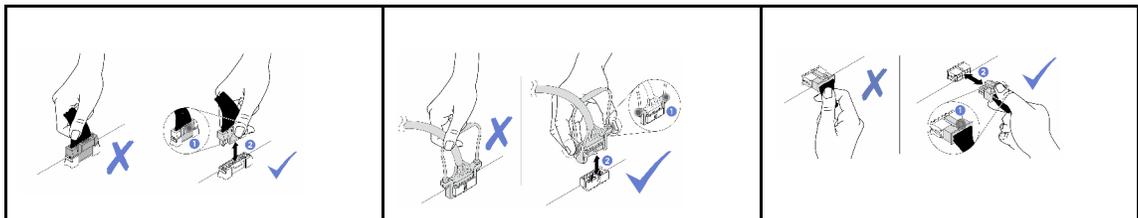
Step 4. If I/O expansion adapters are installed in the defective system-board assembly, remove it from the defective system-board assembly and set it aside. See “Remove an I/O expansion adapter” on page 78.

Step 5. If M.2 backplane assembly is installed in the defective system-board assembly, disconnect the M.2 signal and power cables from the defective system-board. See Step 2 in “Remove the M.2 backplane assembly” on page 81.

**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 6. Remove the air baffle from the defective system-board assembly and set it aside. See “Remove the air baffle” on page 42.

**Note:** M.2 backplane assembly or M.2 backplane assembly filler should remain on the air baffle.

Step 7. Transfer processor and heat sink module 1 (rear processor) from the defective system-board assembly to the same socket on the replacement system-board assembly. See “Processor and heat sink replacement” on page 96.

**Attention:**

- Remove and install only one processor at a time.
- When transferring a processor to a replacement system-board assembly, install the socket cover in the defective system-board assembly immediately after installing the processor in the replacement system-board assembly.
- When removing and installing a processor, always protect empty processor socket with a socket cover.

Step 8. If processor heat sink module 2 (front processor) is installed in the defective system-board assembly, repeat Step 7 to transfer it from defective system-board assembly to replacement system-board assembly.

Step 9. If there is no processor heat sink module 2, transfer the processor heat sink filler from defective system-board assembly to processor socket 2 on the replacement system-board assembly.

Step 10. Remove the memory modules from the defective system-board assembly and immediately install them in the replacement system-board assembly, See “Memory module replacement” on page 91.

**Attention:**

- Remove and install only one memory module at a time.

Step 11. If a RAID adapter was removed previously, install it to the replacement system-board assembly. See “Install the RAID adapter” on page 111.

Step 12. Install the air baffle in the replacement system-board assembly. See “Install the air baffle” on page 43. The air baffle is required to maintain system cooling.

**Notes:**

- M.2 backplane assembly or M.2 backplane assembly filler should remain on the air baffle.
- Retaining clips on the memory modules connectors must be in the closed position to install the air baffle.

Step 13. If an M.2 adapter is installed on the air baffle, connect the M.2 adapter signal and power cables to the signal and power connectors on the replacement system-board. See Step 4 in “Install the M.2 backplane assembly” on page 84.

Step 14. Install the I/O expansion adapters. See “Install an I/O expansion adapter” on page 79.

Step 15. Install the compute node cover that you removed from the defective system-board assembly onto the replacement system-board assembly. See “Install the compute node cover” on page 51.

Step 16. Make sure that both processor sockets on defective system-board assembly have socket covers installed; then, install the compute node cover that came with the replacement system-board assembly onto the defective system-board assembly. See “Install the compute node cover” on page 51.

**Note:** Retention clips that secure the I/O expansion adapters must be in the closed position to install the compute node cover.

Step 17. If a blank ID label plate is on the replacement system-board assembly, remove it and discard. See “Remove the ID label plate” on page 76.

Step 18. Remove the ID label plate that has machine type and serial number information from the front panel of the defective system-board assembly and immediately install it on the replacement system-board assembly. See “ID label plate replacement” on page 76.

**Note:** If your compute node has an RFID tag, it is already attached to the ID label plate.

Step 19. The replacement system-board assembly comes with a Repair Identification (RID) tag. Using a fine tip indelible ink pen, transfer the machine type and serial number from the defective system-board assembly to the label on the Repair Identification tag; then, place the tag in the recessed area 1 on the bottom of replacement system-board assembly.

### REPAIR IDENTIFICATION (RID) TAG

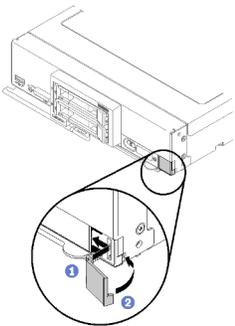
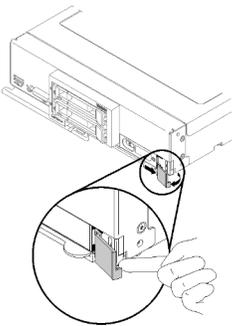
<u>INSTRUCTIONS</u>	MT	
	SN	RID Tag 1
	MT	
	SN	RID Tag 2 (optional)

1. Verify that the serial number of the failing system matches the serial number reported to service.
2. Copy the machine type and serial number from the failing system to a blank RID tag.

Note:

- Use a fine tip indelible ink pen to complete the RID tag.
- If a RID tag is present on the failing system, do not attempt to remove and reuse the existing RID tag. Use new RID tag for the replacement system board.

3. Locate the recessed area on bottom of replacement system board. Attach RID tag in section [ 1 ].
4. Remove Label Plate from front of failing system and install into the opening on the new system board.



Note:  
See system documentation for detailed replacement procedures.

Figure 90. Repair Identification (RID) tag

## After you finish

1. Install the compute node in the chassis. See “Install the compute node in chassis” on page 31.
2. If an Attention label is on the replacement system-board assembly front panel above the power button, read it; then, remove the label and discard it before turning on the compute node.

3. Use the CMM Web Interface to restore the IP address of the compute node XClarity controller. See [https://pubs.lenovo.com/cmm2/cmm\\_ug\\_startwebinterface](https://pubs.lenovo.com/cmm2/cmm_ug_startwebinterface) for more information.

**Note:** If you configured static IP addresses, you will not be able to access the node remotely or from a management device until the IP address of the XClarity controller is restored.

4. Update the machine type and serial number with new vital product data (VPD). Use the Lenovo XClarity Provisioning Manager V3 to update the machine type and serial number, See “Update the machine type and serial number” on page 120.
5. Enable Trusted Platform Module (TPM). See “Enable TPM/TCM” on page 122.
6. Optionally, enable Secure Boot. See “Enable UEFI Secure Boot” on page 124.
7. Update the compute node configuration.
  - Download and install the latest device drivers: <http://datacentersupport.lenovo.com>
  - Update the system firmware. See “Firmware updates” on page 8.
  - Update the UEFI configuration.
  - Reconfigure the disk arrays if you have installed or removed a hot-swap drive or a RAID adapter. See the Lenovo XClarity Provisioning Manager V3 User Guide, which is available for download at: <http://datacentersupport.lenovo.com>
8. If you are instructed to return the system-board assembly, follow all packaging instructions, and use any packaging materials for shipping that are supplied to you.

**Important:** Before you return the system-board assembly, make sure that you install the CPU socket covers from the new system-board assembly. To replace a CPU socket cover:

- a. Take a socket cover from the CPU socket assembly on the replacement system-board assembly and orient it correctly above the CPU socket assembly on the defective system-board assembly.
- b. Gently press down the socket cover legs to the CPU socket assembly, pressing on the edges to avoid damage to the socket pins. You might hear a click meaning the socket cover is securely attached.
- c. **Make sure** that the socket cover is securely attached to the CPU socket assembly.

## Update the machine type and serial number

After the system board is replaced by trained service technicians, the machine type and serial number must be updated.

There are two methods available to update the machine type and serial number:

- From Lenovo XClarity Provisioning Manager

To update the machine type and serial number from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key according to the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface.
2. If the power-on Administrator password is required, enter the password.
3. From the System Summary page, click **Update VPD**.
4. Update the machine type and serial number.

- From Lenovo XClarity Essentials OneCLI

Lenovo XClarity Essentials OneCLI sets the machine type and serial number in the Lenovo XClarity Controller. Select one of the following methods to access the Lenovo XClarity Controller and set the machine type and serial number:

- Operate from the target system, such as LAN or keyboard console style (KCS) access

- Remote access to the target system (TCP/IP based)

To update the machine type and serial number from Lenovo XClarity Essentials OneCLI:

1. Download and install Lenovo XClarity Essentials OneCLI.

To download Lenovo XClarity Essentials OneCLI, go to the following site:

<https://datacentersupport.lenovo.com/solutions/HT116433>

2. Copy and unpack the OneCLI package, which also includes other required files, to the server. Make sure that you unpack the OneCLI and the required files to the same directory.
3. After you have Lenovo XClarity Essentials OneCLI in place, type the following commands to set the machine type and serial number:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> [access_method]
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override [access_method]
```

Where:

*<m/t\_model>*

The server machine type and model number. Type xxxxyyyyyy, where xxxx is the machine type and yyyyyy is the server model number.

*<s/n>*

The serial number on the server. Type zzzzzzzz (length 8-10 characters), where zzzzzzzz is the serial number.

*<system model>*

The system model. Type system yyyyyyyy, where yyyyyyyy is the product identifier.

*[access\_method]*

The access method that you select to use from the following methods:

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

Where:

*xcc\_user\_id*

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

*xcc\_password*

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

Example commands are as follows:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --bmc-username <xcc_user_id> --bmc-password <xcc_password>
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --bmc-username <xcc_user_id> --bmc-password <xcc_password>
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --bmc-username xcc_user_id --bmc-password xcc_password
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override --bmc-username xcc_user_id --bmc-password xcc_password
```

- Online KCS access (unauthenticated and user restricted):

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

Example commands are as follows:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model>
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n>
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model>
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override
```

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

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

Where:

*xcc\_external\_ip*

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

*xcc\_user\_id*

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

*xcc\_password*

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

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

Example commands are as follows:

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> --bmc <xcc_user_id>:
<xcc_password>@<xcc_external_ip>
onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> --bmc <xcc_user_id>:<xcc_
password>@<xcc_external_ip>
```

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> --bmc xcc_user_
id:xcc_password@xcc_external_ip
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system model> --override -
-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/xcc-overview/>.

## Enable TPM/TCM

The server supports Trusted Platform Module (TPM) Version 2.0

**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).

When a system board is replaced, you must make sure that the TPM/TCM policy is set correctly.

### CAUTION:

**Take special care when setting the TPM/TCM policy. If it is not set correctly, the system board can become unusable.**

## Set the TPM policy

By default, a replacement system board is shipped with the TPM policy set to **undefined**. You must modify this setting to match the setting that was in place for the system board that is being replaced.

There are two methods available to set the TPM policy:

- From Lenovo XClarity Provisioning Manager

To set the TPM policy from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key according to the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface.
2. If the power-on Administrator password is required, enter the password.
3. From the System Summary page, click **Update VPD**.
4. Set the policy to one of the following settings.
  - **NationZ TPM 2.0 enabled - China only**. Customers in the Chinese Mainland should choose this setting if a NationZ TPM 2.0 adapter is installed.
  - **TPM enabled - ROW**. Customers outside of the Chinese Mainland should choose this setting.
  - **Permanently disabled**. Customers in the Chinese Mainland should use this setting if no TPM adapter is installed.

**Note:** Although the setting **undefined** is available as a policy setting, it should not be used.

- From Lenovo XClarity Essentials OneCLI

**Note:** Please note that a Local IPMI user and password must be setup in Lenovo XClarity Controller for remote accessing to the target system.

To set the TPM policy from Lenovo XClarity Essentials OneCLI:

1. Read TpmTcmPolicyLock to check whether the TPM\_TCM\_POLICY has been locked:  
`OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>`

**Note:** The imm.TpmTcmPolicyLock value must be 'Disabled', which means TPM\_TCM\_POLICY is NOT locked and changes to the TPM\_TCM\_POLICY are permitted. If the return code is 'Enabled' then no changes to the policy are permitted. The planar may still be used if the desired setting is correct for the system being replaced.

2. Configure the TPM\_TCM\_POLICY into XCC:
  - For customers in Chinese Mainland with no TPM, or customers that require to disable TPM:  
`OneCli.exe config set imm.TpmTcmPolicy "NeitherTpmNorTcm" --override --imm <userid>:<password>@<ip_address>`
  - For customers in Chinese Mainland that require to enable TPM:  
`OneCli.exe config set imm.TpmTcmPolicy "NationZTPM200Only" --override --imm <userid>:<password>@<ip_address>`
  - For customers outside Chinese Mainland that require to enable TPM:  
`OneCli.exe config set imm.TpmTcmPolicy "TpmOnly" --override --imm <userid>:<password>@<ip_address>`
3. Issue reset command to reset system:  
`OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>`
4. Read back the value to check whether the change has been accepted:  
`OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>`

**Notes:**

- If the read back value is matched it means the TPM\_TCM\_POLICY has been set correctly.  
imm.TpmTcmPolicy is defined as below:
  - Value 0 use string "Undefined", which means UNDEFINED policy.

- Value 1 use string “NeitherTpmNorTcm”, which means TPM\_PERM\_DISABLED.
  - Value 2 use string “TpmOnly”, which means TPM\_ALLOWED.
  - Value 4 use string “NationZTPM20Only”, which means NationZ\_TPM20\_ALLOWED.
  - Below 4 steps must also be used to ‘lock’ the TPM\_TCM\_POLICY when using OneCli/ASU commands:
5. Read TpmTcmPolicyLock to check whether the TPM\_TCM\_POLICY has been locked , command as below:  
`OneCli.exe config show imm.TpmTcmPolicyLock --override --imm <userid>:<password>@<ip_address>`  
 The value must be 'Disabled', it means TPM\_TCM\_POLICY is NOT locked and must be set.
  6. Lock the TPM\_TCM\_POLICY:  
`OneCli.exe config set imm.TpmTcmPolicyLock "Enabled" --override --imm <userid>:<password>@<ip_address>`
  7. Issue reset command to reset system, command as below:  
`OneCli.exe misc ospower reboot --imm <userid>:<password>@<ip_address>`  
 During the reset, UEFI will read the value from imm.TpmTcmPolicyLock, if the value is 'Enabled' and the imm.TpmTcmPolicy value is valid, UEFI will lock the TPM\_TCM\_POLICY setting.  
**Note:** The valid values for imm.TpmTcmPolicy include 'NeitherTpmNorTcm', 'TpmOnly', and 'NationZTPM20Only'.  
 If the imm.TpmTcmPolicyLock is set as 'Enabled' but imm.TpmTcmPolicy value is invalid, UEFI will reject the 'lock' request and change imm.TpmTcmPolicyLock back to 'Disabled'.
  8. Read back the value to check whether the ‘Lock’ is accepted or rejected. Command as below:  
`OneCli.exe config show imm.TpmTcmPolicy --override --imm <userid>:<password>@<ip_address>`  
**Note:** If the read back value is changed from 'Disabled' to 'Enabled' that means the TPM\_TCM\_POLICY has been locked successfully. There is no method to unlock a policy once it has been set other than replacing system board.  
 imm.TpmTcmPolicyLock is defined as below:  
 Value 1 uses string “Enabled” , which means lock the policy. Other values are not accepted.

## Enable UEFI Secure Boot

Optionally, you can enable UEFI Secure Boot.

There are two methods available to enable UEFI Secure Boot:

- From Lenovo XClarity Provisioning Manager

To enable UEFI Secure Boot from Lenovo XClarity Provisioning Manager:

1. Start the server and press the key specified in the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.)
2. If the power-on Administrator password is required, enter the password.
3. From the UEFI Setup page, click **System Settings** → **Security** → **Secure Boot**.
4. Enable Secure Boot and save the settings.

- From Lenovo XClarity Essentials OneCLI

To enable UEFI Secure Boot from Lenovo XClarity Essentials OneCLI:

1. Download and install Lenovo XClarity Essentials OneCLI.

To download Lenovo XClarity Essentials OneCLI, go to the following site:

<https://datacentersupport.lenovo.com/solutions/HT116433>

2. Run the following command to enable Secure Boot:

```
OneCli.exe config set SecureBootConfiguration.SecureBootSetting Enabled --bmc <userid>:  
<password>@<ip_address>
```

where:

- <userid>:<password> are the credentials used to access the BMC (Lenovo XClarity Controller interface) of your server. The default user ID is USERID, and the default password is PASSWORD (zero, not an uppercase o)
- <ip\_address> is the IP address of the BMC.

For more information about the Lenovo XClarity Essentials OneCLI **set** command, see:

[https://pubs.lenovo.com/lxce-onecli/onecli\\_r\\_set\\_command](https://pubs.lenovo.com/lxce-onecli/onecli_r_set_command)

**Note:** If disabling UEFI secure boot is needed, run the following command:

```
OneCli.exe config set SecureBootConfiguration.SecureBootSetting Disabled --bmc <userid>:  
<password>@<ip_address>
```

---

## Complete the parts replacement

Go through the checklist to complete parts replacement

To complete the parts replacement, do the following:

1. Ensure that all components have been reassembled correctly and that no tools or loose screws are left inside your server.
2. Properly route and secure the cables in the server. Refer to the cable connecting and routing information for each component.
3. Reinstall the air baffle. See “Install the air baffle” on page 43.

### 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.
4. Reinstall the compute node cover. See “Install the compute node cover” on page 51.
  5. Reinstall the compute node back to the chassis. See “Install the compute node in chassis” on page 31.
  6. Power on the compute node. See “Power on the compute node” on page 12.
  7. Update the server configuration.
    - Download and install the latest device drivers: <http://datacentersupport.lenovo.com>.
    - Update the system firmware. See “Firmware updates” on page 8.
    - Update the UEFI configuration.
    - Reconfigure the disk arrays if you have installed or removed a hot-swap drive or a RAID adapter. See the Lenovo XClarity Provisioning Manager User Guide, which is available for download at: <http://datacentersupport.lenovo.com>.



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## Chapter 4. Problem determination

Use the information in this section to isolate and resolve issues that you might encounter while using your server.

Lenovo servers can be configured to automatically notify Lenovo Support if certain events are generated. You can configure automatic notification, also known as Call Home, from management applications, such as the Lenovo XClarity Administrator. If you configure automatic problem notification, Lenovo Support is automatically alerted whenever a server encounters a potentially significant event.

To isolate a problem, you should typically begin with the event log of the application that is managing the server:

- If you are managing the server from the Lenovo XClarity Administrator, begin with the Lenovo XClarity Administrator event log.
- If you are managing the server from the Chassis Management Module 2, begin with the Chassis Management Module 2 event log.
- If you are using some other management application, begin with the Lenovo XClarity Controller event log.

---

### Event logs

An *alert* is a message or other indication that signals an event or an impending event. Alerts are generated by the Lenovo XClarity Controller or by UEFI in the servers. These alerts are stored in the Lenovo XClarity Controller Event Log. If the server is managed by the Chassis Management Module 2 or by the Lenovo XClarity Administrator, alerts are automatically forwarded to those management applications.

**Note:** For a listing of events, including user actions that might need to be performed to recover from an event, see the *Messages and Codes Reference*, which is available at: <https://pubs.lenovo.com/sn550-v2/pdf/files.html>

#### Lenovo XClarity Administrator event log

If you are using Lenovo XClarity Administrator to manage server, network, and storage hardware, you can view the events from all managed devices through the XClarity Administrator.

## Logs

Severity	Serviceability	Date and Time	System	Event	System Type	Source ID
Warning	Support	Jan 30, 2017, 7:48:07 AM	Chassis114:...	Node Node 08 device	Chassis	Jan 30, 20
Warning	Support	Jan 30, 2017, 7:48:07 AM	Chassis114:...	Node Node 02 device	Chassis	Jan 30, 20
Warning	User	Jan 30, 2017, 7:48:07 AM	Chassis114:...	I/O module IO Module	Chassis	Jan 30, 20
Warning	User	Jan 30, 2017, 7:48:07 AM	Chassis114:...	Node Node 08 incom	Chassis	Jan 30, 20

Figure 91. Lenovo XClarity Administrator event log

For more information about working with events from XClarity Administrator, see:

[http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/events\\_vieweventlog.html](http://sysmgt.lenovofiles.com/help/topic/com.lenovo.lxca.doc/events_vieweventlog.html)

### Chassis Management Module 2 event log

The CMM 2 event log contains all events received by the CMM 2 from all components in the chassis, including switch modules, compute nodes, fans, and power supplies.

Severity	Date	Event ID	Message
Error	Today 02:55 AM	e008003	The system-management processor for node node03 communication to the CMM is offline.

Figure 92. CMM 2 event log

For more information about accessing the CMM event log, see:

[https://pubs.lenovo.com/cmm2/cmm\\_ui\\_events](https://pubs.lenovo.com/cmm2/cmm_ui_events)

### Lenovo XClarity Controller event log

The Lenovo XClarity Controller monitors the physical state of the server and its components using sensors that measure internal physical variables such as temperature, power-supply voltages, fan speeds, and

component status. The Lenovo XClarity Controller provides various interfaces to systems management software and to system administrators and users to enable remote management and control of a server.

The Lenovo XClarity Controller monitors all components of the server and posts events in the Lenovo XClarity Controller event log.

Severity	Source	Date	Event ID	Message
Informational	System	1/11/2013 08:02:42 AM	0x4000000e00000000	Remote Login Successful. Login ID: USERID from webgui at IP address 8.191.28.57
Informational	System	1/11/2013 08:01:08 AM	0x4000001800000000	IPV4-LocalHostName=MG2-0ca6b14e3301, IP@=192.168.101.118, NetName=200.200.0.0, Org@=0.0.0.0
Informational	System	1/11/2013 08:00:58 AM	0x4000001800000000	LAN (Ethernet@00:15:5d) interface is now active
Informational	System	1/11/2013 08:00:55 AM	0x4000001700000000	IPV4-LocalHostName=MG2-0ca6b14e3301, IP@=192.168.101.118, NetName=200.200.0.0, Org@=0.0.0.0
Informational	System	1/11/2013 08:00:53 AM	0x4000001700000000	IPV4-LocalHostName=MG2-0ca6b14e3301, IP@=192.168.101.118, NetName=200.200.0.0, Org@=0.0.0.0
Informational	System	1/11/2013 08:00:51 AM	0x4000001800000000	LAN (Ethernet@00:15:5d) interface is now active
Informational	System	1/11/2013 08:00:47 AM	0x4000001000000000	Management Controller (MCC) Network Initialization Complete
Informational	System	1/11/2013 08:00:02 AM	0x8000012821010000	Device Lock Security (DLS) has been added
Informational	Power	1/11/2013 08:00:02 AM	0x0000000113010000	Host Power has been turned off
Informational	System	1/11/2013 08:00:11 AM	0x4000001500000000	Management Controller (MCC) Network Initialization Complete
Informational	System	1/11/2013 08:47:58 AM	0x4000002500000000	Flash of MCC (MCC) from C:\MSD5195.118 succeeded for user USERID
Informational	System	1/11/2013 08:43:10 AM	0x4000000e00000000	Remote Login Successful. Login ID: USERID from webgui at IP address 8.191.101.118

Figure 93. Lenovo XClarity Controller event log

For more information about accessing the Lenovo XClarity Controller event log, see:

“Viewing Event Logs” section in the XCC documentation compatible with your server at <https://pubs.lenovo.com/lxccc-overview/>

## 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.

## Viewing the Light Path Diagnostics LEDs

Use this information to locate and identify the Light Path Diagnostics LEDs.

**Note:** Before you work inside the compute node to view the Light Path Diagnostics LEDs, read the safety information, which is available at “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27.

If an error occurs, view the Light Path Diagnostics LEDs in the following order:

1. Look at the control panel on the front of the compute node.

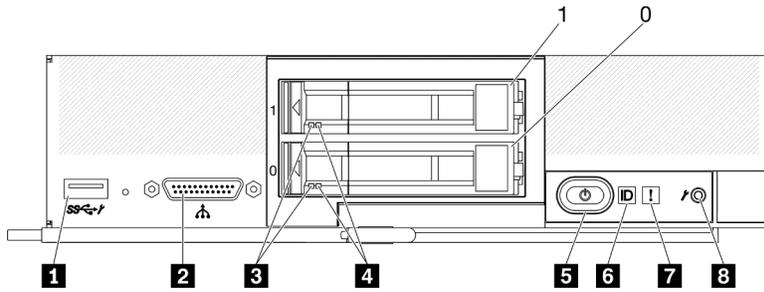


Figure 94. Two 2.5-inch drives compute node control panel buttons, connectors, and LEDs

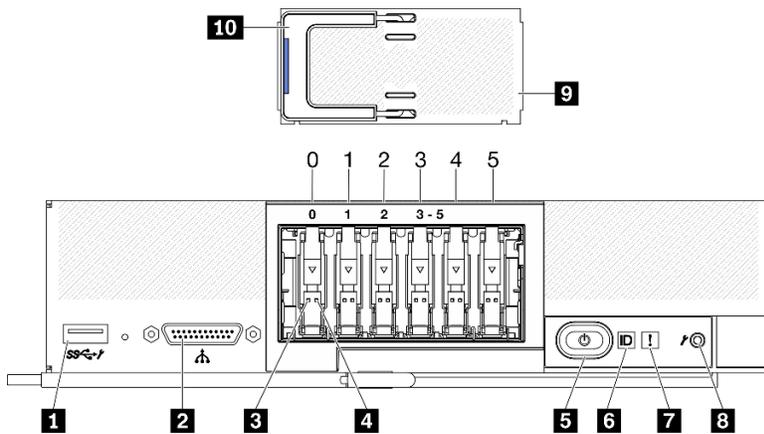


Figure 95. Six ESDFF drives compute node control panel buttons, connectors, and LEDs

Table 23. Compute node control panel buttons, connectors, and LEDs

<b>1</b> USB 3.2 Gen 1 connector USB 2.0 only when accessing Lenovo XClarity Controller via a mobile device.	<b>6</b> Identification LED
<b>2</b> KVM connector	<b>7</b> Fault LED (yellow)
<b>3</b> Drive activity LED (green)	<b>8</b> USB management button
<b>4</b> Drive status LED (yellow)	<b>9</b> EDSFF drive bezel (Six ESDFF drives compute node only)
<b>5</b> Power button/LED (green)	<b>10</b> EDSFF drive bezel handle (Six ESDFF drives compute node only)

- If the fault LED is lit, it indicates that an error has occurred; view the light path diagnostics panel and LEDs to isolate the failing component.
2. To view the light path diagnostics panel LEDs, select one of the following procedures:
    - You can view the LEDs through the CMM `led` command, the CMM web interface and the Lenovo XClarity Administrator application (if installed).
      - For more information about the CMM `led` command, see *Flex System Chassis Management Module: Command-Line Interface Reference Guide* at [https://pubs.lenovo.com/cmm2/cli/command\\_led](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 the *Flex System Chassis Management Module: User's Guide* at [https://pubs.lenovo.com/cmm2/cmm\\_user\\_guide](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>.
- If you are in the same location as the compute node, you can complete the following steps:
  - a. Remove the compute node from the Lenovo Flex System Enterprise Chassis. See “Remove the compute node from chassis” on page 30.
  - b. Carefully lay the compute node on a flat, static-protective surface.
  - c. Open the compute node cover. See “Remove the compute node cover” on page 50.
  - d. Locate the Light Path Diagnostics panel.

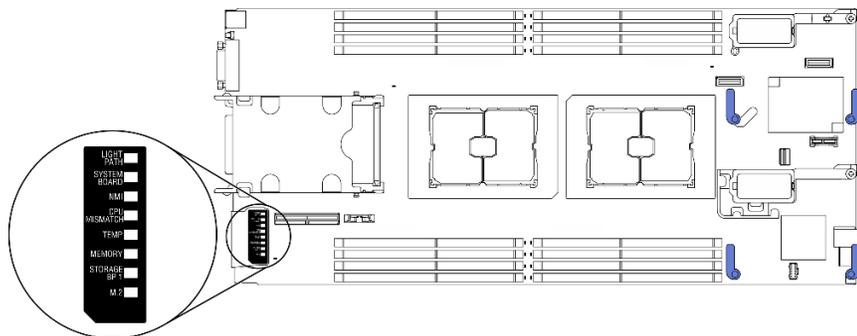


Figure 96. Light Path Diagnostics panel

- e. Press and hold the power button on the control panel on the front of the compute node. When you press the power button, LEDs on the light path diagnostics panel and the system board will be lit if there are any hardware-related issues.

**Note:** The power source for Light Path Diagnostics panel is designed only to last a short time.

- f. Identify the errors indicated by the Light Path Diagnostics panel LEDs. See “Light Path Diagnostics panel LEDs” on page 131.

## 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 “Viewing the Light Path Diagnostics LEDs” on page 129 for information about lighting the LEDs.

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

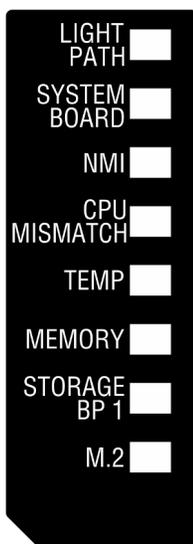


Figure 97. Light Path Diagnostics panel LEDs

Table 24. 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.

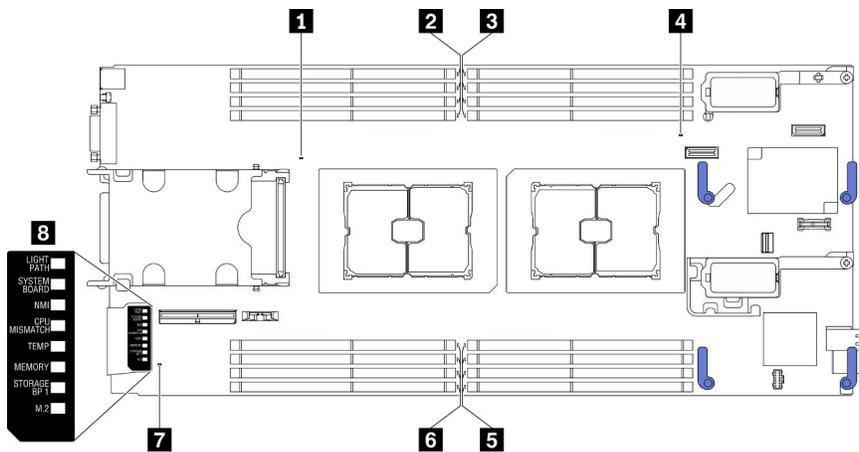


Figure 98. System-board LEDs

Table 25. System-board LEDs

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

See “Light Path Diagnostics panel LEDs” on page 131 for information about how to interpret the light path diagnostics panel LEDs.

## General problem determination procedures

Use the information in this section to resolve problems if the event log does not contain specific errors or the server is inoperative.

If you are not sure about the cause of a problem and the power supplies are working correctly, complete the following steps to attempt to resolve the problem:

1. Power off the server.
2. Make sure that the server is cabled correctly.
3. Remove or disconnect the following devices if applicable, one at a time, until you find the failure. Power on and configure the server each time you remove or disconnect a device.
  - Any external devices.
  - Surge-suppressor device (on the server).
  - Printer, mouse, and non-Lenovo devices.
  - Each adapter.
  - Hard disk drives.
  - Memory modules until you reach the minimum configuration that is supported for the server.

See “Specifications” on page 2 to determine the minimum configuration for your server.

4. Power on the server.

If the problem is solved when you remove an adapter from the server, but the problem recurs when you install the same adapter again, suspect the adapter. If the problem recurs when you replace the adapter with a different one, try a different PCIe slot.

If the problem appears to be a networking problem and the server passes all system tests, suspect a network cabling problem that is external to the server.

---

## Troubleshooting by symptom

Use this information to find solutions to problems that have identifiable symptoms.

To use the symptom-based troubleshooting information in this section, complete the following steps:

1. Check the event log of the application that is managing the server and follow the suggested actions to resolve any event codes.
  - If you are managing the server from the Lenovo XClarity Administrator, begin with the Lenovo XClarity Administrator event log.
  - If you are managing the server from the Chassis Management Module 2, begin with the Chassis Management Module 2 event log.
  - If you are using some other management application, begin with the Lenovo XClarity Controller event log.

For more information about event logs, see “Event logs” on page 127.

2. Review this section to find the symptoms that you are experiencing and follow the suggested actions to resolve the issue.
3. If the problem persists, contact support. See “Contacting Support” on page 159.

## Hard disk drive problems

Use this information to resolve issues related to the hard disk drives.

- “Server cannot recognize a hard drive” on page 134

### 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*).

## Intermittent problems

Use this information to solve intermittent problems.

- “Intermittent external device problems” on page 135
- “Intermittent KVM problems” on page 135
- “Intermittent unexpected reboots” on page 135

### Intermittent external device problems

Complete the following steps until the problem is solved.

1. Make sure that the correct device drivers are installed. See the manufacturer's website for documentation.
2. For a USB device:
  - a. Restart the server and press the key specified in the on-screen instructions to display the LXPM system setup interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) Then, click **System Settings** → **Devices and I/O Ports** → **USB Configuration**.
  - b. Connect the device to another port. If using a USB hub, remove the hub and connect the device directly to the compute node. Make sure that the device is configured correctly for the port.

### Intermittent KVM problems

Complete the following steps until the problem is solved.

#### Video problems:

1. Make sure that all cables and the console breakout cable are properly connected and secure.
2. Make sure that the monitor is working properly by testing it on another compute node.
3. Test the console breakout cable on a working compute node to ensure that it is operating properly. Replace the console breakout cable if it is defective.

#### Keyboard problems:

Make sure that all cables and the console breakout cable are properly connected and secure.

#### Mouse problems:

Make sure that all cables and the console breakout cable are properly connected and secure.

### Intermittent unexpected reboots

**Note:** Some correctable errors require that the server reboot so that it can disable a device, such as a memory DIMM or a processor to allow the machine to boot up properly.

Complete the following steps until the problem is solved.

1. See the management controller event log to check for an event code that indicates a reboot. See “Event logs” on page 127 for information about viewing the event log.

## Memory problems

Use this information to resolve issues related to memory.

- “Displayed system memory is less than installed physical memory” on page 136

## 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” in *Setup Guide*).
  - 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 the LXPM 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” in *Setup Guide*).
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.

## Network problems

Use this information to resolve issues related to networking, such as issues with ping, communications, or login.

### Access problems

Use this information to resolve issues related to logging in to the CMM 2 or an I/O module.

- “Cannot log in to CMM 2” on page 136
- “Cannot log in to I/O module” on page 137

### Cannot log in to CMM 2

Complete the following steps until the problem is solved:

1. Make sure that you are using the correct password and that the capitals lock is off.
2. Restore the CMM 2 default settings by pressing the reset button on the CMM.

## Cannot log in to I/O module

Complete the following steps until the problem is solved:

1. Make sure that you are using the correct password and that the capitals lock is off.
2. Contact Lenovo Support for further assistance if you have forgotten the password.

## Communication problems

Use this information to resolve issues related to the communication between devices.

- “A compute node cannot communicate with the CMM 2 on the data network” on page 137
- “A compute node cannot communicate with an I/O module” on page 137
- “One or more compute nodes cannot communicate with the SAN” on page 137

### A compute node cannot communicate with the CMM 2 on the data network

**Note:** Communications errors from compute nodes can take up to 20 minutes to appear in the CMM 2 event log.

Complete the following steps until the problem is solved:

1. Make sure that all ports in the connection path are enabled and that you can ping the CMM 2. If you are unable to ping the CMM 2, see “A compute node in the chassis cannot ping the CMM 2 on management network” on page 140.
2. Make sure that the protocols that you are using are enabled. By default, only secure protocols are enabled, for example, SSH and HTTPS.
3. Make sure that you can log into the CMM 2. If you are unable to log in to the CMM 2, see “Cannot log in to CMM 2” on page 136.
4. Reset the CMM 2 to the default settings by pressing the reset button on the CMM 2.

Press and hold the button for 10 seconds to reset the CMM 2 configuration settings. All user modified configuration settings are reset to the factory default values.

### A compute node cannot communicate with an I/O module

Complete the following steps until the problem is solved:

1. Make sure that all ports in the connection path are enabled and that you can ping the I/O module. If you are unable to ping the I/O module, see “A compute node cannot ping an I/O module” on page 142.
2. Make sure that the protocols that you are using are enabled. By default, only secure protocols are enabled, for example, SSH and HTTPS.
3. Make sure that you can log into the I/O module. If you are unable to log in to the I/O module, see “Cannot log in to I/O module” on page 137.
4. Use a serial cable to connect to the I/O module to further isolate the problem. You can also link to the I/O module through an external Ethernet port.

### One or more compute nodes cannot communicate with the SAN

Complete the following steps until the problem is solved:

1. Make sure that:
  - The I/O module is powered on and the appropriate ports are enabled on the I/O module.
  - The CMM 2 has reported that the I/O module has completed POST and that no errors have been reported in the logs.
  - The SAN device is powered on and is functional.

- All cables between the I/O module and the SAN device are properly connected and secure, and that the activity LEDs are lit on the appropriate ports.
2. See the documentation for the I/O module for additional information about troubleshooting SAN connectivity or network connectivity issues.

## Connectivity problems

Use this information to resolve issues related to the connectivity between the compute node and the Ethernet network.

- “A compute node cannot connect to the data network (Ethernet) during initial setup” on page 138
- “Intermittently, a compute node cannot connect to the data network (Ethernet)” on page 138
- “Multiple compute nodes cannot connect to the data network (Ethernet) during initial setup” on page 139
- “Intermittently, multiple compute nodes cannot connect to the data network (Ethernet)” on page 139

### A compute node cannot connect to the data network (Ethernet) during initial setup

Complete the following steps until the problem is solved:

1. If you have just updated the firmware for one or more devices in the chassis (I/O module, CMM 2, etc), install the previous level of firmware.
2. Make sure that:
  - The I/O module is powered on and the appropriate ports are enabled on the I/O module.
  - All cables between the I/O module and the network device (switch or router) are properly connected and secure, and that the activity LEDs are lit on the appropriate ports.
3. From the compute node operating system, verify the network settings, such as IP address, subnet mask (if using IPv4), DHCP settings, and vLAN settings, to ensure that the settings match the settings of the network device. See the documentation for the operating system for information about checking network settings.
4. From the compute node operating system, make sure that the network device is active. See the documentation for the operating system for information about viewing network devices.
5. Check the Lenovo support Web site for any firmware updates that might apply to this issue. You can view the release notes for a firmware update to determine the issues addressed by the update.
6. Check the Lenovo support Web site for any service bulletins that are related to network connectivity.
7. (Trained service technician only) Perform the following steps:
  - a. Force the Link/duplex speed.
  - b. Check the connectors on the I/O module to ensure that there are no bent pins.
  - c. Check the connectors on the chassis midplane to ensure there are no bent pins.
  - d. Remove the I/O module and install a working I/O module in the same I/O module bay.
  - e. If the problem is resolved, replace the I/O module that you removed.

### Intermittently, a compute node cannot connect to the data network (Ethernet)

Complete the following steps until the problem is solved:

1. Make sure that the network cables are correctly connected in the switch module ports and the switch module is correctly seated.
2. Update the NIC device driver, or the storage device controller device driver.
3. See the documentation for the I/O module for resolving connectivity issues.

## Multiple compute nodes cannot connect to the data network (Ethernet) during initial setup

Complete the following steps until the problem is solved:

1. Make sure that:
  - The I/O module is powered on and the appropriate ports are enabled on the I/O module.
  - All cables between the I/O module and the network device (switch or router) are properly connected and secure, and that the activity LEDs are lit on the appropriate ports.
2. From the compute node operating system, verify the network settings, such as IP address, subnet mask (if using IPv4), DHCP settings, and vLAN settings, to ensure that the settings match the settings of the network device. See the documentation for the operating system for information about checking network settings.
3. From the compute node operating system, make sure that the network device is active. See the documentation for the operating system for information about viewing network devices.
4. Make sure that the proper device drivers are installed for the compute node Ethernet device.
5. Check the Lenovo support Web site for any firmware updates that might apply to this issue. You can view the release notes for a firmware update to determine the issues addressed by the update.
6. Remove the compute node from the chassis and check the connectors at the back of the node for bent pins. If the pins are bent, contact Lenovo Support. See Removing a compute node from a chassis.
7. Install the compute node in another compute node bay to see if the problem persists. See Installing a compute node in a chassis. If the problem persists, make sure that this compute node is connected to a port that has been enabled and that the vLAN settings enable that port to connect to the network.
8. Check the Lenovo support Web site for any service bulletins that are related to network connectivity.
9. (Trained service technician only) Perform the following steps:
  - a. Force the Link/duplex speed.
  - b. Check the connectors on the I/O module to ensure that there are no bent pins.
  - c. Check the connectors on the chassis midplane to ensure there are no bent pins.
  - d. Remove the I/O module and install a working I/O module in the same I/O module bay.
  - e. If the problem is resolved, replace the I/O module that you removed.

## Intermittently, multiple compute nodes cannot connect to the data network (Ethernet)

Complete the following steps until the problem is solved:

1. Using the diagnostic tools that are provided by the device manufacturer, test the I/O module that the devices are connected to.
2. Attempt to connect one compute node to the network first, and connect other compute nodes, one by one, to try to isolate the problem.
3. Update the I/O module firmware, if necessary.

**Note:** Restarting the compute node and running POST diagnostics on the I/O module might also help isolate the problem; however, this might have other ramifications to the network.

## Ping problems

Use this information to resolve issues related to the ability to ping the CMM 2 or an I/O module.

- “A compute node in the chassis cannot ping the CMM 2 on management network” on page 140
- “Multiple compute nodes in the chassis cannot ping the CMM 2 on management network” on page 140
- “CMM 2 cannot ping a CMM 2 in a different chassis” on page 141
- “A compute node cannot ping an I/O module” on page 142

- “Multiple compute nodes cannot ping an I/O module” on page 142

### **A compute node in the chassis cannot ping the CMM 2 on management network**

Complete the following steps until the problem is solved:

1. Make sure that the CMM 2 is powered on and the applicable ports are enabled on the CMM 2.
2. Make sure that the compute node BMC (Lenovo XClarity Controller) has acquired an IP address from the CMM 2 by using the Setup utility on the node.

**Note:** If the CMM 2 recently lost connection to the DHCP server, you must reset the BMC by using the CMM 2 interface so that a new IP address can be acquired.

3. In the CMM 2 user interface, click **Chassis Management** → **Component IP Configuration** and make sure that the IP address that is listed is the same as the IP address that is displayed in the Setup utility. If it is not the same IP address, configure the BMC network settings correctly or reset the BMC to automatically acquire a new IP address.
4. Check <http://datacentersupport.lenovo.com> for any firmware updates that might apply to this problem. You can view the release notes for a firmware update to determine the issues that the update addresses.
5. Remove the compute node from the chassis and check the connectors on the back of the node for bent pins. If the pins are bent, contact Lenovo Support.
6. Install the compute node in another node bay to determine whether the problem remains. If the problem remains, make sure that the compute node is connected to a port that has been enabled and that the vLAN settings allow that port to connect to the network.
7. Check <http://datacentersupport.lenovo.com> for any tech tips (service bulletins) that are related to network connectivity.
8. (Trained service technician only) Complete the following steps:
  - a. Force the link/duplex speed.
  - b. Check the connectors on the I/O module to make sure that no pins are bent.
  - c. Check the connectors on the chassis midplane to make sure that no pins are bent.
  - d. Remove the CMM 2 and install a working CMM 2 in the same bay.
  - e. If the problem is solved, replace the CMM 2 that you removed.

### **Multiple compute nodes in the chassis cannot ping the CMM 2 on management network**

Complete the following steps until the problem is solved:

1. Make sure that the CMM 2 is powered on and the applicable ports are enabled on the CMM 2. If the CMM 2 is hung, reset the CMM 2.
2. Reset the CMM 2.
3. Check for firmware updates for the CMM 2.
4. Reset the CMM 2 to factory defaults and attempt to discover the nodes again. Allow enough time for each BMC to acquire a network address.
5. Replace the CMM 2.
6. Make sure that the compute node BMC has acquired an IP address from the CMM 2 by using the Setup utility on the node.

**Note:** If the CMM 2 recently lost connection to the DHCP server, you must reset the BMC by using the CMM 2 interface so that a new IP address can be acquired.

7. In the CMM 2 user interface, click **Chassis Management** → **Component IP Configuration** and make sure that the IP address that is listed is the same as the IP address that is displayed in the Setup utility. If

it is not the same IP address, configure the BMC network settings correctly or reset the BMC to automatically acquire a new IP address.

8. Check <http://datacentersupport.lenovo.com> for any firmware updates that might apply to this problem. You can view the release notes for a firmware update to determine the issues that the update addresses.
9. Remove the compute node from the chassis and check the connectors on the back of the node for bent pins. If the pins are bent, contact Lenovo Support.
10. Check <http://datacentersupport.lenovo.com> for any tech tips (service bulletins) that are related to network connectivity.
11. (Trained service technician only) Complete the following steps:
  - a. Force the link/duplex speed.
  - b. Check the connectors on the CMM 2 to make sure that no pins are bent.
  - c. Check the connectors on the chassis midplane to make sure that no pins are bent.
  - d. Remove the CMM 2 and install a working CMM 2 in the same bay.
  - e. If the problem is solved, replace the CMM 2 that you removed.

### **CMM 2 cannot ping a CMM 2 in a different chassis**

Complete the following steps until the problem is solved:

1. Make sure that the CMM 2 are powered on and the applicable ports are enabled.
  - a. If the CMM 2 is powered on and hung, reset the CMM 2.
  - b. Make sure that the compute node BMC, the management node, and the CMM 2 are all on the same subnet.
2. Verify that the cables between the CMM 2 and the top-of-rack switch are correctly connected and that the activity LEDs are lit on the applicable ports.
3. Make sure that the management node has a correct IP address and is on the same subnet as the CMM 2.
4. Make sure that the compute node BMC has acquired an IP address from the CMM 2 by using the Setup utility on the node.

**Note:** If the CMM 2 recently lost connection to the DHCP server, you must to reset the BMC by using the CMM 2 interface so that a new IP address can be acquired.

5. In the CMM 2 user interface, click **Chassis Management → Component IP Configuration** and make sure that the IP address that is listed is the same as the IP address that is displayed in the Setup utility. If it is not the same IP address, configure the BMC network settings correctly or reset the BMC to automatically acquire a new IP address.
6. Check <http://datacentersupport.lenovo.com> for any firmware updates that might apply to this problem. You can view the release notes for a firmware update to determine the issues that the update addresses.
7. Check <http://datacentersupport.lenovo.com> for any tech tips (service bulletins) that are related to network connectivity.
8. Remove the compute node from the chassis and check the connectors on the back of the node and on the midplane for bent pins. If the pins are bent, contact Lenovo Support.
9. (Trained service technician only) Complete the following steps:
  - a. Force the link/duplex speed.
  - b. Check the connectors on the nodes and on the midplane to make sure that no pins are bent.
  - c. Replace the I/O expansion card in the management node.
  - d. Replace the management node.

## A compute node cannot ping an I/O module

Complete the following steps until the problem is solved:

1. If you have recently updated the firmware for one or more devices in the chassis (I/O module) and have verified the network settings, install the previous level of firmware.
2. Make sure that the I/O module is powered on and the applicable ports are enabled on the I/O module.
3. Make sure that all network cables are correctly connected and that the activity LEDs are lit. If the cables are correctly connected and the LEDs are not lit, replace the cable.
4. Check <http://datacentersupport.lenovo.com> for any firmware updates that might apply to this problem. You can view the release notes for a firmware update to determine the issues that are addressed by the update.
5. Remove the node from the chassis and check the connectors at the back of the node for bent pins. If the pins are bent, go to <http://datacentersupport.lenovo.com> to submit a service request.
6. Install the compute node in another node bay, if one is available. If the problem remains, make sure that the compute node is connected to a port that has been enabled and that the vLAN settings allow that port to connect to the network.
7. Check <http://datacentersupport.lenovo.com> for any tech tips that are related to I/O-module connectivity.
8. If the problem remains, replace the I/O module, and go to <http://datacentersupport.lenovo.com> to submit a service request.
9. (Trained service technician only) Complete the following steps:
  - a. Force the link/duplex speed.
  - b. Check the connectors on the I/O module to make sure that no pins are bent.
  - c. Check the connectors on the chassis midplane to make sure that no pins are bent.
  - d. Remove the I/O module and install a working I/O module in the same I/O bay.
  - e. If the problem is solved, replace the I/O module that you removed.

## Multiple compute nodes cannot ping an I/O module

Complete the following steps until the problem is solved:

1. If you have recently updated the firmware for one or more devices in the chassis (I/O module or CMM 2), install the previous level of firmware.
2. Make sure that the I/O module is powered on and the applicable ports are enabled on the I/O module.
3. Make sure that all network cables are correctly connected and that the activity LEDs are lit.
4. From the compute node operating system, verify that the network device is active. Check also the network settings, such as IP address, subnet mask (if you are using IPv4), DNS, DHCP settings, and vLAN settings to make sure that the settings match the settings of the network device. See the documentation that comes with the operating system for information about viewing network devices and checking the network settings.
5. Check <http://datacentersupport.lenovo.com> for any firmware updates that might apply to this problem. You can view the release notes for a firmware update to determine the issues that are addressed by the update.
6. Check <http://datacentersupport.lenovo.com> for any tech tips (service bulletins) that are related to network connectivity.
7. (Trained service technician only) Complete the following steps:
  - a. Force the link/duplex speed.
  - b. Check the connectors on the I/O module to make sure that no pins are bent.
  - c. Check the connectors on the chassis midplane to make sure that no pins are bent.

- d. Remove the I/O module and install a working I/O module in the same I/O bay.
- e. If the problem is solved, replace the I/O module that you removed.

## Observable problems

Use this information to solve observable problems.

- “Compute node hangs during the UEFI boot process” on page 143
- “The compute node immediately displays the POST Event Viewer when it is turned on” on page 143
- “Compute node is unresponsive (POST is complete and operating system is running)” on page 144
- “Voltage planar fault is displayed in the event log” on page 144
- “Unusual smell” on page 144
- “Compute node seems to be running hot” on page 144
- “Cannot enter legacy mode after installing a new adapter” on page 145
- “Cracked parts or cracked chassis” on page 145

### Compute node hangs during the UEFI boot process

If the system hangs during the UEFI boot process with the message UEFI: DXE INIT on the display, make sure that Option ROMs were not configured with a setting of **Legacy**. You can remotely view the current settings for Option ROMs by running the following command using the Lenovo XClarity Essentials OneCLI:

```
onecli config show EnableDisableAdapterOptionROMSupport --bmc xcc_userid:xcc_password@xcc_ipaddress
```

To recover a system that hangs during the boot process with Legacy Option ROM settings, see the following Tech Tip:

<https://datacentersupport.lenovo.com/us/en/solutions/ht506118>

If legacy Option ROMs must be used, do not set slot Option ROMs to **Legacy** on the Devices and I/O Ports menu. Instead, set slot Option ROMs to **Auto** (the default setting), and set the System Boot Mode to **Legacy Mode**. Legacy option ROMs will be invoked shortly before the system boots.

### 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

### **Compute node is unresponsive (POST is complete and operating system is running)**

Complete the following steps until the problem is solved.

- If you are in the same location as the compute node, complete the following steps:
  1. If you are using a KVM connection, make sure that the connection is operating correctly. Otherwise, make sure that the keyboard and mouse are operating correctly.
  2. If possible, log in to the compute node and verify that all applications are running (no applications are hung).
  3. Restart the compute node.
  4. If the problem remains, make sure that any new software has been installed and configured correctly.
  5. Contact your place of purchase of the software or your software provider.
- If you are accessing the compute node from a remote location, complete the following steps:
  1. Make sure that all applications are running (no applications are hung).
  2. Attempt to log out of the system and log back in.
  3. Validate the network access by pinging or running a trace route to the compute node from a command line.
    - a. If you are unable to get a response during a ping test, attempt to ping another compute node in the enclosure to determine whether it is a connection problem or compute node problem.
    - b. Run a trace route to determine where the connection breaks down. Attempt to resolve a connection issue with either the VPN or the point at which the connection breaks down.
  4. Restart the compute node remotely through the management interface.
  5. If the problem remains, verify that any new software has been installed and configured correctly.
  6. Contact your place of purchase of the software or your software provider.

### **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 2 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.

### **Unusual smell**

Complete the following steps until the problem is solved.

1. An unusual smell might be coming from newly installed equipment.
2. If the problem remains, contact Lenovo Support.

### **Compute node seems to be running hot**

Complete the following steps until the problem is solved.

Multiple compute nodes or chassis:

1. Make sure that the room temperature is within the specified range (see “Specifications” on page 2).
2. Check the management processor event log for rising temperature events. If there are no events, the compute node is running within normal operating temperatures. Note that you can expect some variation in temperature.

### **Cannot enter legacy mode after installing a new adapter**

Complete the following procedure to solve the problem.

1. Go to **UEFI Setup → Devices and I/O Ports → Set Option ROM Execution Order**.
2. Move the RAID adapter with operation system installed to the top of the list.
3. Select **Save**.
4. Reboot the system and auto boot to operation system.

### **Cracked parts or cracked chassis**

Contact Lenovo Support.

## **Optional-device problems**

Use this information to solve problems related to optional devices.

- “External USB device is not recognized” on page 145
- “PCIe adapter is not recognized or is not functioning” on page 145
- “Insufficient PCIe resources are detected.” on page 145
- “A Lenovo optional device that was just installed does not work” on page 146
- “A Lenovo optional device that worked previously does not work now” on page 146

### **External USB device is not recognized**

Complete the following steps until the problem is resolved:

1. Make sure that the proper drivers are installed on the compute node. See the product documentation for the USB device for information about device drivers.
2. Use the Setup utility to make sure that the device is configured correctly. When you start a server and press the key specified in the on-screen instructions, the LXPM interface is displayed by default.
3. If the USB device is plugged into a hub or the console breakout cable, unplug the device and plug it directly into the USB port on the front of the compute node.

### **PCIe adapter is not recognized or is not functioning**

Complete the following steps until the problem is resolved:

1. Check the event log and resolve any issues related to the device.
2. Validate that the device is supported for the server (see <https://serverproven.lenovo.com/>).
3. Make sure that the adapter is installed in a correct slot.
4. Make sure that the proper device drivers are installed for the device.
5. Resolve any resource conflicts if running legacy mode (UEFI).
6. Check <http://datacentersupport.lenovo.com> for any service bulletins
7. Ensure any adapter external connections are correct and that the connectors are not physically damaged.

### **Insufficient PCIe resources are detected.**

If you see an error message stating “Insufficient PCI Resources Detected,” complete the following steps until the problem is resolved:

1. Press Enter to access System Setup Utility.
2. Select **System Settings → Devices and I/O Ports → MM Config Base**; then, modify the setting to increase the device resources. For example, modify 3 GB to 2 GB or modify 2 GB to 1 GB.

3. Save the settings and restart the system.
4. If the error recurs with the highest device resource setting (1GB), shutdown the system and remove some PCIe devices; then, power on the system.
5. If the reboot failed, repeat step 1 to step 4.
6. If the error recurs, press Enter to access System Setup Utility.
7. Select **System Settings** → **Devices and I/O Ports** → **PCI 64-Bit Resource Allocation**, then; modify the setting from **Auto** to **Enable**.
8. If the Boot Device does not support MMIO above 4GB for Legacy Boot, use UEFI Boot Mode or remove/disable some PCIe devices.
9. Contact Lenovo technical 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.

### **A Lenovo optional device that worked previously does not work now**

1. Make sure that all of the cable connections for the device are secure.
2. If the device comes with test instructions, use those instructions to test the device.
3. If the failing device is a SCSI device, make sure that:
  - The cables for all external SCSI devices are connected correctly.
  - Any external SCSI device is turned on. You must turn on an external SCSI device before you turn on the server.
4. Reseat the failing device.
5. Replace the failing device.

## **Performance problems**

Use this information to solve performance problems.

- “Network performance” on page 146
- “Operating system performance” on page 147
- “Processor performance” on page 147

### **Network performance**

Complete the following steps until the problem is solved:

1. Isolate network (such as storage, data, and management) to identify the one with compromised performance. You might find it helpful to use ping tools or operating-system tools such as task manager or resource manager.
2. Check for traffic congestion on the network.
3. Update the NIC device driver, or the storage device controller device driver.
4. Use the traffic-diagnostic tools that are provided by the IO-module manufacturer.

## Operating system performance

Complete the following steps until the problem is solved:

1. If you have recently made changes to the compute node (for example updated device drivers or installed software applications), remove the changes.
2. Check for any networking issues.
3. Check the operating system logs for performance related errors.
4. Check for events related to high temperatures and power issues, as the compute node might be throttled to help with cooling. If it is throttled, reduce the workload on the compute node to help improve performance.
5. Check for events related to disabled memory modules. Without sufficient memory for application workload, operation system runs with poor performance.
6. Ensure that the workload is not too high for the configuration.

## Processor performance

Unsupported PSU configuration, CPU power has been capped to 125W.

If this warning message appears, complete the following step:

1. 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](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](https://pubs.lenovo.com/sn550-v2/sn550_v2_psu_flyer_pdf.pdf).

## Power on and power off problems

Use this information to resolve issues when powering on or powering off the server.

- “Embedded hypervisor is not in the boot list” on page 147
- “Single server does not power on” on page 148
- “Multiple servers do not power on” on page 148
- “Server does not power off” on page 148

### Embedded hypervisor is not in the boot list

Complete the following steps until the problem is solved.

1. If the server has been installed, moved, or serviced recently, or if this is the first time the embedded hypervisor is being used, make sure that the device is connected properly and that there is no physical damage to the connectors.
2. See the documentation that comes with the optional embedded hypervisor flash device for setup and configuration information.
3. Check <https://serverproven.lenovo.com/> to validate that the embedded hypervisor device is supported for the server.
4. Make sure that the embedded hypervisor device is listed in the list of available boot options. From the management controller user interface, click **Server Configuration → Boot Options**.

For information about accessing the management controller user interface, see the “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/>.

5. Check <http://datacentersupport.lenovo.com> for any tech tips (service bulletins) related to the embedded hypervisor and the server.
6. Make sure that other software works on the server to ensure that it is working properly.

### 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, reseal the server in the bay. If the server was not recently installed, moved, or serviced, perform a virtual reseal through the CMM **service** command. For more information about the CMM **service** command, see the [https://pubs.lenovo.com/cmm2/cli\\_command\\_service](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 the CMM 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](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](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” on page 115).

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

### Multiple servers do not power on

Complete the following steps until the problem is resolved:

1. If you recently installed, moved, or serviced the computer nodes, reseal the compute nodes in the bays. If the compute nodes were not recently installed, moved, or serviced, perform a virtual reseal through the CMM **service** command. For more information about the CMM **service** command, see the [https://pubs.lenovo.com/cmm2/cli\\_command\\_service](https://pubs.lenovo.com/cmm2/cli_command_service).
2. Check the CMM 2 event log for any events that are related to the servers, and solve them.

### Server does not power off

Complete the following steps until the problem is resolved:

1. Attempt to power off the server through the CMM 2 interface.
2. Attempt to restart the system-management processor for the compute node through the CMM 2 interface. Click the server in the chassis view and then click **Restart System Mgmt Processor**. After the system-management processor has been restarted, attempt to power off the node from the CMM 2.
3. Attempt to power off the server by using the power button on the front of the server.
4. Attempt to reset the compute node from the CMM 2 command-line interface (CLI) by using the **reset** command.
5. Reseat the CMM 2. Then, perform steps 1-4 again.

## Software problems

Use this information to solve software problems.

1. To determine whether the problem is caused by the software, make sure that:
  - The compute node has the minimum memory that is needed to use the software. For memory requirements, see the information that comes with the software.  
  
**Note:** If you have just installed an adapter or memory, the compute node might have a memory-address conflict.
  - The software is designed to operate on the compute node.
  - Other software works on the compute node.
  - The software works on another compute node.
2. If you receive any error messages while you use the software, see the information that comes with the software for a description of the messages and suggested solutions to the problem.
3. Contact your place of purchase of the software.



---

## Appendix A. Hardware disassembling for recycle

Follow the instructions in this section to recycle components with compliance with local laws or regulations.

---

### Disassemble the compute node for chassis recycle

Follow the instructions in this section to disassemble the compute node before recycling the chassis.

#### About this task

##### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.

**Note:** Refer to local environmental, waste or disposal regulations to ensure compliance.

#### Procedure

- Step 1. Remove the compute node cover. See “Remove the compute node cover” on page 50.
- Step 2. Remove hot-swap drives, optional drive components, and hot-swap drive bay fillers. See the following:
  - “Remove a 2.5-inch hot-swap drive” on page 33
  - “Remove an EDSFF hot-swap drive” on page 55
- Step 3. Remove the front bezel. See “Remove the front bezel” on page 69.
- Step 4. Remove the RAID adapter. See “Remove the RAID adapter” on page 110.
- Step 5. Remove the flash power module. See “Remove the flash power module” on page 67.
- Step 6. Remove the hot-swap drive backplane. See the following:
  - “Remove the 2.5-inch drive backplane” on page 35
  - “Remove the EDSFF drive backplane assembly” on page 61
- Step 7. Remove the EDSFF drive inner cage. See “Remove the EDSFF drive cage” on page 65.
- Step 8. Remove the I/O expansion adapters. See “Remove an I/O expansion adapter” on page 78.
- Step 9. Remove the M.2 backplane assembly or M.2 backplane assembly filler. See the following:
  - “Remove the M.2 backplane assembly” on page 81
  - “Remove the M.2 backplane assembly filler” on page 86
- Step 10. Remove the air baffle. See “Remove the air baffle” on page 42.
- Step 11. Remove the PHM. See “Remove a processor and heat sink” on page 97.
- Step 12. Remove the memory modules. See “Remove a memory module” on page 91.
- Step 13. Remove the CMOS battery. See “Remove the CMOS battery - CR2032” on page 46.
- Step 14. Remove the system board. See “Disassemble the system board for recycle” on page 152

## After you finish

After disassembling the compute node, recycle the unit in compliance with local regulations.

---

## Disassemble the system board for recycle

Follow the instructions in this section to disassemble the system board before recycling.

### About this task

#### Attention:

- Read “Safety inspection checklist” on page iv and “Installation Guidelines” on page 27 to ensure that you work safely.
- Power off the corresponding compute node that you are going to perform the task on.
- Remove the compute node from the chassis. See “Remove the compute node from chassis” on page 30.
- Carefully lay the compute node on a flat, static-protective surface, orienting the compute node with the bezel pointing toward you.
- Make sure you have T8 Torx, T10 Torx, Phillips #1, and hex socket drivers available.

**Note:** Refer to local environmental, waste or disposal regulations to ensure compliance.

### Procedure

- Step 1. Disassemble the compute node. See “Disassemble the compute node for chassis recycle” on page 151.
- Step 2. Remove the screws from the bottom side of the chassis.
  - a. Carefully place the compute node on its side, making sure the protruding part of the handle is at the top so that the compute node is stable.
  - b. Using a T10 Torx screwdriver and a Phillips #1 screwdriver, remove the screws from the bottom side of the chassis. Remove the I/O expansion adapter retention clips away from the system board.

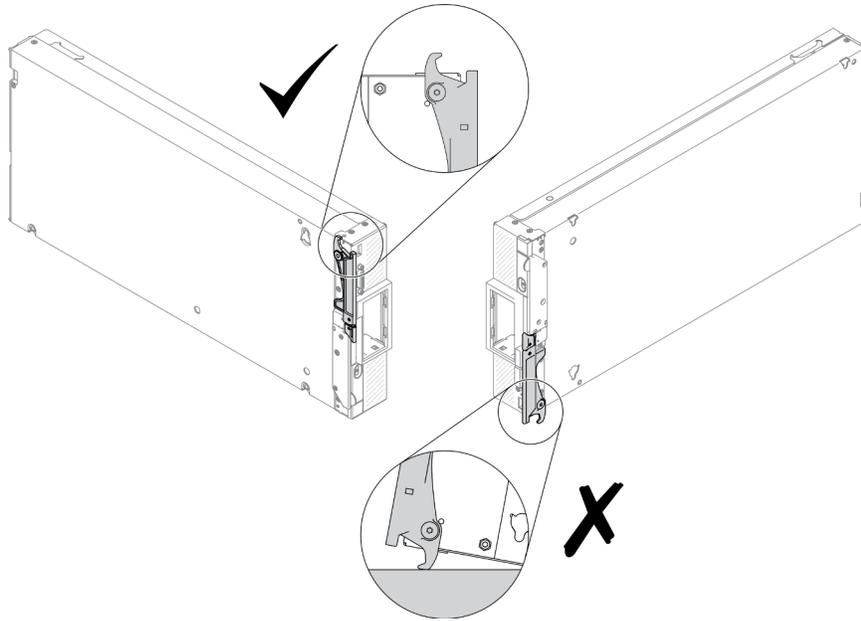


Figure 99. Compute node positioning direction

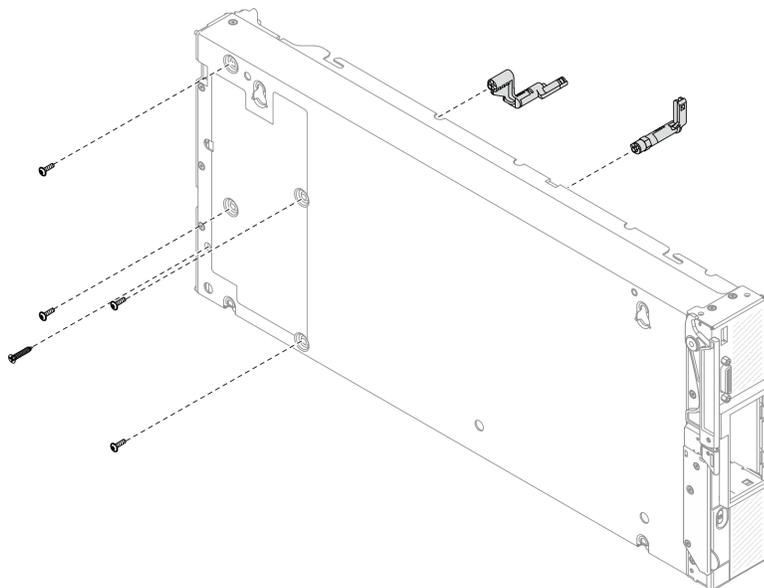


Figure 100. Screws removal from bottom side of the chassis

- Step 3. Remove the bulkhead.
- a. Carefully place the compute node to the up-side-down orientation.
  - b. Using a T8 Torx screwdriver, remove the five screws securing the bulkhead.
  - c. Remove the bulkhead from the compute node.

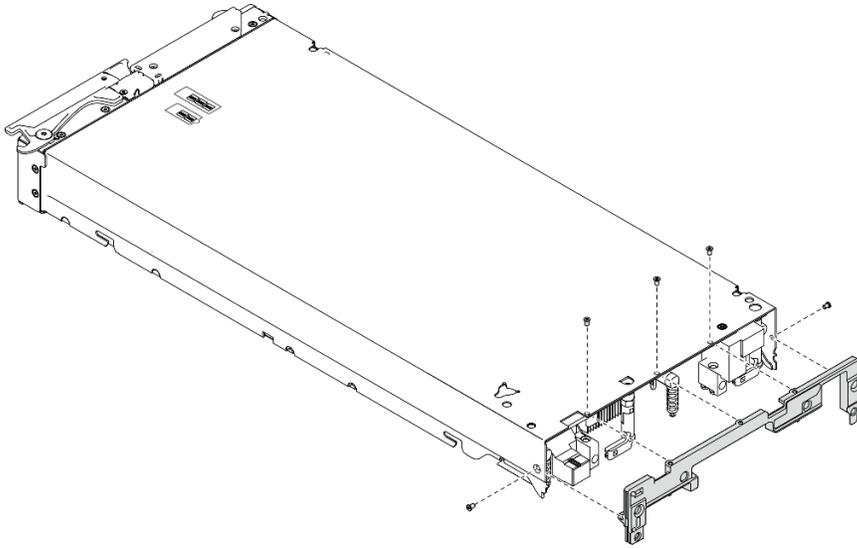


Figure 101. Bulkhead removal

Step 4. Remove the front panel.

- a. Pull out the Lenovo XClarity Controller tag.
- b. Using the T8 Torx screwdriver, remove the eight screws securing the front panel.
- c. Using a hex socket driver, remove the fasteners securing the KVM connector.

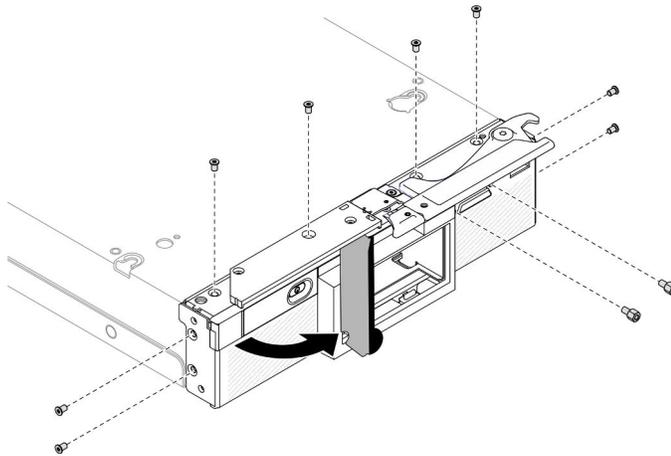


Figure 102. Unfastening front panel screws

- d. Carefully place the compute node to the bottom-side-down orientation, remove the front panel from the compute node.

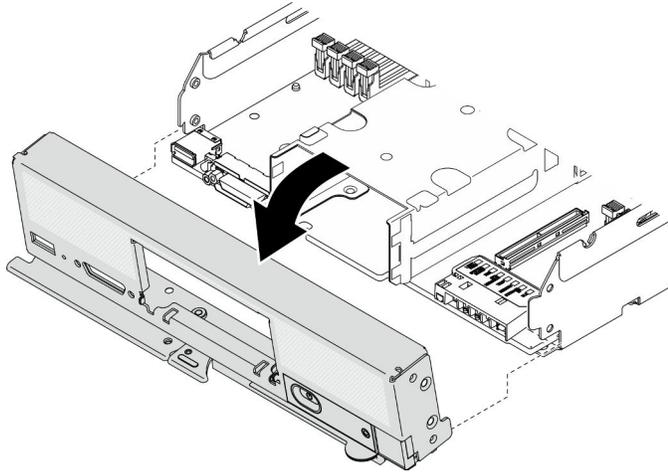


Figure 103. Removing the front panel

- Step 5. Remove the hot-swap drive cage.
- Using the T10 Torx screwdriver, remove the four screws from the cage.
  - Remove the cage from the compute node.

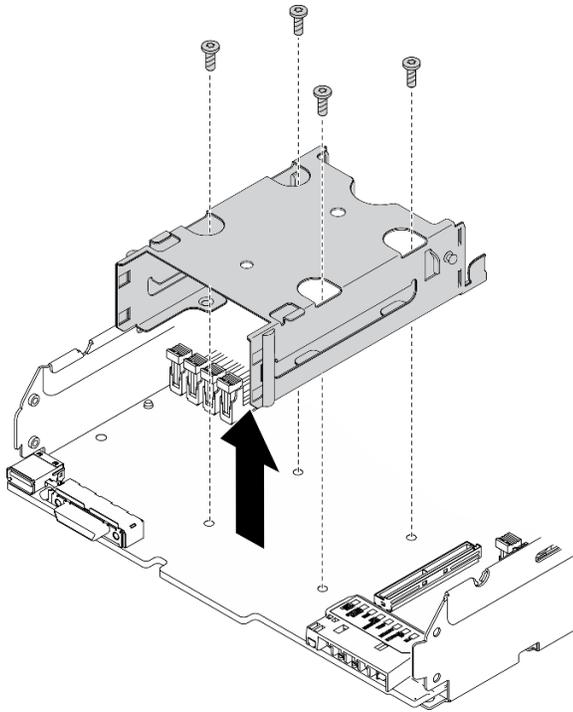
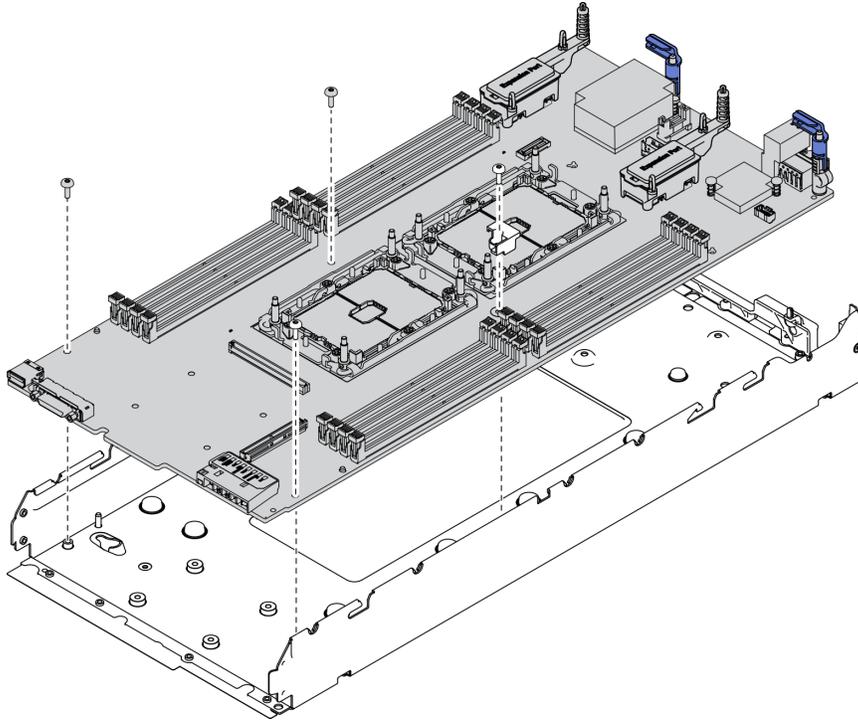


Figure 104. Hot-swap drive cage removal

- Step 6. Remove the four screws securing system board to the chassis, and remove the processor key from the system board. Then, lift up the system board from the chassis.



*Figure 105. Removing the system board*

## **After you finish**

After disassembling the compute node, recycle the unit in compliance with local regulations.

---

## Appendix B. Getting help and technical assistance

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

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

<http://datacentersupport.lenovo.com>

**Note:** 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](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](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](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](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/supportphonenumberlist> for your region support details.



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## Appendix C. Notices

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## Important notes

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

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

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

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

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

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

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

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

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

---

## Telecommunication regulatory statement

This product may not be certified in your country for connection by any means whatsoever to interfaces of public telecommunications networks. Further certification may be required by law prior to making any such connection. Contact a Lenovo representative or reseller for any questions.

## Electronic emission notices

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

Additional electronic emissions notices are available at:

[https://pubs.lenovo.com/important\\_notices/](https://pubs.lenovo.com/important_notices/)

## Taiwan Region BSMI RoHS declaration

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (PB)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr <sup>6+</sup> )	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機架	○	○	○	○	○	○
外部蓋板	○	○	○	○	○	○
機械組零件	-	○	○	○	○	○
空氣傳動設備	-	○	○	○	○	○
冷卻組零件	-	○	○	○	○	○
內存模組	-	○	○	○	○	○
處理器模組	-	○	○	○	○	○
電纜組零件	-	○	○	○	○	○
電源供應器	-	○	○	○	○	○
儲備設備	-	○	○	○	○	○
印刷電路板	-	○	○	○	○	○

備考1. “超出0.1 wt%”及“超出0.01 wt%”係指限用物質之百分比含量超出百分比含量基準值。  
Note1: “exceeding 0.1wt%” and “exceeding 0.01 wt%” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考2. “○”係指該項限用物質之百分比含量未超出百分比含量基準值。  
Note2: “○”indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考3. “-”係指該項限用物質為排除項目。  
Note3: The “-” indicates that the restricted substance corresponds to the exemption.

## Taiwan Region import and export contact information

Contacts are available for Taiwan Region import and export information.

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

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