



ThinkSystem SD665 V3 Neptune DWC Tray Hardware Maintenance Guide



Machine Types: 7D9P

Note

Before using this information and the product it supports, be sure to read and understand the safety information and the safety instructions, which are available at:

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

In addition, be sure that you are familiar with the terms and conditions of the Lenovo warranty for your server, which can be found at:

<http://datacentersupport.lenovo.com/warrantylookup>

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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.

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

安裝本產品之前，請先閱讀「安全資訊」。

Prije instalacije ovog produkta obavezno pročitajte Sigurnosne Upute.

Před instalací tohoto produktu si přečtěte příručku bezpečnostních instrukcí.

Læs sikkerhedsforskrifterne, før du installerer dette produkt.

Lees voordat u dit product installeert eerst de veiligheidsvoorschriften.

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

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

Vor der Installation dieses Produkts die Sicherheitshinweise lesen.

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

לפני שתתקינו מוצר זה, קראו את הוראות הבטיחות.

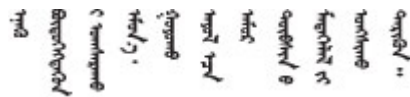
A termék telepítése előtt olvassa el a Biztonsági előírásokat!

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

製品の設置の前に、安全情報をお読みください。

본 제품을 설치하기 전에 안전 정보를 읽으십시오.

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



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

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

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

Перед установкой продукта прочтите инструкции по технике безопасности.

Pred inštaláciou tohto zariadenia si pečítajte Bezpečnostné predpisy.

Pred namestitvijo tega proizvoda preberite Varnostne informacije.

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

Läs säkerhetsinformationen innan du installerar den här produkten.

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

Bu ürünü kurmadan önce güvenlik bilgilerini okuyun.

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canjbinj soengq cungj vahgangj ancien siusik.

Safety inspection checklist

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

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

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

CAUTION:

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

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

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

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

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

- a. Go to:

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

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

Chapter 1. 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 solution.
2. Click **Parts**.
3. Enter the serial number to view a listing of parts for your solution.

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 “Update the firmware” in *User Guide* or *System Configuration Guide*.

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 your safety at work:
 - A complete list of safety information for all products is available at:
https://pubs.lenovo.com/safety_documentation/
 - The following guidelines are available as well: “Handling static-sensitive devices” on page 4.
- Make sure the components you are installing are supported by your server.
 - For a list of supported optional components for the server, see <https://serverproven.lenovo.com>.
 - For the option package contents, see <https://serveroption.lenovo.com/>.
- For more information about ordering parts:
 1. Go to <http://datacentersupport.lenovo.com> and navigate to the support page for your server.
 2. Click **Parts**.
 3. Enter the serial number to view a listing of parts for your server.
- 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 <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> 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 before you update the code.

- 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 “Update the firmware” in *User Guide* or *System Configuration Guide*.

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

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

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

Safety inspection checklist

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

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

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

CAUTION:

This equipment must be installed or serviced by trained personnel, as defined by the 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.

System reliability guidelines

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

Make sure the following requirements are met:

- When the server comes with redundant power, a power supply must be installed in each power-supply bay.
- Adequate space around the server must be spared to allow server cooling system to work properly. Leave approximately 50 mm (2.0 in.) of open space around the front and rear of the server. Do not place any object in front of the fans.
- For proper cooling and airflow, refit the server cover before you turn the power on. Do not operate the server for more than 30 minutes with the server cover removed, for it might damage server components.
- Cabling instructions that come with optional components must be followed.
- All processor sockets must contain either a socket cover or a processor.

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.

Memory module installation rules and order

Memory modules must be installed in a specific order based on the memory configuration that you implement on your node.

For information on the types of memory module supported by this server, see “Memory” section in [“Technical specifications” on page 244](#).

The following memory configuration is available:

- Independent memory mode

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

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

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

https://dcsc.lenovo.com/#/memory_configuration

Specific information about the required installation order of memory modules in your solution based on the system configuration and memory mode that you are implementing is shown below.

Memory modules and processors layout

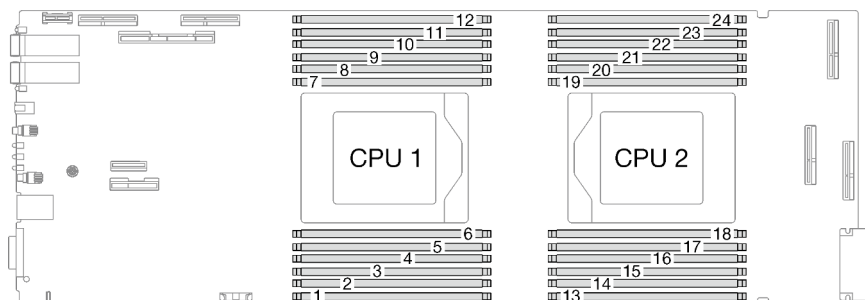


Figure 1. Memory modules and processors layout

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

Table 1. Channel and slot information of DIMMs around a processor

CPU	CPU 1											
Channel	F	E	D	C	B	A	G	H	I	J	K	L
DIMM slot number	1	2	3	4	5	6	7	8	9	10	11	12
CPU	CPU 2											
Channel	L	K	J	I	H	G	A	B	C	D	E	F
DIMM slot number	13	14	15	16	17	18	19	20	21	22	23	24

DRAM DIMM installation order for Independent Mode

Mixing DIMM capacity, types, and brand are not allowed. All the DIMM installed in the system must be identical.

The following memory configuration is available:

- Independent memory mode
 - 8 DIMMs per processor, total of 16 DIMMs per node
 - 12 DIMMs per processor, total of 24 DIMMs per node

Independent mode memory population sequence for 8 DIMMs per processor, total of 16 DIMMs per node

Table 2. Independent mode memory population sequence for 8 DIMMs per processor, total of 16 DIMMs per node

Note: A DIMM slot must be installed with a DIMM or DIMM filler.

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

Independent mode memory population sequence for 12 DIMMs per processor, total of 24 DIMMs per node

Table 3. Independent mode memory population sequence for 12 DIMMs per processor, total of 24 DIMMs per node

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

Gap pad/Putty pad identification and location

Follow the information in this section to identify their shape, location, and orientation of the various gap pads and putty pads used in SD665 V3.

Installation Guidelines for gap pad and putty pad

There are two types of thermal pad: putty pad and gap pad. When replacing components, always replace putty pad. Replace gap pad if it is damaged or missing.

Attention: Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Water loop–Gap pad/Putty pad identification and location

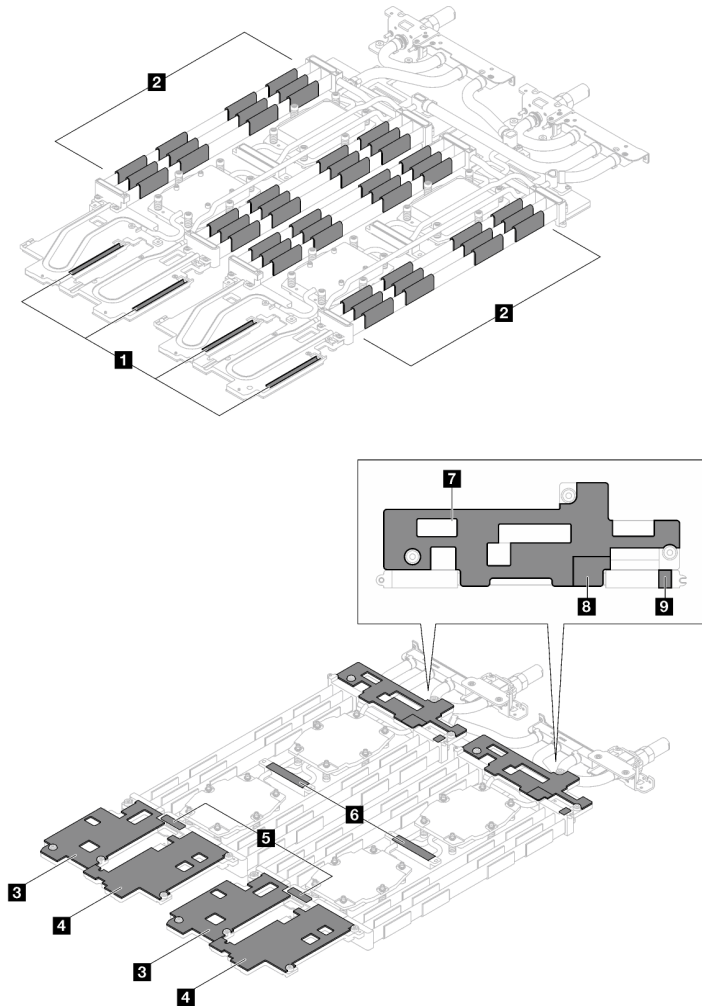


Figure 2. Water loop–Gap pad/Putty pad identification and location

Table 4. Water loop–Gap pad/Putty pad identification and location

Pad index	Pad category	Attached component	Pad orientation
1	Gap pad	Water loop	Gray side facing outward
2	Gap pad	Water loop	Gray side facing outward
3	Gap pad	Water loop	Gray side facing outward
4	Gap pad	Water loop	Gray side facing outward
5	Putty pad	Water loop	Both sides can be facing outward
6	Putty pad	Water loop	Both sides can be facing outward
7	Gap pad	Water loop	Gray side facing outward
8	Gap pad	Water loop	Gray side facing outward
9	Gap pad	Water loop	Gray side facing outward

Components–Gap pad/Putty pad identification and location

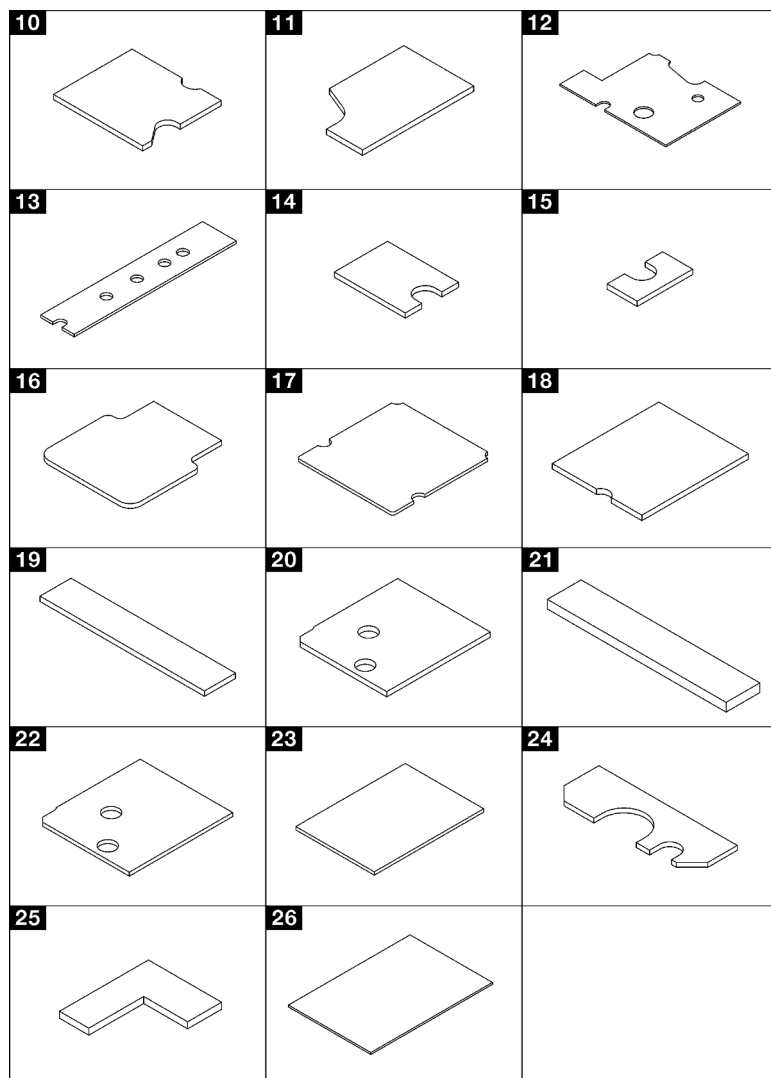


Figure 3. Components–Gap pad/Putty pad identification and location

Table 5. Components–Gap pad/Putty pad identification and location

Pad index	Pad category	Attached component	Pad orientation
10	Putty pad	PCIe riser (ConnectX-7 NDR 200)	Align pad cutout to the screw hole and opening on the interface plate as shown in “Install a PCIe riser assembly (ConnectX-7 NDR 200)” on page 148.
11	Putty pad	PCIe riser (ConnectX-7 NDR 200)	Align pad cutout to the screw hole and opening on the interface plate as shown in “Install a PCIe riser assembly (ConnectX-7 NDR 200)” on page 148.

Table 5. Components–Gap pad/Putty pad identification and location (continued)

Pad index	Pad category	Attached component	Pad orientation
12	Putty pad	PCIe riser (ConnectX-7 NDR 400)	Align pad cutout to the screw hole and opening on the interface plate as shown in “Install a PCIe riser assembly (ConnectX-7 NDR 400)” on page 160.
13	Putty pad	M.2 backplane assembly	Align pad cutout to the screw hole and opening on the interface plate as shown in “Install the M.2 backplane assembly” on page 110.
14	Putty pad	M.2 backplane assembly	
15	Putty pad	M.2 backplane assembly	
16	Putty pad	M.2 backplane assembly	
17	Putty pad	M.2 backplane assembly	
18	Putty pad	PCIe riser (ConnectX-6)	Align pad cutout to the screw hole and opening on the interface plate as shown in “Install a PCIe riser assembly (ConnectX-6)” on page 136.
19	Gap pad	Drive cage	Gray side facing outward
20	Gap pad	Drive cage	Gray side facing outward
21	Putty pad	Conduction plate for U.3 7mm drive	Both sides can be facing outward
22	Gap pad	Drive cage for U.3 7mm drive	Align pad cutout to the screw hole and opening on the interface plate as shown in “Install a drive cage assembly” on page 64
23	Gap pad	E3.S drive	
24	Putty Pad		
25	Putty Pad		
26	Gap pad	E3.S drive cage	“Install the E3.s drive cage assembly” on page 99

Power on and power off the solution

Follow the instructions in this section to power on and power off the solution.

Power on the solution

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

Power button location and power LED locations are specified in [“Troubleshooting by system LEDs and diagnostics display” on page 250.](#)

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

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

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/>.

For information about powering off the solution, see [“Power off the solution” on page 10](#).

Power off the solution

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

Power button location and power LED locations are specified in [“Troubleshooting by system LEDs and diagnostics display” on page 250](#).

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

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

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

When in a standby state, the solution can respond to remote power-on requests sent to the Lenovo XClarity Controller. For information about powering on the solution, see [“Power on the solution” on page 9](#).

Replace components in the tray

Use the following information to remove and install tray components.

DWC tray replacement

Use the following procedures to remove and install a DWC tray.

Remove a DWC tray from the enclosure

Use this information to remove a DWC tray from the enclosure.

About this task

Important: For your safety, use the lift tool to remove the tray from the rack.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Note: The following illustration might differ slightly from your hardware, but the removal method is the same.

Procedure

Step 1. Remove the tray.

- a. ① Rotate the front cam handles as shown in the illustration. The tray moves out of the tray bay approximately 0.6 cm (0.25 inch).
- b. ② Pull the DWC tray out of the enclosure until you see the warning icon in the right side of the cover; then, adjust hands and grip tray (~49 lb.) at sides to carefully pull out of enclosure.

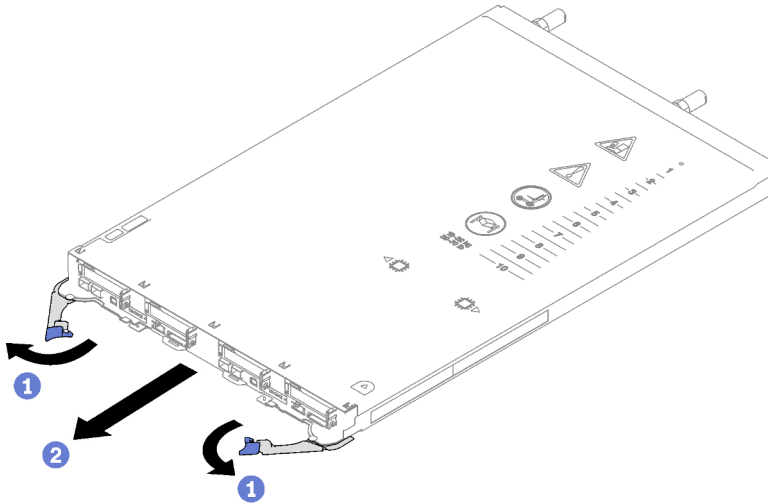


Figure 4. Tray removal

Attention:

- To maintain proper system cooling, do not operate the enclosure without a DWC tray or tray bay filler installed in each tray bay. For more information, see [“Install a DWC tray in the enclosure” on page 11](#).
- When you remove the DWC tray, note the tray bay number. Reinstalling a DWC tray into a different tray bay from the one it was removed from can have unintended consequences. Some configuration information and update options are established according to tray bay number. If you reinstall the DWC tray into a different tray bay, you might have to reconfigure the DWC tray.

Step 2. Once the DWC tray has been serviced, place the tray back into the original position as soon as possible.

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 DWC tray in the enclosure

Use this information to install a DWC tray in the enclosure.

About this task

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Installing different DWC trays in the DW612S enclosure requires specific PSU configuration, see [“Guidance on mixing trays configuration for the DW612S enclosure” in User Guide](#).

Attention: For your safety, use the lift tool to install the tray into the rack.

Procedure

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

Step 1. Select the tray bay to install the tray.

Attention:

- To maintain proper system cooling, do not operate the enclosure without a DWC tray or tray bay filler installed in each tray bay. See the picture below for reference.
- Start with slot 1 when installing trays into the the DW612S enclosure.
- If you are reinstalling a DWC tray that you removed, you must install it in the same tray bay from which you removed it. Some DWC tray configuration information and update options are established according to tray bay number. Reinstalling a DWC tray into a different tray bay can have unintended consequences. If you reinstall the DWC tray into a different tray bay, you might have to reconfigure the DWC nodes in the tray.

Step 2. Install the tray.

- a. ① Make sure that the front cam handles on the DWC tray are in the open position; then, insert the DWC tray into the tray bay until it stops.
- b. ② Rotate the front cam handles on the front of the DWC tray to the closed position to secure the tray in the enclosure.

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

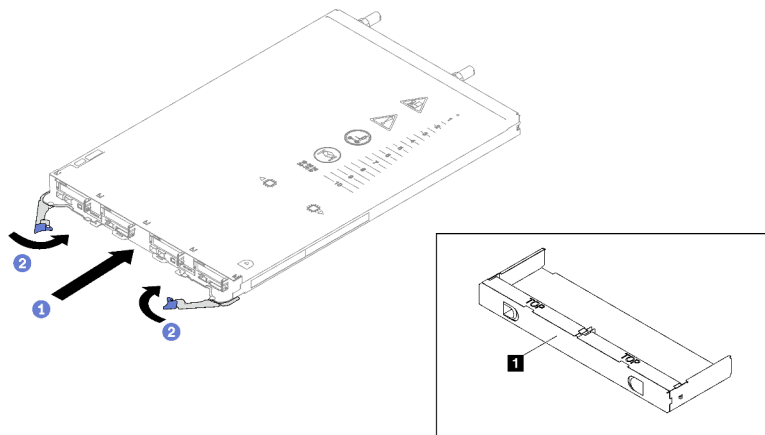


Figure 5. Tray installation

1 Tray bay filler

Note: After the DWC tray is installed, the XCC in the DWC tray initializes. This process takes approximately 110 seconds. The power LED flashes rapidly, and the power button on the DWC tray does not respond until this process is complete.

Step 3. Connect all required external cables to the enclosure.

Note: Use extra force to connect QSFP cables to the solution.

Step 4. Press the power buttons to turn on both nodes in the DWC tray.

Step 5. Make sure that the power LED on the front operator panel is lit continuously, indicating that the each node is receiving power and is turned on.

Step 6. If you have other trays to install, do so now.

After you finish

- If this is the initial installation of the DWC tray in the enclosure, you must configure the DWC tray through the Setup Utility and install the DWC tray operating system.
- If you have changed the configuration of the DWC tray or if you are installing a different DWC tray from the one that you removed, you must configure the DWC tray through the Setup Utility, and you might have to install the DWC tray operating system.

Demo video

[Watch the procedure on YouTube](#)

Tray cover replacement

Use the following procedures to remove and install the tray cover.

Remove the tray cover

Use this information to remove the tray cover.

About this task

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).

Step 2. Press on the release latch and the push point at the same time and slide the cover toward the rear of the DWC tray.

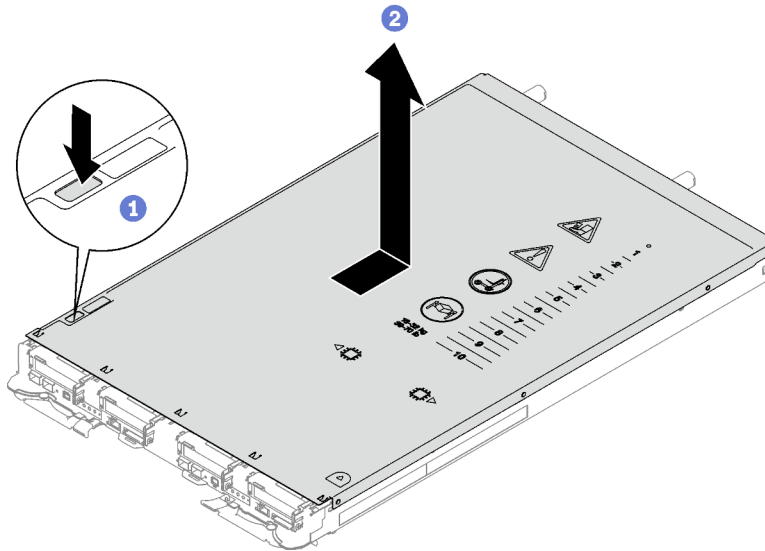


Figure 6. Tray cover removal

Step 3. Lift the cover off the DWC tray and set it aside.

Note: Service label instructions are located on the underside of each tray cover.

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 tray cover

Use this information to install the tray cover.

About this task

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

Procedure

Step 1. Position the cover on top of the tray and slide the cover towards the front of the tray.

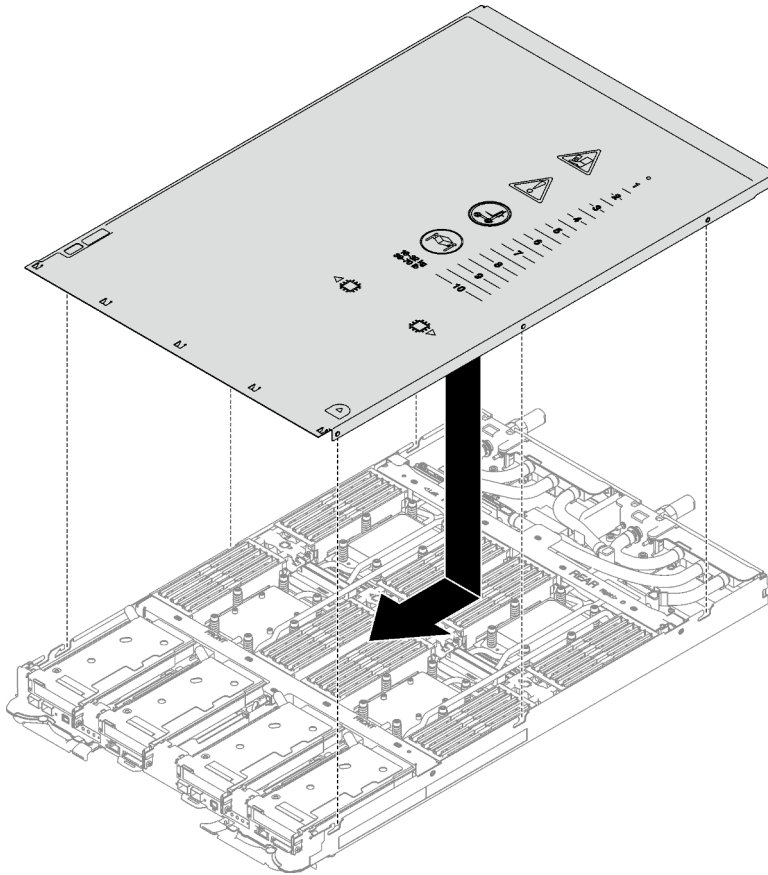


Figure 7. Tray cover installation

Important: Before you slide the cover forward, make sure that all the tabs on the front, rear, and side of the cover are engaged with the enclosure correctly. If all the tabs do not engage the enclosure correctly, it will be very difficult to install the cover later.

After you finish

1. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
2. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

3. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

Cross braces replacement

Use the following procedures to remove and install the cross braces in SD665 V3 tray.

Remove the cross braces

Use this information to remove the cross braces.

About this task

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- b. Remove the tray cover. See [“Remove the tray cover” on page 13](#).

Step 2. Remove the front and the rear cross braces (14x Phillips #1 screws).

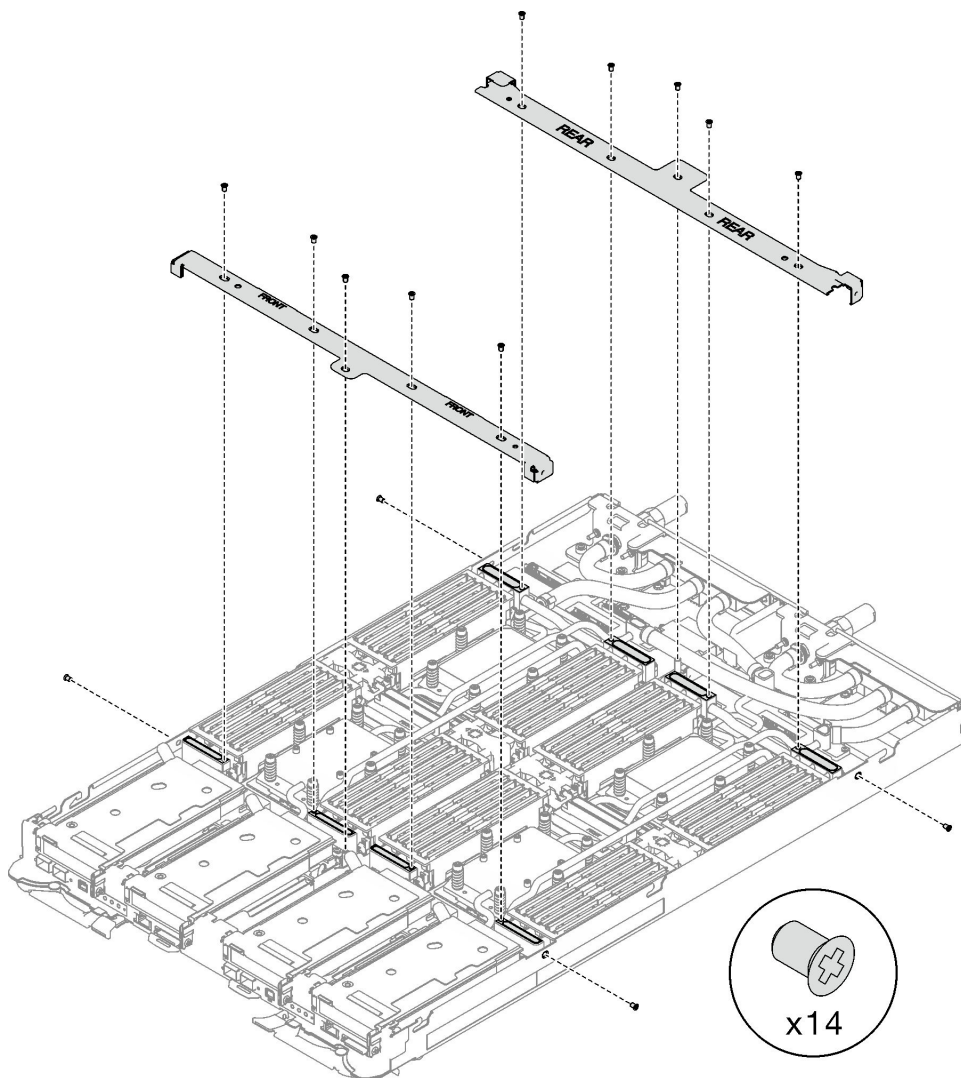


Figure 8. Cross brace removal

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 cross braces

Use this information to install the cross braces.

About this task

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

Procedure

Step 1. Install the front and the rear cross braces (14x Phillips #1 screws).

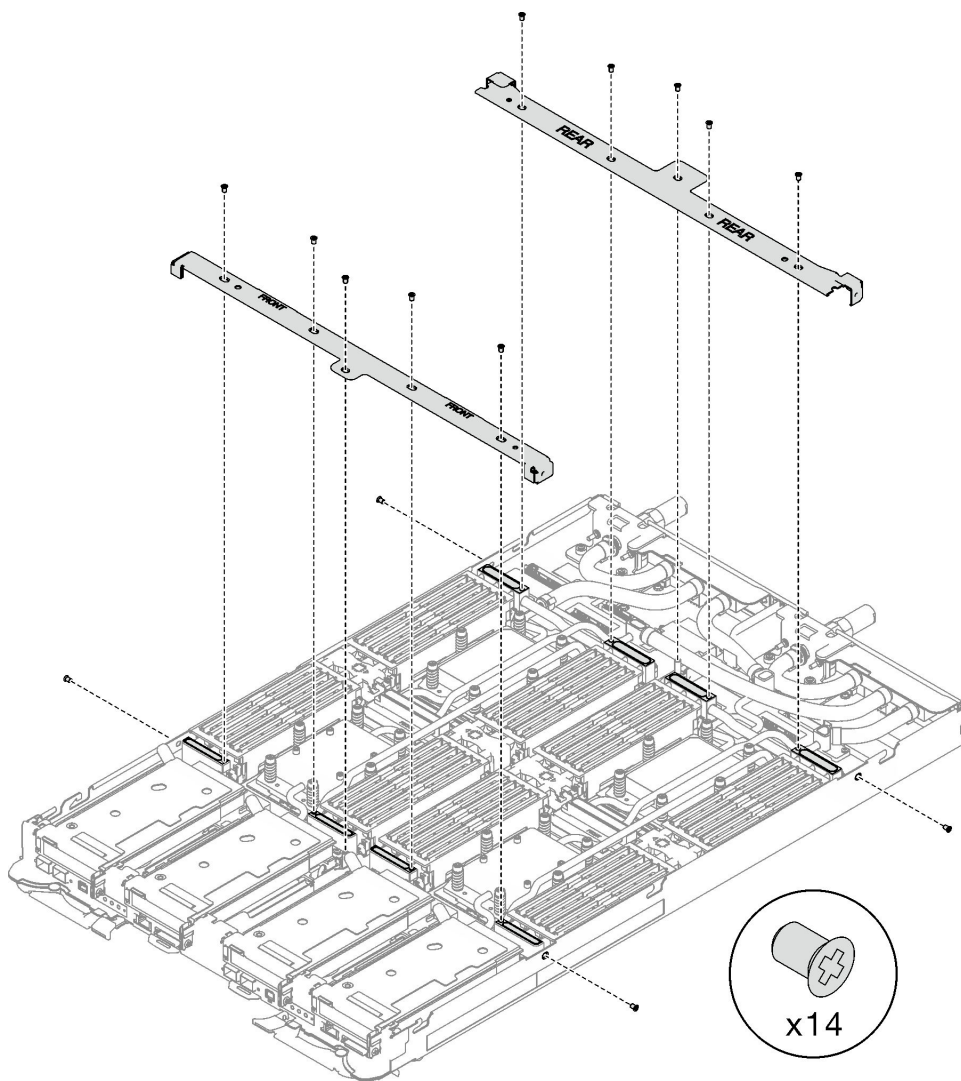


Figure 9. Cross brace installation

After you finish

1. Install the tray cover. See [“Install the tray cover” on page 14](#).
2. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
3. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

4. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

Water loop replacement

Use the following procedures to remove and install the water loop in the SD665 V3 tray.

Attention:

- The water loop replacement procedure requires trained personnel.
- For your safety, use lift tool to remove the tray from the enclosure.

Remove the water loop

Use this information to remove the water loop in the SD665 V3 tray.

About this task**Required tools**

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Service Kit (The water loop carrier in the Service Kit is reusable, it is recommended to keep it at the facility where the server operates for future replacement needs.)
- SD665 V3 Water Loop Putty Pad Kit
- VR Conduction Plate 12.4 (including washers)
- VR 1.5mm Putty Pad
- VR 2.5 mm Putty Pad
- Drive gap pad or putty pad kits according to the drives installed in the tray. See their respective replacement procedures for more information.
- ConnectX series adapter putty pad kits according to the ConnectX adapter installed in the tray. See their respective replacement procedures for more information.
- Screws and screwdrivers

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T20 head screwdriver	Torx T20 screw
Phillips #2 head screwdriver	Phillips #2 screw

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- b. Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- c. Remove the cross braces. See [“Remove the cross braces” on page 15](#).
- d. Remove the DIMM comb. See [“Remove a DIMM comb” on page 48](#).

- e. Remove memory modules. See [“Remove a memory module” on page 114.](#)
- f. Remove the M.2 backplane assembly. See [“Remove the M.2 backplane assembly” on page 104.](#)

Note: The M.2 backplane cold plate needs to be removed as well.

- g. Remove the drive cage. See [“Remove a drive cage assembly” on page 52.](#)
- h. Remove the PCIe riser assembly. Depending on your configuration, see [“Remove a PCIe riser assembly \(ConnectX-6\)” on page 133,](#) [“Remove a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 141,](#) or [“Remove a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 154.](#)

Step 2. Remove the ten screws to loosen the quick connect.

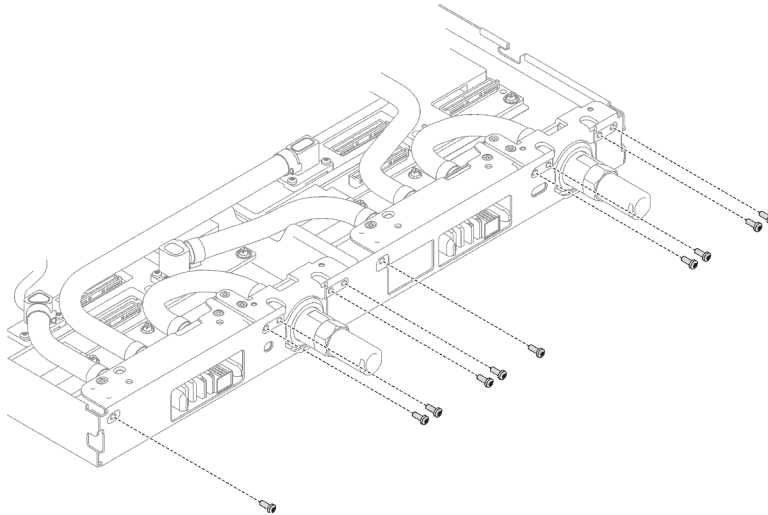


Figure 10. Quick connect screw removal

Step 3. Remove water loop screws and quick connect screws (14x Torx T10 screws per node) with a torque screwdriver set to the proper torque.

Notes:

- For reference, the torque required for the screws to be fully tightened/removed is 5.0+/- 0.5 lbf-in, 0.55+/- 0.05 N-M.
- When removing the **VR** cold plate screws (x2), remove the washers, too. **Make sure** to keep the washers for future use. (Depending on the configurations, there may not be any washers on the VR cold plate. In this case, there is no need to remove and keep the washers.)

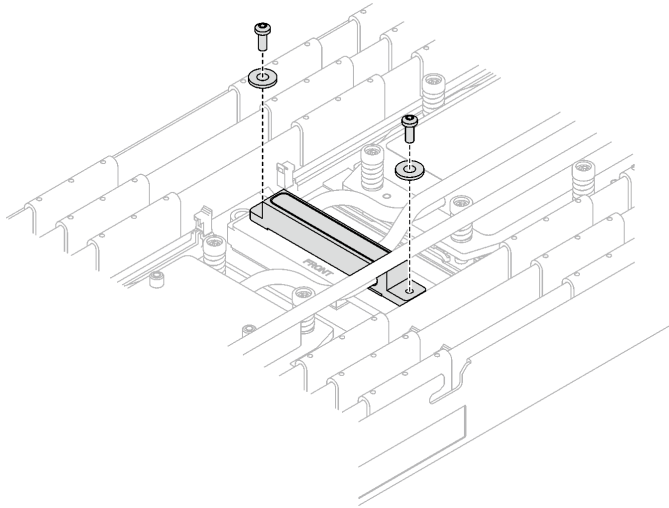


Figure 11. VR cold plate screws with washers

1 VR cold plate screws (x2)

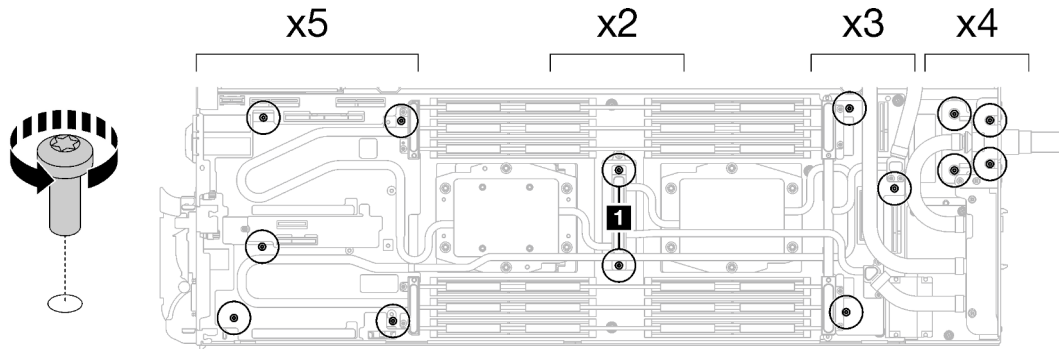


Figure 12. Water loop screw removal

Step 4. Orient two water loop carriers with the guide pins; then, gently put the two water loop carriers down and ensure they are seated firmly on the water loop.

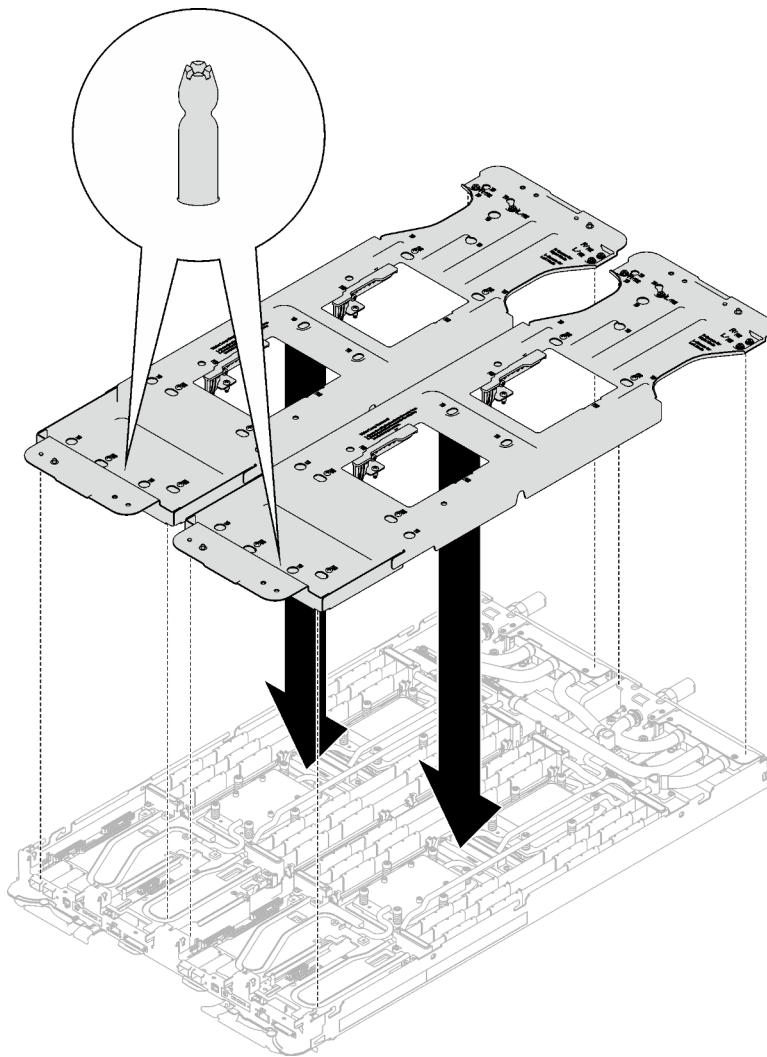


Figure 13. Water loop carrier installation

Step 5. Tighten water loop carrier screws (24x Phillips #2 screws for two nodes).

Note: The screw holes on the rear of the carrier are marked with **L** and **R**. Select screw holes marked as **L** when the carrier is on the **left** node, and **R** for the **right** node.

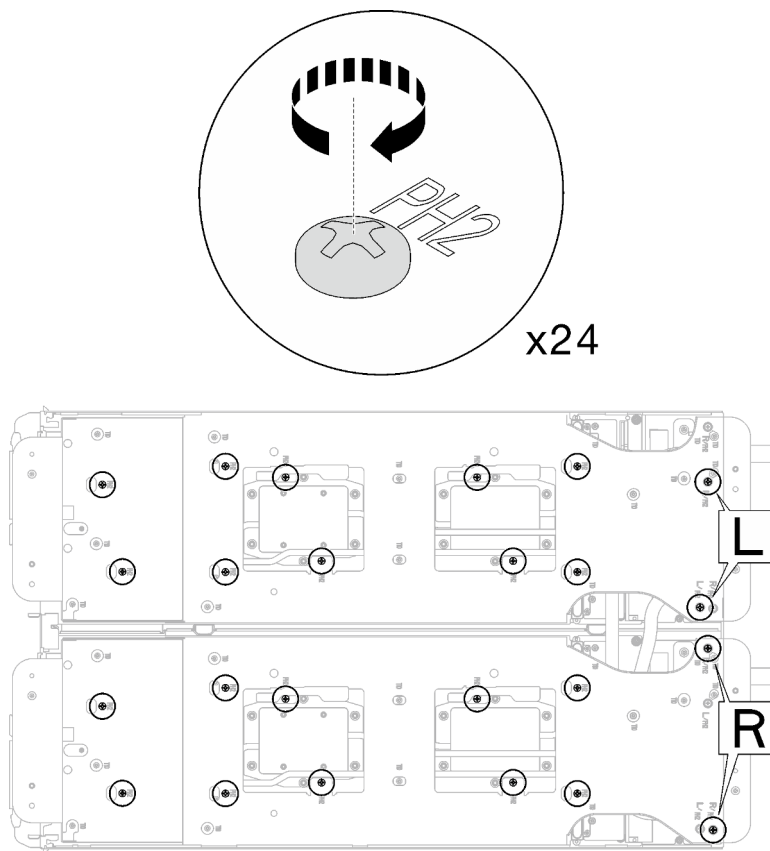


Figure 14. Water loop carrier screws installation

- Step 6. Remove processor cold plate screws (12x Torx T20 screws per node). Follow the screw sequence specified on the processor cold plate label and loosen the screws with a general screwdriver torque screwdriver. Fully loosen each screw; then, proceed to the next screw.

Note: For reference, the torque required for the screws to be fully tightened/removed is 1.12-1.46 newton-meters, 10-13 inch-pounds

Fully loosen each screw in this order: 6 → 5 → 4 → 3 → 2 → 1

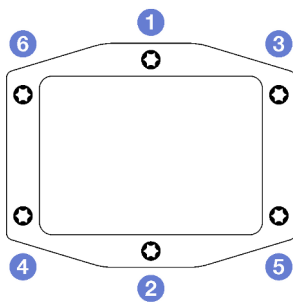


Figure 15. Processor cold plate label

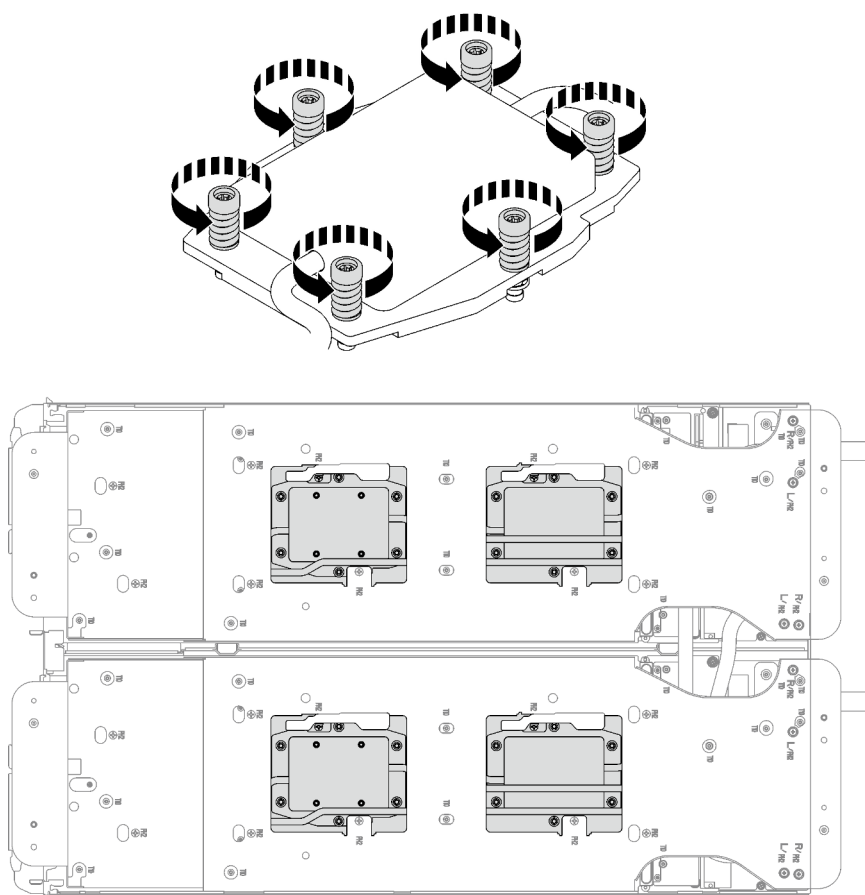


Figure 16. Processor cold plate removal

Step 7. Rotate the latches on the water loop carrier to separate the processor cold plates from processors.

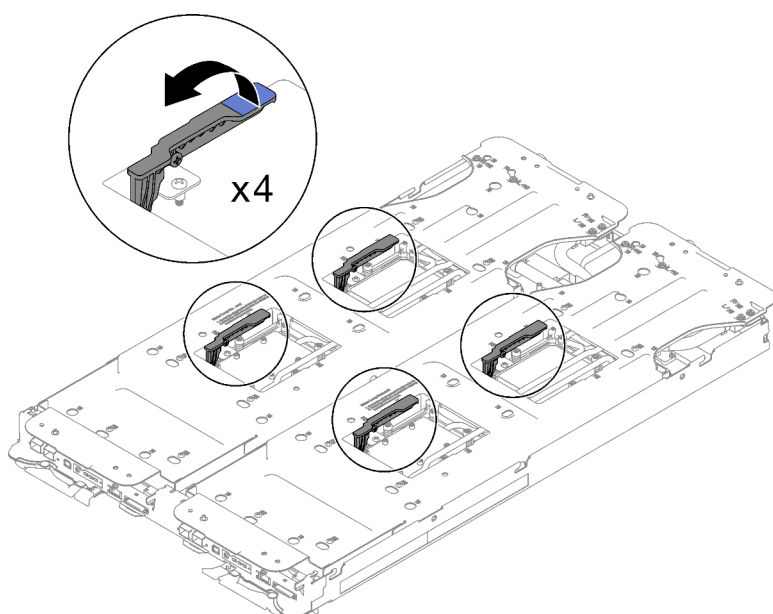


Figure 17. Separate water loop from processor

Step 8. Do not tilt the water loop. Keep the water loop horizontal with the tray. Slightly lift up the water loop, and carefully rotate the water loop so one half is sitting on top of the other half.

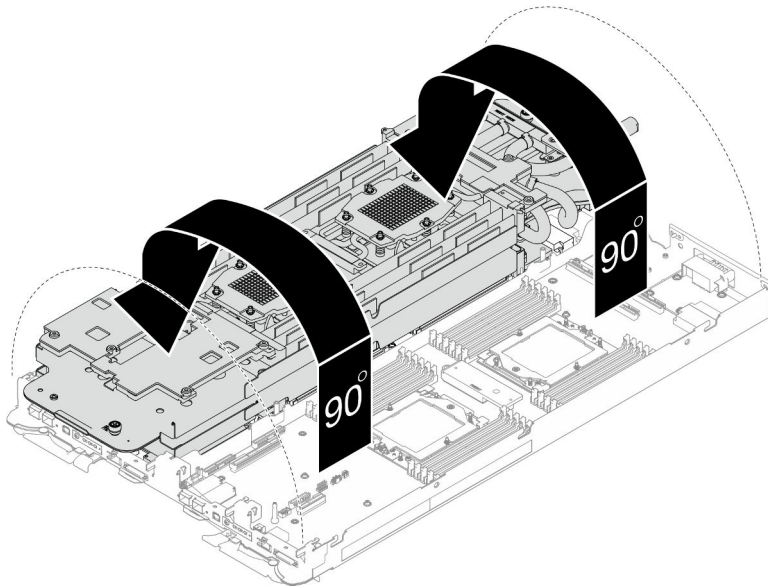


Figure 18. Folding the water loop

Step 9. Fasten two captive thumbscrews to secure water loop carriers to each other.

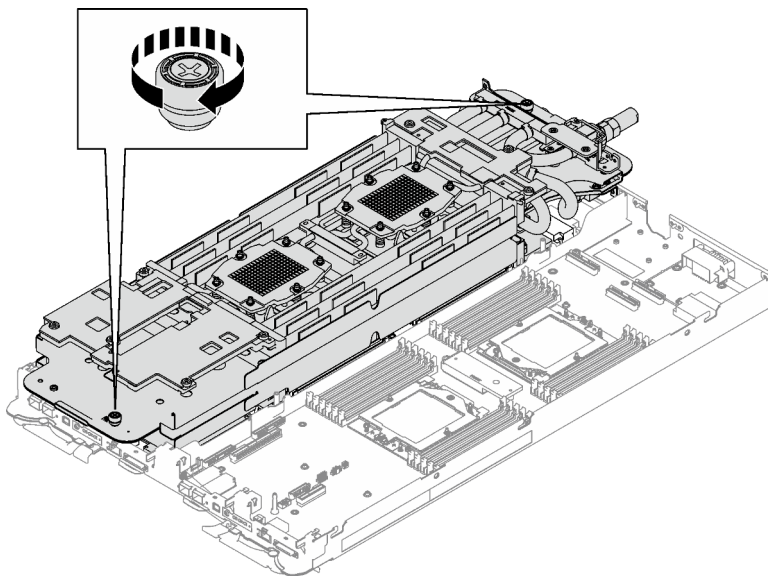


Figure 19. Tightening captive thumbscrews

Step 10. Carefully lift the water loop up off the system board and out of the node.

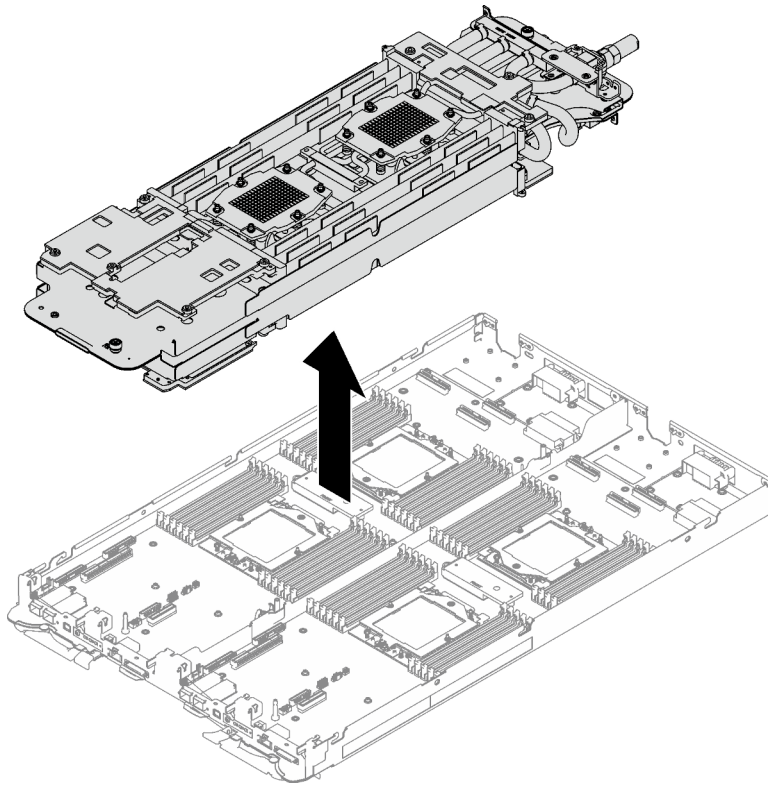


Figure 20. Water loop removal

Step 11. Wipe the thermal grease from the top of the processors with an alcohol cleaning pad.

Step 12. Wipe the thermal grease from the bottom of the cold plate with an alcohol cleaning pad.

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 water loop

Use this information to install the water loop in the SD665 V3 tray.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Service Kit (The water loop carrier in the Service Kit is reusable, it is recommended to keep it at the facility where the server operates for future replacement needs.)
- SD665 V3 Water Loop Putty Pad Kit
- VR Conduction Plate 12.4 (including washers)
- VR 1.5mm Putty Pad
- VR 2.5 mm Putty Pad

- Drive gap pad or putty pad kits according to the drives installed in the tray. See their respective replacement procedures for more information.
- ConnectX series adapter putty pad kits according to the ConnectX adapter installed in the tray. See their respective replacement procedures for more information.
- Screws and screwdrivers

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T20 head screwdriver	Torx T20 screw
Phillips #2 head screwdriver	Phillips #2 screw

Attention:

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see “[Gap pad/Putty pad identification and location](#)” on page 6.
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

Attention: Make sure that the retaining clips on all memory module connectors are in the locked position.

- Step 1. **If you are installing a new water loop to the tray**, before starting to install the water loop, complete replacing the VR conduction plate first, see “[Install the VR conduction plate for water loop replacement](#)” on page 37. **If you are reinstalling the water loop after replacing the system board, processor, or power distribution board**, skip this step.

Step 2. When removing the water loop from the package box, **make sure** to hold the touch points marked in grey in the illustration below.

Attention: Holding the water loop anywhere other than the touch points may cause damage to it.

Top image	Isometric view of water loop
Bottom image	Top view of the water loop

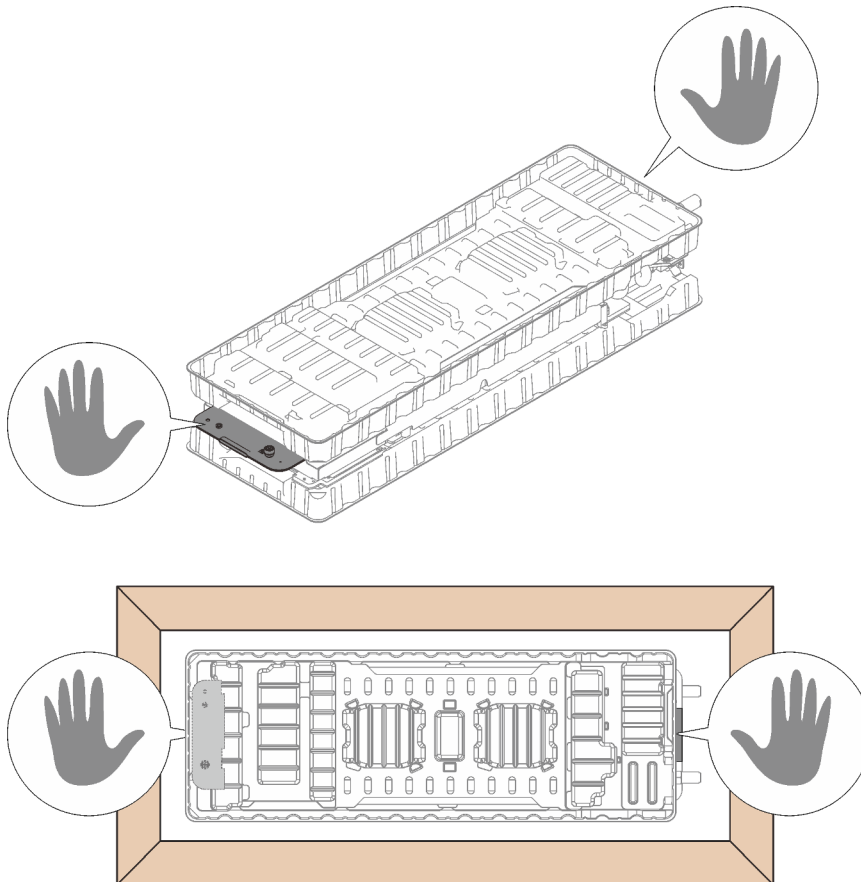


Figure 21. Touching points when removing water loop from package box

Step 3. If needed, remove plastic grease covers from the underside of processor cold plates.

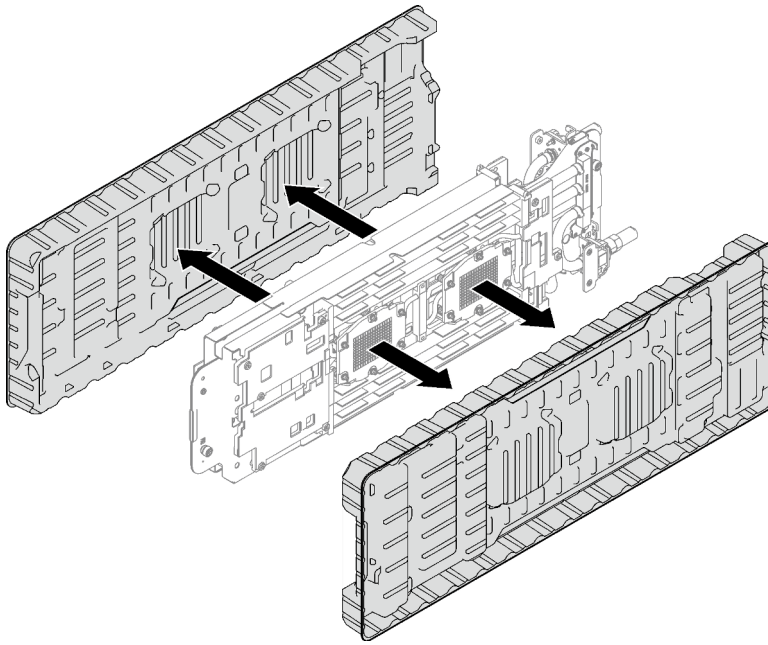


Figure 22. Plastic grease covers removal

Step 4. Fully loosen four captive thumbscrews on the water loop carrier.

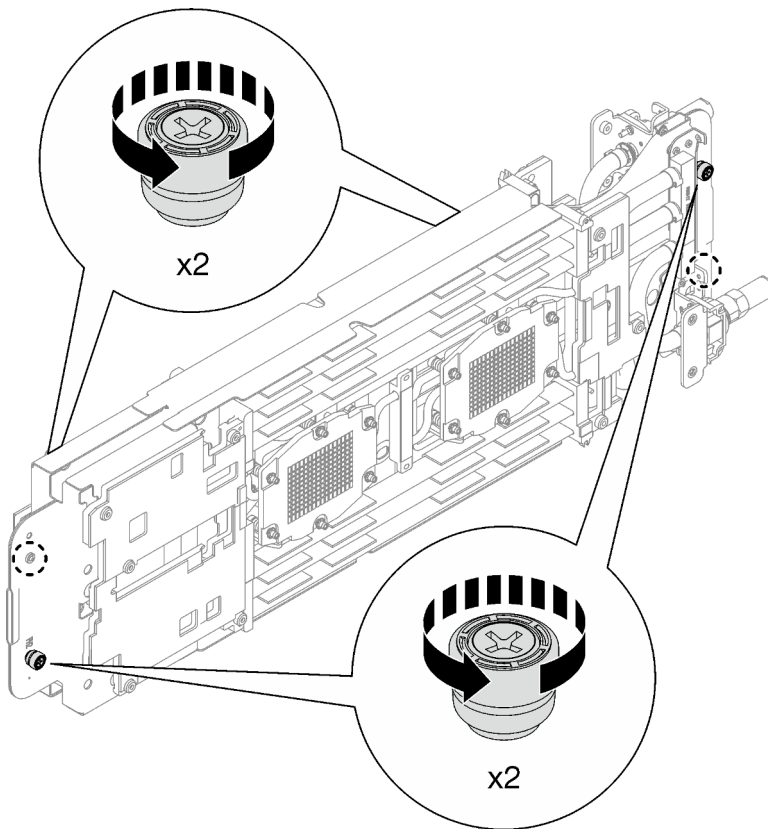


Figure 23. Loosening water loop carrier captive thumbscrews

- Step 5. Check the both gap pads and putty pads on the bottom side and top side of the water loop, if any of them are damaged, missing, or fallen off the water loop, replace them with new ones. Make sure to follow [Gap pad/putty pad replacement guidelines](#).

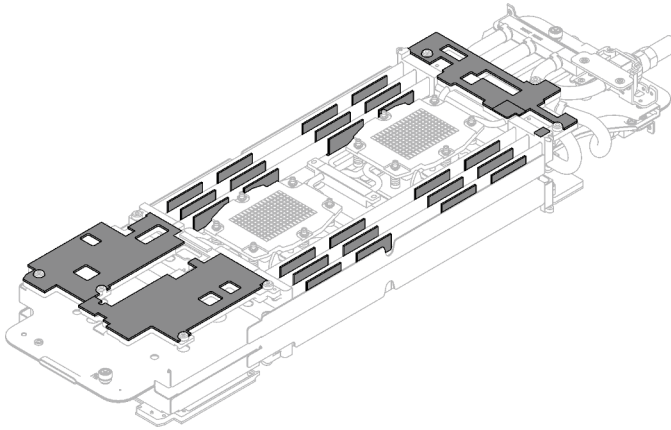


Figure 24. Water loop gap pads (bottom side)

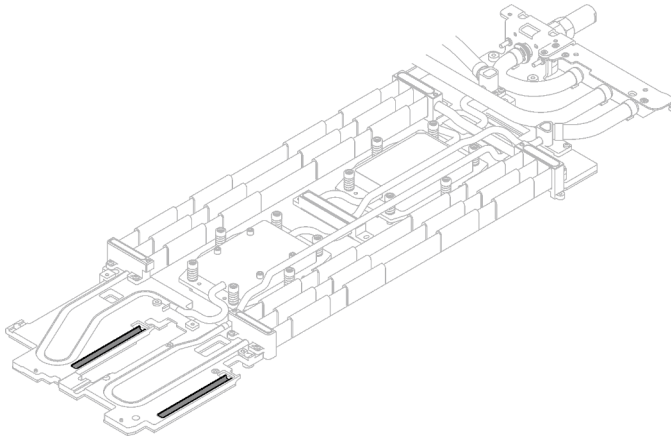


Figure 25. Water loop gap pads (top side)

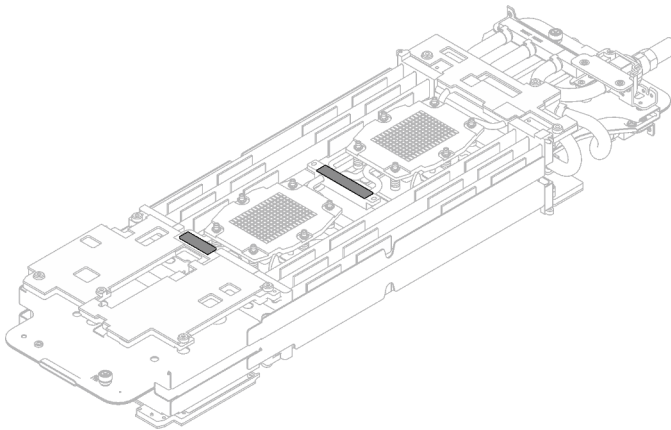


Figure 26. Water loop putty pads

- Step 6. Install the one side of the water loop.

- a. ① Carefully hold the water loop with both hands and flip it.
- b. ② Carefully position the water loop onto the three guide pins, one near the front of the node and two near the rear of the node; then, gently lower down the water loop and ensure it is seated firmly on the system board.

Attention: Keep the water loop at an upright position to prevent damaging the system board.

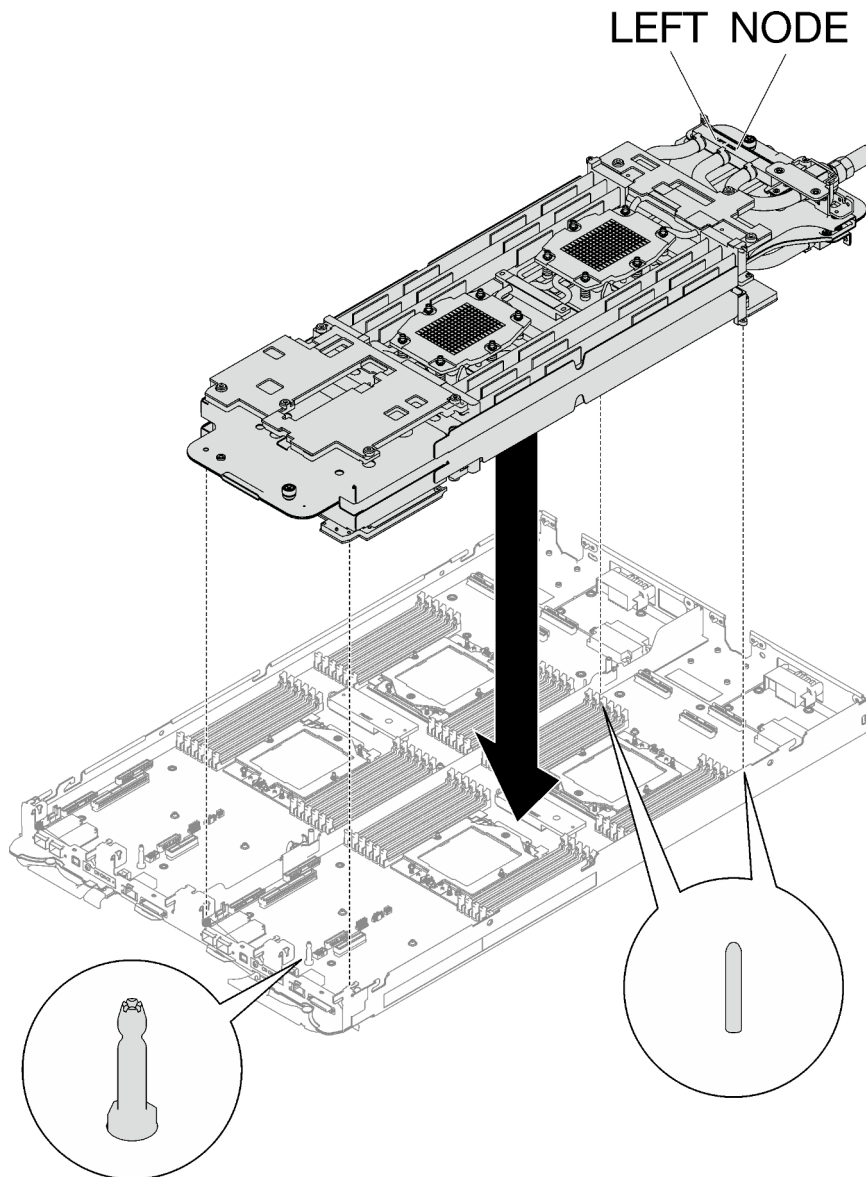


Figure 27. Water loop carrier installation

Step 7. Unfold and install the other side of the water loop as shown.

Attention: Make sure to align the water loop with the three guide pins on the left side compute node.

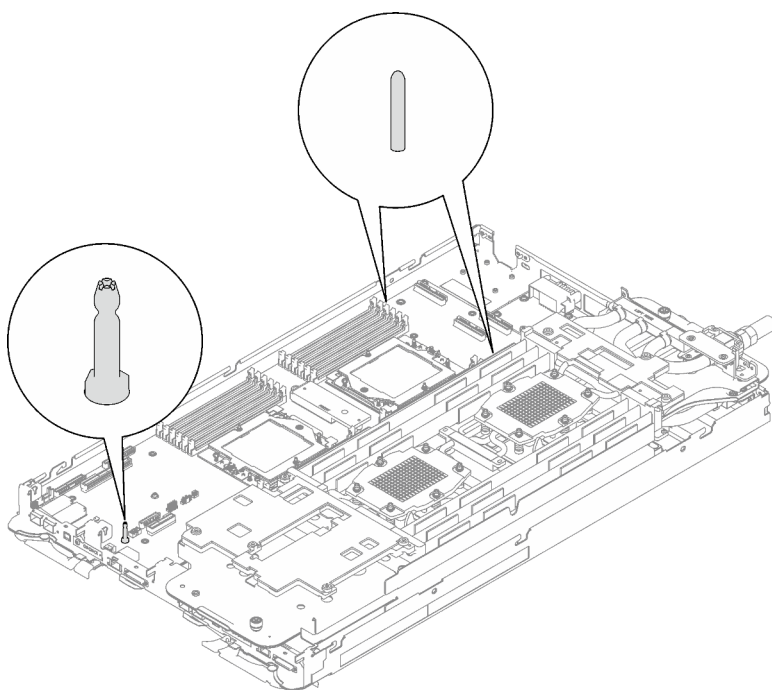


Figure 28. Guide pins on the left side compute node

Note: Do not tilt the water loop. Keep the water loop horizontal with the tray.

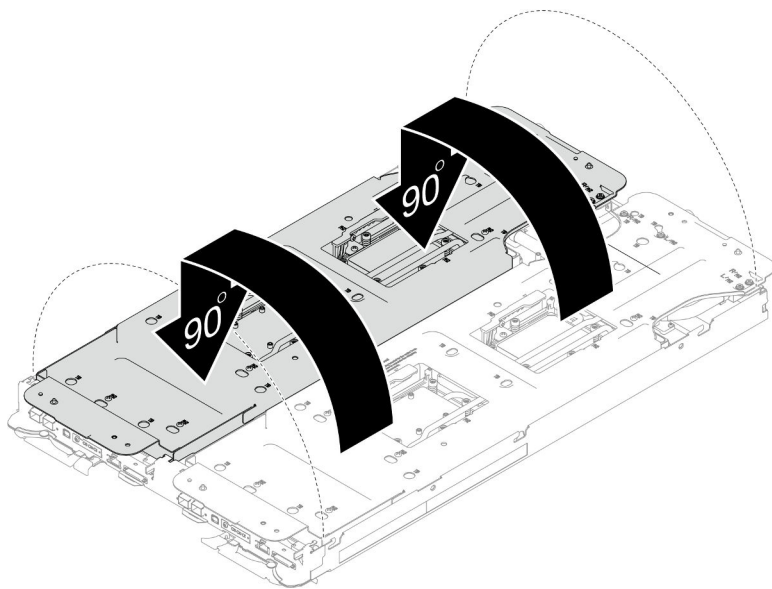


Figure 29. Unfolding water loop

Step 8. Install processor cold plate screws (12x Torx T20 screws per node). Follow the screw sequence specified below and tighten the screws with a torque screwdriver. Fully tighten each screw; then, proceed to the next screw.

Note: For reference, the torque required for the screws to be fully tightened/removed is 1.12-1.46 newton-meters, 10-13 inch-pounds

Fully tighten each screw the order below:

Pro- ces- sor	Screw sequence
A	1 → 2 → 6 → 4 → 3 → 5
B	1 → 2 → 3 → 5 → 6 → 4
C	2 → 1 → 4 → 6 → 5 → 3
D	2 → 1 → 5 → 3 → 4 → 6

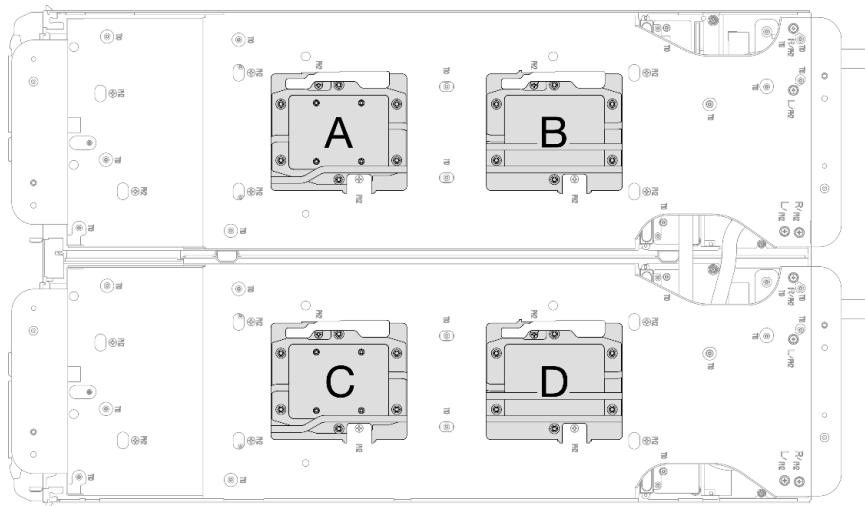
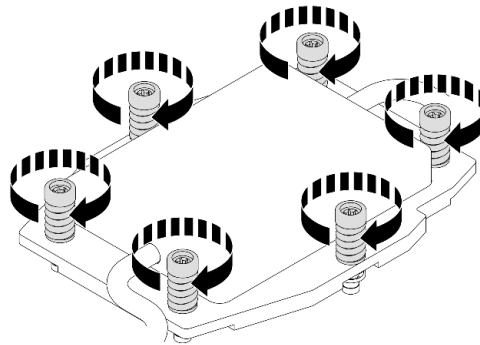
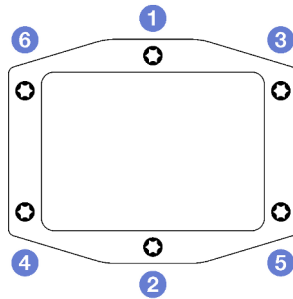


Figure 30. Processor cold plate installation

Step 9. Loosen water loop carrier screws (24x Phillips #2 screws for two nodes).

Note: The screw holes on the rear of the carrier are marked with **L** and **R**. Select screw holes marked as **L** when the carrier is on the **left** node, and **R** for the **right** node.

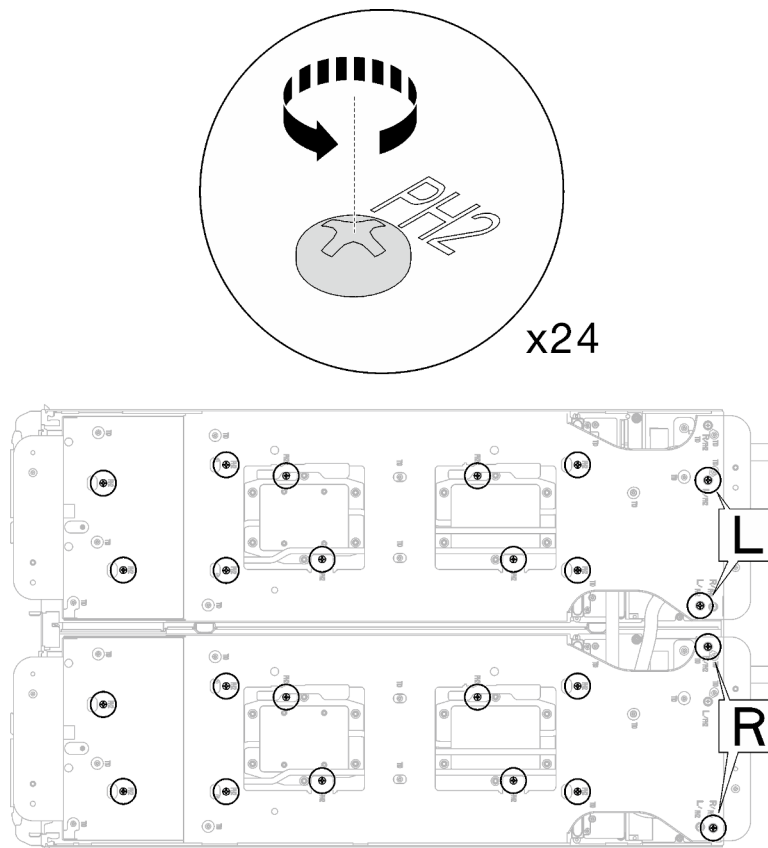


Figure 31. Loosening water loop carrier screws

Step 10. Remove the water loop carrier. Carefully lift each water loop carrier up and away from the water loop one at a time.

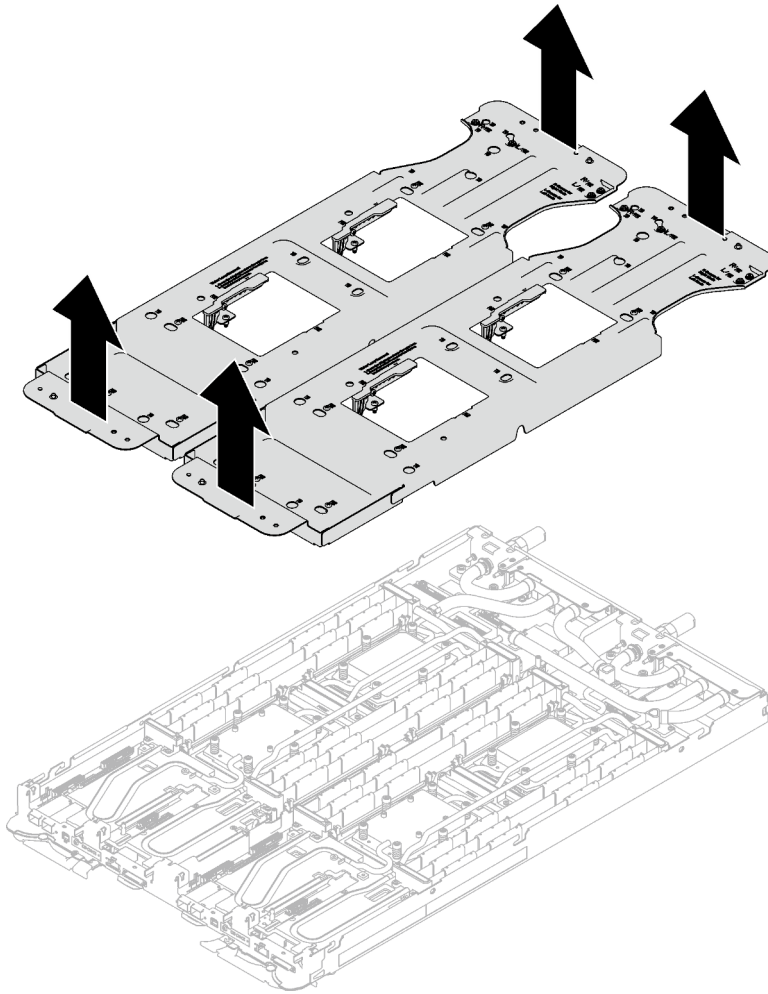


Figure 32. Water loop carrier removal

Step 11. Install water loop screws and quick connect screws (14x Torx T10 screws per node) with a torque screwdriver set to the proper torque.

Notes:

- For reference, the torque required for the screws to be fully tightened/removed is 5.0+/- 0.5 lbf-in, 0.55+/- 0.05 N-M.
- Install the **1** VR cold plate screws (x2) with washers.
 - **Installing a new water loop:**

Use the washers previously removed from the defect water loop. If there were no washers on the VR cold plate originally, use the washers in VR Conduction Plate 12.4 (including washers).
 - **Reinstalling the water loop:**

You may not be installing a new water loop, but is reinstalling the water loop after replacing the system board, processor, or power distribution board. In this case, use the washers previously removed from the water loop. If there were no washers on the VR cold plate originally, it is not required to install VR cold plate with washers.

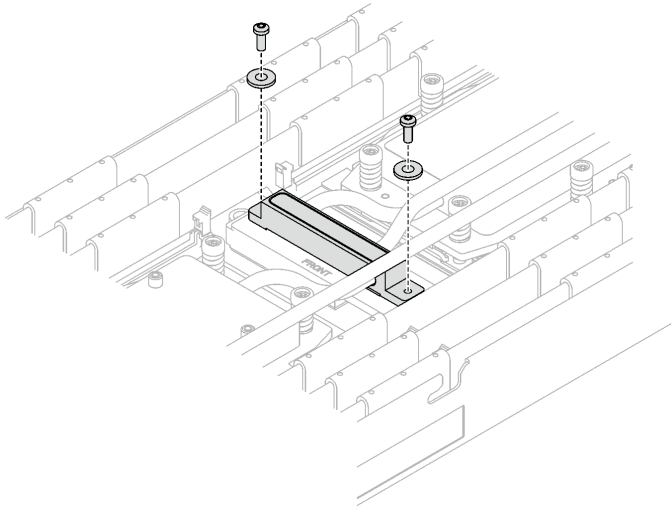


Figure 33. VR cold plate screws with washers

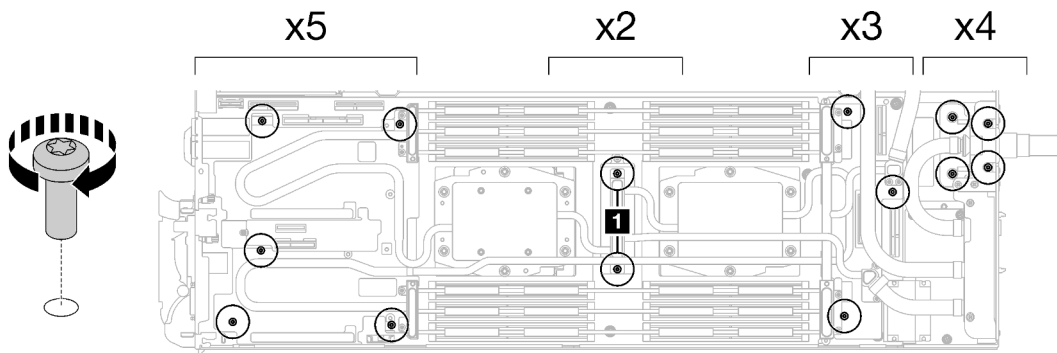


Figure 34. Water loop screws and quick connect screws installation

Step 12. Install the ten Torx T10 screws to secure the quick connect.

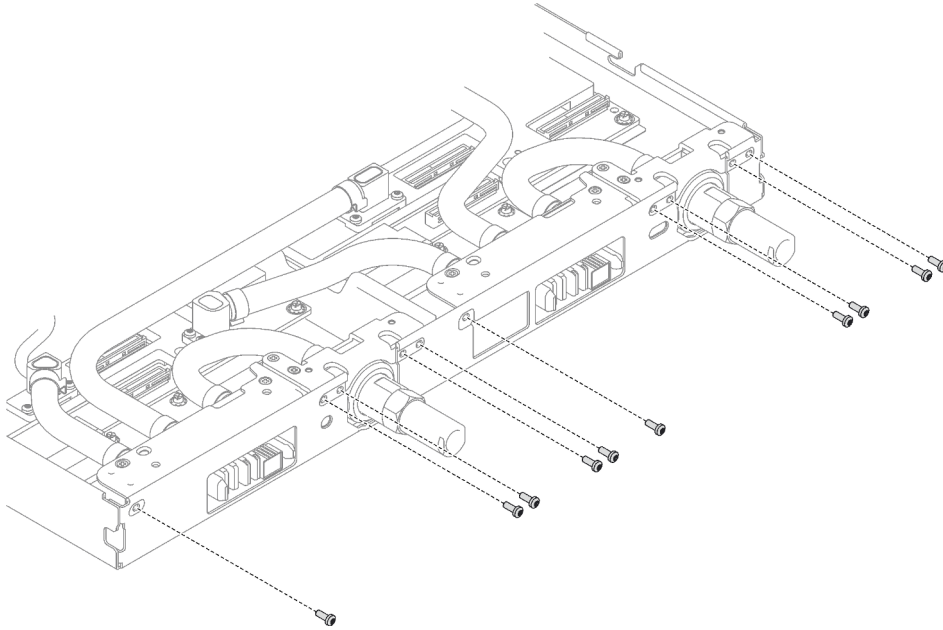


Figure 35. Quick connect screw installation

After you finish

1. Install the PCIe riser assembly. See [“Install a PCIe riser assembly \(ConnectX-6\)” on page 136](#) , [“Install a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 148](#), or [“Install a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 160](#).
2. Install the drive cage. See [“Install a drive cage assembly” on page 64](#).
3. Install the M.2 backplane assembly. See [“Install the M.2 backplane assembly” on page 110](#).
4. Install the memory modules. See [“Install a memory module” on page 121](#).
5. Install the DIMM comb. See [“Install a DIMM comb” on page 50](#).
6. Install the cross braces. See [“Install the cross braces” on page 17](#).
7. Install the tray cover. See [“Install the tray cover” on page 14](#).
8. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
9. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

10. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

Install the VR conduction plate for water loop replacement

Use this information to install the VR conduction plate for water loop replacement in the SD665 V3 tray.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- VR Conduction Plate 12.4 (including washers)
- VR 2.5 mm Putty Pad
- VR 1.5mm Putty Pad

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

Important: Gap pad/putty pad replacement guidelines

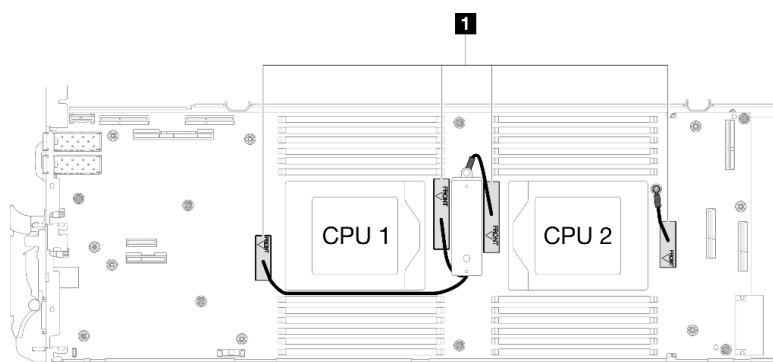
- To identify the gap pad/putty pad location and orientation, see [“Gap pad/Putty pad identification and location” on page 6](#).
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Procedure

Attention: This procedure is ONLY for installing a new water loop. Skip this procedure if you are reinstalling the water loop after replacing the system board, processor, or power distribution board.

- Step 1. Replace the VR conduction plate on the system board with VR Conduction Plate 12.4 (including washers).
- If the system board is **with** shielding cables, proceed to [For system board with shielding cables](#).
 - If the system board is **without** shielding cables, proceed to [For system board without shielding cables](#).

1 Shielding cables



For system board with shielding cables

- Step 2. Paste VR 2.5 mm Putty Pad to the VR Conduction Plate 12.4 (including washers).
- a. Remove the two M3 screws (two screws per node) to remove the VR conduction plate out of the system board.
 - b. Discard the VR conduction plate.

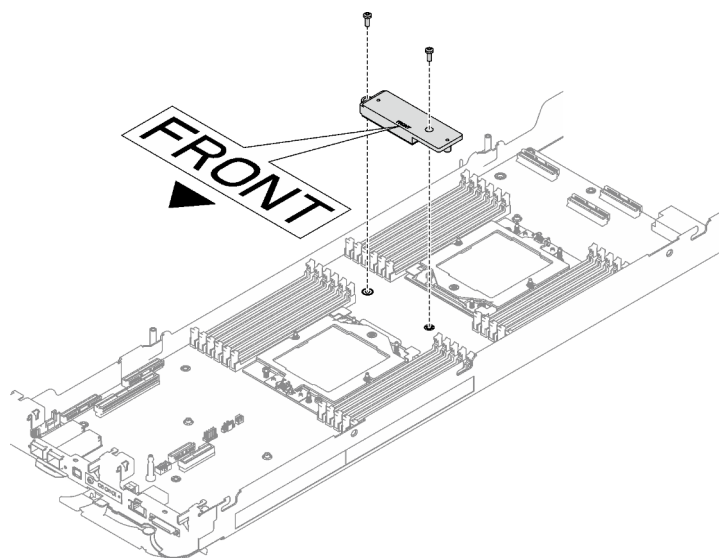


Figure 36. VR conduction plate removal

- c. Paste the VR 2.5 mm Putty Pad to the bottom side of the VR Conduction Plate 12.4 (including washers).

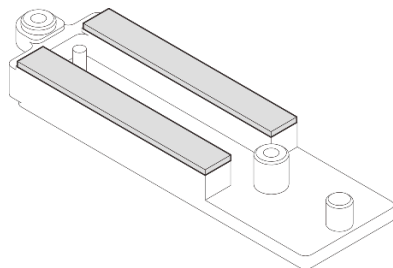


Figure 37. Putty pads on the bottom side of the VR conduction plate

Step 3. Install the VR Conduction Plate 12.4 (including washers) to the system board.

- a. Locate the screw holes for shielding cable 1/2 and shielding cable 3.

1 Screw hole for shielding cable 1/2
2 Screw hole for shielding cable 3

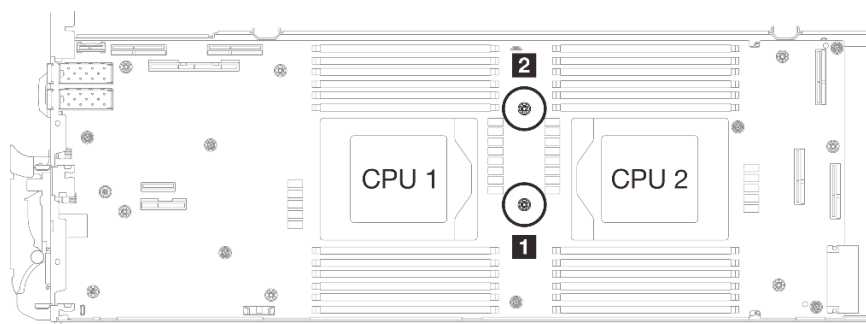


Figure 38. Location of screw holes of shielding cable 1/2 and 3

- b. Align shielding cable 1/2 and shielding cable 3 to the screw holes on system board. **Make sure the ring terminals of the cable are placed in the angle shown below.**

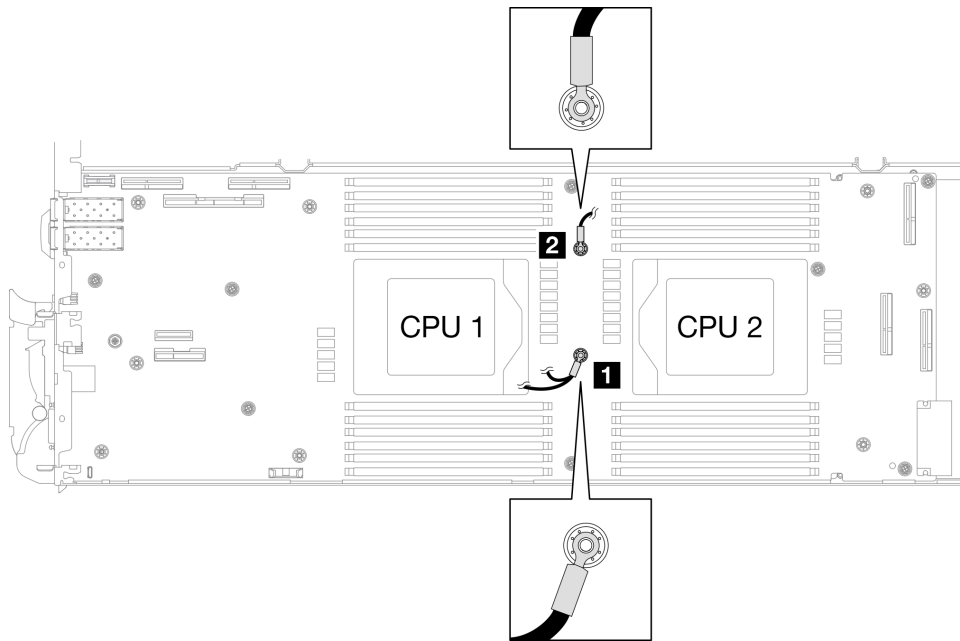


Figure 39. Aligning shielding cable 1/2 and shielding cable 3 with screw holes

- c. ① Keep the FRONT marking on the VR conduction plate pointing the front of the tray. Then, place the VR conduction plate on top of the two cable ring terminals.

Note: A putty pad is attached to the bottom side of the VR conduction plate. Carefully hold the VR conduction plate to avoid damaging the putty pad.

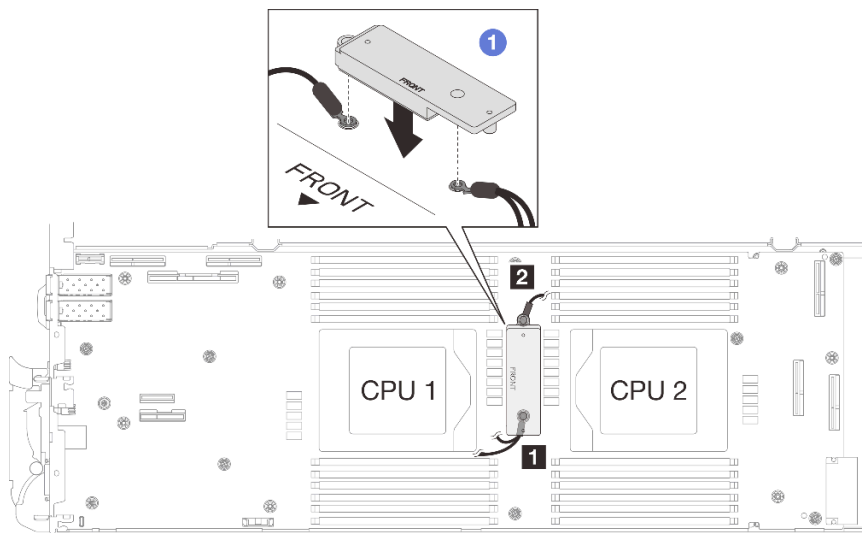


Figure 40. Aligning VR conduction plate, shielding cables, and system board screw holes

- d. ② Slightly press down the VR conduction plate.

Attention: The following items will be secured by screw. Make sure they are aligned and do not block each other.

- Screw hole on the system board
- The hole on the ring terminal of the shielding cage cable
- Screw hole on the VR conduction plate

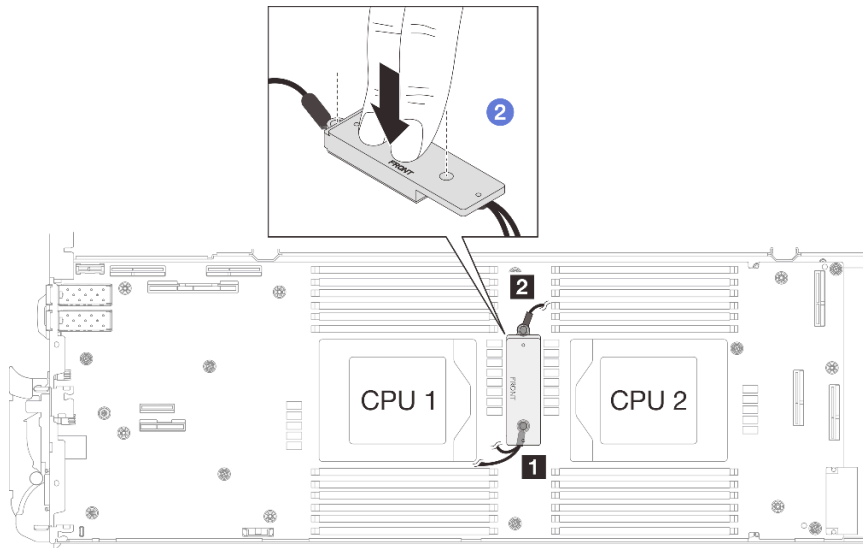


Figure 41. Pressing on the VR conduction plate

- e. ③ While pressing down the VR conduction plate, place the screws into the two screw holes on the VR conduction plate. Then, fasten the two screws to secure the cables to the system board. **DO NOT fasten the screws until both screws are placed into the VR conduction plate.**

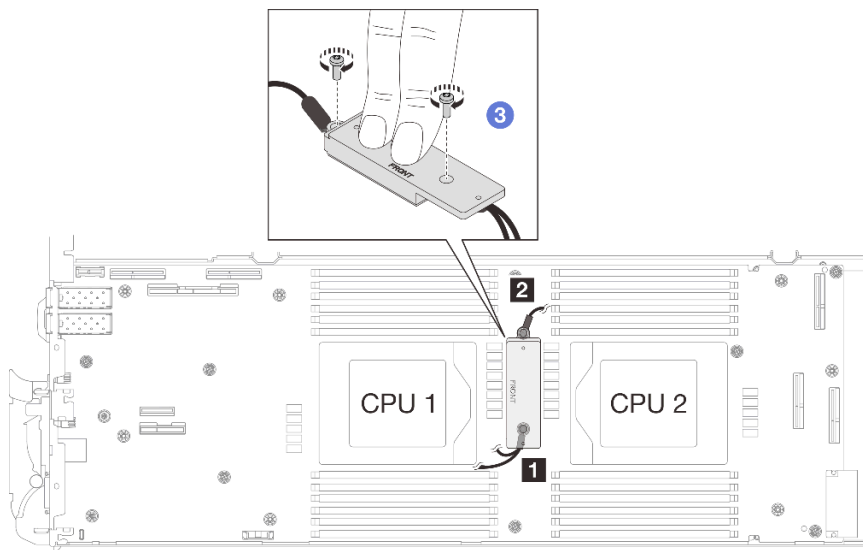


Figure 42. Installing shielding cable 1/2 and 3

For system board *without* shielding cables

- Step 4. Replace the VR conduction plate on the system board with VR Conduction Plate 12.4 (including washers).

- a. Remove the two M3 screws (two screws per node) to remove the VR conduction plate out of the system board.
- b. Discard the VR conduction plate.

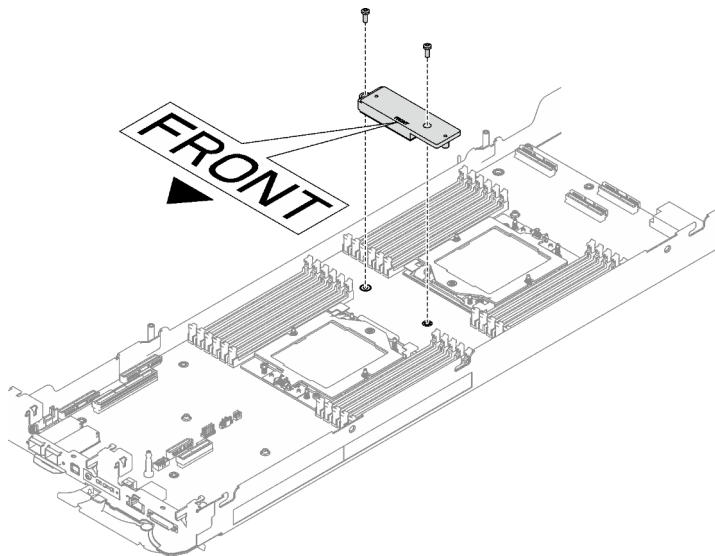


Figure 43. VR conduction plate removal

- c. Paste the VR putty pad VR 1.5mm Putty Pad to the bottom side of VR Conduction Plate 12.4 (including washers).

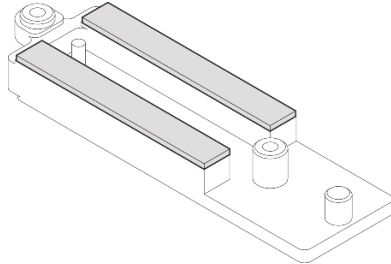


Figure 44. Putty pads on the bottom side of the VR conduction plate

- d. Install the VR Conduction Plate 12.4 (including washers) to the system board.

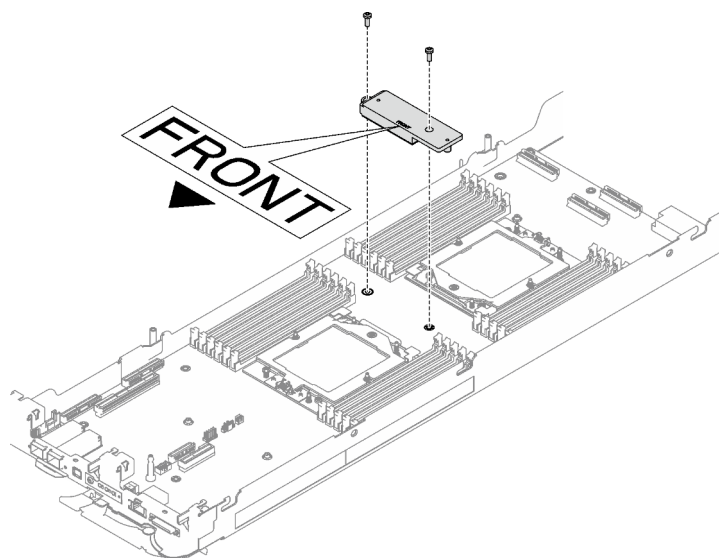


Figure 45. VR conduction plate removal

After you finish

Proceed to install the water loop. See [“Install the water loop” on page 26](#).

Replace components in the compute node

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

Notes:

- The illustrations in this document are for reference only and might differ slightly from your hardware.
- The replacement procedures in this section uses the right node as an example, the replacement procedures for the left node are similar.

CMOS battery (CR2032) replacement

Use the following procedures to remove and install the CMOS battery (CR2032).

Remove the CMOS battery (CR2032)

Use this information to remove the CMOS battery.

About this task

To avoid possible danger, read and follow the following safety statement.

- **S004**



CAUTION:

When replacing the lithium battery, use only Lenovo specified part number or an equivalent type of 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.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.
- The following notes describe information that you must consider when replacing the battery.
 - Lenovo has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.
 - If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.
 - After you replace the battery, you must reconfigure the solution and reset the system date and time.

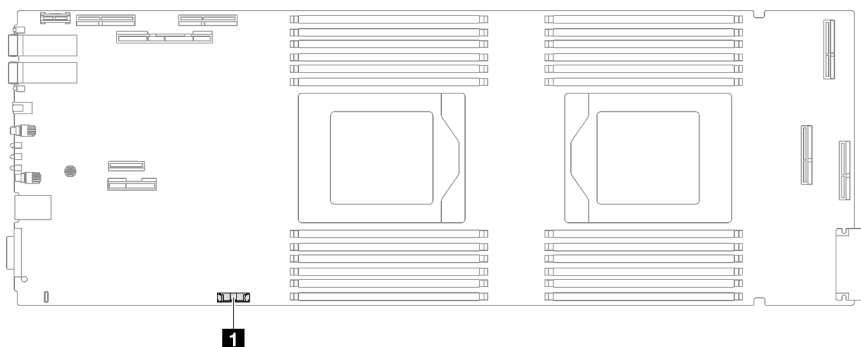


Figure 46. CMOS battery location

Table 6. CMOS battery location

1 CMOS battery

Procedure

Step 1. Make preparations for this task.

- Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- Remove the PCIe riser assembly. Depending on your configuration, see [“Remove a PCIe riser assembly \(ConnectX-6\)” on page 133](#), [“Remove a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 141](#), or [“Remove a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 154](#).

Step 2. Remove the CMOS battery:

Attention: Do not lift the battery by using excessive force. Failing to remove the battery properly may damage the socket on the system board. Any damage to the socket may require replacing the system board.

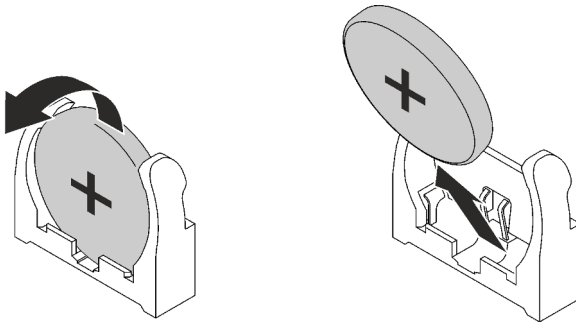


Figure 47. CMOS battery removal

- Pivot the battery toward the middle of the compute node.
- Lift the battery from the socket.

Step 3. Dispose of the CMOS battery as required by local ordinances or regulations.

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 CMOS battery (CR2032)

Use this information to install the CMOS battery.

About this task

To avoid possible danger, read and follow the following safety statement.

- **S004**

**CAUTION:**

When replacing the lithium battery, use only Lenovo specified part number or an equivalent type of 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.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- The following notes describe information that you must consider when replacing the battery.
 - Lenovo has designed this product with your safety in mind. The lithium battery must be handled correctly to avoid possible danger. If you replace the battery, you must adhere to the following instructions.
 - If you replace the original lithium battery with a heavy-metal battery or a battery with heavy-metal components, be aware of the following environmental consideration. Batteries and accumulators that contain heavy metals must not be disposed of with normal domestic waste. They will be taken back free of charge by the manufacturer, distributor, or representative, to be recycled or disposed of in a proper manner.
 - After you replace the battery, you must reconfigure the solution and reset the system date and time.

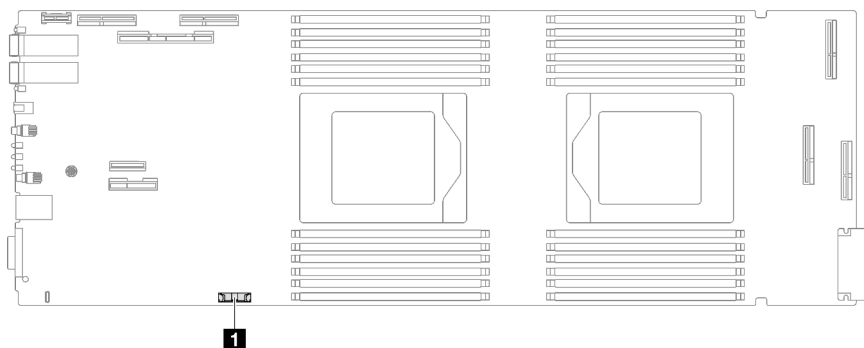


Figure 48. CMOS battery location

Table 7. CMOS battery location

1 CMOS battery

Procedure

- Step 1. Follow any special handling and installation instructions that come with the CMOS battery.
- Step 2. Insert the new CMOS battery:
 - a. Face the positive (+) symbol to the center of the node; then, place the battery into the seat until it clicks in place.
 - b. As you slide the CMOS battery into place, press the top of the CMOS battery into the socket. Make sure that the battery clip holds the battery securely.

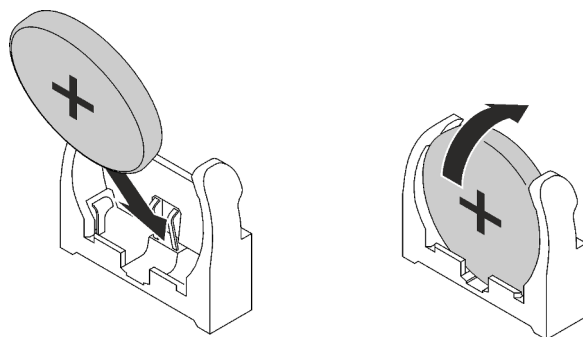


Figure 49. CMOS battery installation

After you finish

1. Install the PCIe riser assembly. See [“Install a PCIe riser assembly \(ConnectX-6\)” on page 136](#), [“Install a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 148](#), or [“Install a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 160](#).
2. Install the tray cover. See [“Install the tray cover” on page 14](#).
3. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
4. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

DIMM comb replacement

Use the following procedures to remove and install a DIMM comb.

Remove a DIMM comb

Use this information to remove a DIMM comb.

About this task

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- b. Remove the tray cover. See [“Remove the tray cover” on page 13](#).

Step 2. Remove the memory module tool attached to the DIMM comb.

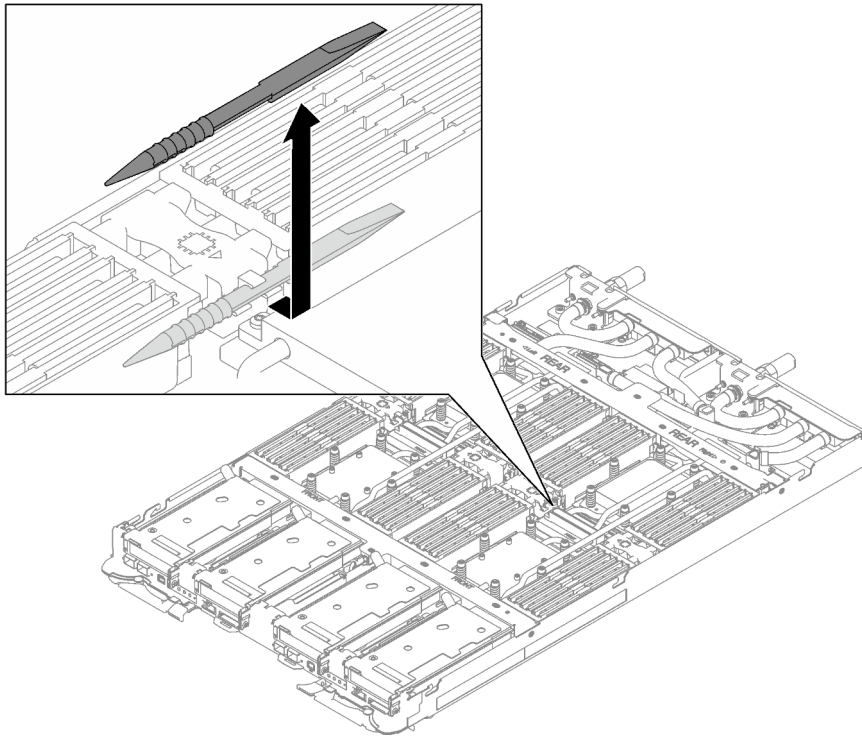


Figure 50. Memory module tool removal

Note: Memory module tool is recommended due to space limitations caused by location of water loop tubes through the memory section.

Step 3. Gently hold the DIMM comb and remove it out of the chassis.

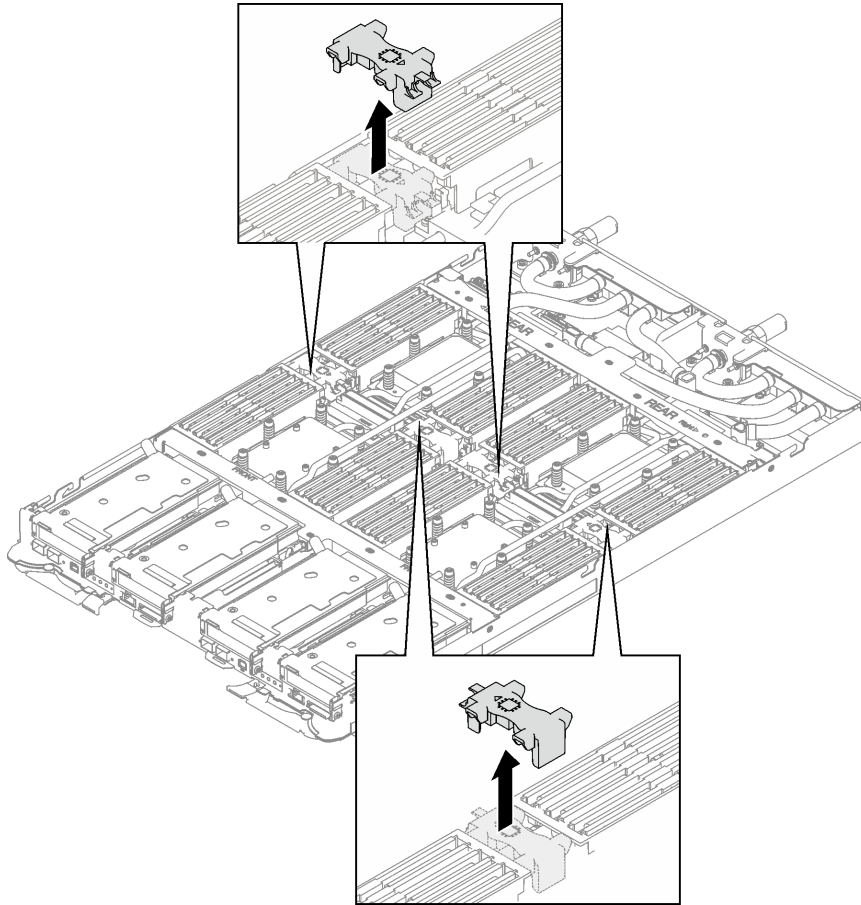


Figure 51. DIMM comb removal

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 a DIMM comb

Use this information to install a DIMM comb.

About this task

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

Procedure

Step 1. Align the DIMM comb with the slots and insert it into the node.

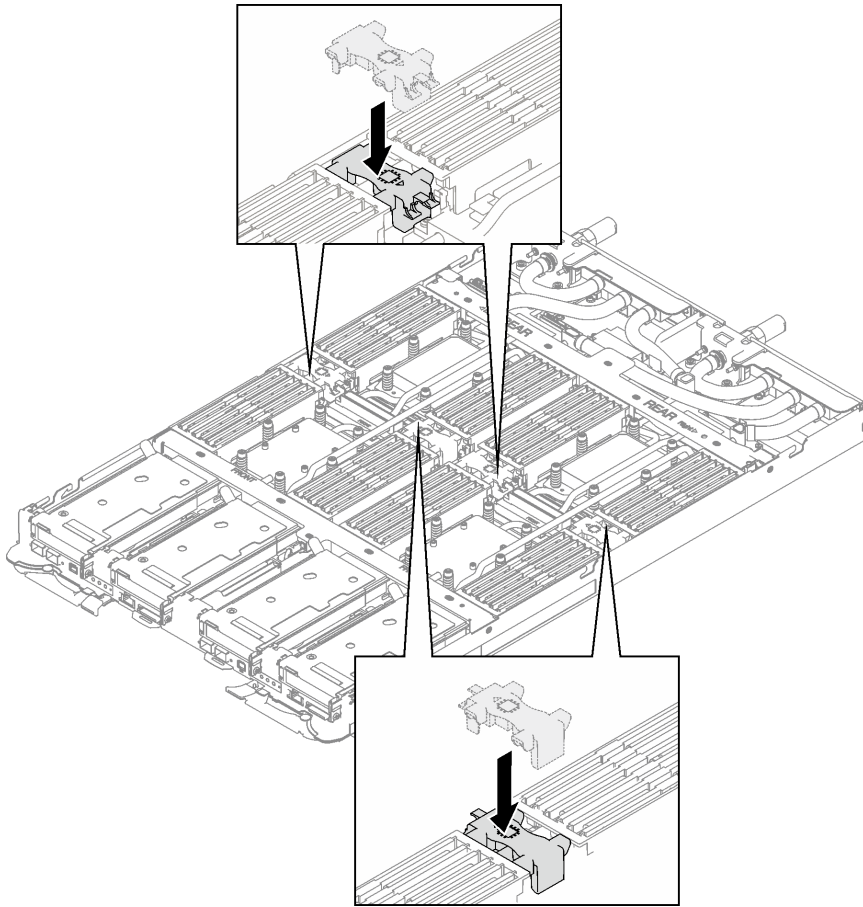


Figure 52. DIMM comb installation

Step 2. Install the memory module tool to the DIMM comb on the left side of the node.

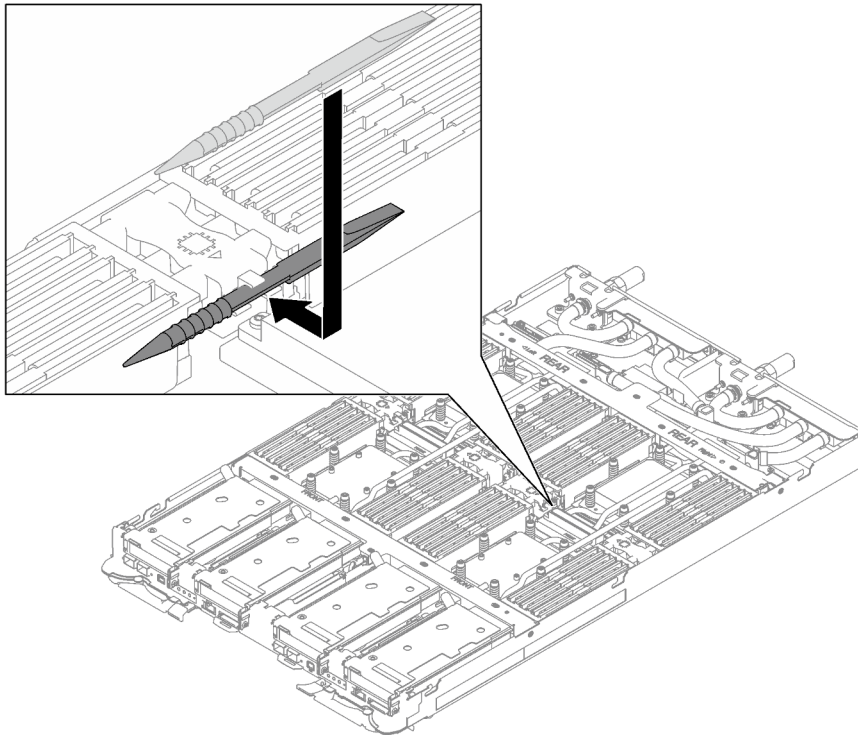


Figure 53. Memory module tool installation

After you finish

1. Install the tray cover. See [“Install the tray cover” on page 14.](#)
2. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11.](#)
3. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

4. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

Drive and drive cage assembly replacement

Use the following procedures to remove and install a drive and drive cage assembly.

Remove a drive cage assembly

Use this information to remove a drive cage assembly.

About this task

Required tools

You may need the SD665 V3 Water Loop Gap Pad Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

- Step 1. Make preparations for this task.
- Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
 - Remove the tray cover. See [“Remove the tray cover” on page 13](#).
 - Remove the cross braces. See [“Remove the cross braces” on page 15](#).
- Step 2. Disconnect the cables from the system board.

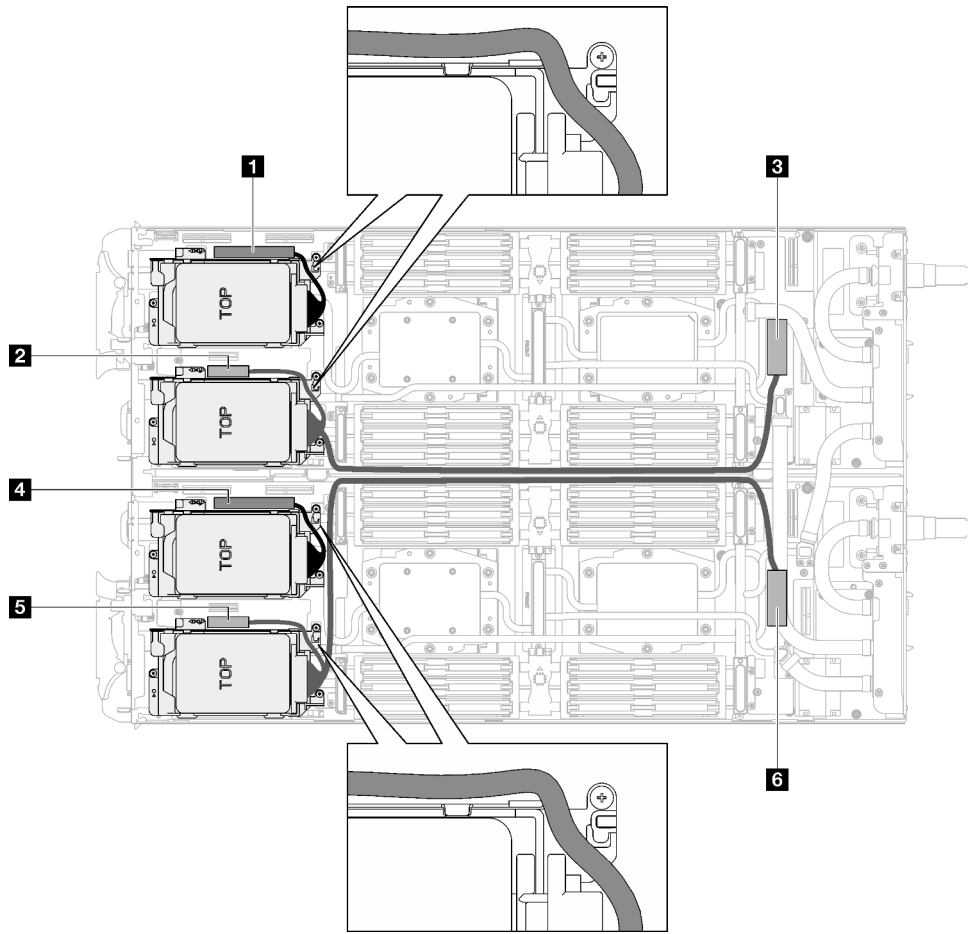


Figure 54. Drive assembly cable routing for SATA drives

Table 8. Drive assembly cable routing for SATA drives

System board connector	Node
1 PCIe 2/SATA– drive 2/3	Left node

Table 8. Drive assembly cable routing for SATA drives (continued)

System board connector	Node
2 Power and sideband signal for drive bay 0/1	Right node
3 PCIe 1/SATA – drive 0/1	
4 PCIe 2/SATA– drive 2/3	
5 Power and sideband signal for drive bay 0/1	
6 PCIe 1/SATA – drive 0/1	

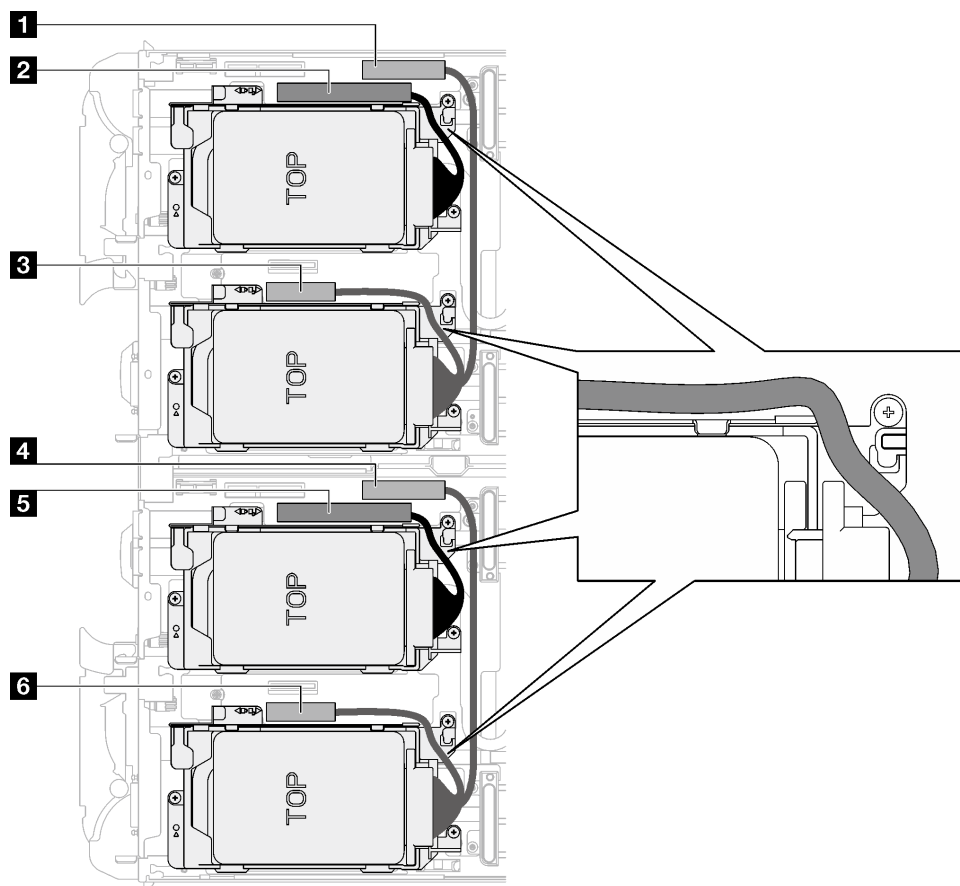


Figure 55. Drive assembly cable routing for all NVMe drives

Table 9. Drive assembly cable routing for all NVMe drives

System board connector	Node
1 PCIe 3 – drive bay 0/1 (NVMe only)	Left node
2 PCIe 2/SATA– drive 2/3	
3 Power and sideband signal for riser 1 or drive bay 0/1	
4 PCIe 3 – drive bay 0/1 (NVMe only)	Right node
5 PCIe 2/SATA– drive 2/3	
6 Power and sideband signal for riser 1 or drive bay 0/1	

Step 3. Remove the drive cage assembly.

- a. ① Remove the 3 screws.
- b. ② Remove the drive assembly out of the node.

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

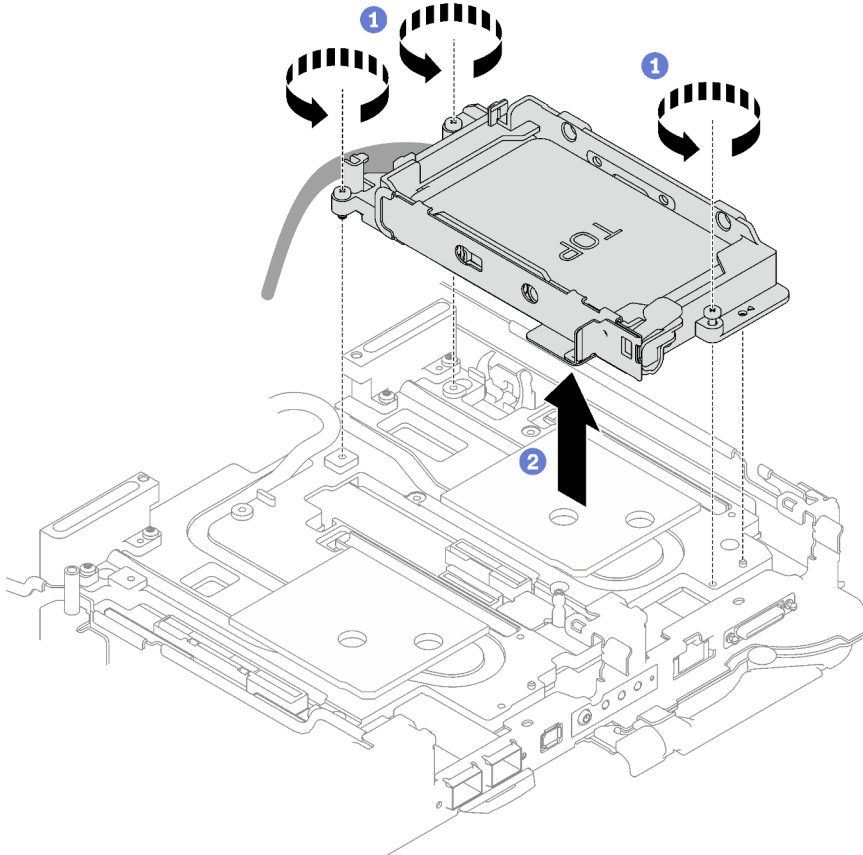


Figure 56. One 7 mm drive cage assembly removal

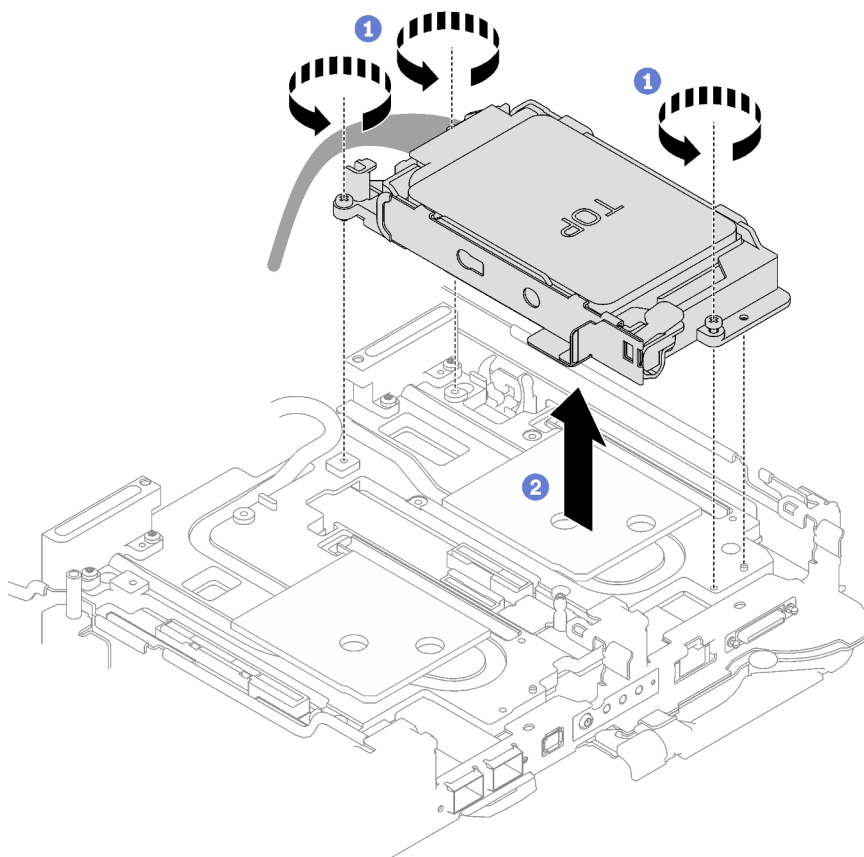


Figure 57. Two 7 mm drive cage assembly removal

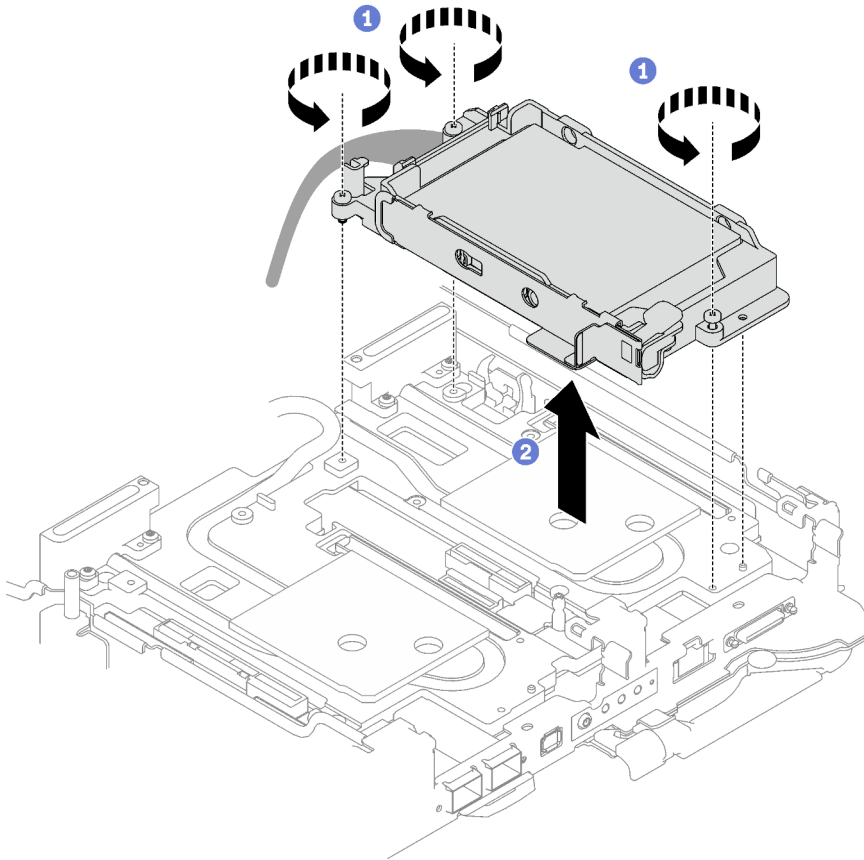


Figure 58. One 15 mm drive cage assembly removal

Step 4. If necessary, remove the blank bezel fillers.

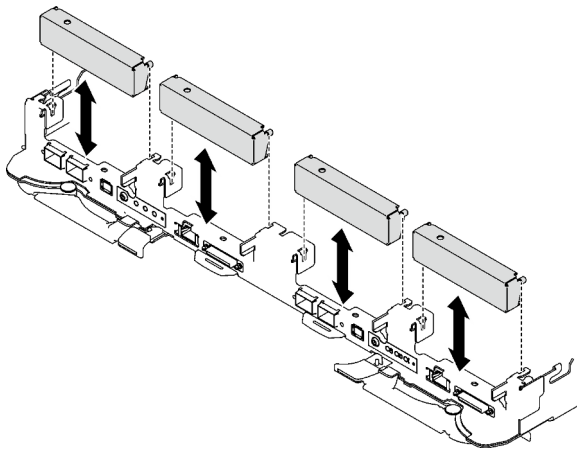


Figure 59. Blank bezel filler removal

After you finish

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

Demo video

[Watch the procedure on YouTube](#)

Remove a drive

Use this information to remove a drive.

About this task

Required tools

You may need the SD665 V3 Water Loop Gap Pad Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- b. Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- c. Remove the cross braces. See [“Remove the cross braces” on page 15](#).
- d. Remove the drive cage. See [“Remove a drive cage assembly” on page 52](#).

Step 2. There are different procedures for removing one and two drives, follow the steps according to your configuration.

For removing one 7 mm or 15 mm drive only, complete the following steps.

1. ① Remove the drive out of the bottom of the drive cage.
2. ② Disconnect the cable from the drive.

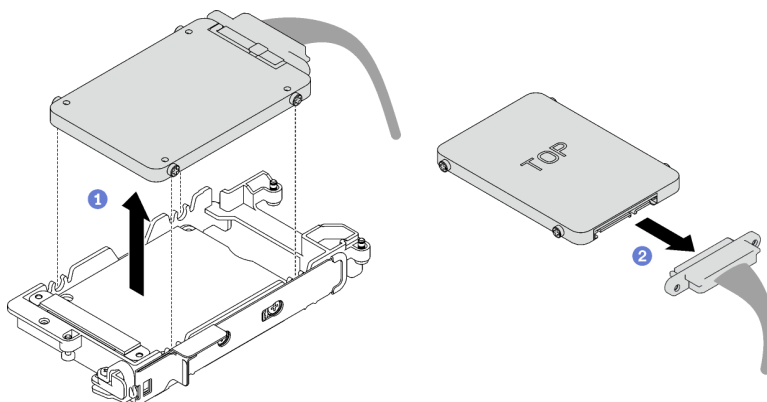


Figure 60. 7 mm drive removal

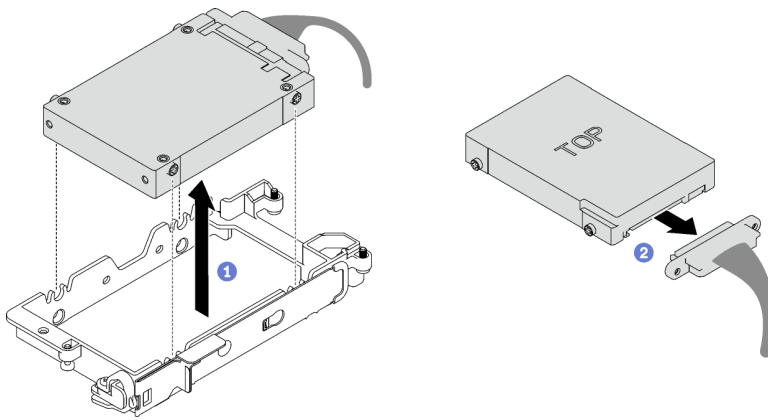


Figure 61. 15 mm drive removal

For removing two 7 mm drives, complete the following steps.

1. Remove the upper drive.
 - a. ① Push and hold the release latch.
 - b. ② Slide the metal tab to the unlocked position.
 - c. ③ Pivot the drive out of the top of the drive cage as shown.
 - d. ④ Disconnect the cable from the drive.

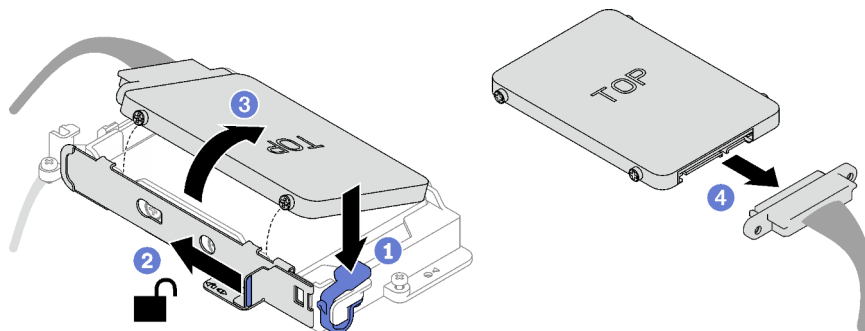


Figure 62. Upper drive removal

2. Remove the lower drive.
 - a. ① Remove the drive out of the bottom of the drive cage.
 - b. ② Disconnect the cable from the drive.

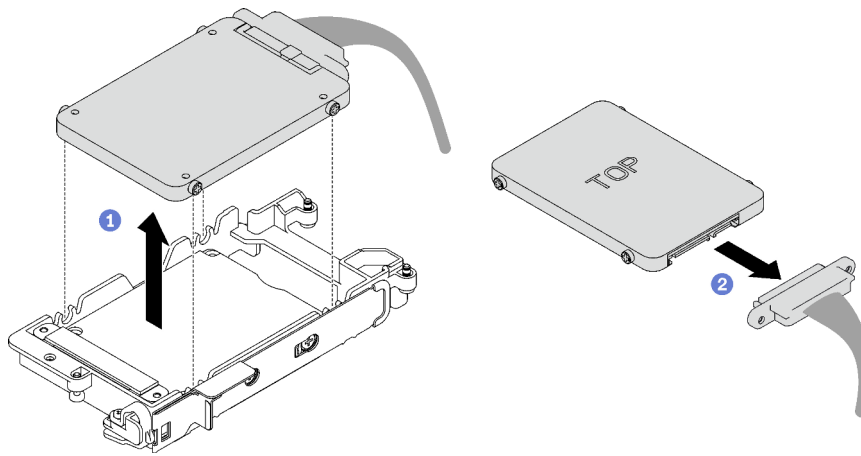


Figure 63. Lower drive removal

3. If necessary, remove the four screws securing the conduction plate and lift it out of the drive cage.

Note: Make sure the metal tab is in the unlocked position.

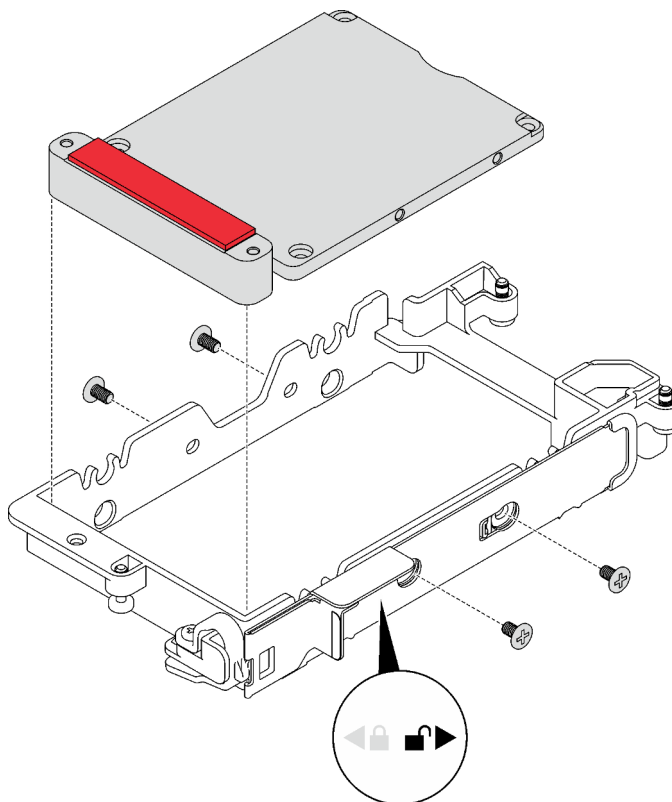


Figure 64. Conduction plate removal

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 a drive

Use this information to install a drive.

About this task

Required tools

You may need the SD665 V3 Water Loop Gap Pad Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

Note: You may need the Gap Pad Kit to perform this task.

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see [“Gap pad/Putty pad identification and location” on page 6](#).
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Procedure

Step 1. **For installing one 7 mm or 15 mm drive only, complete the following steps.**

1. ① Find the cable with its plugger marked as **SSD 0/2**, and connect it to the drive.
2. ② Flip the drive over.
3. ③ Install the drive into the bottom of the drive cage and make sure it is secured in place.

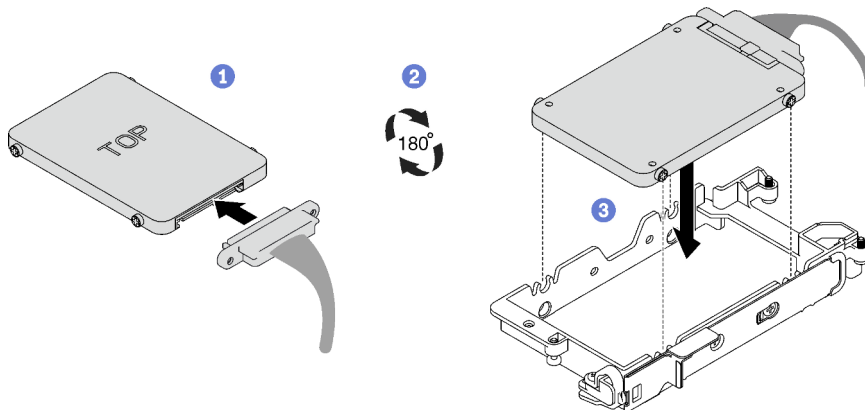


Figure 65. 7 mm drive installation

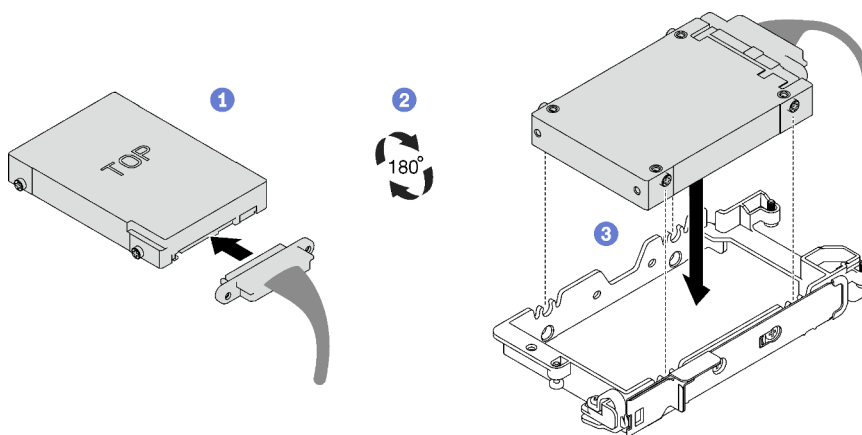


Figure 66. 15 mm drive installation

Note: Secure the unconnected cable plugger on top side of the drive cage.

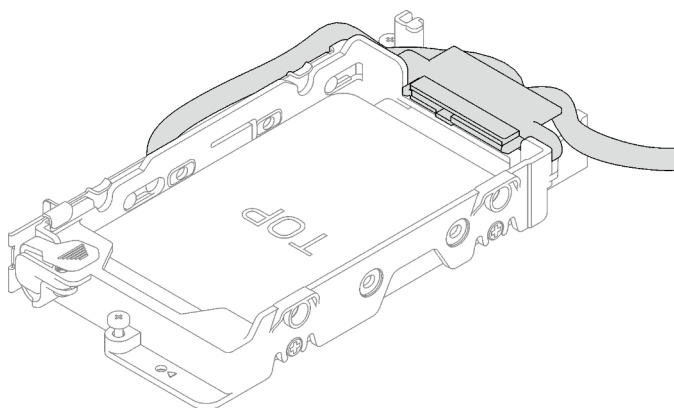


Figure 67. Securing the unplugged cable plugger

Step 2. **For installing two 7 mm drives, complete the following steps.**

1. If removed, install the conduction plate into the bottom of the drive cage and secure it with four screws.

If the gap pad located on the reverse side of the drive is damaged, missing, or fallen off the conduction late, replace it with a new one. Make sure to follow the [Gap pad/putty pad replacement guidelines](#).

Note: Make sure the metal tab is in the unlocked position.

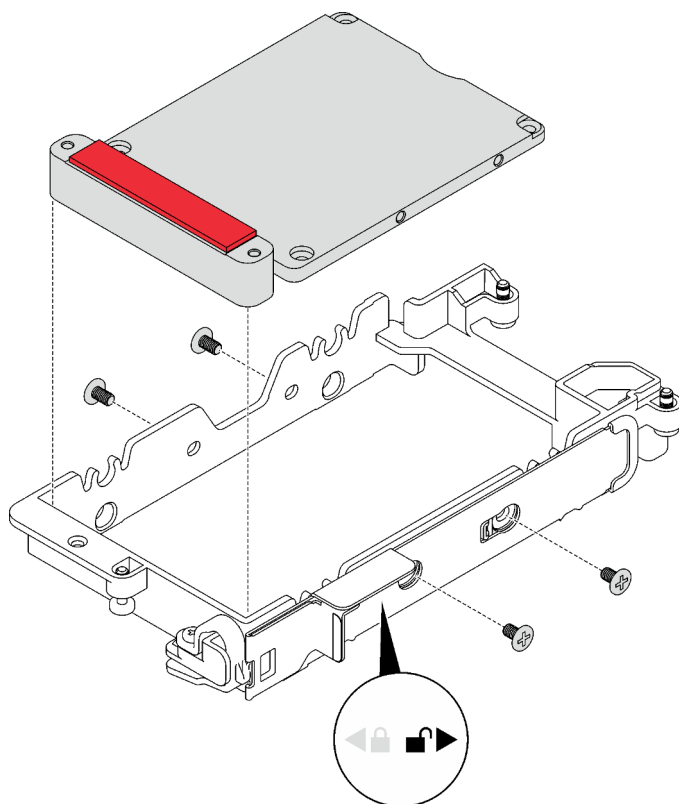


Figure 68. Conduction plate installation

2. Install the lower drive.

- a. ① Find the cable with its plugger marked as **SSD 0/2**, and connect it to the drive.
- b. ② Flip the drive over.
- c. ③ Install the drive into the bottom of the drive cage and make sure it is secured in place.

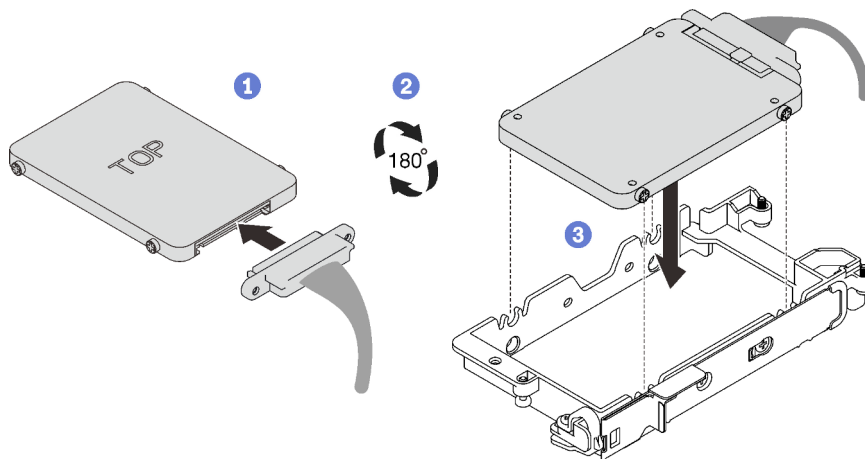


Figure 69. Lower drive installation

3. Install the upper drive.

- a. ① Find the cable with its plugger marked as **SSD 1/3**, and connect it to the drive. Then, pivot the drive into the top of the drive cage as shown.

- b. ② Push and hold the release latch.
- c. ③ Slide the metal tab to the locked position.

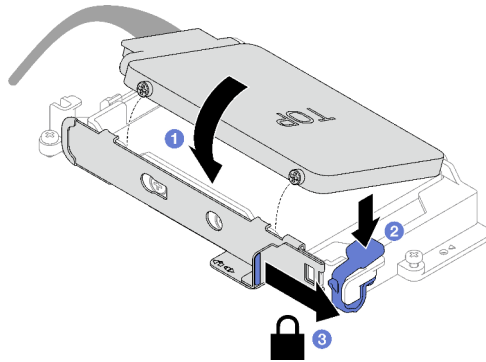


Figure 70. Upper drive installation

After you finish

1. Install the drive cage. See [“Install a drive cage assembly” on page 64](#).
2. Install the cross braces. See [“Install the cross braces” on page 17](#).
3. Install the tray cover. See [“Install the tray cover” on page 14](#).
4. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
5. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

6. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

Install a drive cage assembly

Use this information to install a drive cage assembly.

About this task

Required tools

You may need the SD665 V3 Water Loop Gap Pad Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

Note: You may need the Gap Pad Kit to perform this task.

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see [“Gap pad/Putty pad identification and location” on page 6](#).

- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

Step 1. Make sure the blank bezel fillers are installed. If not, install them to the node.

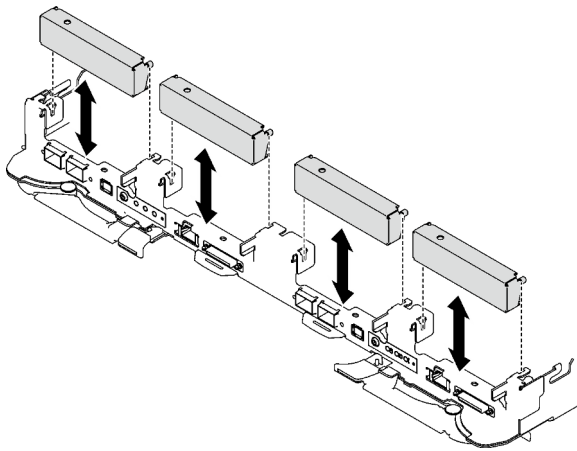


Figure 71. Blank bezel filler installation

Step 2. If the gap pad located on the reverse side of the drive cage is damaged, missing, or fallen off the drive cage, replace it with a new one. Make sure to follow [Gap pad/putty pad replacement guidelines](#).

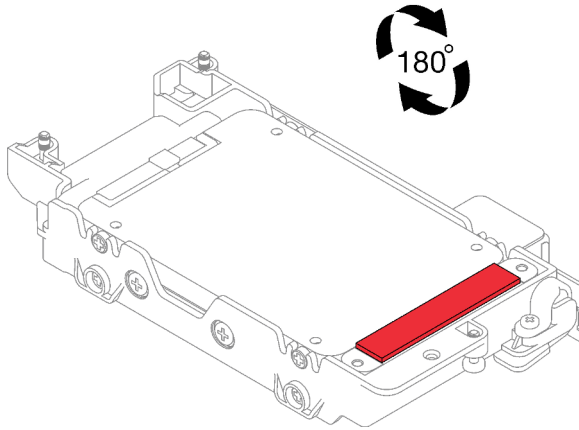


Figure 72. Gap pad location

- Step 3. If the drive cage gap pad is damaged or missing, replace it with a new one. See the following for the gap pad location for each drive cage. Make sure to follow [Gap pad/putty pad replacement guidelines](#).

Note: Align the gap pad with marking on water loop when attaching gap pad.

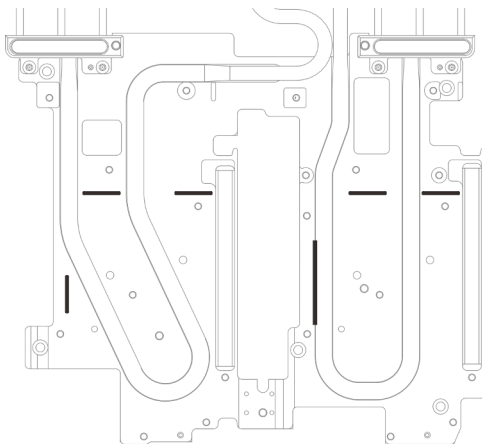


Figure 73. Markings on water loop for gap pad alignment

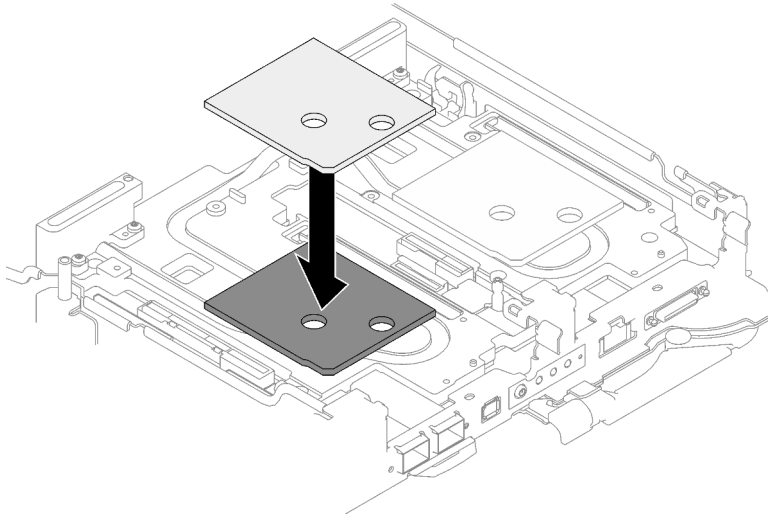


Figure 74. Replacing gap pad

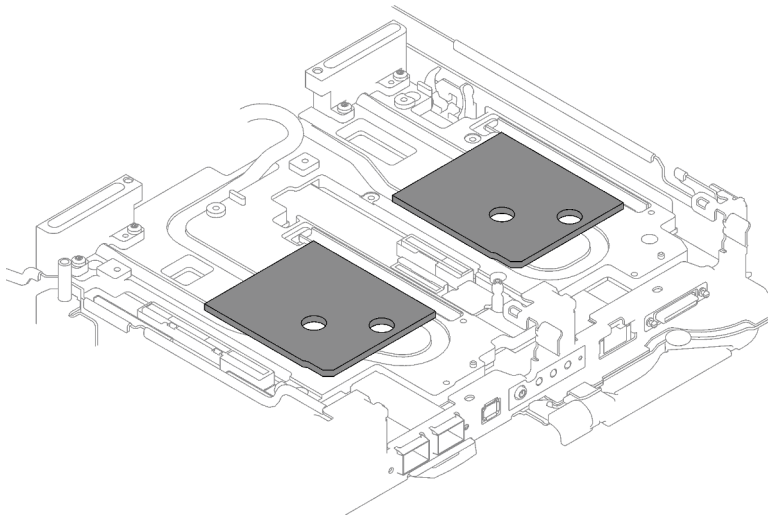


Figure 75. Gap pad locations

- Step 4. Install the drive cage assembly.
- a. ① Install the drive assembly into the node.
 - b. ② Secure the 3 screws.

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

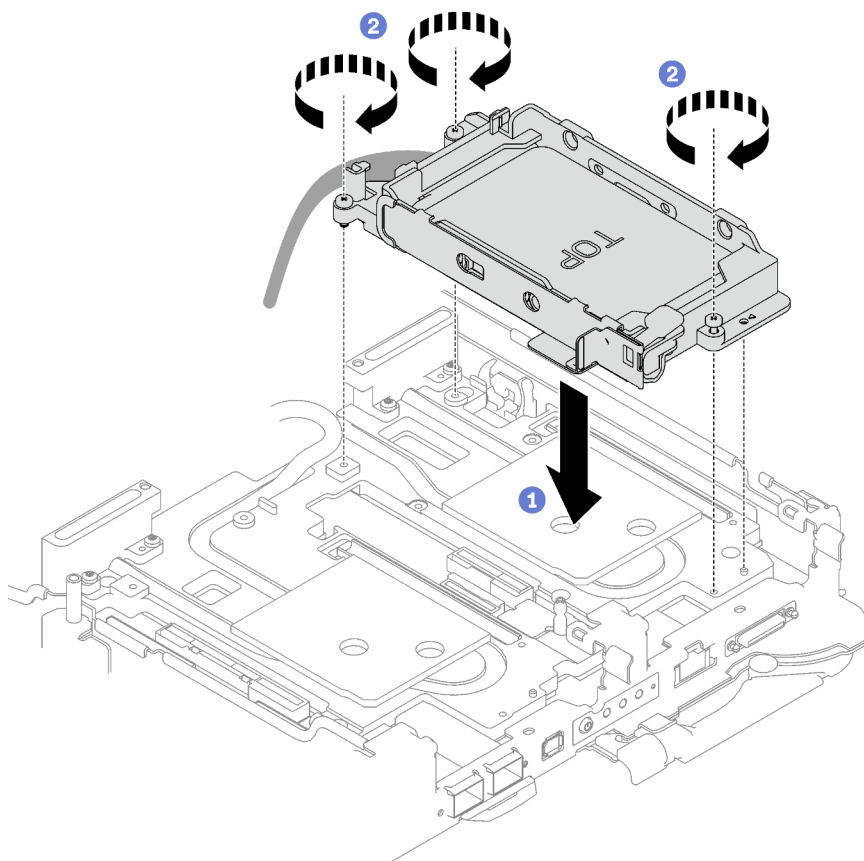


Figure 76. One 7 mm drive cage assembly installation

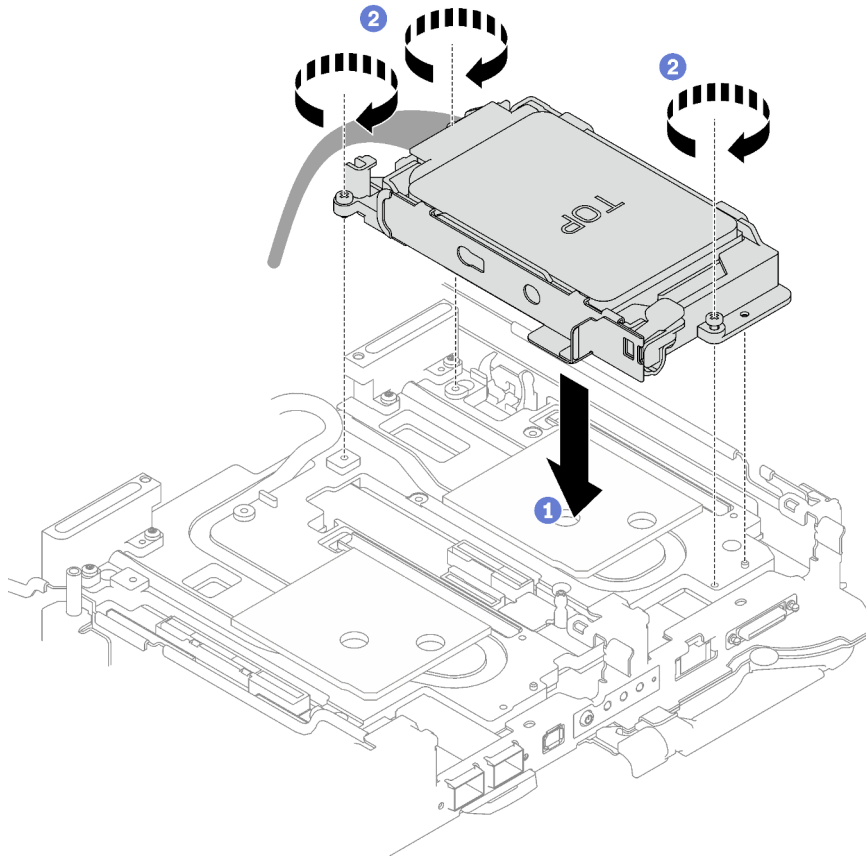


Figure 77. Two 7 mm drive cage assembly installation

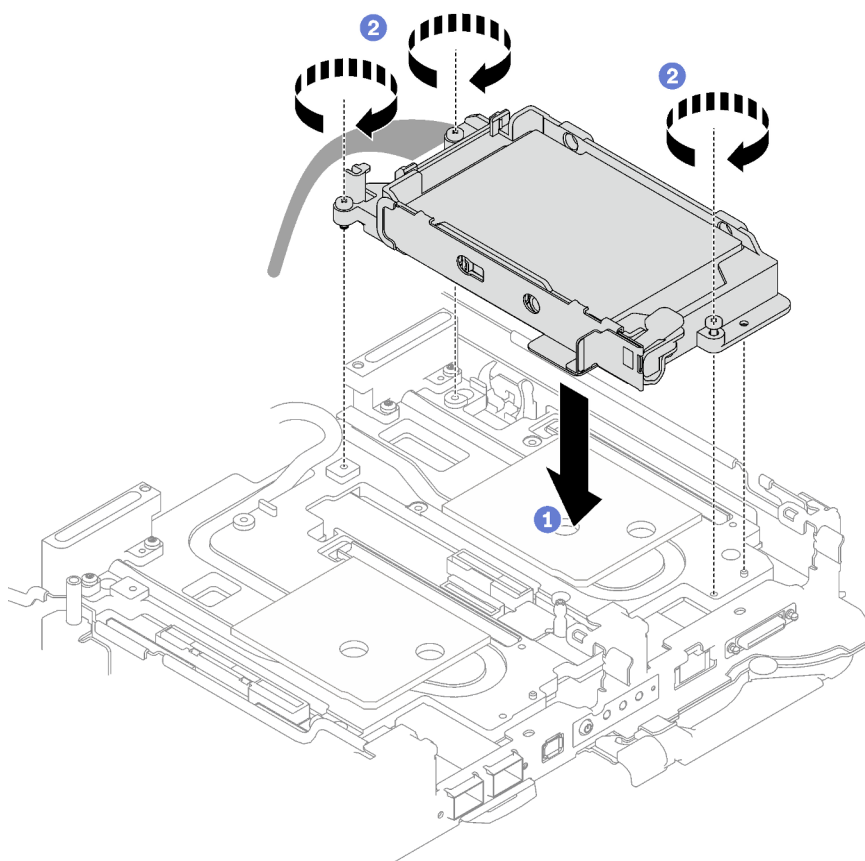


Figure 78. One 15 mm drive cage assembly installation

- Step 5. Connect the drive assembly cable to the system board. Cable routing is different for SATA drives and NVMe drives. Follow the cable routing below according to the drive configuration in your system. For more information, see “System-board connectors” section in *User Guide* or *System Configuration Guide*.

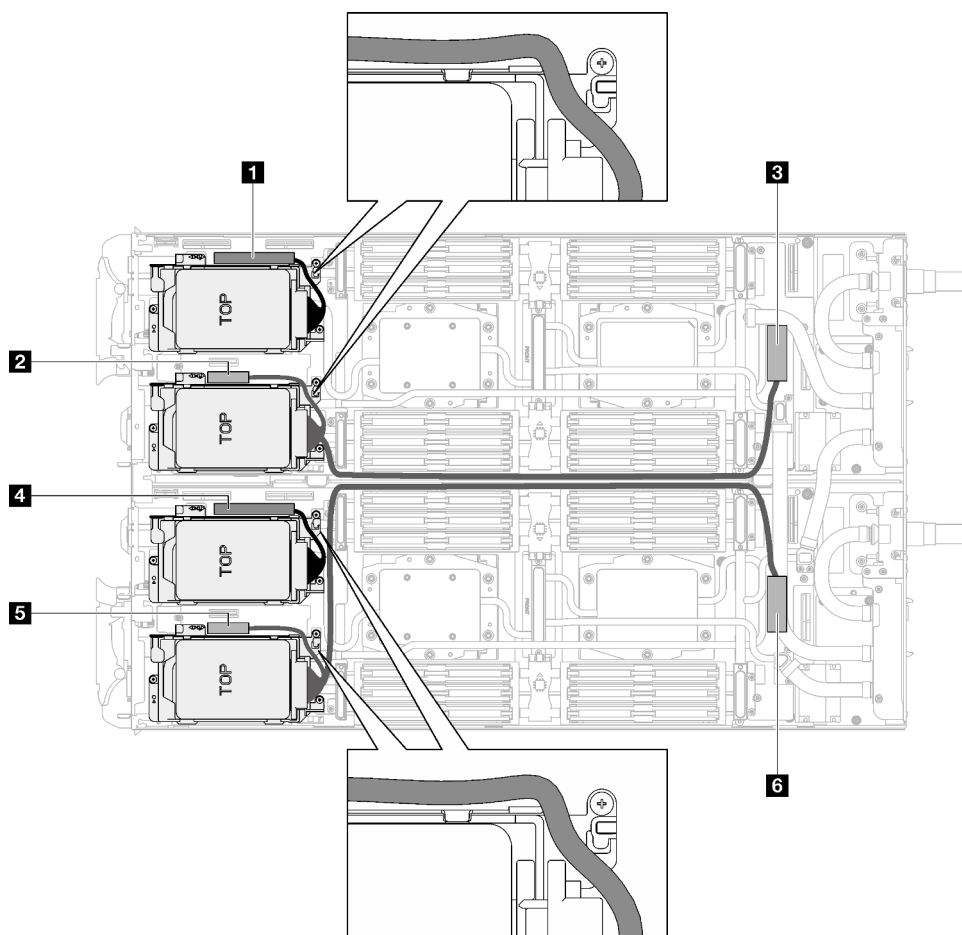


Figure 79. Drive assembly cable routing for SATA drives

Table 10. Drive assembly cable routing for SATA drives

System board connector	Node
1 PCIe 2/SATA– drive 2/3	Left node
2 Power and sideband signal for drive bay 0/1	
3 PCIe 1/SATA – drive 0/1	
4 PCIe 2/SATA– drive 2/3	Right node
5 Power and sideband signal for drive bay 0/1	
6 PCIe 1/SATA – drive 0/1	

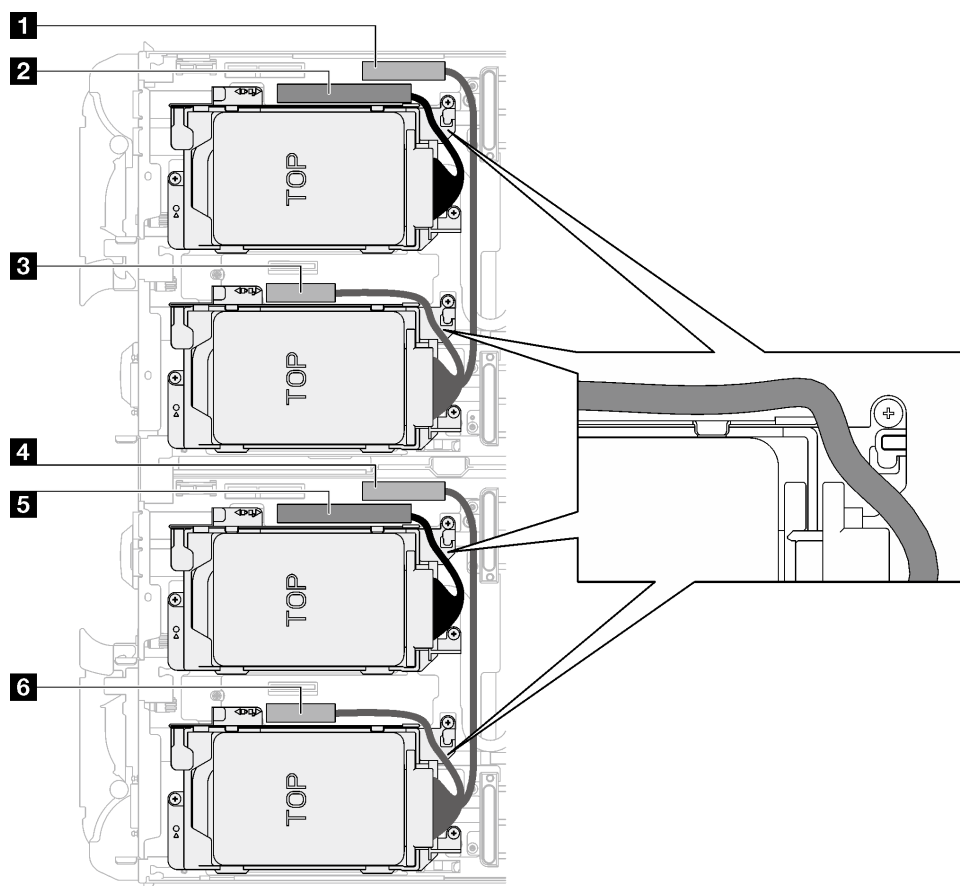


Figure 80. Drive assembly cable routing for all NVMe drives

Table 11. Drive assembly cable routing for all NVMe drives

System board connector	Node
1 PCIe 3 – drive bay 0/1 (NVMe only)	Left node
2 PCIe 2/SATA– drive 2/3	
3 Power and sideband signal for riser 1 or drive bay 0/1	
4 PCIe 3 – drive bay 0/1 (NVMe only)	Right node
5 PCIe 2/SATA– drive 2/3	
6 Power and sideband signal for riser 1 or drive bay 0/1	

After you finish

1. Install the cross braces. See [“Install the cross braces” on page 17](#).
2. Install the tray cover. See [“Install the tray cover” on page 14](#).
3. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
4. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

7mm NVMe drive and drive cage assembly replacement

Use the following procedures to remove and install a 7mm NVMe drive and drive cage assembly.

Remove a 7mm NVMe drive cage assembly

Use this information to remove a 7mm NVMe drive cage assembly.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Gap Pad Kit
- Conduction Plate Parts U3 7mm Dual
- U3 7mm Conduction Plate Pad (small)
- U3 7mm Conduction Plate Putty Pad

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- b. Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- c. Remove the cross braces. See [“Remove the cross braces” on page 15](#).

Step 2. Disconnect the cables from the system board.

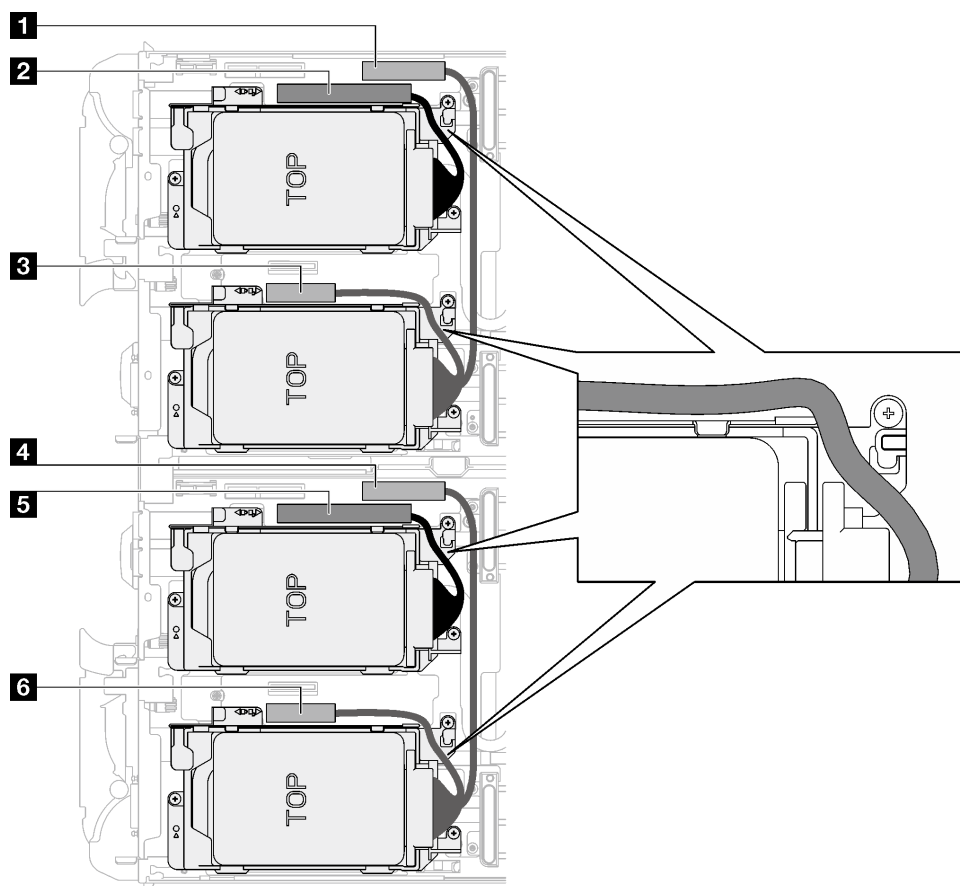


Figure 81. Drive assembly cable routing for all NVMe drives

Table 12. Drive assembly cable routing for all NVMe drives

System board connector	Node
1 PCIe 3 – drive bay 0/1 (NVMe only)	Left node
2 PCIe 2/SATA– drive 2/3	
3 Power and sideband signal for riser 1 or drive bay 0/1	
4 PCIe 3 – drive bay 0/1 (NVMe only)	Right node
5 PCIe 2/SATA– drive 2/3	
6 Power and sideband signal for riser 1 or drive bay 0/1	

- Step 3. Remove the drive cage assembly.
- 1** Remove the three screws.
 - 2** Remove the drive assembly out of the node.

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

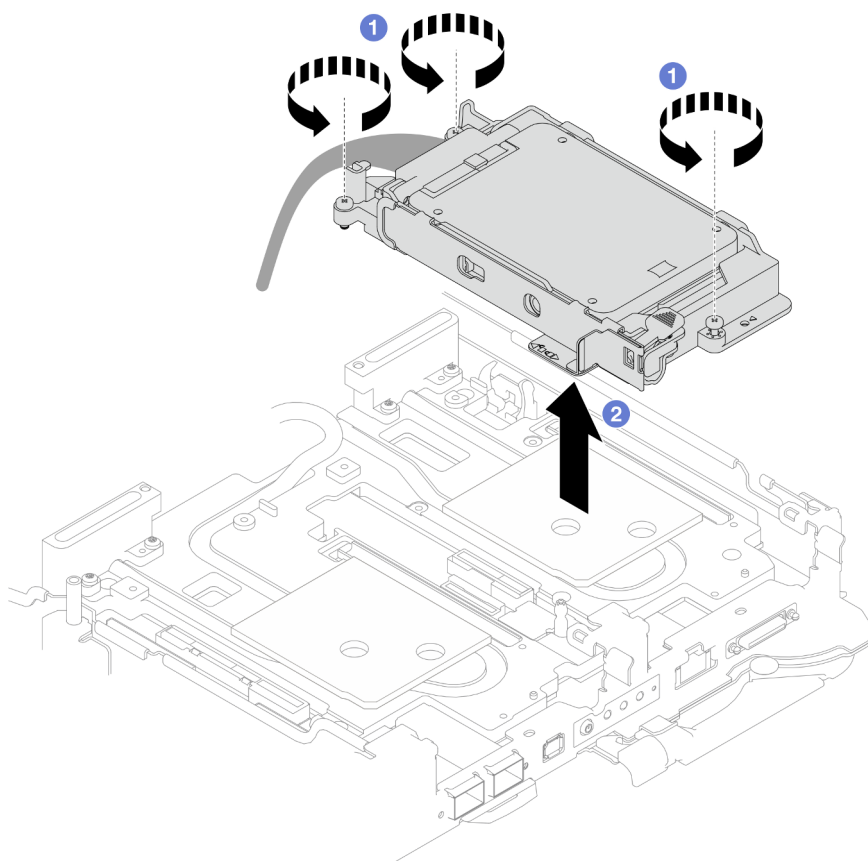


Figure 82. 7mm NVMe drive cage assembly removal

Step 4. If necessary, remove the blank bezel fillers.

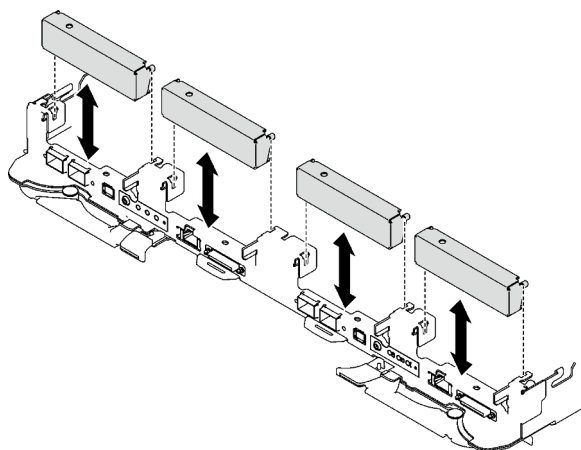


Figure 83. Blank bezel filler removal

After you finish

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

Demo video

[Watch the procedure on YouTube](#)

Remove a 7mm NVMe drive

Use this information to remove a 7mm NVMe drive.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Gap Pad Kit
- Conduction Plate Parts U3 7mm Dual
- U3 7mm Conduction Plate Pad (small)
- U3 7mm Conduction Plate Putty Pad

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- b. Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- c. Remove the cross braces. See [“Remove the cross braces” on page 15](#).
- d. Remove the 7mm NVMe drive cage. See [“Remove a 7mm NVMe drive cage assembly” on page 73](#).

Step 2. Remove the upper drive.

- a. ① Push and hold the release latch.
- b. ② Slide the metal tab to the unlocked position.
- c. ③ Pivot the drive out of the top of the drive cage as shown.
- d. ④ Disconnect the cable from the drive.

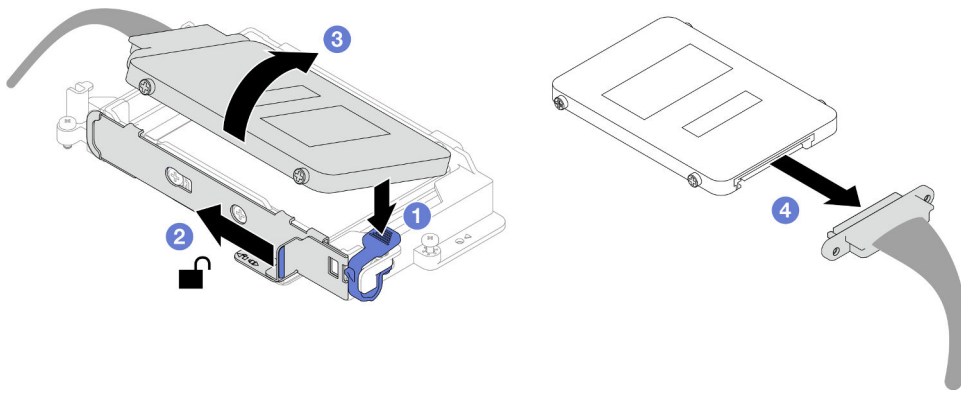


Figure 84. Upper drive removal (7mm NVMe)

Step 3. Remove the lower drive.

- a. 1 Remove the drive out of the bottom of the drive cage.
- b. 2 Disconnect the cable from the drive.

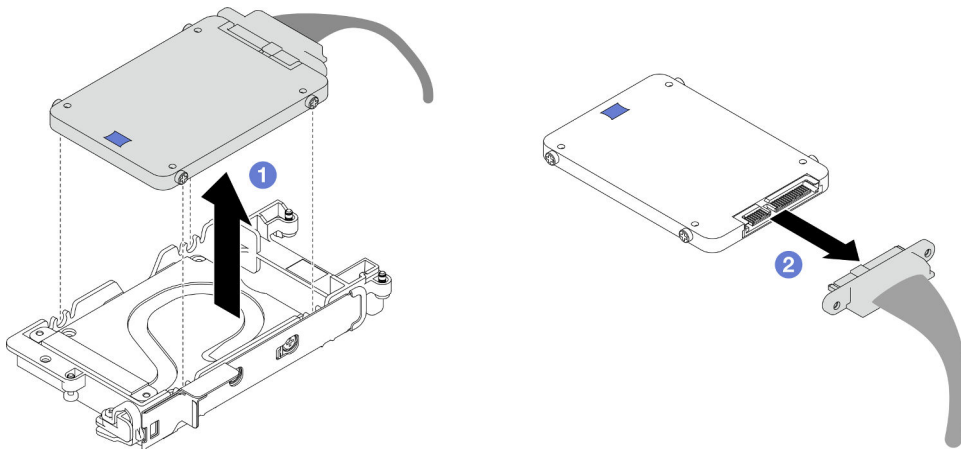


Figure 85. Lower drive removal

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 a 7mm NVMe drive

Use this information to install a 7mm NVMe drive.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Gap Pad Kit

- Conduction Plate Parts U3 7mm Dual
- U3 7mm Conduction Plate Pad (small)
- U3 7mm Conduction Plate Putty Pad

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see [“Gap pad/Putty pad identification and location” on page 6](#).
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Procedure

- Step 1. If the gap pad on the conduction plate is damaged or detached, discard the conduction plate. Then, install a new conduction plate already attached with the gap pad.

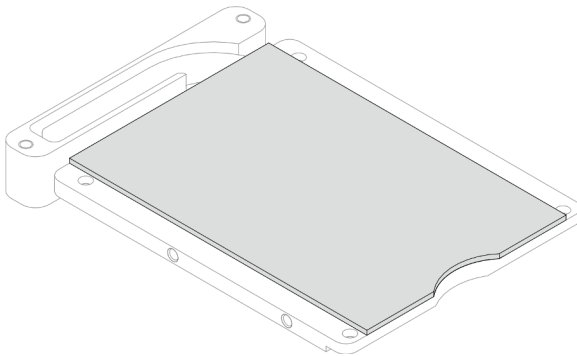


Figure 86. Conduction plate gap pad installation

- Step 2. Install the conduction plate to the drive cage.
- 1 Unlock the metal tab on the drive cage.
 - 2 Align the conduction plate to two guide pins on the drive cage; then, install the conduction plate to the drive cage as shown.
 - 3 Install the four screws to secure the conduction plate to the drive cage.

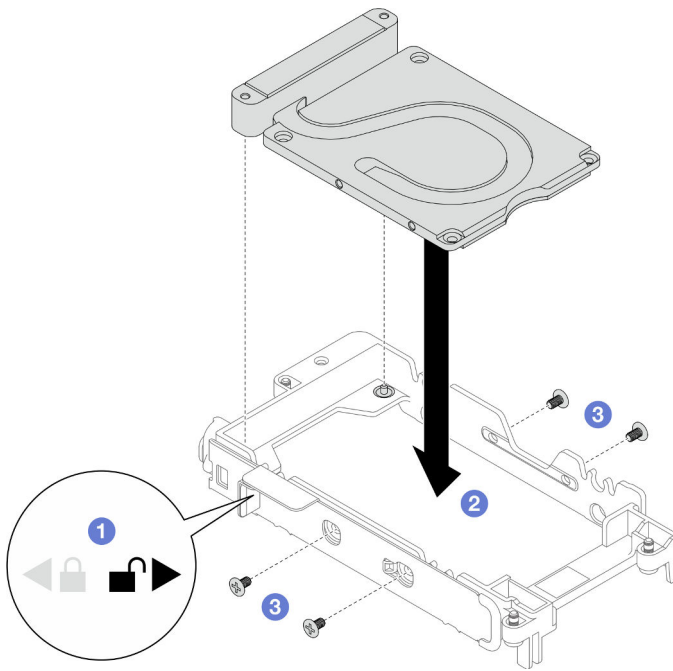


Figure 87. Conduction plate installation

Step 3. Install the lower drive.

- a. ① Connect the cable with **SSD 0/2** marked on plugger to the drive.
- b. ② Install the drive into the bottom of the drive cage and make sure it is secured in place.

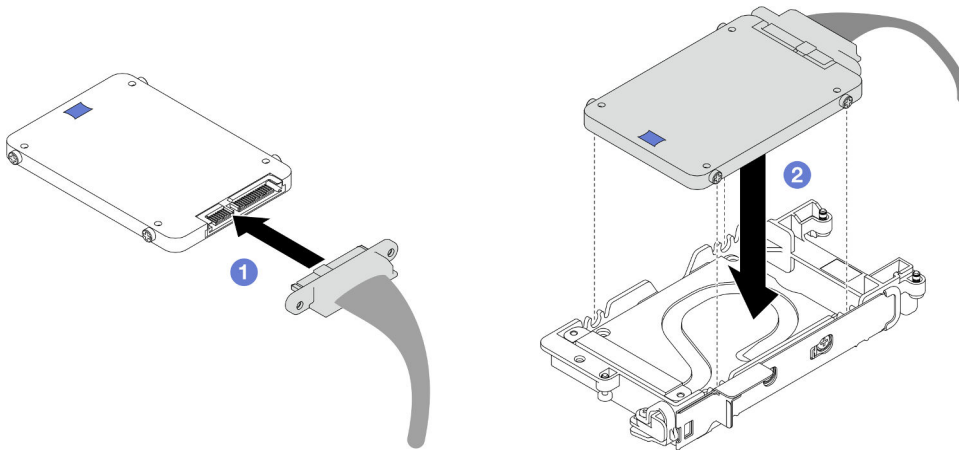


Figure 88. Lower drive installation

Step 4. Install the upper drive.

- a. ① Connect the cable with **SSD 1/3** marked on plugger to the drive. Then, insert the screws on the drive into the two screw holes on the drive cage.
- b. ② Rotate the drive into the drive cage.
- c. ③ Press the drive into the drive cage.
- d. ④ While pressing down the drive, push and hold the release latch.
- e. ⑤ Slide the metal tab to the lock position.

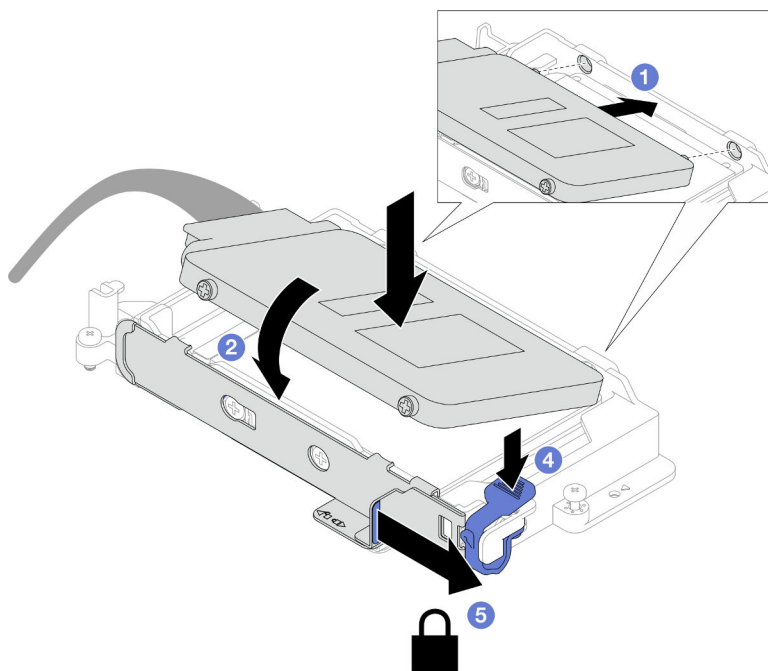
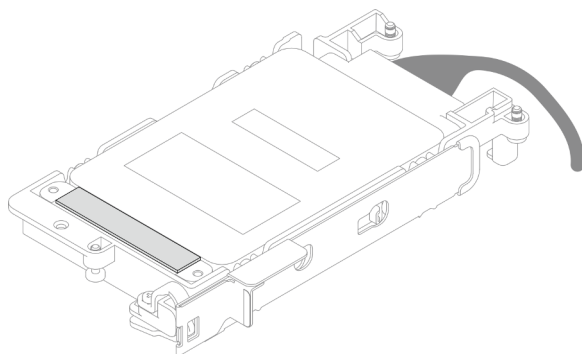


Figure 89. Upper drive installation

- Step 5. Replace the putty pad on the conduction plate. Make sure to follow [Gap pad/putty pad replacement guidelines](#).



After you finish

1. Install the 7mm NVMe drive cage. See [“Install a 7mm NVMe drive cage assembly”](#) on page 81.
2. Install the cross braces. See [“Install the cross braces”](#) on page 17.
3. Install the tray cover. See [“Install the tray cover”](#) on page 14.
4. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure”](#) on page 11.
5. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

6. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

Install a 7mm NVMe drive cage assembly

Use this information to install a drive cage assembly.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Gap Pad Kit
- Conduction Plate Parts U3 7mm Dual
- U3 7mm Conduction Plate Pad (small)
- U3 7mm Conduction Plate Putty Pad

Attention:

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.

Note: You may need the Gap Pad Kit to perform this task.

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see “[Gap pad/Putty pad identification and location](#)” on page 6.
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

Step 1. Make sure the blank bezel fillers are installed. If not, install them to the node.

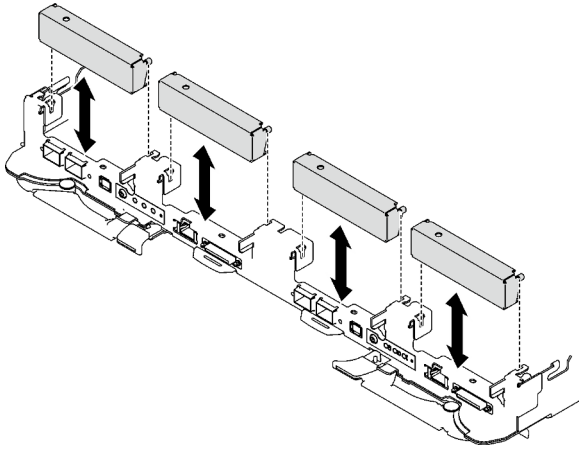


Figure 90. Blank bezel filler installation

Step 2. If the drive cage gap pad is damaged or missing, replace it with a new one. See the following for the gap pad location for each drive cage. Make sure to follow [Gap pad/putty pad replacement guidelines](#).

Note: Align the gap pad with marking on water loop when attaching gap pad.

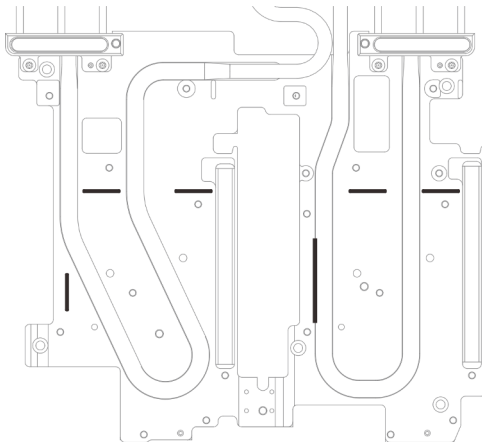


Figure 91. Markings on water loop for gap pad alignment

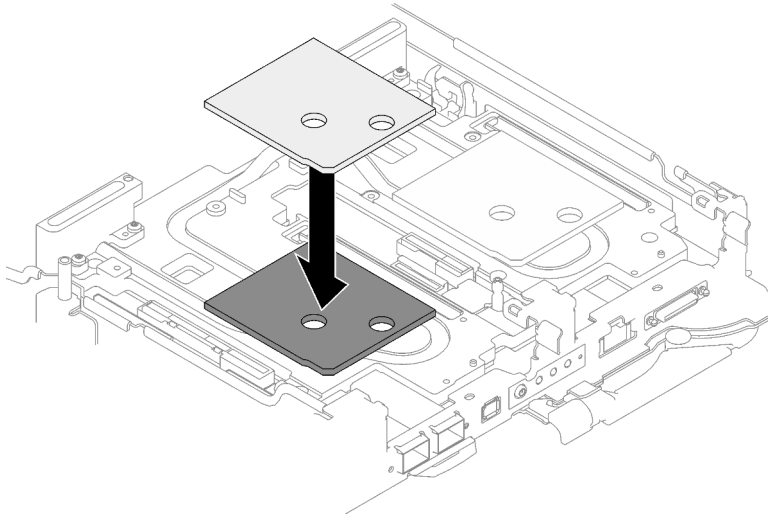


Figure 92. Replacing gap pad

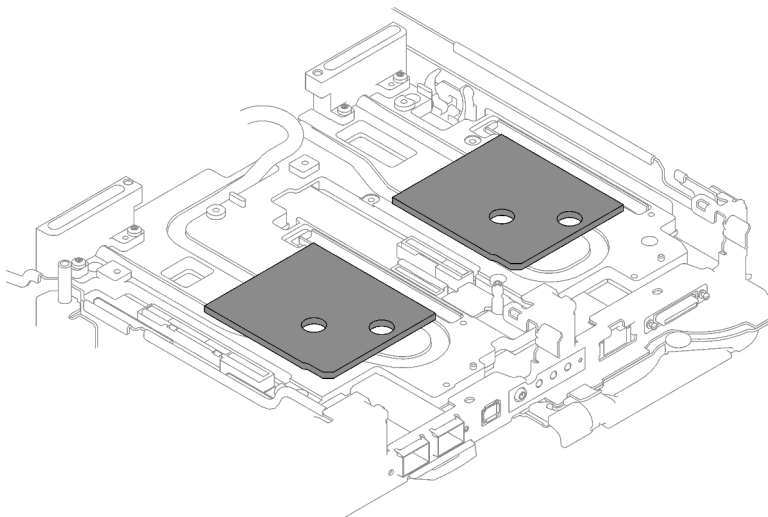


Figure 93. Gap pad locations

- Step 3. Install the drive cage assembly.
- 1 Install the drive assembly into the node.
 - 2 Secure the 3 screws.

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

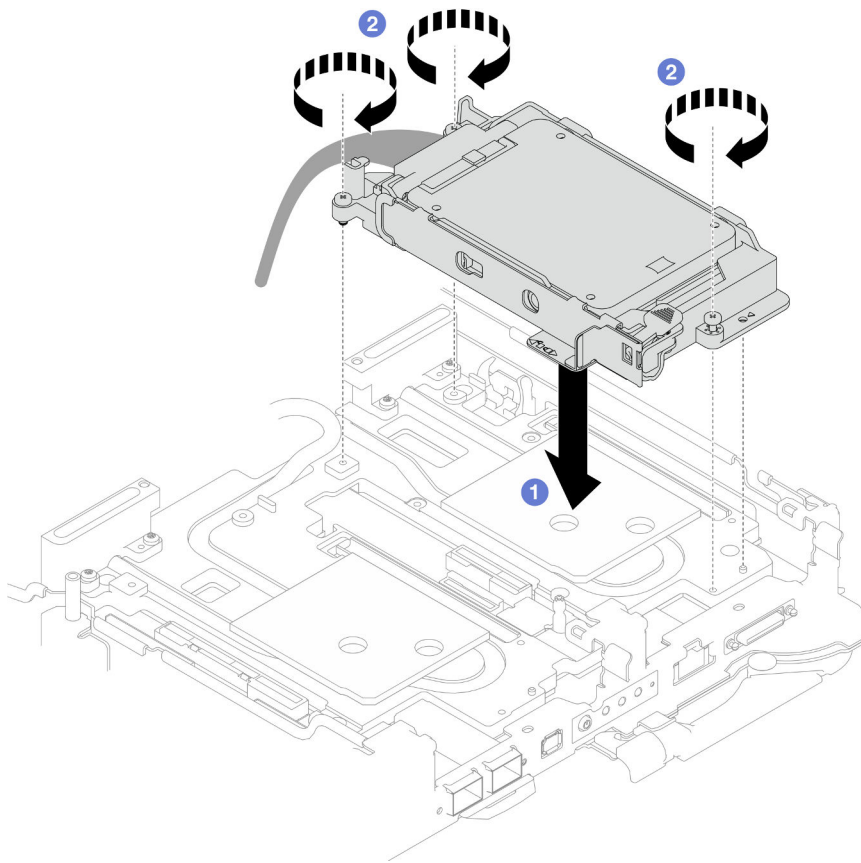


Figure 94. 7mm NVMe drive cage assembly installation

- Step 4. Connect the drive assembly cable to the system board. Cable routing is different for SATA drives and NVMe drives. Follow the cable routing below according to the drive configuration in your system. For more information, see “System-board connectors” section in *User Guide* or *System Configuration Guide*.

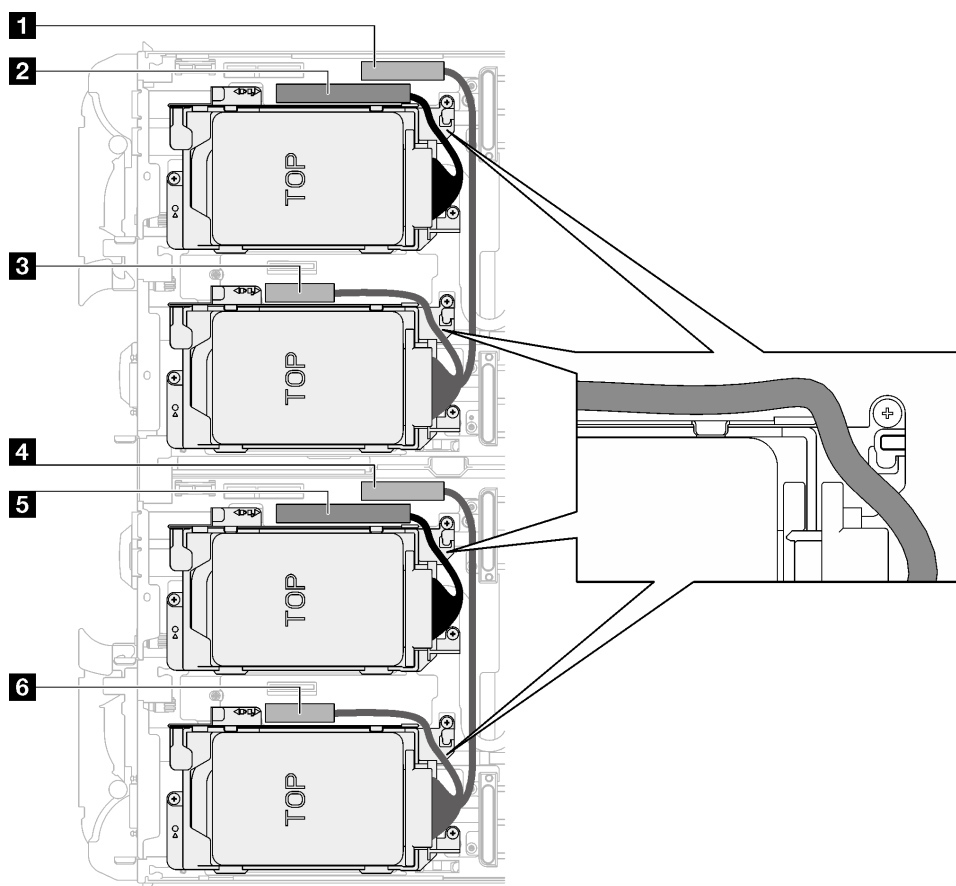


Figure 95. Drive assembly cable routing for all NVMe drives

Table 13. Drive assembly cable routing for all NVMe drives

System board connector	Node
1 PCIe 3 – drive bay 0/1 (NVMe only)	Left node
2 PCIe 2/SATA– drive 2/3	
3 Power and sideband signal for riser 1 or drive bay 0/1	
4 PCIe 3 – drive bay 0/1 (NVMe only)	Right node
5 PCIe 2/SATA– drive 2/3	
6 Power and sideband signal for riser 1 or drive bay 0/1	

After you finish

1. Install the cross braces. See [“Install the cross braces” on page 17](#).
2. Install the tray cover. See [“Install the tray cover” on page 14](#).
3. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
4. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

E3.s drive and drive cage assembly replacement

Use the following procedures to remove and install the E3.s drive and drive cage assembly.

Remove the E3.s drive cage assembly

Use this information to remove the E3.s drive cage assembly.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- E3.S Drive Conduction Plate Assembly
- E3S Putty Pad Kit
- E3S Gap Pad Kit

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- b. Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- c. Remove the cross braces. See [“Remove the cross braces” on page 15](#).

Step 2. Disconnect the cables from the system board.

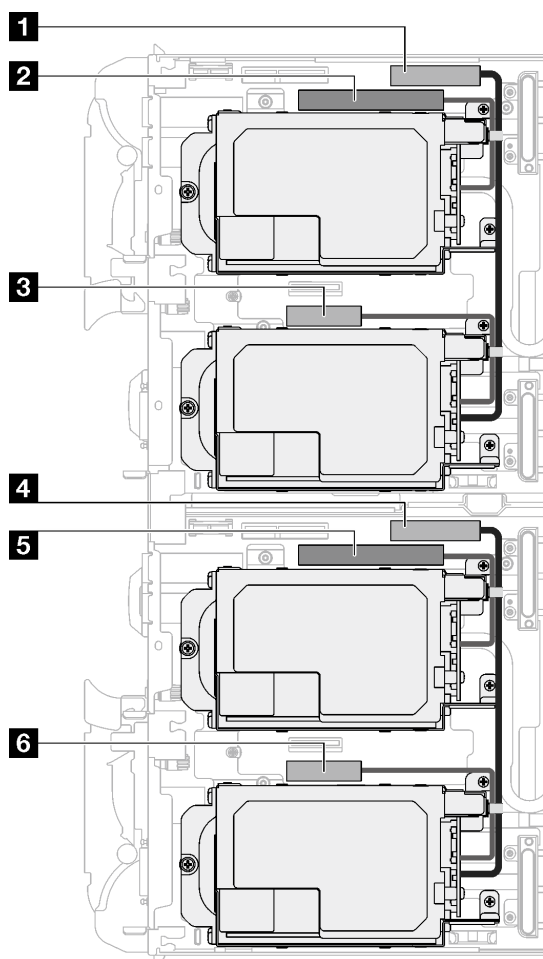


Figure 96. E3.s drives cable routing

Table 14. E3.s drives cable routing

System board connector	Node
1 PCIe 2/SATA- drive 2/3	Left node
2 Power and sideband signal for drive bay 0/1	
3 PCIe 1/SATA - drive 0/1	
4 PCIe 2/SATA- drive 2/3	Right node
5 Power and sideband signal for drive bay 0/1	
6 PCIe 1/SATA - drive 0/1	

Step 3. Remove the E3.s drive cage assembly.

- a. **1** Remove the three screws.
- b. **2** Remove the E3.s drive cage assembly out of the node.

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

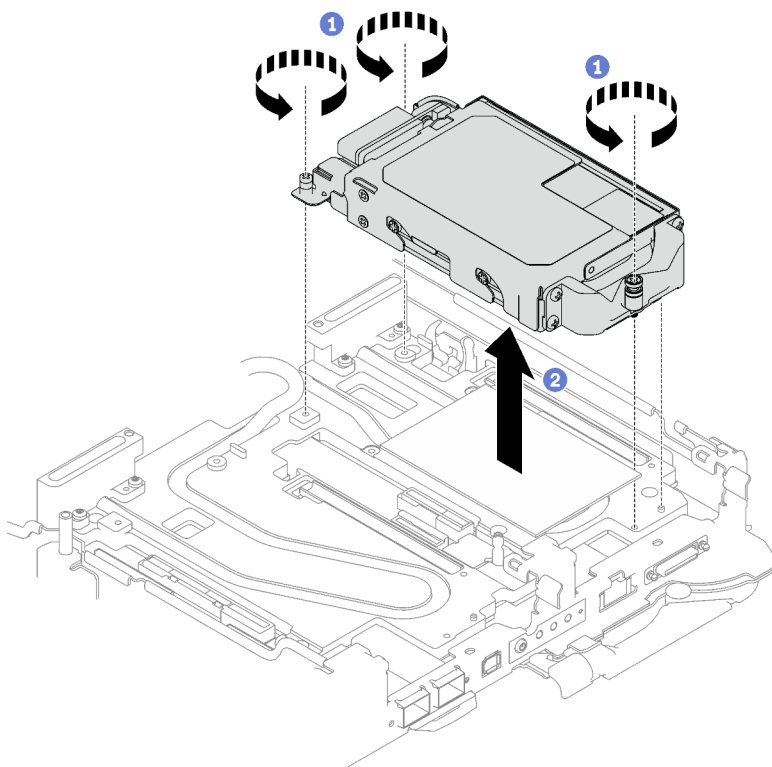


Figure 97. E3.s drive cage assembly removal

Step 4. If necessary, remove the blank bezel fillers.

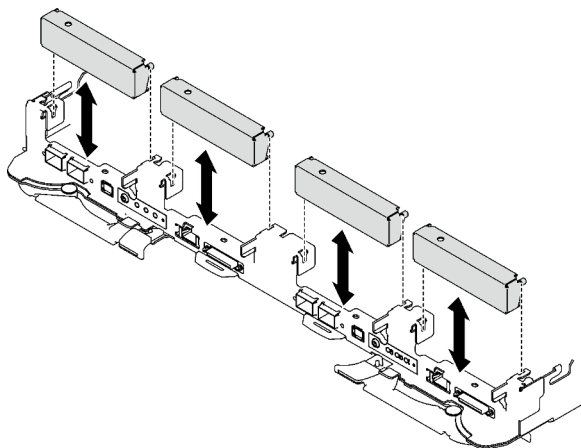


Figure 98. Blank bezel filler removal

After you finish

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

Demo video

[Watch the procedure on YouTube](#)

Remove an E3.s drive

Use this information to remove an E3.s drive.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- E3.S Drive Conduction Plate Assembly
- E3S Putty Pad Kit
- E3S Gap Pad Kit

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

- Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- Remove the cross braces. See [“Remove the cross braces” on page 15](#).
- Remove the E3.s drive cage. See [“Remove the E3.s drive cage assembly” on page 86](#).

Step 2. The cables on the E3.s drive cable-ended backplane are bundled with the cable tie. Unfasten the cable tie to release the cables from it.

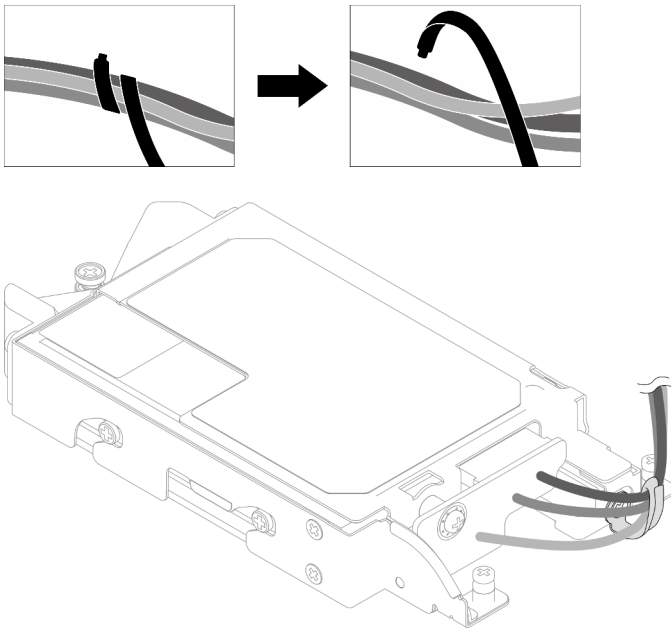


Figure 99. Release cables from the cable tie

Step 3. Remove the screw; then, remove the cable tie from the E3.s drive cage.

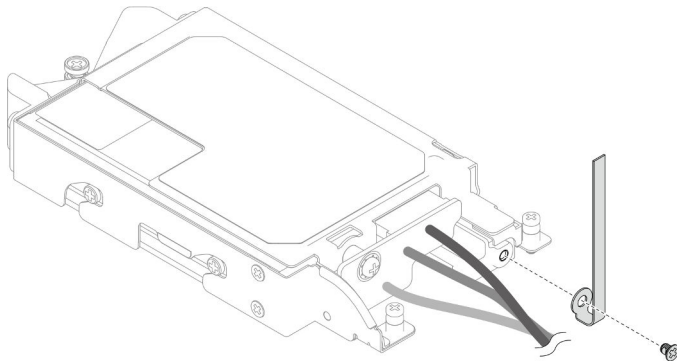


Figure 100. Cable tie removal

Step 4. Remove the E3.s drive cable-ended backplane.

- a. ① Remove the screw.
- b. ② Remove the backplane from the E3.s drive cage.

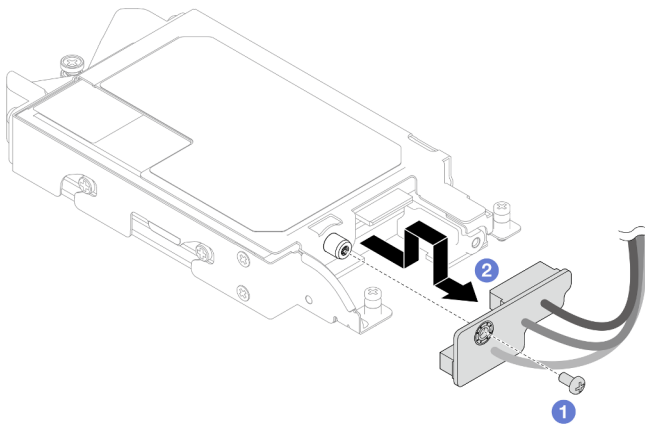


Figure 101. E3.s drive cable-ended backplane removal

Step 5. Remove the bottom E3.s drive from the drive cage.

- a. ① Remove the four screws.
- b. ② Remove the bottom E3.s drive from the E3.s drive cage.

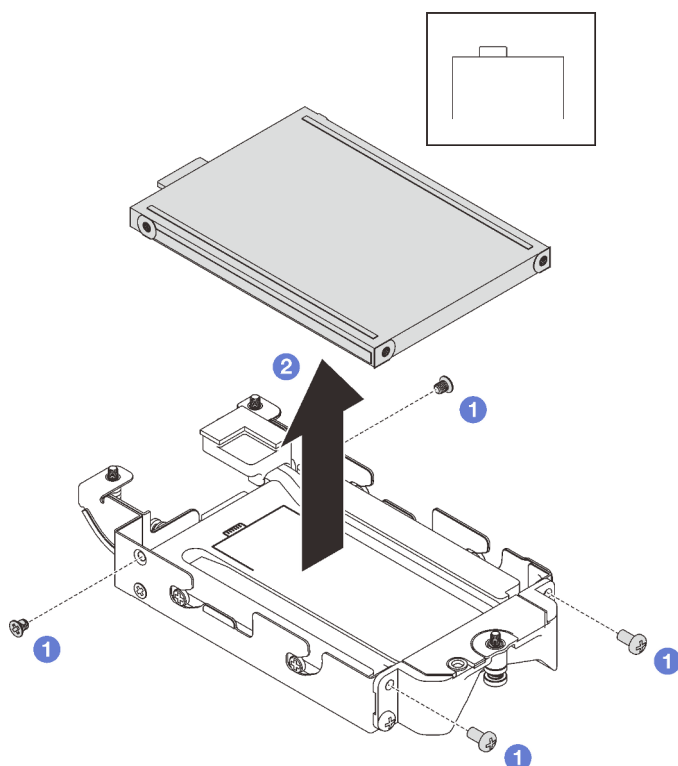


Figure 102. Bottom E3.s drive removal

Step 6. Remove the conduction plate.

- a. ① Remove the two screws.
- b. ② Insert a flat head screwdriver into the notch on the corner of the drive cage; then, slightly rotate the screwdriver to release the conduction plate from the E3.s drive cage.
- c. ③ Remove the conduction plate from the E3.s drive cage.

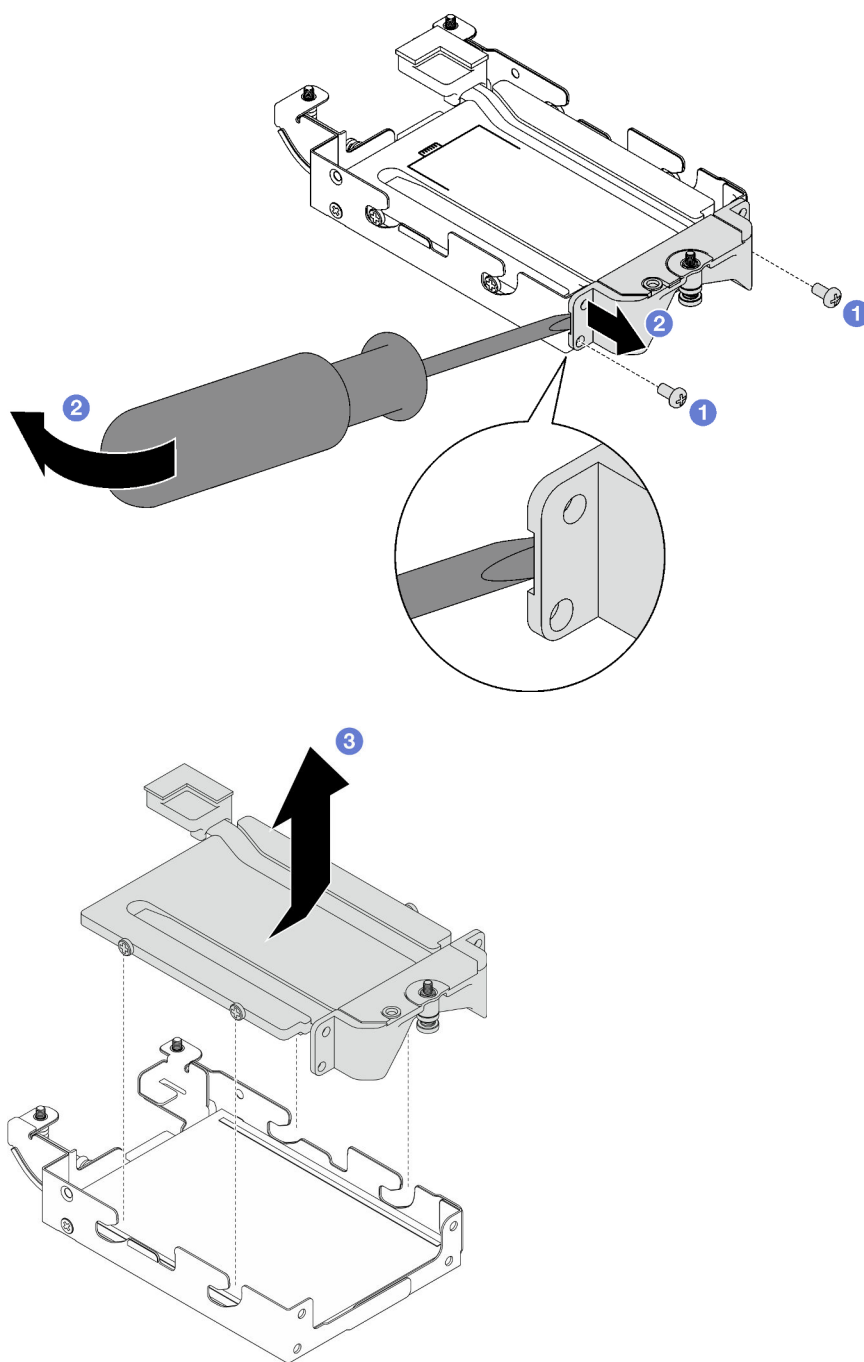


Figure 103. Conduction plate removal

- Step 7. Remove the top E3.s drive.
- a. ❶ Remove the two screws.
 - b. ❷ Remove the top E3.s drive from the drive cage.

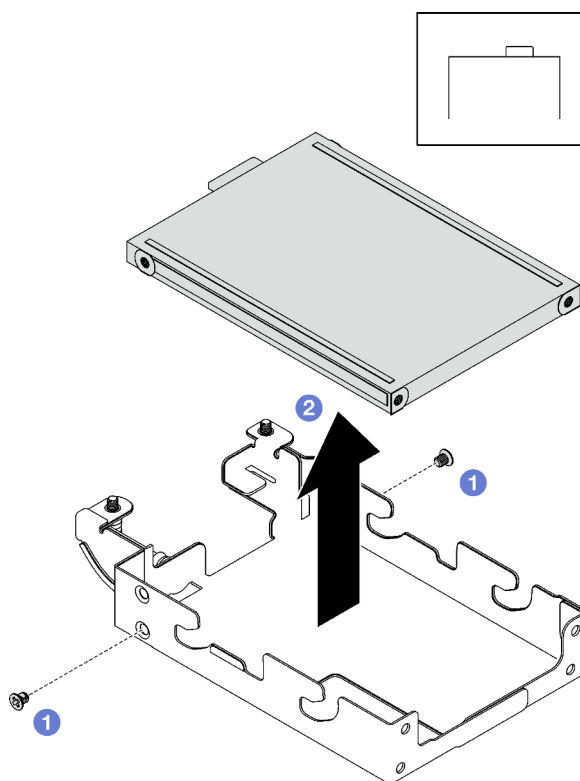


Figure 104. Top E3.s drive removal

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 E3.s drive

Use this information to install an E3.s drive.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- E3.S Drive Conduction Plate Assembly
- E3S Putty Pad Kit
- E3S Gap Pad Kit

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see [“Gap pad/Putty pad identification and location” on page 6](#).
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Procedure

Step 1. Install the top E3.s drive to the E3.s drive cage.

- 1 Orient the E3.s drive so that the connector is on the right side as shown. Then, place the E3.s drive into the E3.s drive cage.
- 2 Fasten the two screws to secure the E3.s drive to the E3.s drive cage

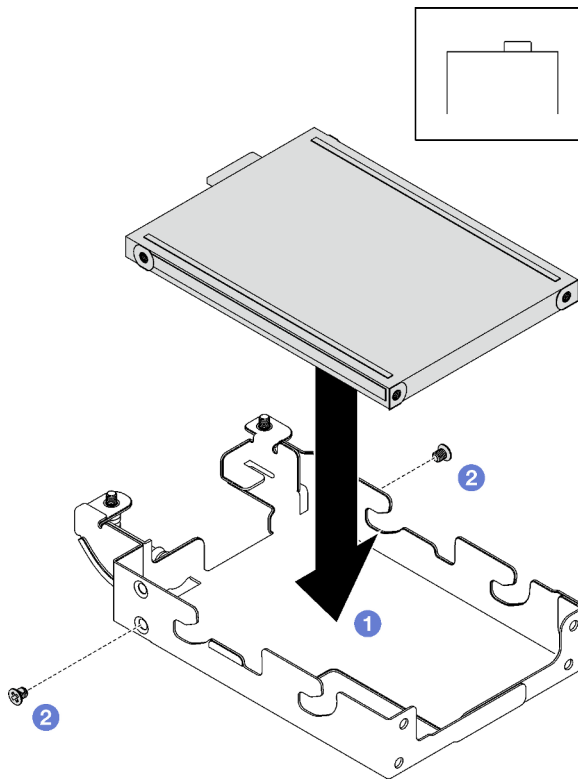


Figure 105. Top E3.s drive installation

Step 2. If the gap pad located on the conduction plate is damaged or detached, discard the conduction plate. Then, install a new conduction plate already attached with the gap pad.

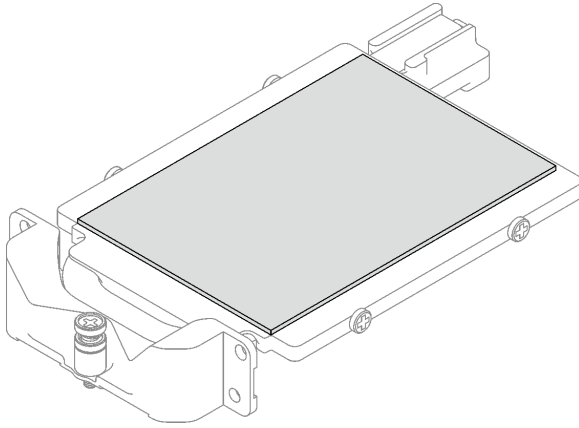


Figure 106. Replacing the conduction plate gap pad

- Step 3. Replace the putty pads on the conduction plate with new ones. Make sure to follow [Gap pad/putty pad replacement guidelines](#)

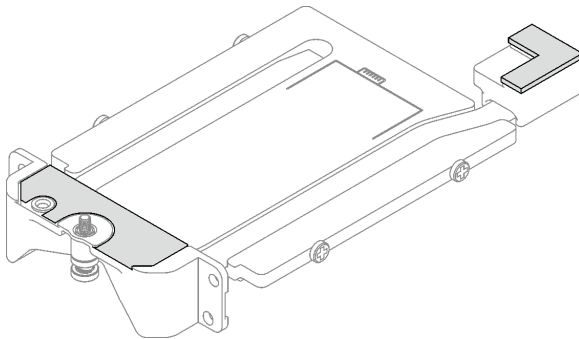


Figure 107. Replacing the conduction plate putty pads

- Step 4. Install the conduction plate to the drive cage.
- 1 Hold the conduction plate at an angle; then, insert the conduction plate into the E3.s drive cage.
 - 2 Fasten the two screws to secure the conduction plate to the E3.s drive cage.

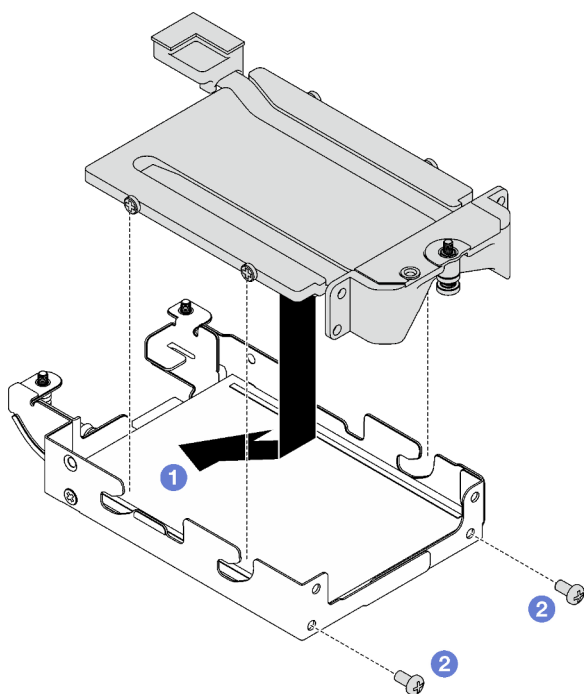


Figure 108. E3.s drive conduction plate installation

Step 5. Install the bottom E3.s drive.

- a. ① Orient the E3.s drive so that the connector is on the left side as shown. Then, place the bottom E3.s drive into the E3.s drive cage.
- b. ② Fasten the four screws to secure the bottom E3.s drive to the E3.s drive cage.

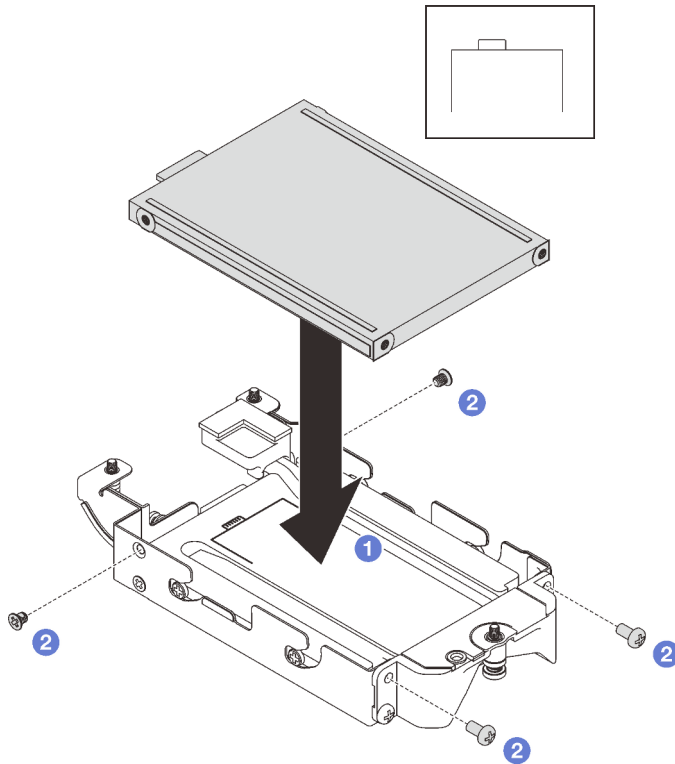


Figure 109. Bottom E3.s drive installation

Step 6. Install the E3.s drive cable-ended backplane.

- a. ① Align the backplane to the screw hole on the E3.s drive cage; then, insert the backplane to the E3.s drive cage.
- b. ② Fasten the screw to secure the backplane to the E3.s drive cage.

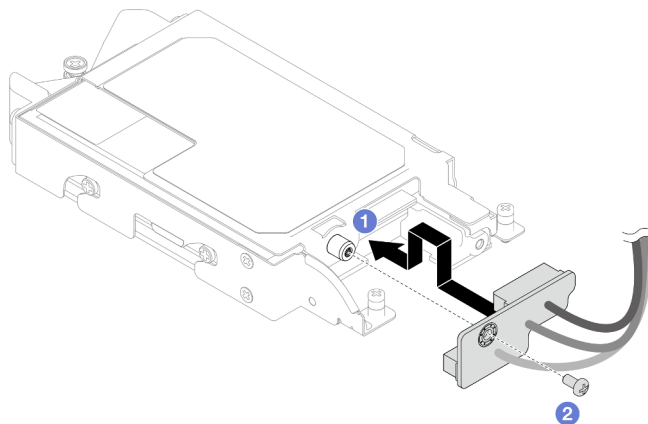


Figure 110. E3.s cable-ended backplane installation

Step 7. Fasten the screw to install the cable tie to the E3.s drive cage.

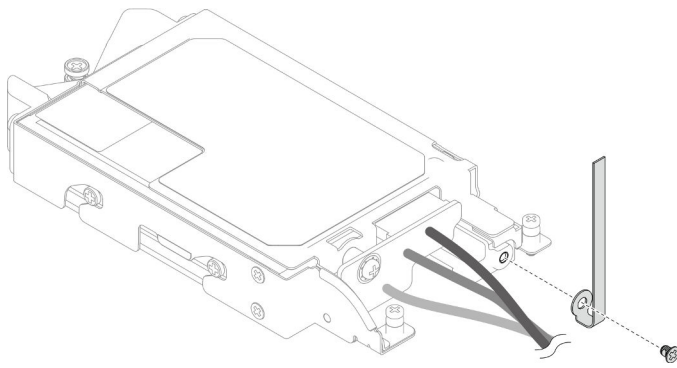


Figure 111. Cable tie installation

Step 8. Bundle the cables on the E3.s drive cable-ended backplane with the cable tie.

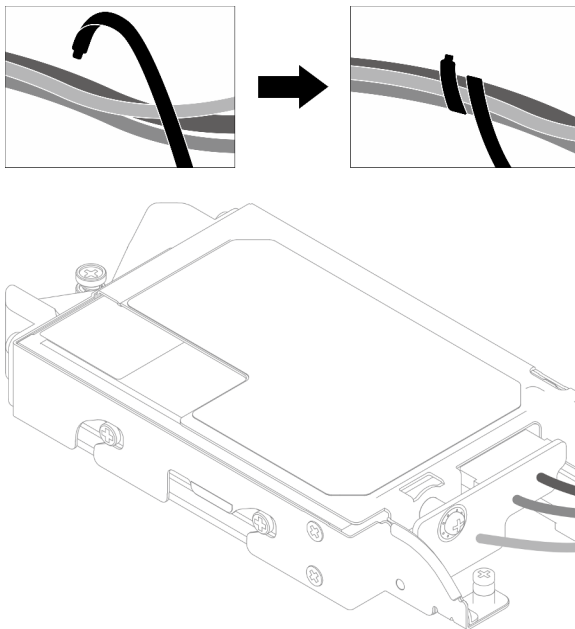


Figure 112. Bundling cables with cable tie

After you finish

1. Install the E3.s drive cage. See [“Install the E3.s drive cage assembly” on page 99](#).
2. Install the cross braces. See [“Install the cross braces” on page 17](#).
3. Install the tray cover. See [“Install the tray cover” on page 14](#).
4. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
5. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

6. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

Install the E3.s drive cage assembly

Use this information to install the E3.s drive cage assembly.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- E3.S Drive Conduction Plate Assembly
- E3S Putty Pad Kit
- E3S Gap Pad Kit

Attention:

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see “[Gap pad/Putty pad identification and location](#)” on page 6.
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

Step 1. Make sure the blank bezel fillers are installed. If not, install them to the node.

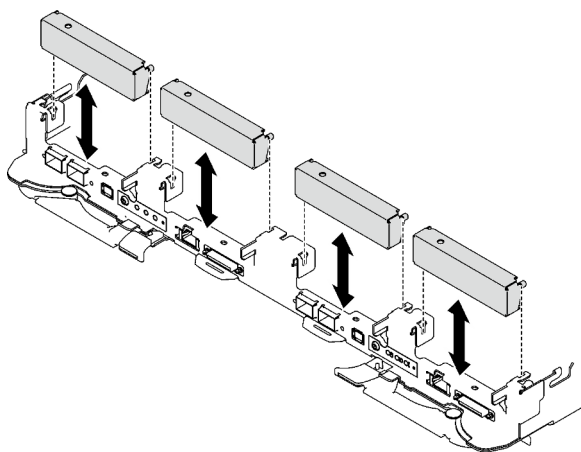


Figure 113. Blank bezel filler installation

Step 2. If the E3.s drive cage gap pad is damaged or missing, replace it with a new one. Make sure to follow [Gap pad/putty pad replacement guidelines](#)

Note: Align the gap pad with marking on water loop when attaching gap pad.

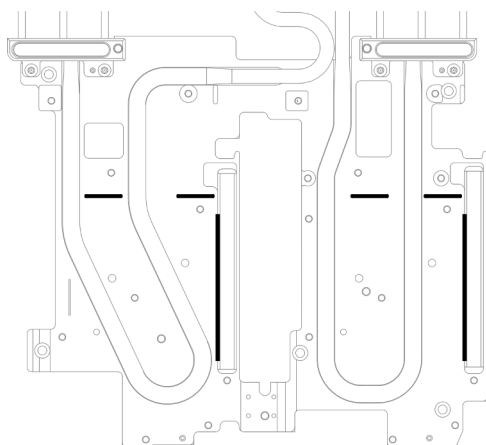


Figure 114. Markings on water loop for E3.S gap pad alignment

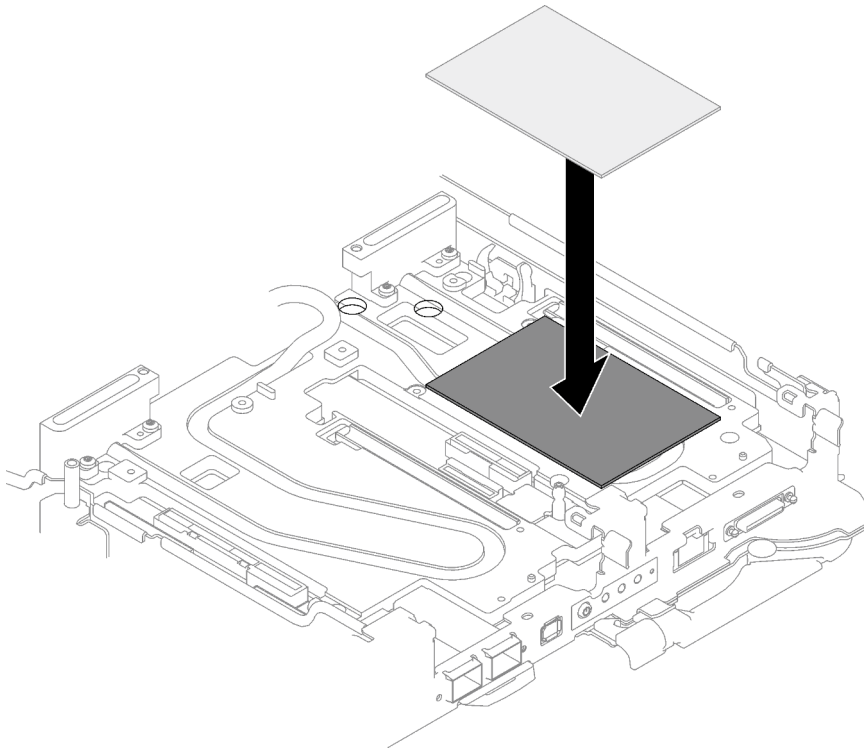


Figure 115. Replacing gap pad

Step 3. Install the E3.s drive cage assembly.

- a. ❶ Install the E3.s drive cage assembly into the node.
- b. ❷ Secure the three screws.

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

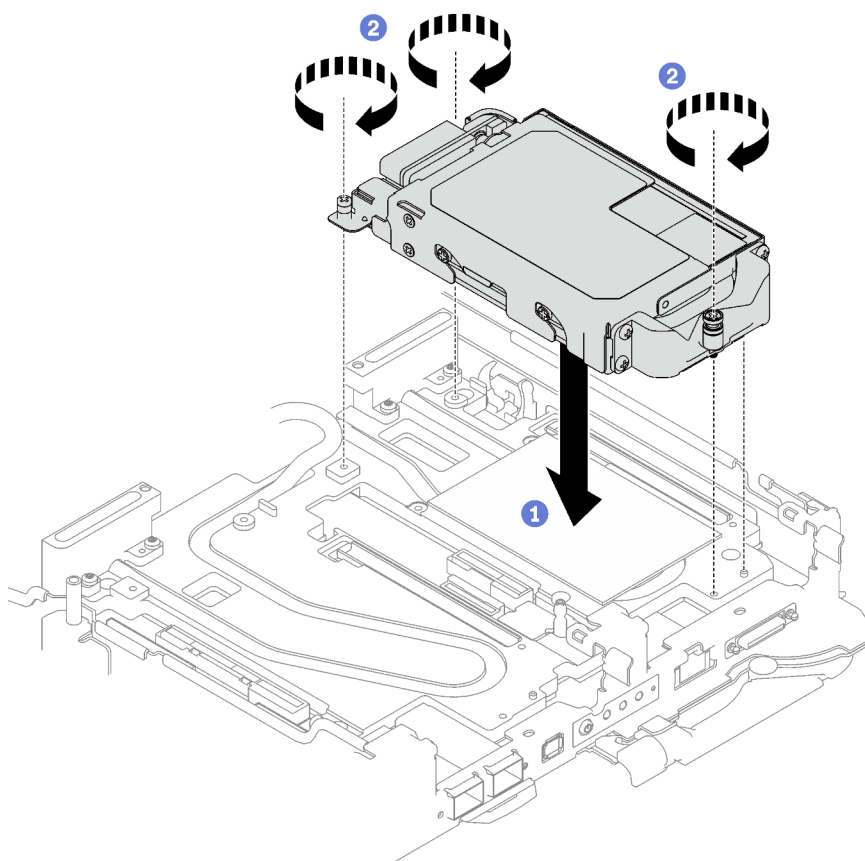


Figure 116. E3.s drive cage assembly installation

- Step 4. Connect the drive assembly cable to the system board. Follow the cable routing below according to the drive configuration in your system. For more information, see “System-board connectors” section in *User Guide* or *System Configuration Guide*.

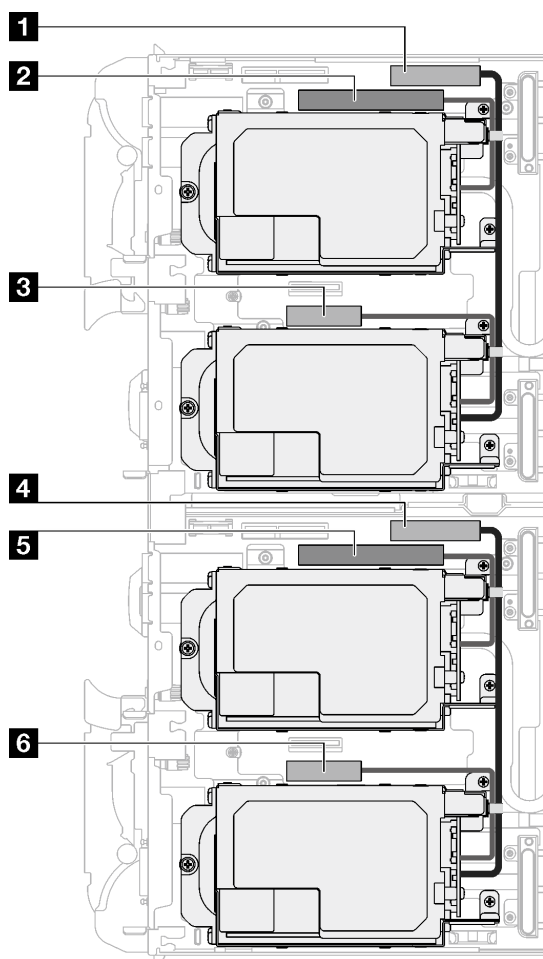


Figure 117. E3.s drives cable routing

Table 15. E3.s drives cable routing

System board connector	Node
1 PCIe 2/SATA- drive 2/3	Left node
2 Power and sideband signal for drive bay 0/1	
3 PCIe 1/SATA - drive 0/1	
4 PCIe 2/SATA- drive 2/3	Right node
5 Power and sideband signal for drive bay 0/1	
6 PCIe 1/SATA - drive 0/1	

After you finish

1. Install the cross braces. See [“Install the cross braces” on page 17](#).
2. Install the tray cover. See [“Install the tray cover” on page 14](#).
3. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
4. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

M.2 drive and backplane replacement

Use the following procedures to remove and install M.2 drive and backplane.

Remove the M.2 backplane assembly

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

About this task

Make sure you have the following kits to properly replace the component:

- SD665 V3 Conduction Plate Parts
- SD665 V3 Miscellaneous Parts Kit
- M.2 Putty Pad Kit

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- b. Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- c. Remove the cross braces. See [“Remove the cross braces” on page 15](#).

Step 2. Disconnect the cable from the system board.

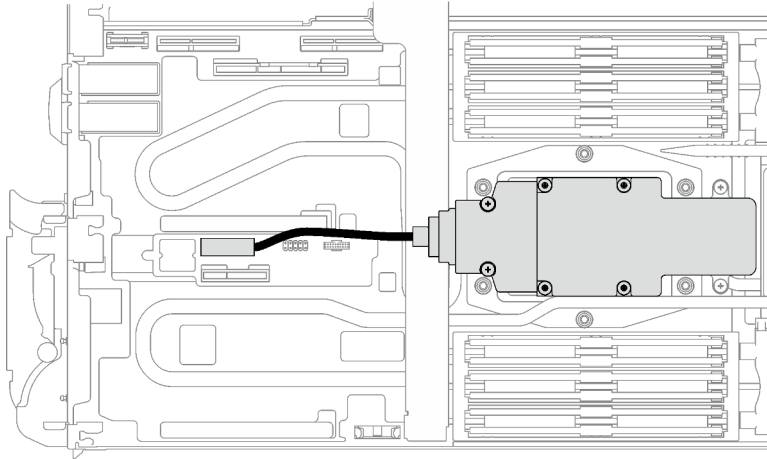


Figure 118. M.2 backplane assembly cable removal

Step 3. Remove the M.2 backplane assembly.

- a. ① Remove the six screws.
- b. ② Remove the M.2 backplane assembly out from the node.
- c. ③ Disconnect the cable from the M.2 backplane assembly.

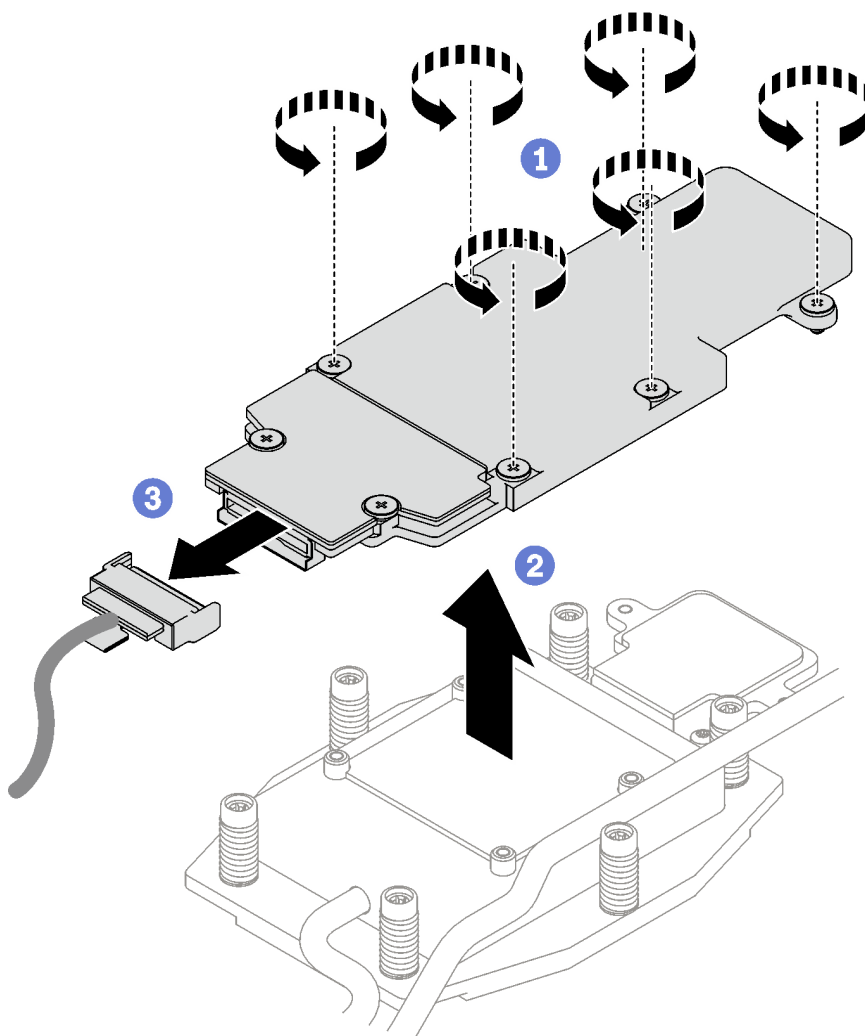


Figure 119. M.2 backplane assembly removal

- Step 4. **(Optional)** If you are removing the water loop, remove the M.2 backplane cold plate.
- 1 Unfasten the two screws.
 - 2 Remove the M.2 backplane cold plate from the processor cold plate.

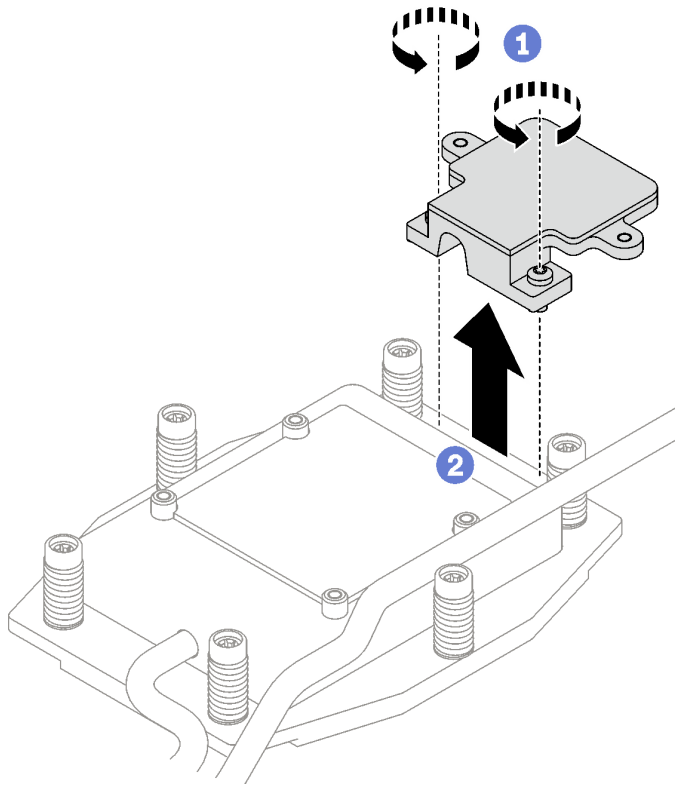


Figure 120. M.2 backplane cold plate removal

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](#)

Remove an M.2 drive

Use this information to remove an M.2 drive.

About this task

Required tools

Make sure you have the M.2 Putty Pad Kit and SD665 V3 Miscellaneous Parts Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10.](#)
- b. Remove the tray cover. See [“Remove the tray cover” on page 13.](#)
- c. Remove the cross braces. See [“Remove the cross braces” on page 15.](#)
- d. Remove the M.2 backplane assembly. See [“Remove the M.2 backplane assembly” on page 104.](#)

Step 2. Remove the M.2 drive.

- a. ❶ Remove the screw securing the M.2 drive.
- b. ❷ Rotate the M.2 drive away from the M.2 backplane assembly at an angle (approximately 30 degrees).
- c. ❸ Pull the M.2 drive away from the connector on the M.2 backplane assembly.

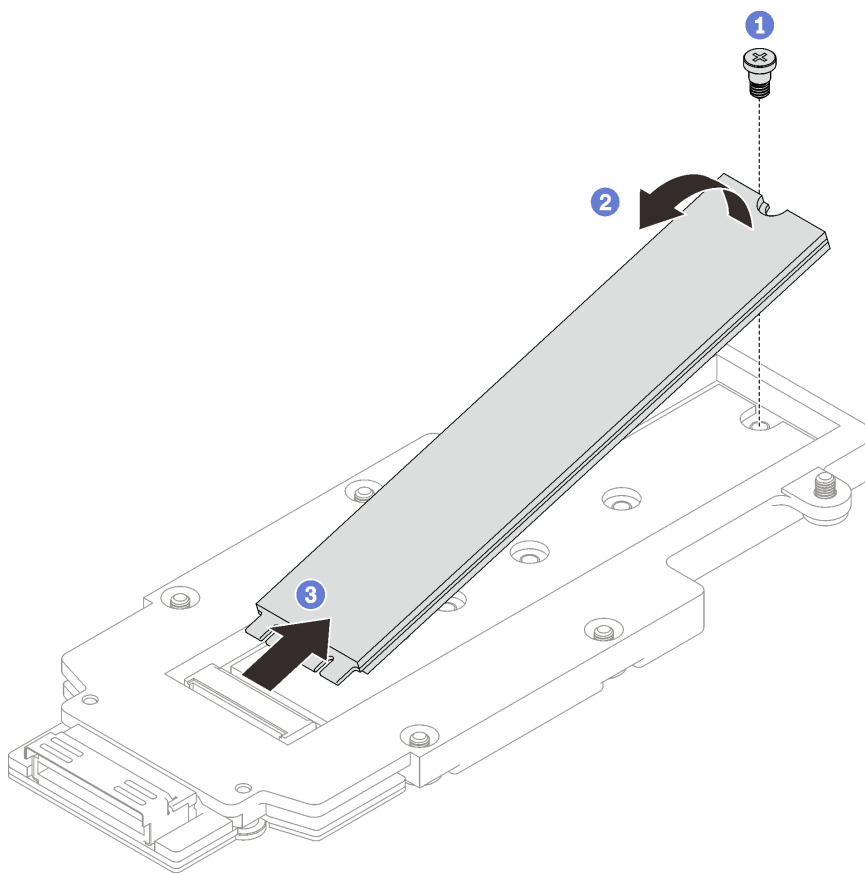


Figure 121. M.2 drive removal

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

Required tools

Make sure you have the M.2 Putty Pad Kit and SD665 V3 Miscellaneous Parts Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see [“Gap pad/Putty pad identification and location” on page 6](#).
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

- Step 1. If the M.2 backplane gap pad is damaged, missing, or fallen off the drive cage, replace it with a new one. Make sure to follow [Gap pad/putty pad replacement guidelines](#)

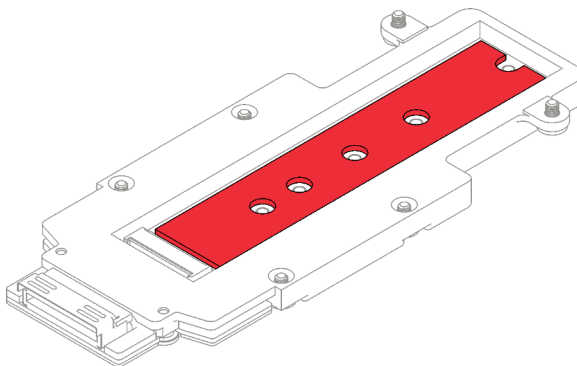


Figure 122. M.2 backplane gap pad

Step 2. Install the M.2 drive.

- a. ① Insert the M.2 drive at an angle (approximately 30 degrees) into the connector on the M.2 backplane assembly.
- b. ② Rotate the M.2 drive into the M.2 backplane assembly.
- c. ③ Secure the M.2 drive with one screw into the corresponding hole.

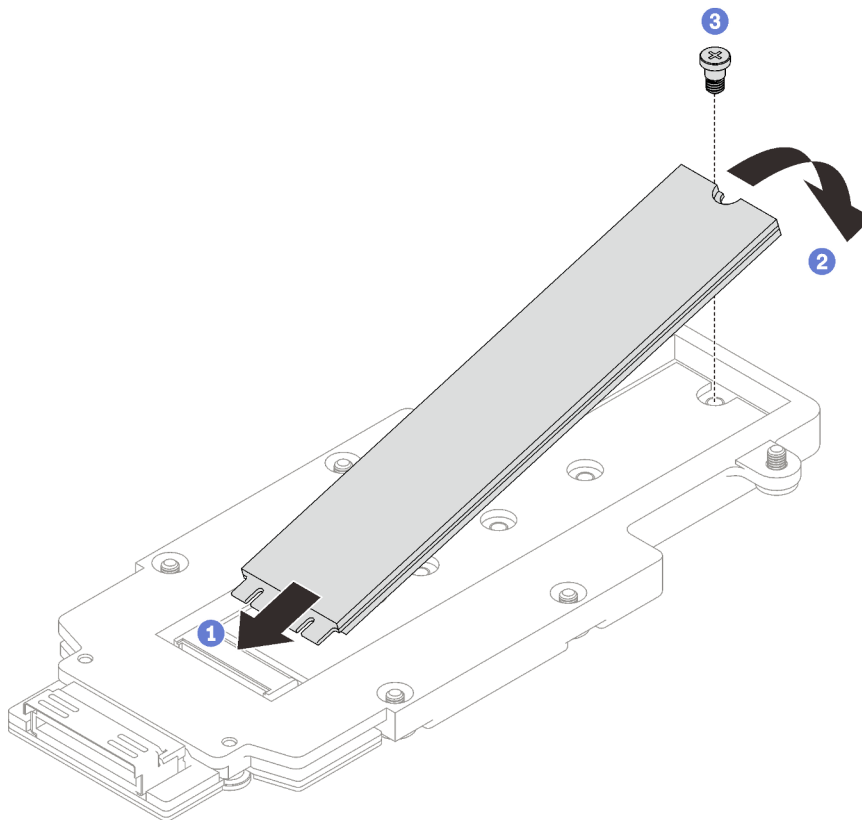


Figure 123. M.2 drive installation

After you finish

1. Install the M.2 backplane assembly. See [“Install the M.2 backplane assembly” on page 110](#).
2. Install the cross braces. See [“Install the cross braces” on page 17](#).
3. Install the tray cover. See [“Install the tray cover” on page 14](#).
4. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
5. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

6. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

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

Required tools

Make sure you have the following kits to properly replace the component:

- SD665 V3 Conduction Plate Parts
- SD665 V3 Miscellaneous Parts Kit
- M.2 Putty Pad Kit

Attention:

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see “[Gap pad/Putty pad identification and location](#)” on page 6.
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

- Step 1. Replace the putty pad on bottom side of the M.2 backplane cold plate with new ones. Make sure to follow [Gap pad/putty pad replacement guidelines](#).

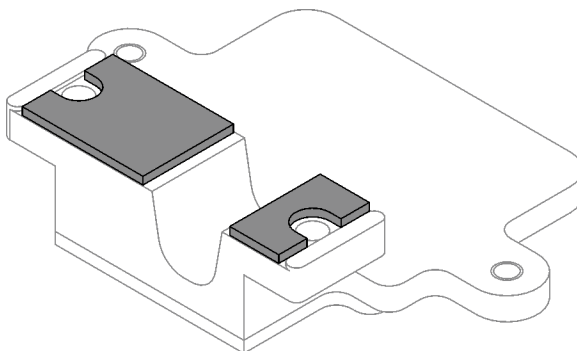


Figure 124. Putty pads on the M.2 backplane cold plate (bottom side)

- Step 2. Install the M.2 backplane cold plate.
- a. ① Place the M.2 cold plate onto the front processor (Processor 1) cold plate.

- b. ② Fasten the two screws to secure the M.2 backplane cold plate to the processor cold plate.

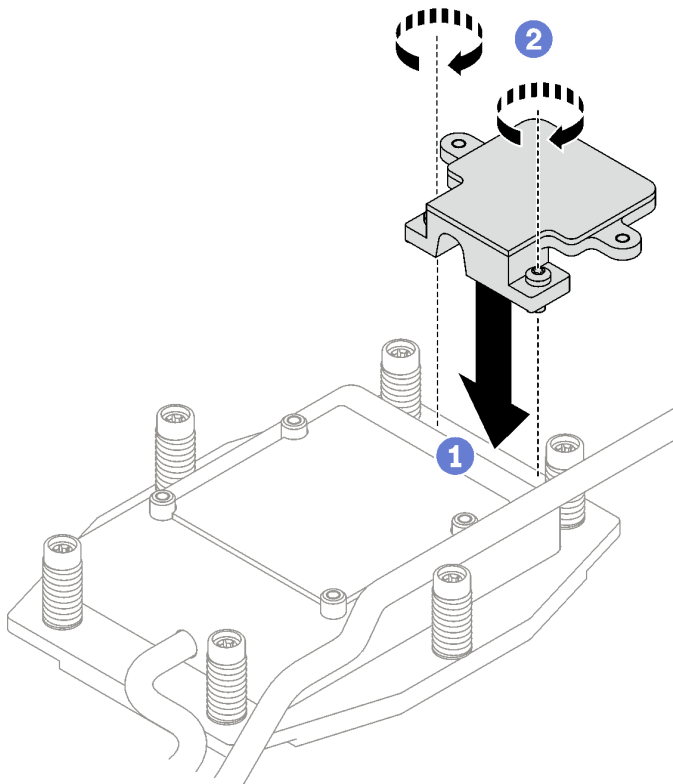


Figure 125. M.2 backplane cold plate installation

- Step 3. Replace the putty pad on the processor (Processor 1) cold plate and the M.2 backplane cold plate with new ones. Make sure to follow [Gap pad/putty pad replacement guidelines](#).

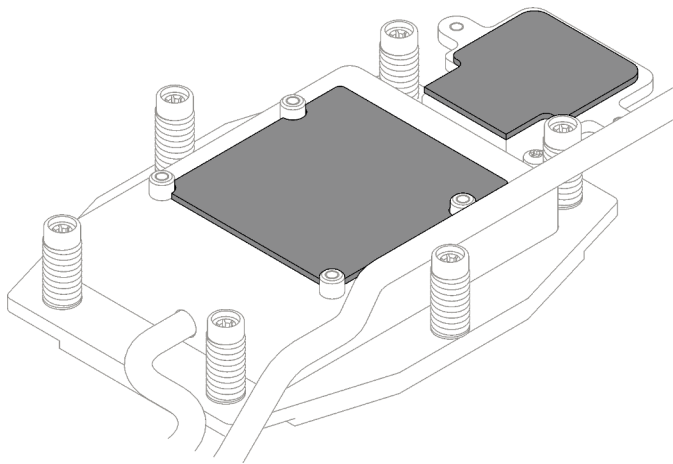


Figure 126. Putty pads on processor cold plate and M.2 cold plate

- Step 4. Install the M.2 backplane assembly.
- ① Connect the cable to the M.2 backplane assembly.
 - ② Install the M.2 backplane assembly into the node.
 - ③ Secure the six screws.

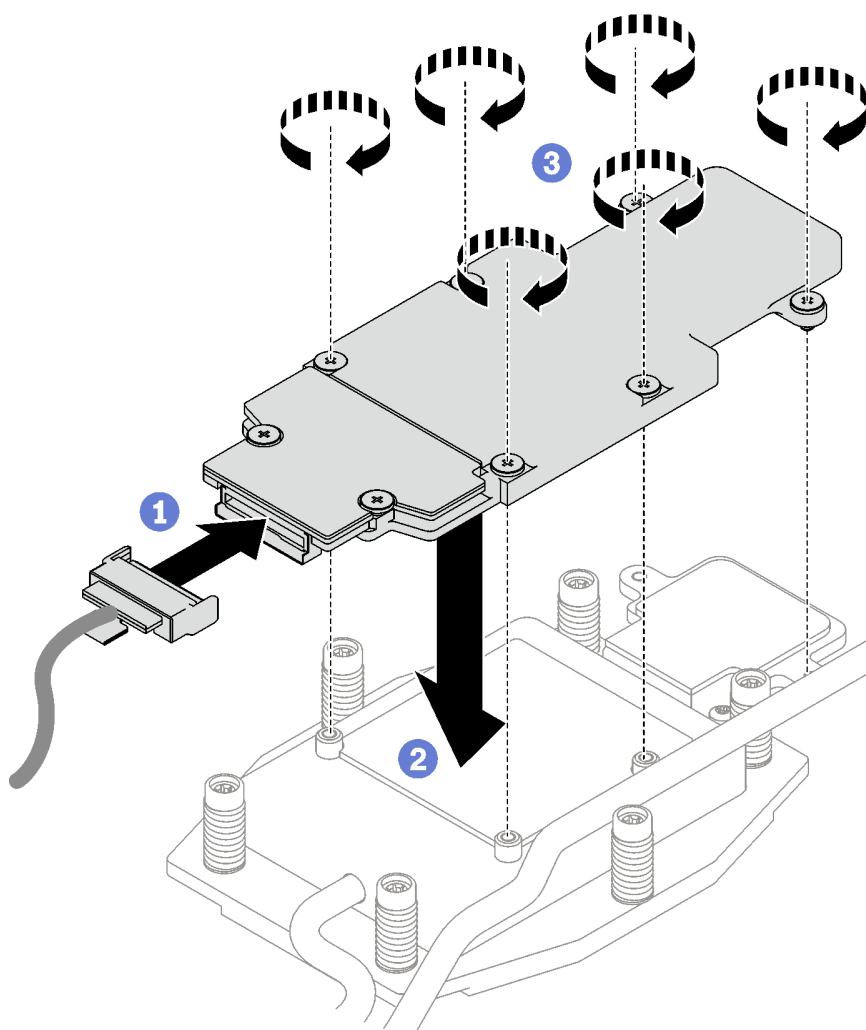


Figure 127. M.2 backplane assembly installation

Step 5. Connect the cable to the system board.

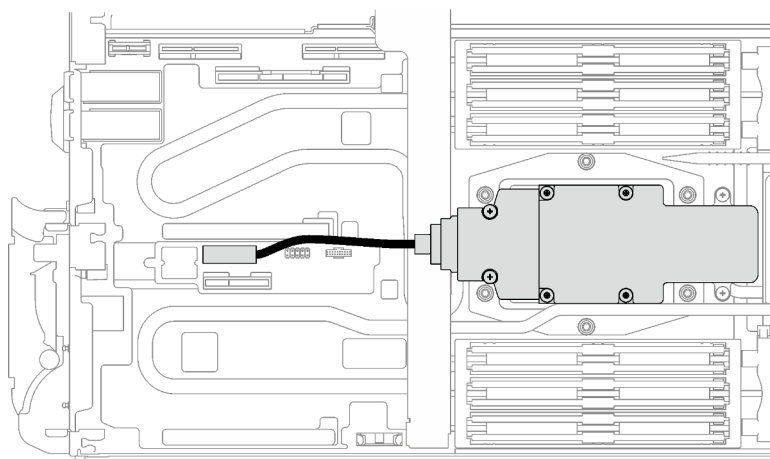


Figure 128. M.2 backplane assembly cable installation

After you finish

1. Install the cross braces. See [“Install the cross braces” on page 17](#).
2. Install the tray cover. See [“Install the tray cover” on page 14](#).
3. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
4. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

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

Important: When removing/installing the memory module, do not tilt the memory module and keep it at an upright position to prevent damaging the gap pad.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect the power cords and all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.
- Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.
- Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for [“Handling static-sensitive devices” on page 4](#):
 - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
 - Never hold two or more memory modules together so that they touch. Do not stack memory modules directly on top of each other during storage.
 - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory-module connector housing.
 - Handle memory modules with care: never bend, twist, or drop a memory module.
- Before installing 24 Gb DRAM RDIMMs, make sure to update the UEFI firmware to the latest version first, then remove all existing 16 Gb DRAM RDIMMs.

The following illustration shows the location of the memory module connectors on the system board.

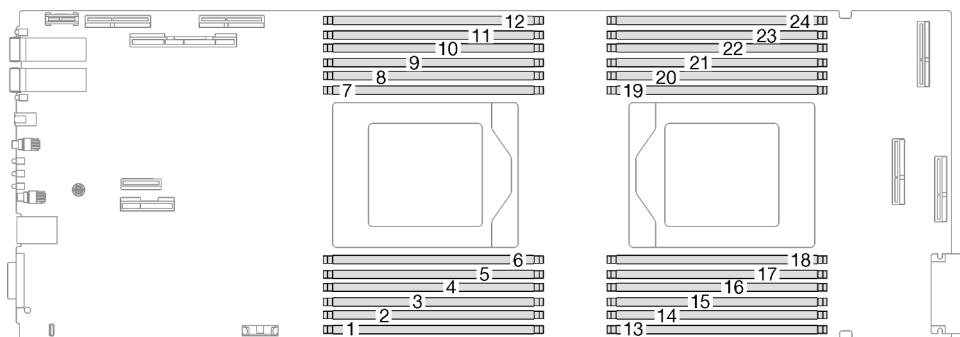


Figure 129. Memory module connector location

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

Procedure

Notes:

- Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.
- Depending on the model, your solution might look slightly different from the illustration.

Step 1. Make preparations for this task.

- Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- Remove the tray cover. See [“Remove the tray cover” on page 13](#).

Step 2. Remove the memory module tool attached to the DIMM comb.

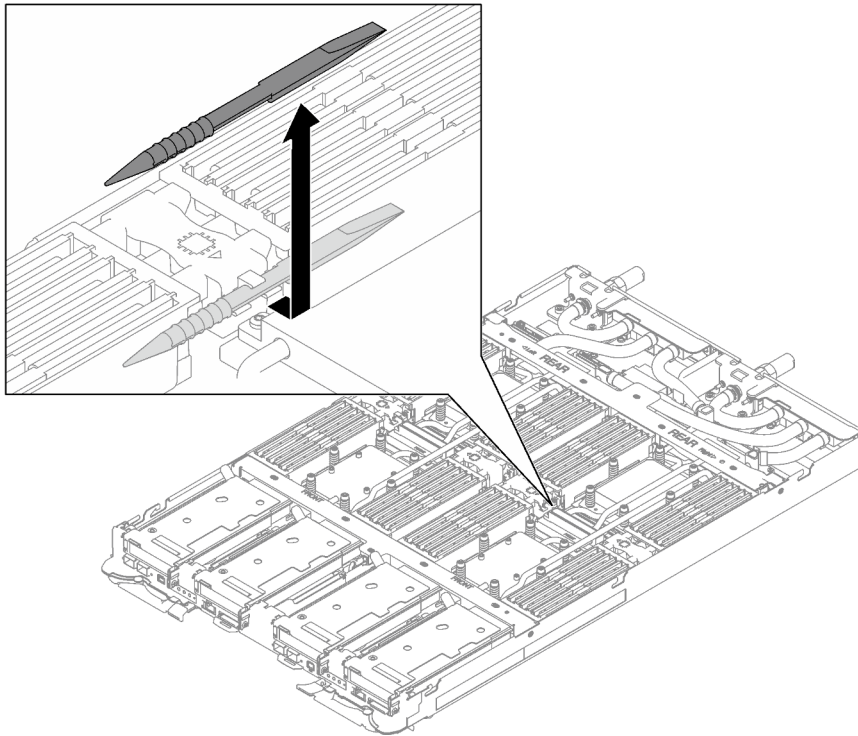


Figure 130. Memory module tool removal

Note: Memory module tool is recommended due to space limitations caused by location of water loop tubes through the memory section.

Step 3. Remove the DIMM cover.

Note: Do not tilt the DIMM cover and keep it at an upright position to prevent damaging the gap pads.

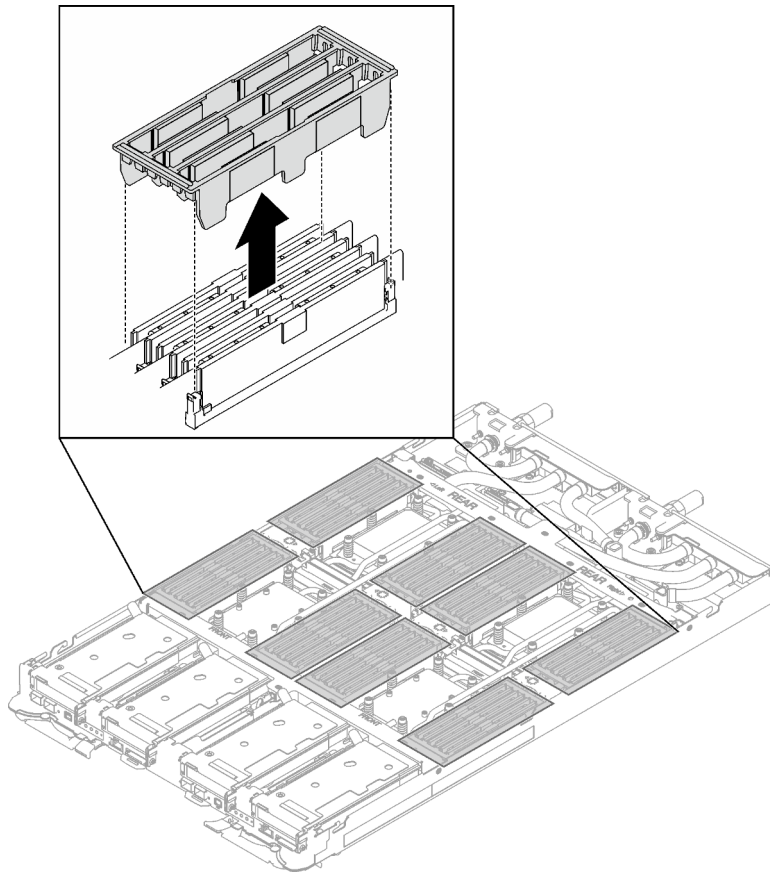


Figure 131. DIMM cover removal

- Step 4. Carefully use the memory module tool to press the retaining clips outward on each end of the memory module connector.

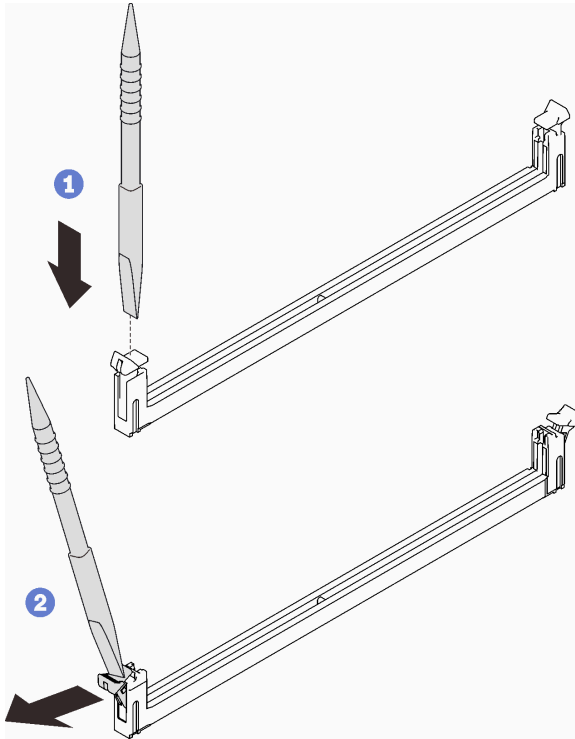


Figure 132. Pressing retaining clips on memory module connector

Attention:

- Memory modules are static-sensitive devices. The package must be grounded before it is opened.
- To avoid breaking the retaining clips or damaging the memory module connectors, open and close the clips gently.

Step 5. Carefully remove the memory module.

Attention: When removing/installing the memory module, do not tilt the memory module and keep it at an upright position to prevent damaging the gap pad.

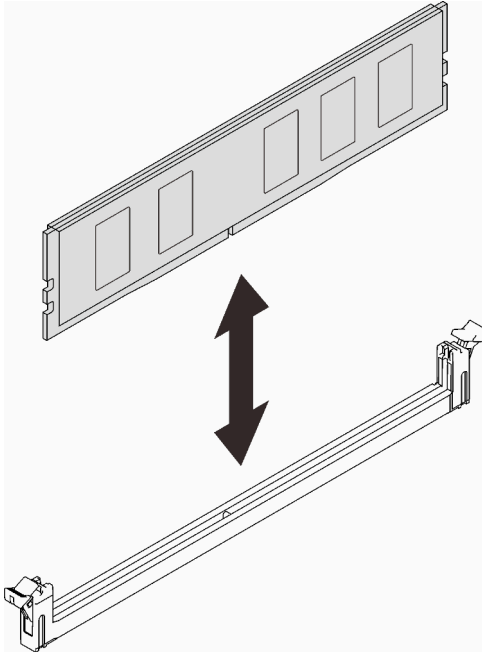


Figure 133. Memory module removal

Step 6. Install the DIMM cover.

Note: Do not tilt the DIMM cover and keep it at an upright position to prevent damaging the gap pads.

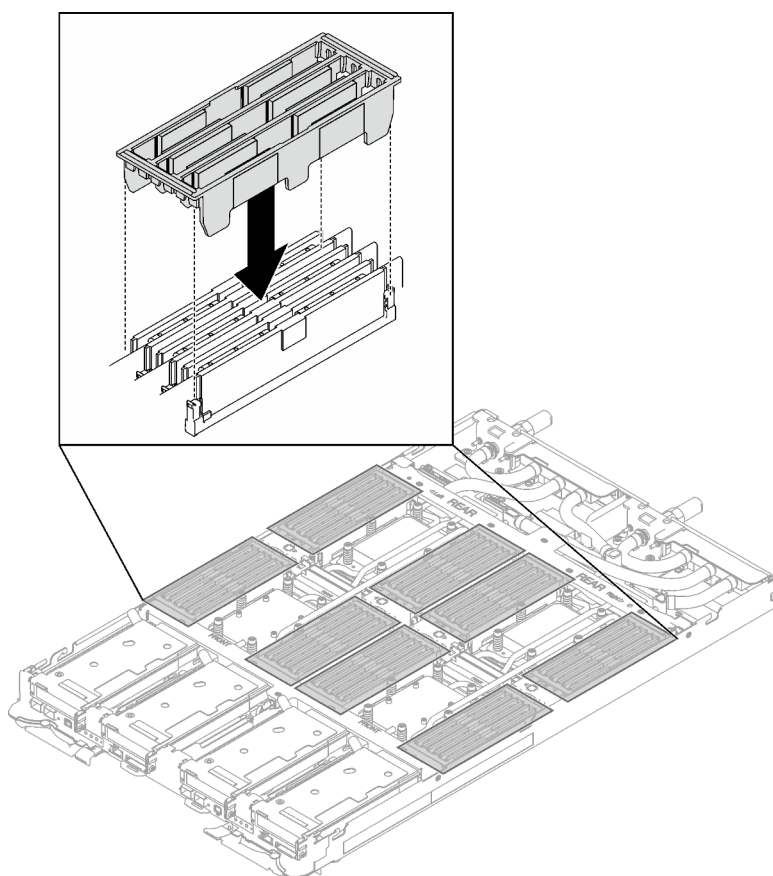


Figure 134. DIMM cover installation

Step 7. Install the memory module tool to the DIMM comb on the left side of the node.

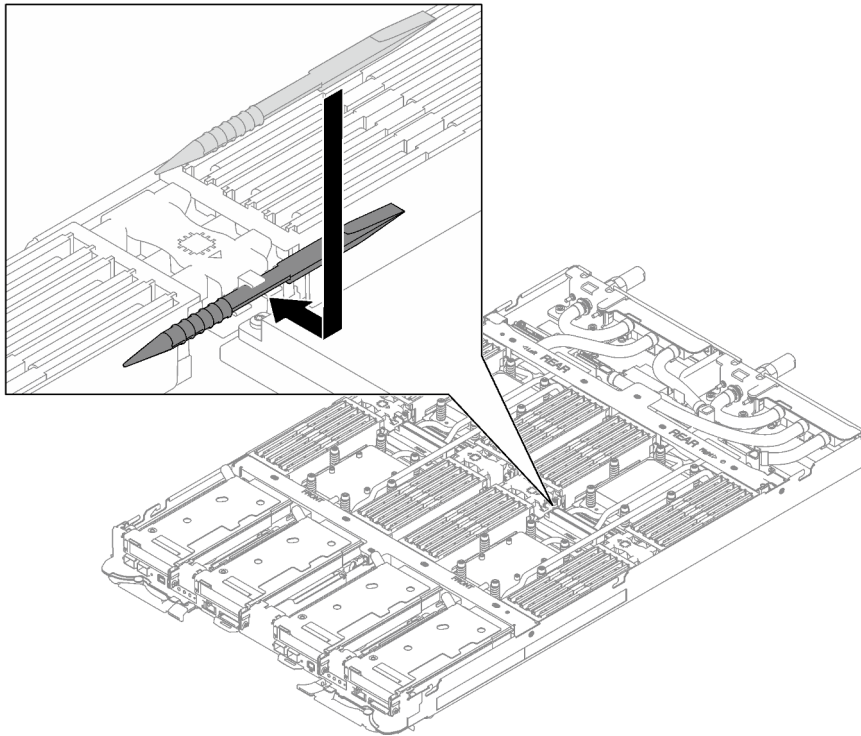


Figure 135. Memory module tool installation

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 memory module

Use this information to install a memory module.

About this task

See for detailed information about memory configuration and setup.

Important: When removing/installing the memory module, do not tilt the memory module and keep it at an upright position to prevent damaging the gap pad.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.
- Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for [“Handling static-sensitive devices” on page 4](#):

- Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
- Never hold two or more memory modules together so that they touch. Do not stack memory modules directly on top of each other during storage.
- Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory-module connector housing.
- Handle memory modules with care: never bend, twist, or drop a memory module.
- 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.
- DIMM fillers must be installed in unused slots for proper cooling.
- Before installing 24 Gb DRAM RDIMMs, make sure to update the UEFI firmware to the latest version first, then remove all existing 16 Gb DRAM RDIMMs.

The following illustration shows the location of the memory module connectors on the system board.

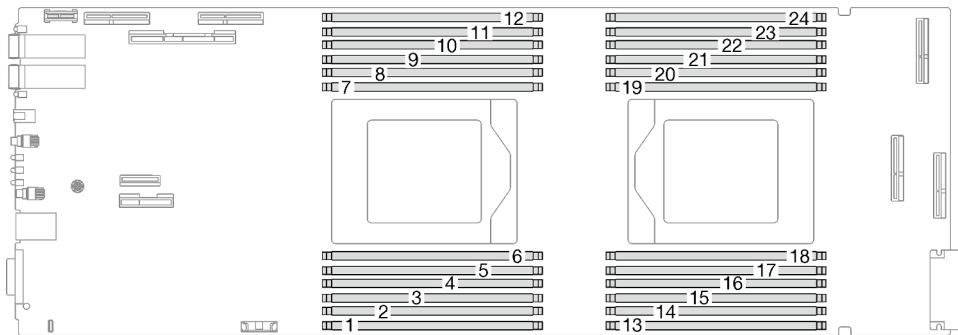


Figure 136. Memory module connector location

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

Notes:

- Make sure to remove or install memory module 20 seconds after disconnecting power cords from the system. It allows the system to be completely discharged of electricity and safe for handling memory module.
- Depending on the model, your solution might look slightly different from the illustration.

Step 1. Remove the memory module tool attached to the DIMM comb.

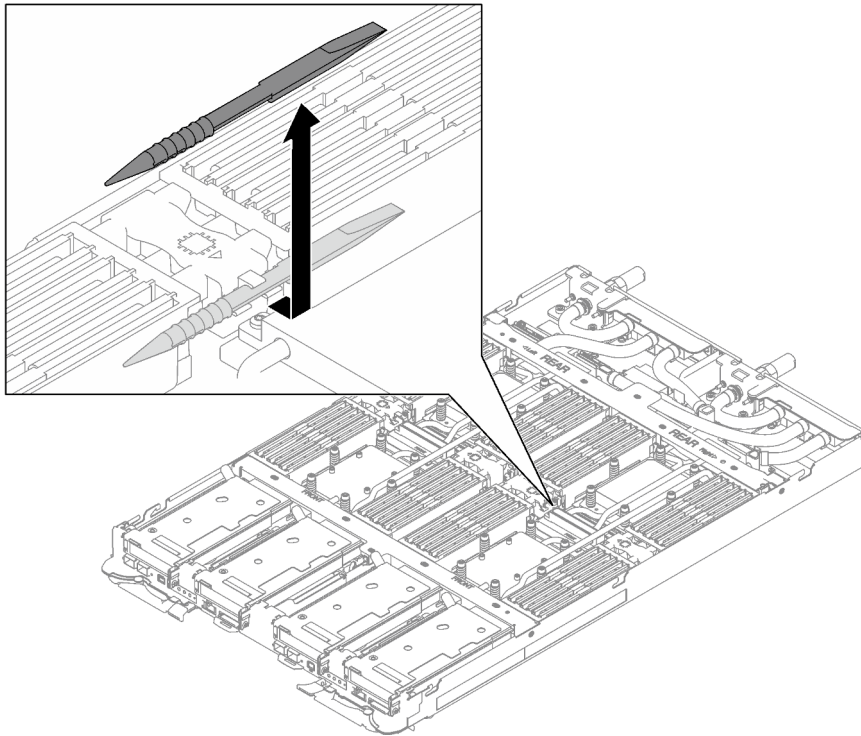


Figure 137. Memory module tool removal

Note: Memory module tool is recommended due to space limitations caused by location of water loop tubes through the memory section.

Step 2. Remove the DIMM cover.

Note: Do not tilt the DIMM cover and keep it at an upright position to prevent damaging the gap pads.

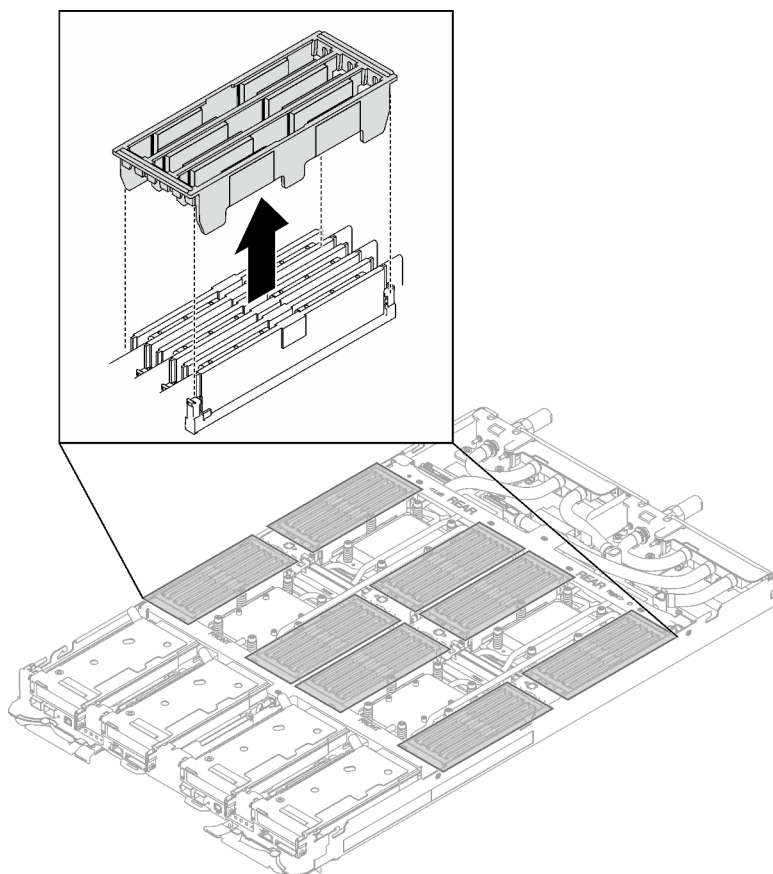


Figure 138. DIMM cover removal

- Step 3. Carefully use the memory module tool to press the retaining clips outward on each end of the memory module connector.

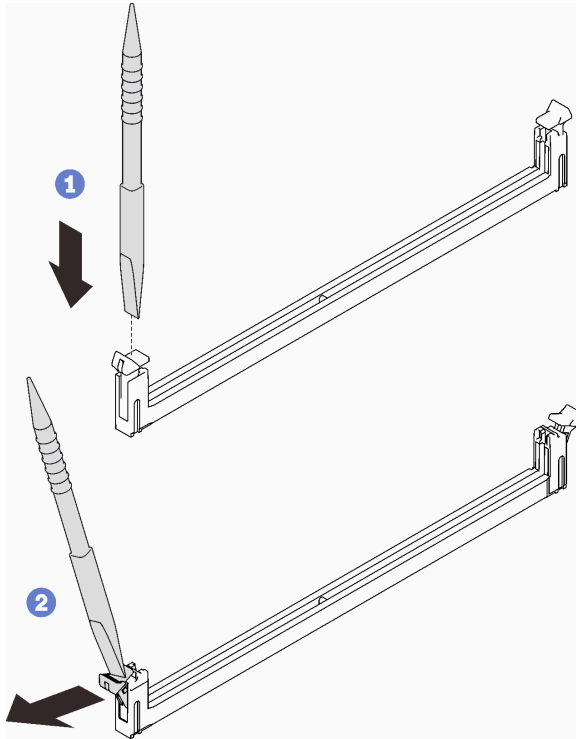


Figure 139. Pressing retaining clips on memory module connector

Attention:

- Memory modules are static-sensitive devices. The package must be grounded before it is opened.
- To avoid breaking the retaining clips or damaging the memory module connectors, open and close the clips gently.

- Step 4. Touch the static-protective package that contains the memory module to any unpainted metal surface on the outside of the node; then, remove the memory module from the package.
- Step 5. Align the memory module with the slot, and gently place the memory module on the slot with both hands.
- Step 6. Firmly press both ends of the memory module straight down into the slot until the retaining clips snap into the locked position.

Attention: When removing/installing the memory module, do not tilt the memory module and keep it at an upright position to prevent damaging the gap pad.

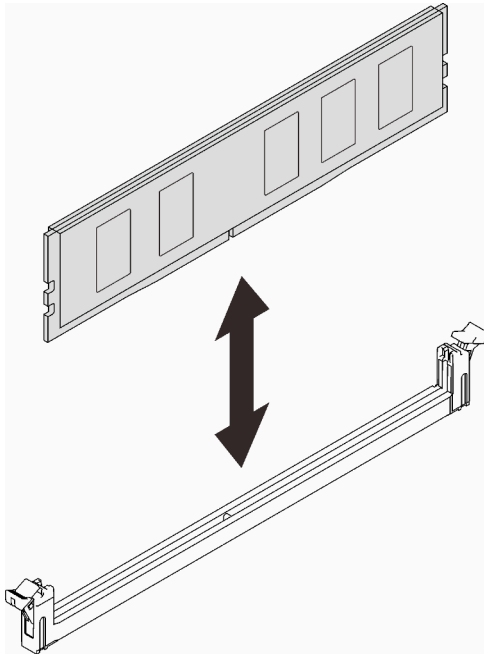


Figure 140. Memory module installation

Note: If there is a gap between the memory module and the retaining clips, the memory module has not been correctly inserted; open the retaining clips, remove the memory module, and then reinsert it.

Step 7. Install the DIMM cover.

Note: Do not tilt the DIMM cover and keep it at an upright position to prevent damaging the gap pads.

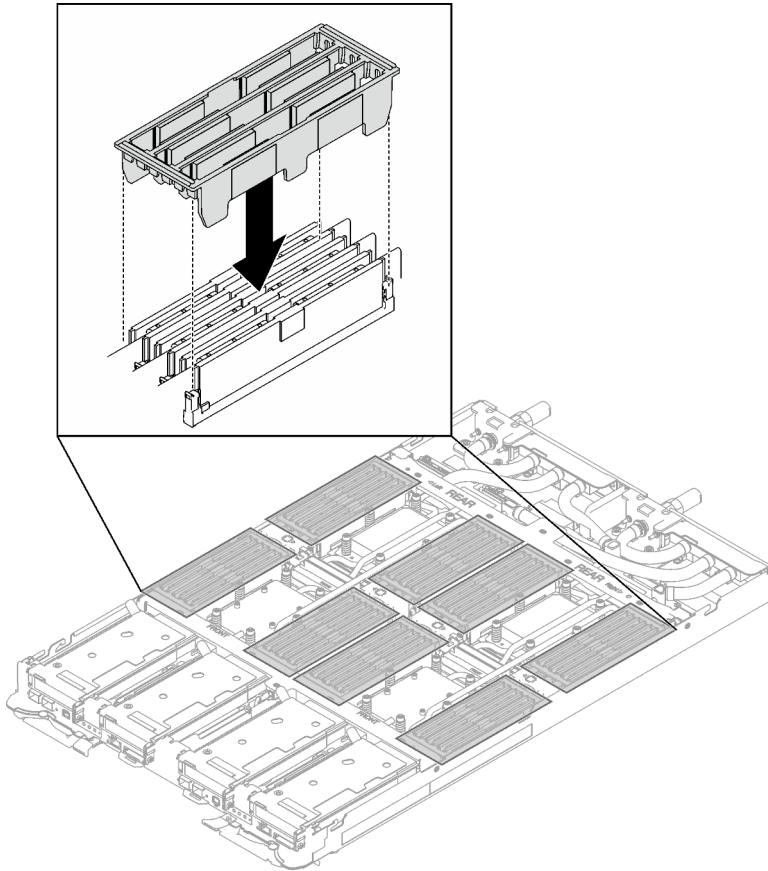


Figure 141. DIMM cover installation

Step 8. Install the memory module tool to the DIMM comb on the left side of the node.

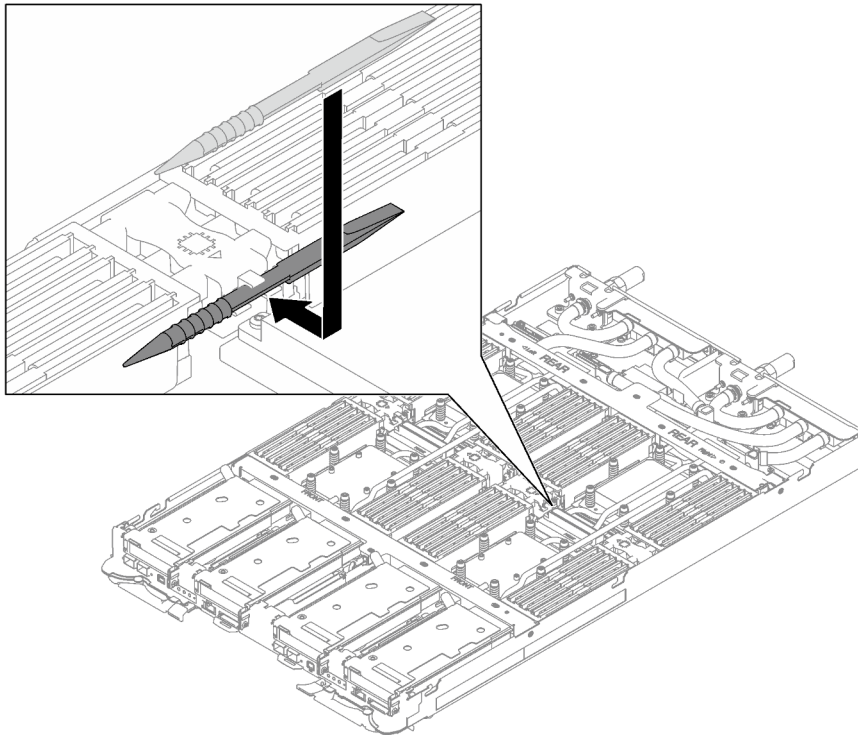


Figure 142. Memory module tool installation

After you finish

1. Install the tray cover. See [“Install the tray cover” on page 14](#).
2. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
3. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

4. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

PCIe adapter replacement

Use the following procedures to remove and install a PCIe adapter.

Remove a PCIe adapter

Use this information to remove a PCIe adapter.

About this task

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.

- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Note: The following illustration might differ slightly from your hardware, but the removal method is the same.

Procedure

Step 1. Make preparations for this task.

- Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10.](#)
- Remove the tray cover. See [“Remove the tray cover” on page 13.](#)
- Remove the cross braces. See [“Remove the cross braces” on page 15.](#)
- Remove the PCIe riser assembly. Depending on your configuration, see [“Remove a PCIe riser assembly \(ConnectX-6\)” on page 133](#), [“Remove a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 141](#), or [“Remove a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 154.](#)

Step 2. Remove the screw; then, grasp the adapter by its edges and carefully pull it out of the PCIe riser-cage.

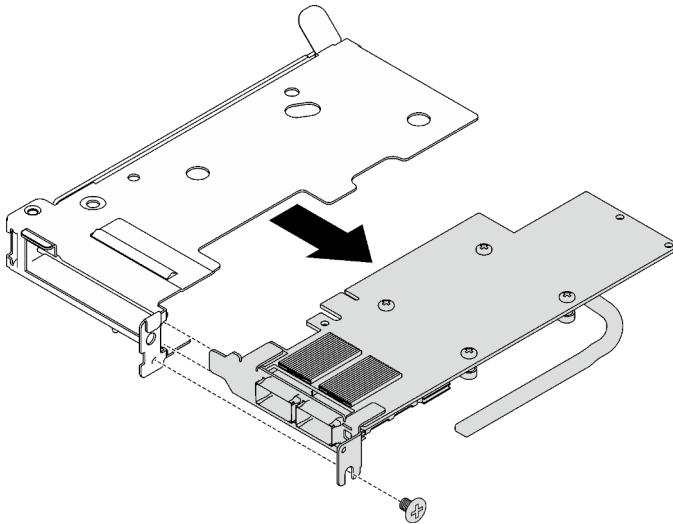


Figure 143. PCIe adapter removal

Step 3. For shared I/O or socket direct configurations, disconnect the cable.

- ① Carefully pull the two latches outward.
- ② Open the bottom cable clip cover.
- ③ Remove the cable clip away from the connectors.
- ④ Gently grasp and pull the black plastic sheets outward.
- ⑤ Pull the cable connectors out of the adapter.

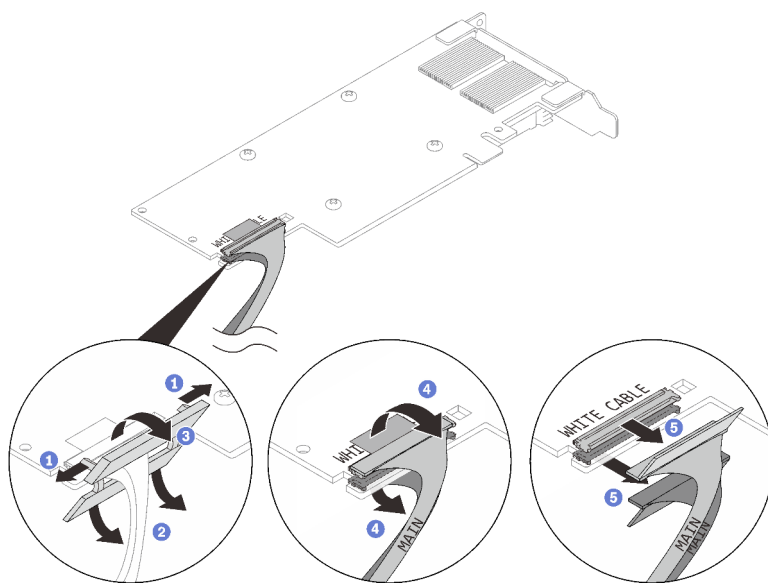


Figure 144. PCIe adapter cable removal

Step 4. If necessary, install a filler into the PCIe riser-cage and secure it with a screw.

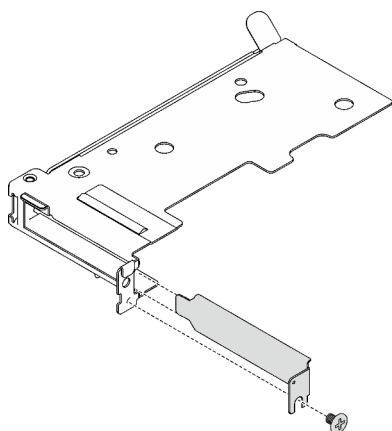


Figure 145. Filler installation

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 PCIe adapter

Use this information to install a PCIe adapter.

About this task

Attention:

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Watch the procedure

A video of this procedure is available at YouTube: <https://www.youtube.com/playlist?list=PLYV5R7hVcs-BqLjGu7K9CniVdCJdoLwS2>.

Procedure

Step 1. If a filler is installed, remove the screw and remove the filler out of the PCIe riser-cage.

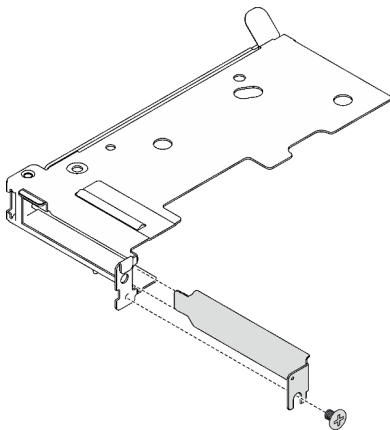


Figure 146. Filler removal

Step 2. For shared I/O or socket direct configurations, connect the cable.

- 1 Gently push the connectors into the slots.
- 2 Close the cable covers and slightly press the cable covers until they click into place.
- 3 On the side without the copper tubing of the PCIe adapter, insert the two latches into the slots next to the connectors.
- 4 Close the cable clip covers and slightly press them to secure the connectors.

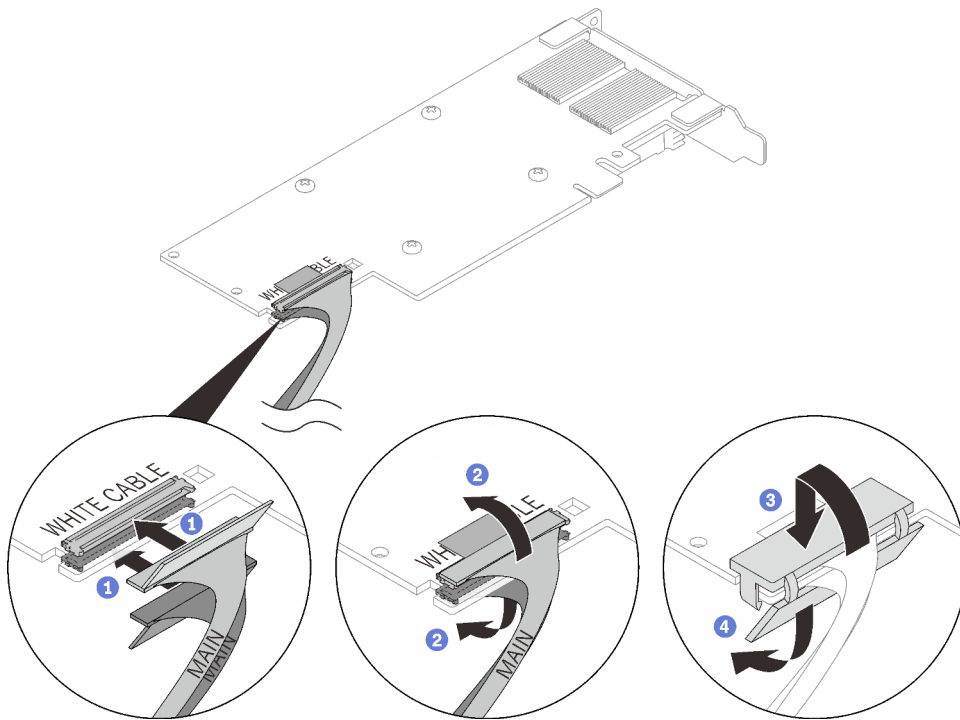


Figure 147. PCIe adapter cable installation

Attention: There are **WHITE CABLE** and **BLACK CABLE** callouts on the adapter, connect the cables to the connectors according to the cable colors.

- Step 3. Align the adapter with the PCIe slot on the riser-cage; then, carefully press the adapter straight into the slot until it is securely seated. Fasten the screw to secure the adapter.

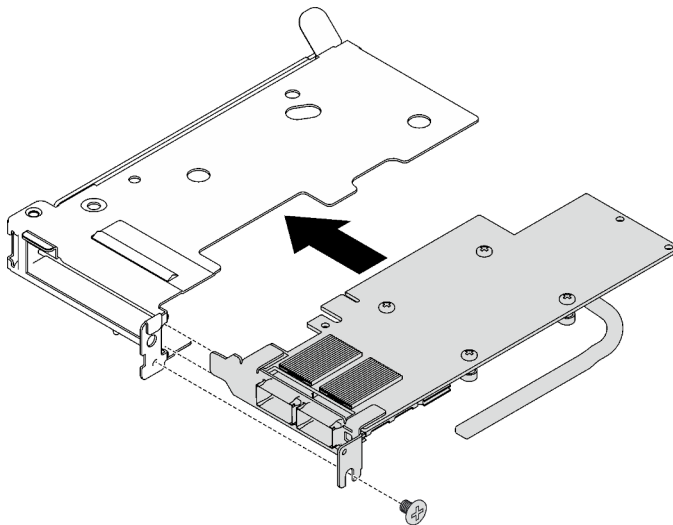


Figure 148. PCIe adapter installation

After you finish

1. Install the PCIe riser assembly. See [“Install a PCIe riser assembly \(ConnectX-6\)” on page 136](#), [“Install a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 148](#), or [“Install a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 160](#).

2. Install the cross braces. See [“Install the cross braces” on page 17](#).
3. Install the tray cover. See [“Install the tray cover” on page 14](#).
4. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
5. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

6. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

PCIe riser assembly replacement (ConnectX-6)

Use the following procedures to remove and install a PCIe riser assembly with ConnectX-6 adapter.

- For PCIe riser with ConnectX-7 NDR 200 adapter, see [“PCIe riser assembly replacement \(ConnectX-7 NDR 200\)” on page 141](#).
- For PCIe riser with ConnectX-7 NDR 400 adapter, see [“PCIe riser assembly replacement \(ConnectX-7 NDR 400\)” on page 154](#).

Remove a PCIe riser assembly (ConnectX-6)

Use this information to remove a PCIe riser assembly with ConnectX-6 adapter.

About this task

Required tools

Make sure you have the ConnectX-6 Putty Pad Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- b. Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- c. Remove the cross braces. See [“Remove the cross braces” on page 15](#).
- d. For shared I/O or socket direct configurations, disconnect the cable from the system board. See [Chapter 2 “Internal cable routing” on page 237](#).

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

Step 2. If a heatpipe beam is installed, remove the screw that secures the heatpipe beam and remove it.

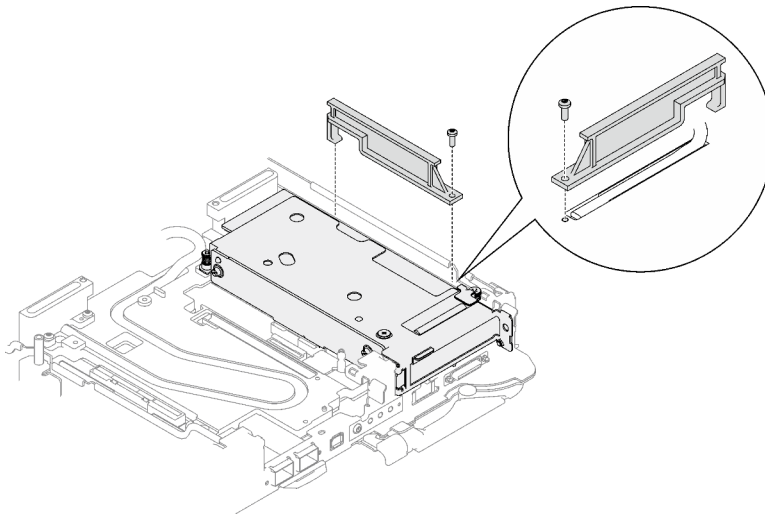


Figure 149. Heatpipe beam removal

Step 3. Loosen the PCIe riser assembly.

- a. ① Loosen the captive screw on the PCIe riser assembly.
- b. ② Loosen the captive screw on the clamp bracket and remove it.
- c. ③ Remove the screw that secures the riser assembly.

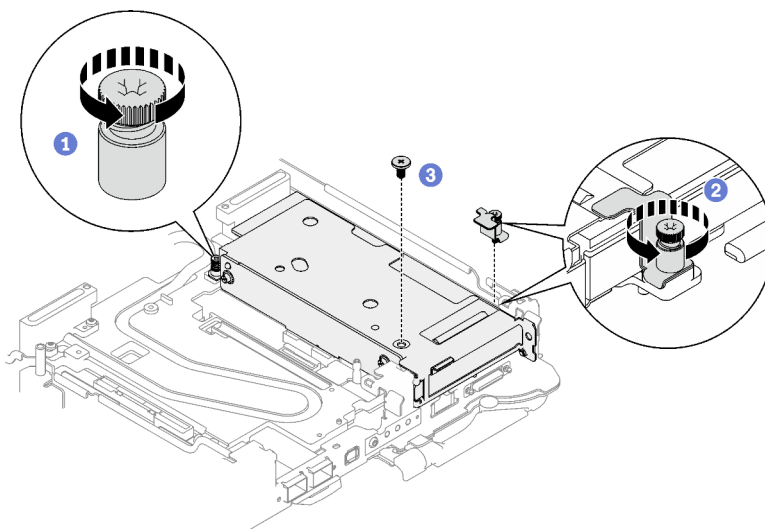


Figure 150. Clamp bracket captive screw removal

Step 4. Loosen the PCIe riser assembly.

- a. ① Loosen the captive screw on the PCIe riser assembly.
- b. ② Carefully grasp the PCIe riser-cage assembly by its edges and remove it out of the node.

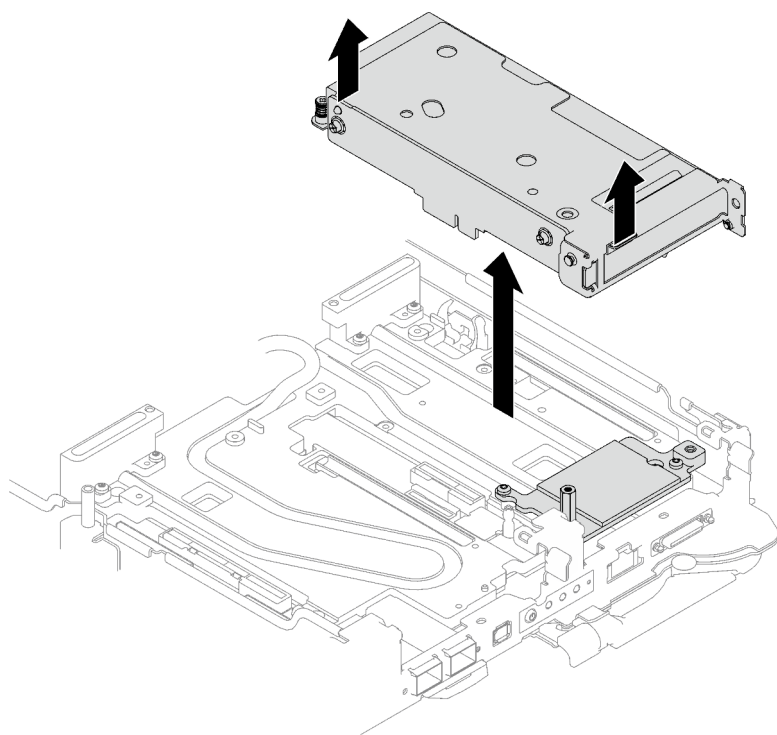


Figure 151. Loosening the PCIe riser assembly

- Step 5. If necessary, remove the hex standoff screw and the two Torx T10 screws that secure the interface plate; then, remove the interface plate.

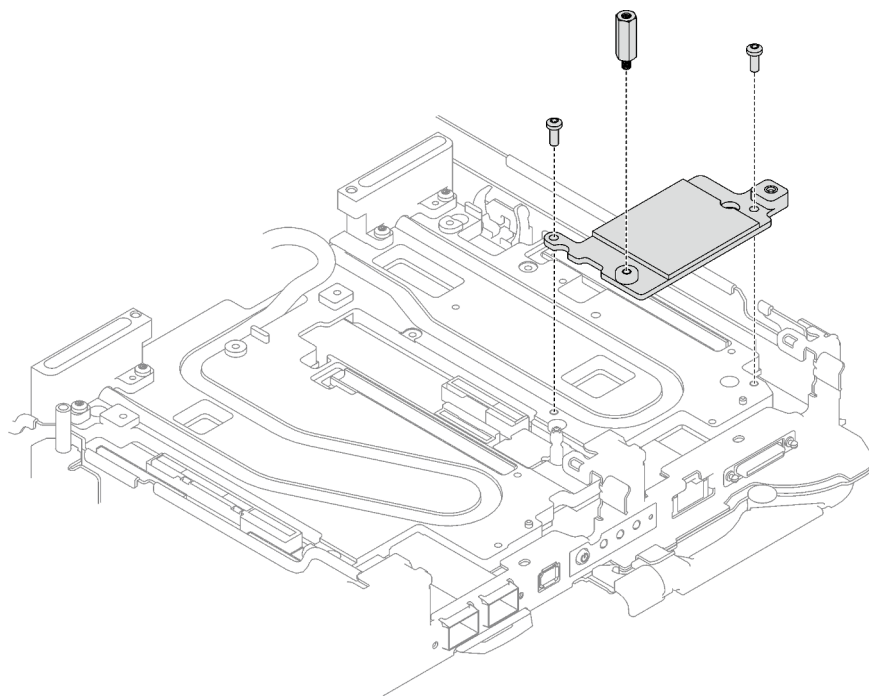
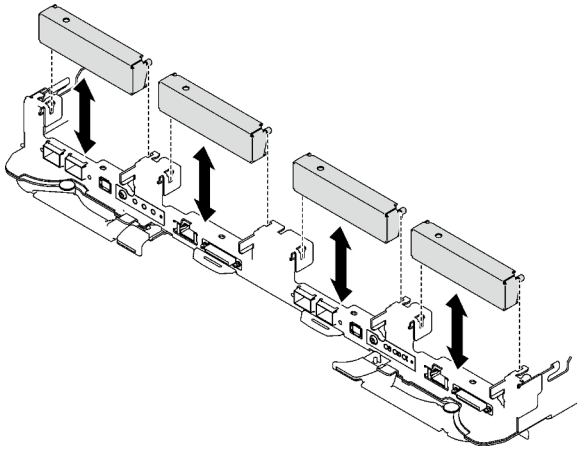


Figure 152. Interface plate removal

- Step 6. If necessary, install the blank bezel fillers.

Figure 153. Blank bezel filler installation



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.

If you need to disassemble the PCIe riser assembly, follow the instructions below:

Attention: You can only disassemble a PCIe riser assembly for recycle. Do not disassemble it for any other purposes.

1. If necessary, remove Mylar film from the PCIe riser assembly.
2. Remove the two screws with a 3/16" hex head screwdriver; then, separate the expansion board from the cage.

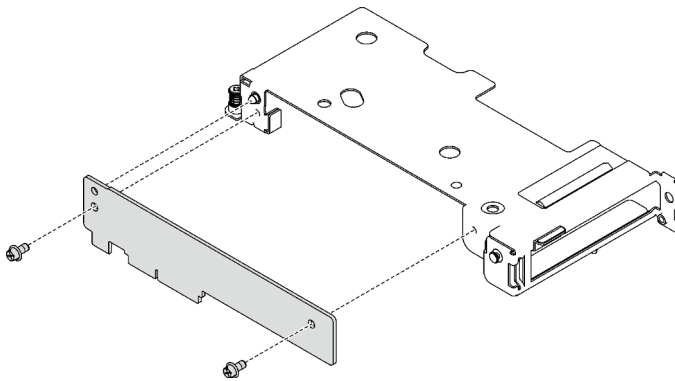


Figure 154. Expansion board removal

3. Recycle the unit in compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Install a PCIe riser assembly (ConnectX-6)

Use this information to install a PCIe riser assembly with ConnectX-6 adapter.

About this task

Required tools

Make sure you have the ConnectX-6 Putty Pad Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Notes:

- For more information on selecting riser slot for PCIe riser installation, see [Chapter 2 “Internal cable routing” on page 237](#).

Attention: The type of PCIe riser installed in slot 1 and slot 2 are different. Cable-ended riser must be installed in Slot 1. See the illustration below for proper PCIe riser installation.

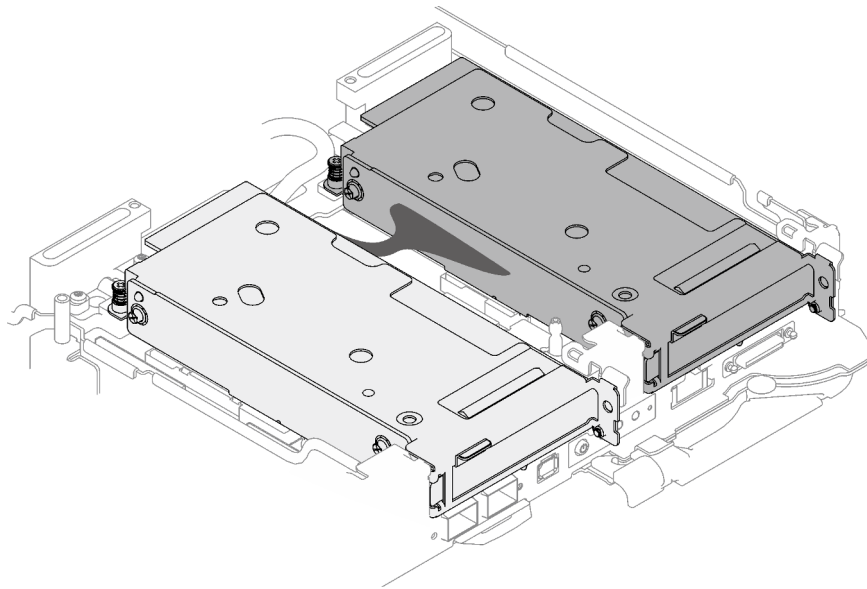


Figure 155. Types of PCIe riser installed in slot 1 and slot 2

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see [“Gap pad/Putty pad identification and location” on page 6](#).
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

Step 1. Remove the blank bezel fillers if they are installed.

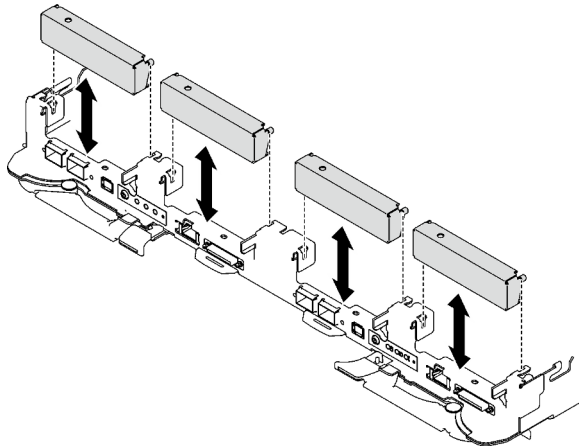


Figure 156. Blank bezel filler removal

Step 2. If the interface plate was removed, place the interface plate onto the node; then, secure the interface plate with two Torx T10 screws.

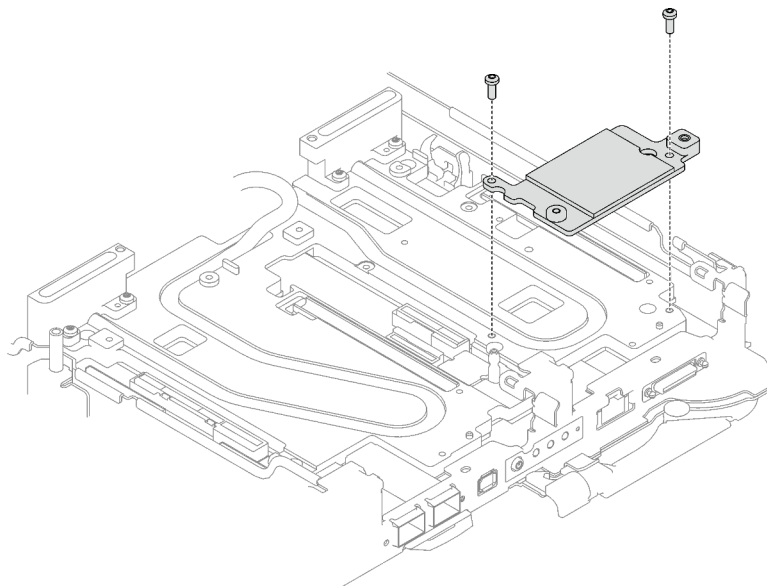


Figure 157. Interface plate installation

Step 3. Replace the interface plate putty pad with a new one. Make sure to follow [Gap pad/putty pad replacement guidelines](#).

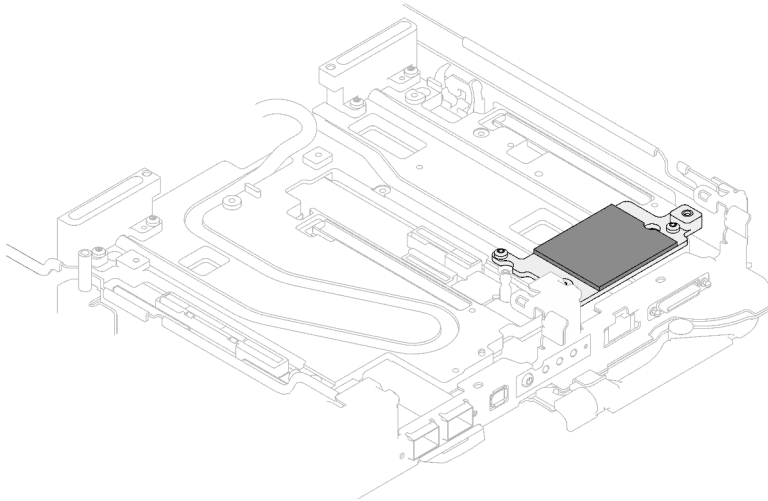


Figure 158. Interface plate putty pad for CX-6 riser

Step 4. Install the PCIe riser assembly.

- a. ① Install one hex standoff screw to the cold plate.
- b. ② Align the tab on the PCIe riser assembly with the slot on the front of the node; then, insert the PCIe riser assembly onto the system board.
- c. ③ Secure the riser assembly with one screw.

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

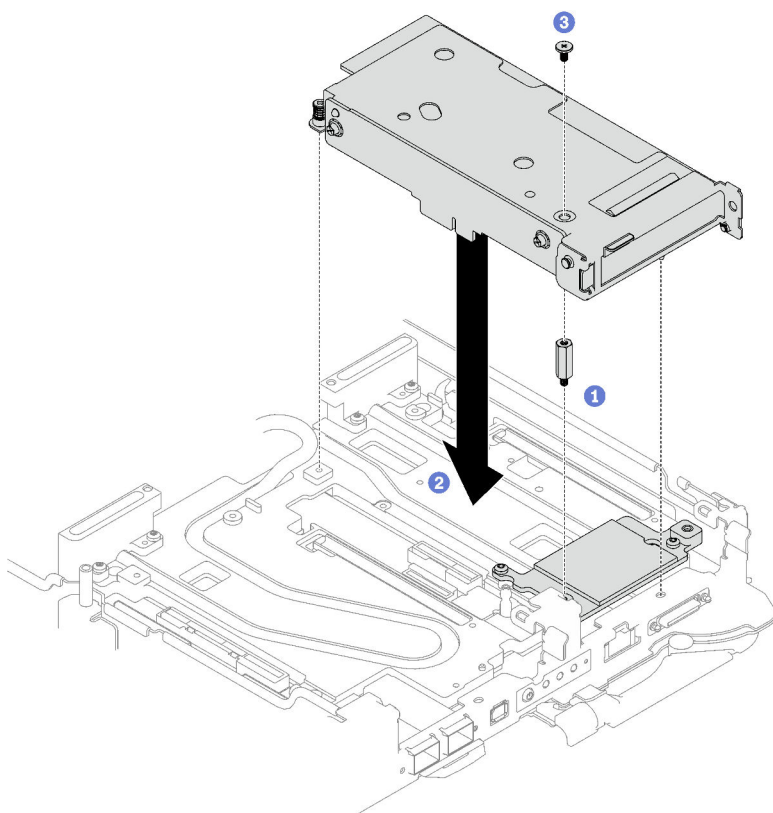


Figure 159. PCIe riser assembly installation

Step 5. Secure the PCIe riser assembly.

- a. ① Install the clamp bracket and fasten the captive screw.
- b. ② Fasten the captive screw on the PCIe riser assembly.

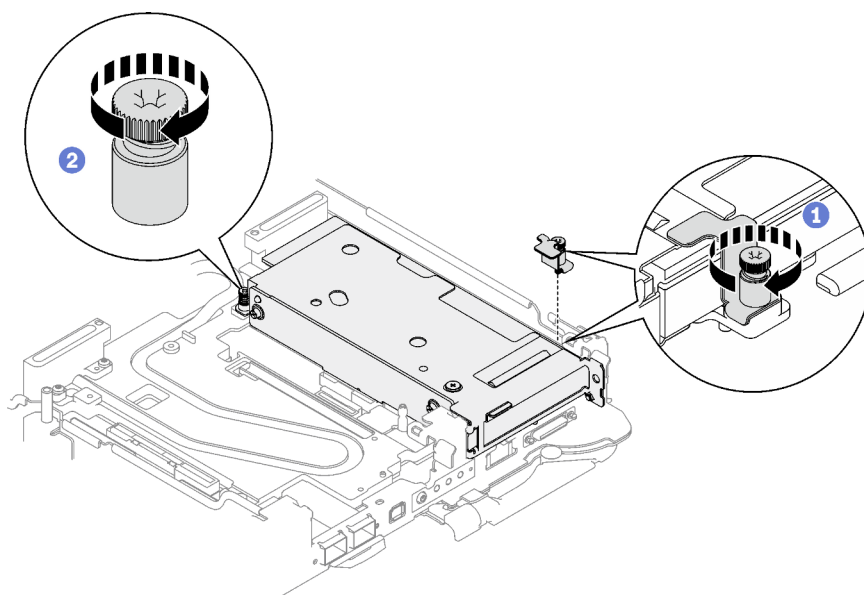


Figure 160. Clamp bracket captive screw installation

Step 6. Install the heatpipe beam and secure it with one screw.

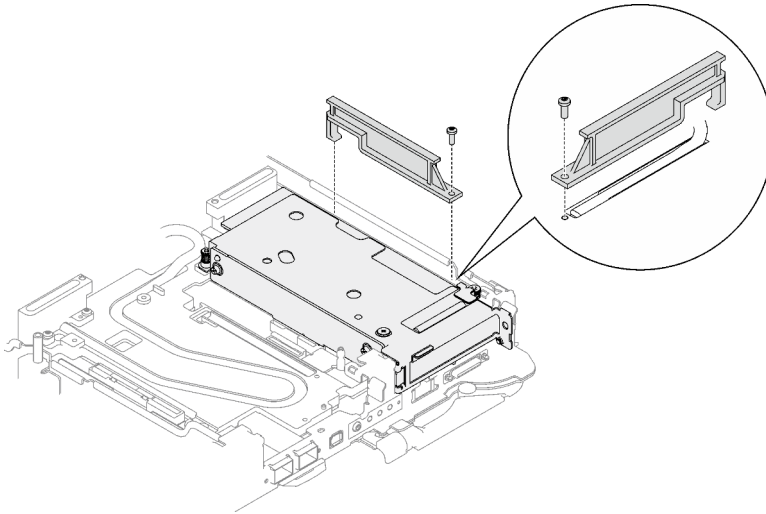


Figure 161. Heatpipe beam installation

After you finish

1. For shared I/O or socket direct configurations, route the cables. See [Chapter 2 “Internal cable routing” on page 237](#) for cable routing details.
2. Install the cross braces. See [“Install the cross braces” on page 17](#).
3. Install the tray cover. See [“Install the tray cover” on page 14](#).
4. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
5. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

6. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

PCIe riser assembly replacement (ConnectX-7 NDR 200)

Use the following procedures to remove and install a PCIe riser assembly with ConnectX-7 NDR 200 adapter.

- For PCIe riser with ConnectX-6 adapter, see [“PCIe riser assembly replacement \(ConnectX-6\)” on page 133](#).
- For PCIe riser with ConnectX-7 NDR 400 adapter, see [“PCIe riser assembly replacement \(ConnectX-7 NDR 400\)” on page 154](#).

Remove a PCIe riser assembly (ConnectX-7 NDR 200)

Use this information to remove a PCIe riser assembly with ConnectX-7 NDR 200 adapter.

About this task

Required tools

Make sure you have the ConnectX-7 NDR200 Putty Pad Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- b. Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- c. Remove the cross braces. See [“Remove the cross braces” on page 15](#).
- d. For shared I/O or socket direct configurations, disconnect the cable from the system board. See [Chapter 2 “Internal cable routing” on page 237](#).

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

Step 2. If applicable, remove the interconnect cable from the node.

- a. ① Remove the two screws from the interconnect cable.
- b. ② Remove the interconnect cable from the water loop.
- c. ③ Remove the two washers from the water loop.

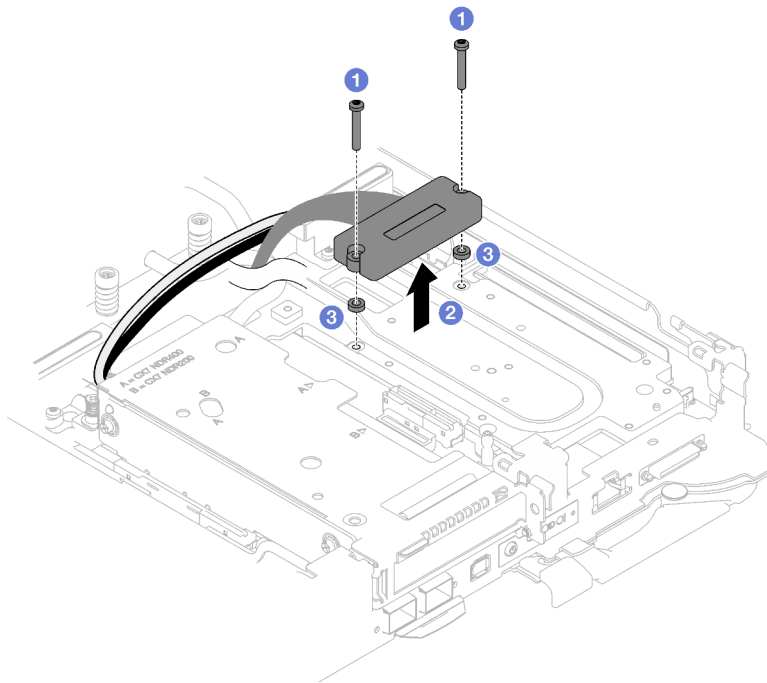


Figure 162. Interconnect cable removal

Step 3. Loosen the PCIe riser assembly from system board.

- a. ① Loosen the captive screw on the clamp bracket and remove it.
- b. ② Loosen the screw on the front of the PCIe riser assembly
- c. ③ Loosen the captive screw on the rear of the PCIe riser assembly.
- d. ④ Remove the two long screws that secure the riser assembly.

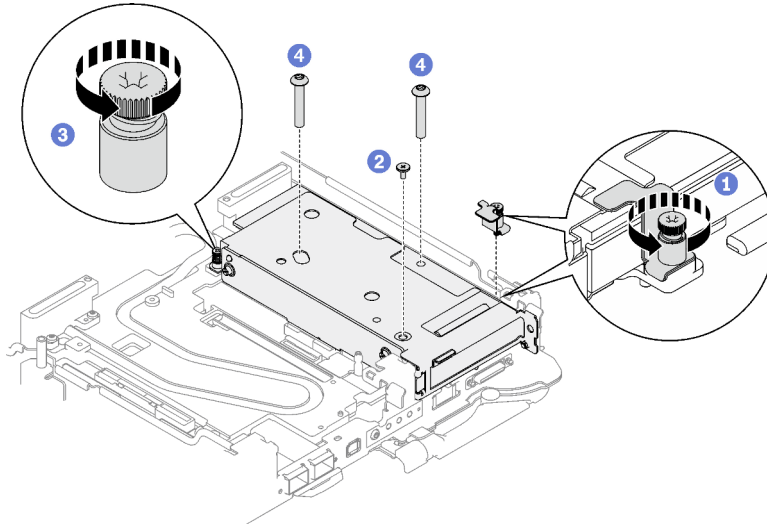


Figure 163. Loosening PCIe riser assembly from system board

Step 4. Carefully grasp the PCIe riser-cage assembly by its edges and remove it out of the node.

Note: The following illustration might differ slightly from your hardware, but the removal method is the same.

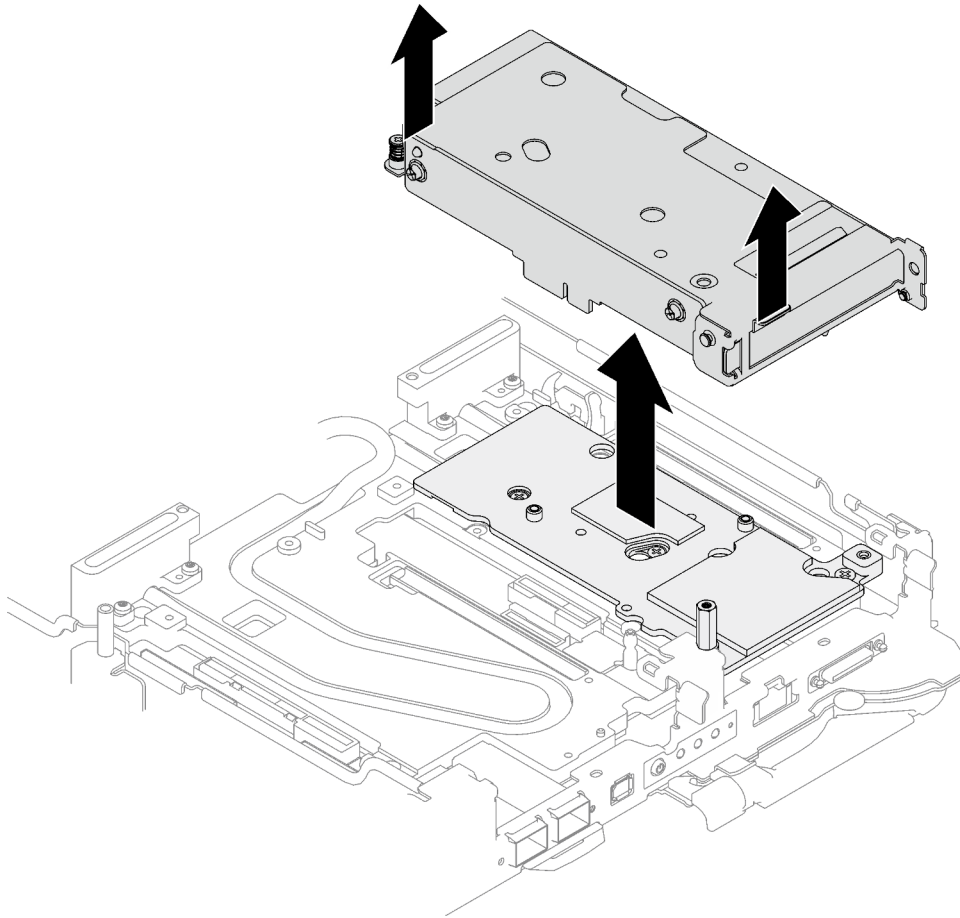


Figure 164. PCIe riser assembly removal

- Step 5. If necessary, remove the interface plate.
- Remove the hex standoff screw and five Torx T10 screws that secure the interface plate.

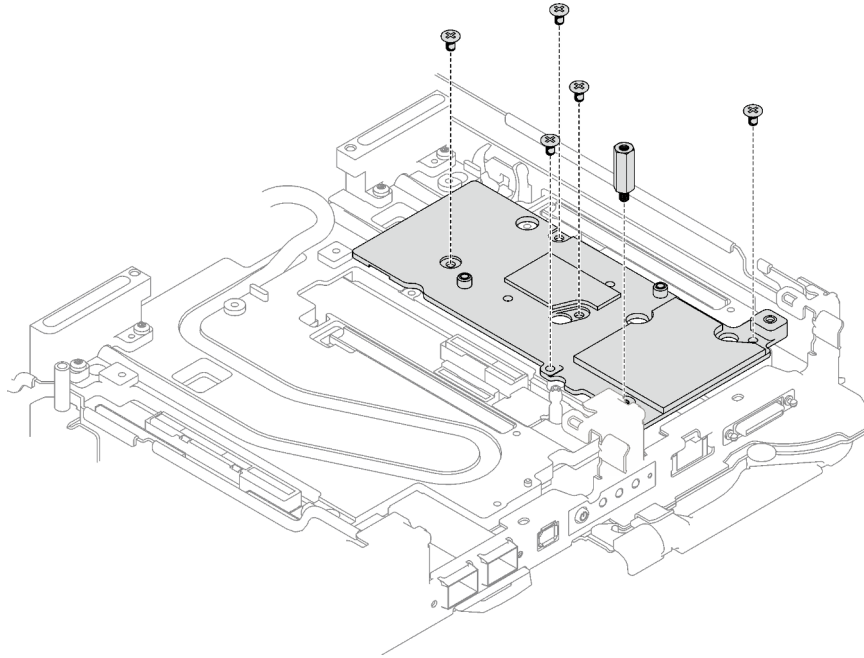


Figure 165. Interface plate screws removal

- b. Release the interface plate with a flat head screwdriver. (If a flat head screwdriver is not available, the DIMM tool can also be used.)
 1. There are two openings (marked with black triangle in the illustration below) on the bottom side of the interface plate for inserting a flat head screwdriver—select the one that is accessible for the flat head screwdriver.
 2. Insert a flat head screwdriver into the opening; then, slightly rotate the screwdriver to release the interface plate from the water loop cold plate.

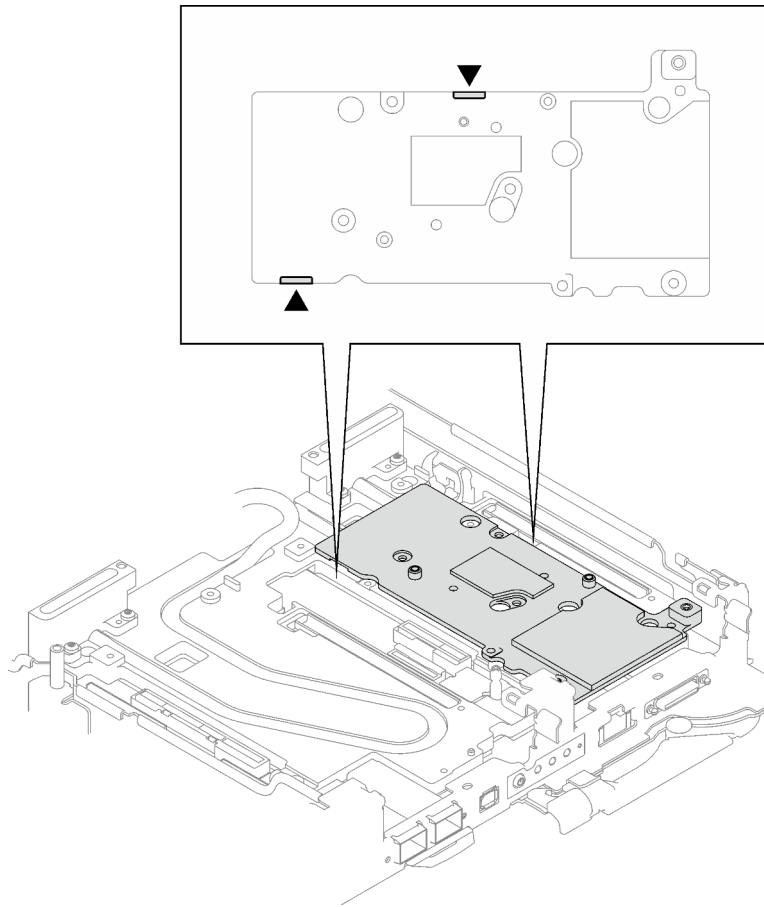


Figure 166. Locations of openings on the bottom side of the interface plate

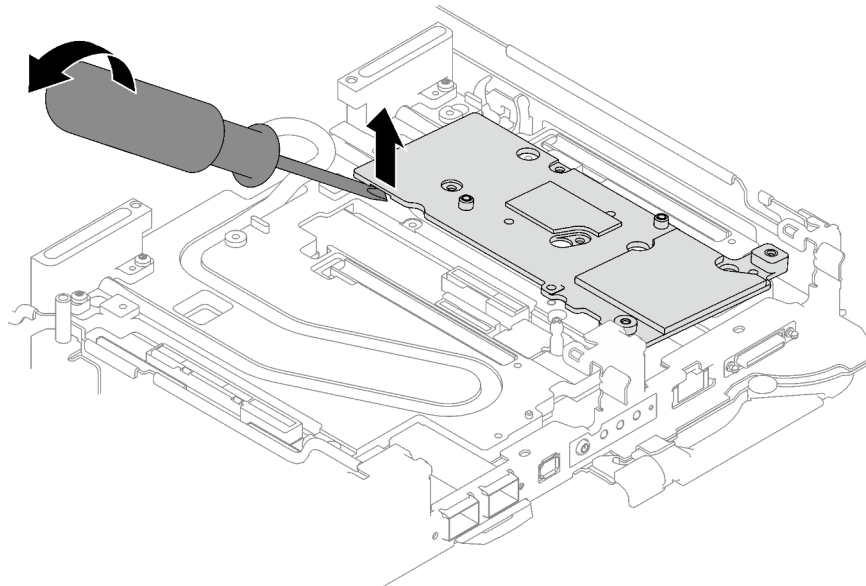


Figure 167. Releasing the interface plate from water loop cold plate

- c. Remove the interface plate from the tray.

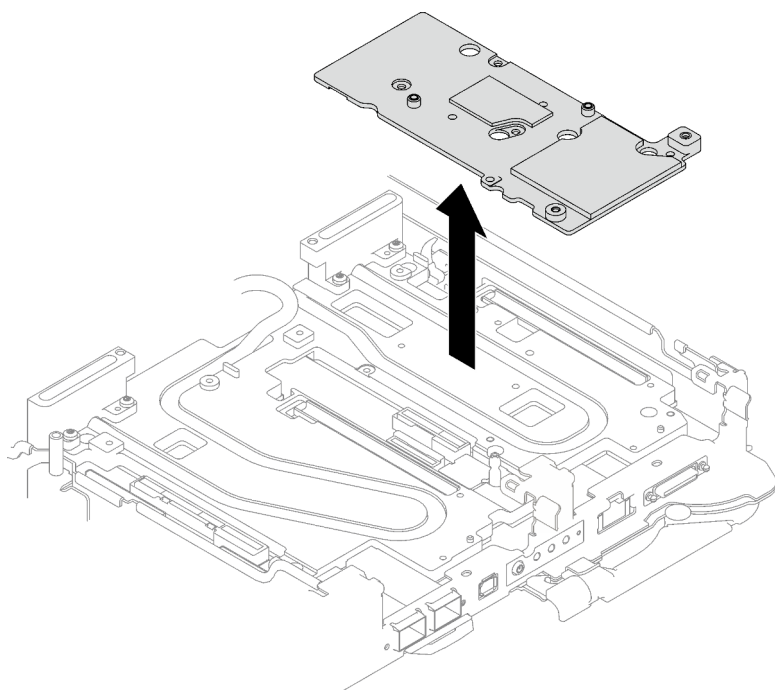
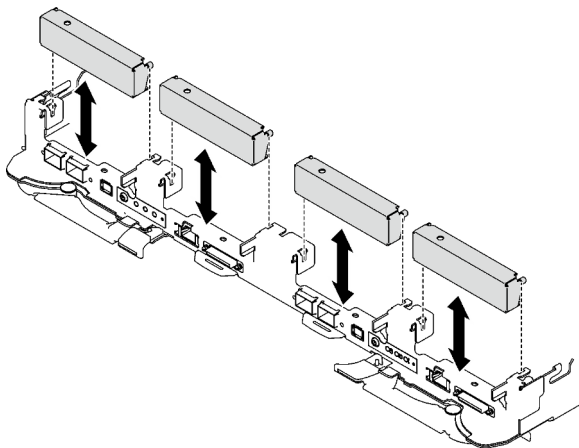


Figure 168. Removing the interface plate

Step 6. If necessary, install the blank bezel fillers.

Figure 169. Blank bezel filler installation



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.

If you need to disassemble the PCIe riser assembly, follow the instructions below:

Attention: You can only disassemble a PCIe riser assembly for recycle. Do not disassemble it for any other purposes.

1. If necessary, remove Mylar film from the PCIe riser assembly.

2. Remove the two screws with a 3/16" hex head screwdriver; then, separate the expansion board from the cage.

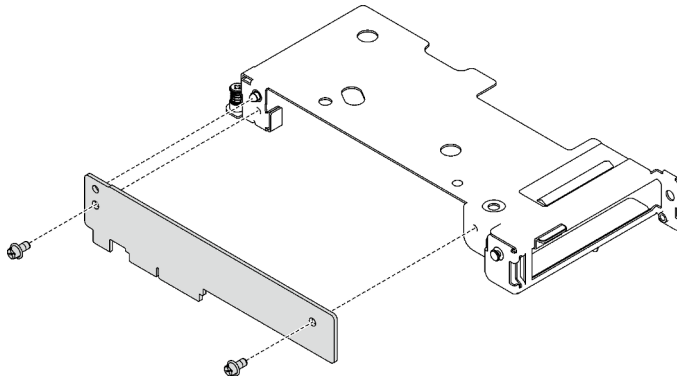


Figure 170. Expansion board removal

3. Recycle the unit in compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Install a PCIe riser assembly (ConnectX-7 NDR 200)

Use this information to install a PCIe riser assembly with ConnectX-7 NDR 200 adapter.

About this task

Required tools

Make sure you have the ConnectX-7 NDR200 Putty Pad Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Notes:

- For more information on selecting riser slot for PCIe riser installation, see [Chapter 2 “Internal cable routing” on page 237](#).

Attention: The type of PCIe riser installed in slot 1 and slot 2 are different. Cable-ended riser must be installed in Slot 1. See the illustration below for proper PCIe riser installation.

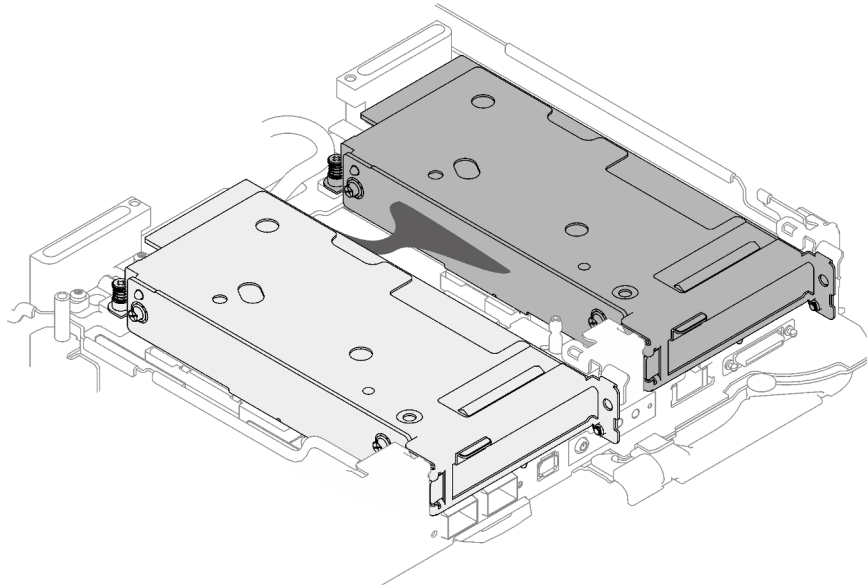


Figure 171. Types of PCIe riser installed in slot 1 and slot 2

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see [“Gap pad/Putty pad identification and location” on page 6](#).
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

Step 1. Remove the blank bezel fillers if they are installed.

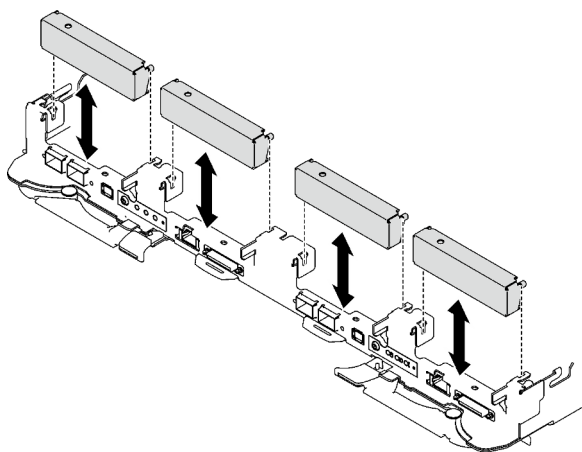


Figure 172. Blank bezel filler removal

- Step 2. If the interface plate was removed, place the interface plate onto the node; then, secure the interface plate with five Phillips #2 screws.

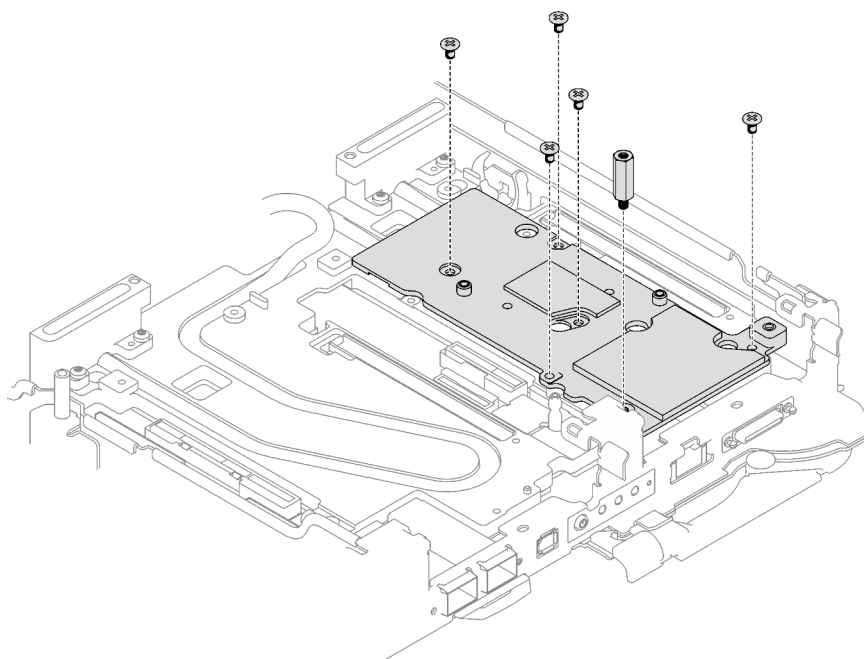


Figure 173. Interface plate installation

- Step 3. Replace the interface plate putty pad with a new one. Make sure to follow [Gap pad/putty pad replacement guidelines](#).

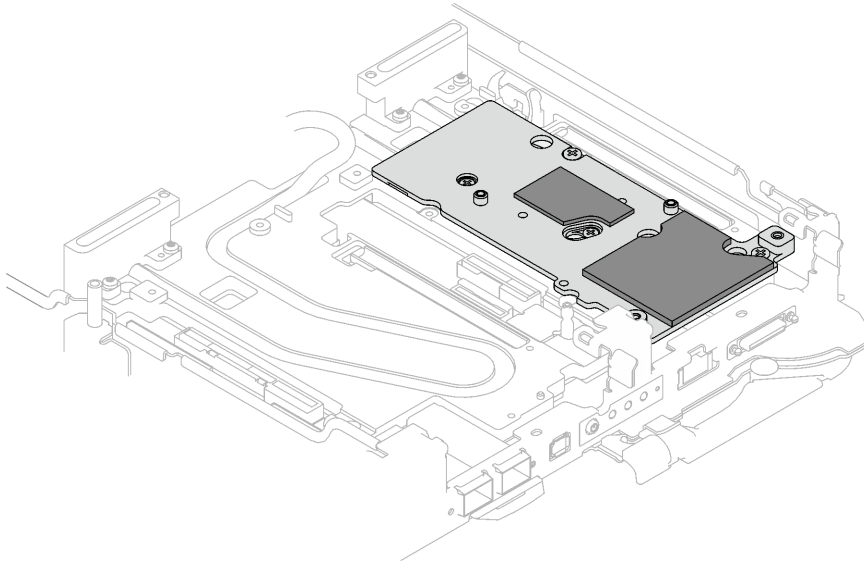


Figure 174. Interface pad on cold plate for CX-7 NDR 200

Step 4. Install the PCIe riser assembly.

- a. ① Install one hex standoff screw to the cold plate.
- b. ② Align the tab on the PCIe riser assembly with the slot on the front of the node; then, insert the PCIe riser assembly onto the system board.
- c. ③ Secure the riser assembly with one screw.

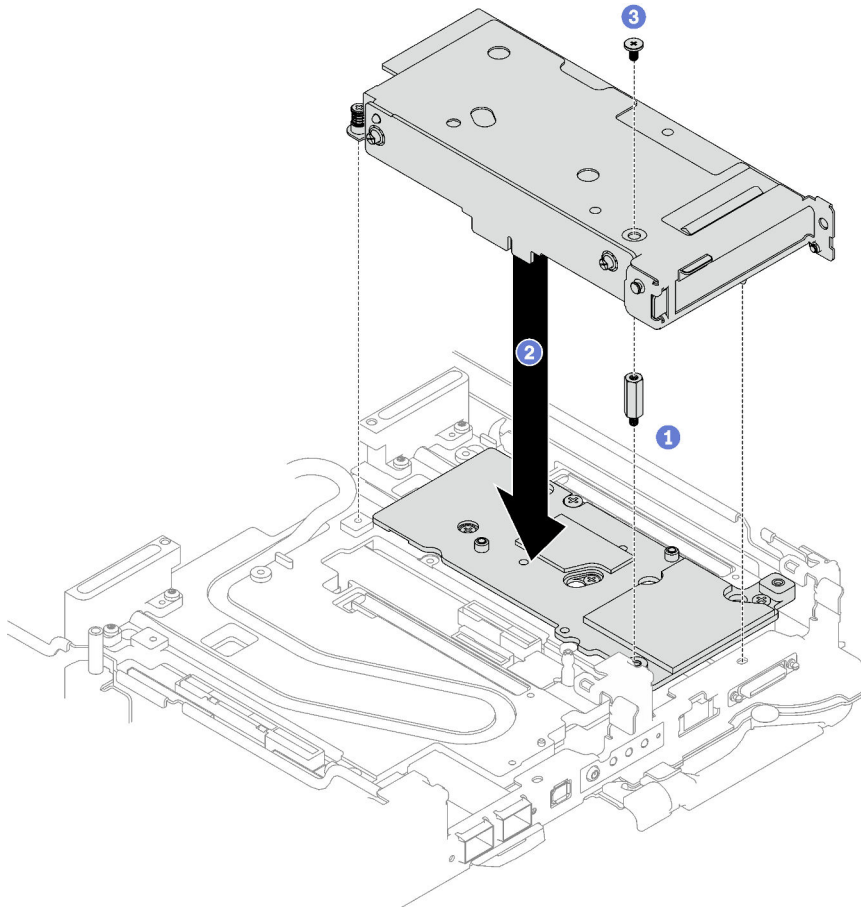


Figure 175. PCIe riser assembly installation

- Step 5. Secure the PCIe riser assembly.
- 1 Install the clamp bracket and fasten the captive screw.
 - 2 Fasten the captive screw on the PCIe riser assembly.
 - 3 Install two screws to secure the PCIe riser assembly.

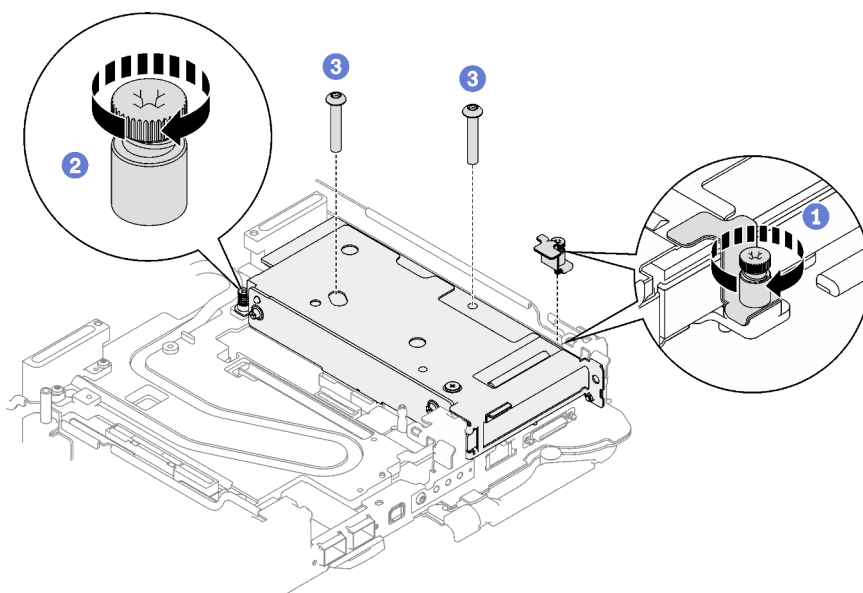


Figure 176. Clamp bracket captive screw installation

Step 6. If applicable, install the interconnect cable to the node.

- a. ① Place the two washers onto the water loop.
- b. ② Align the interconnect cable to the screw holes on the water loop.
- c. ③ Install the two screws to secure the interconnect cable to the water loop.

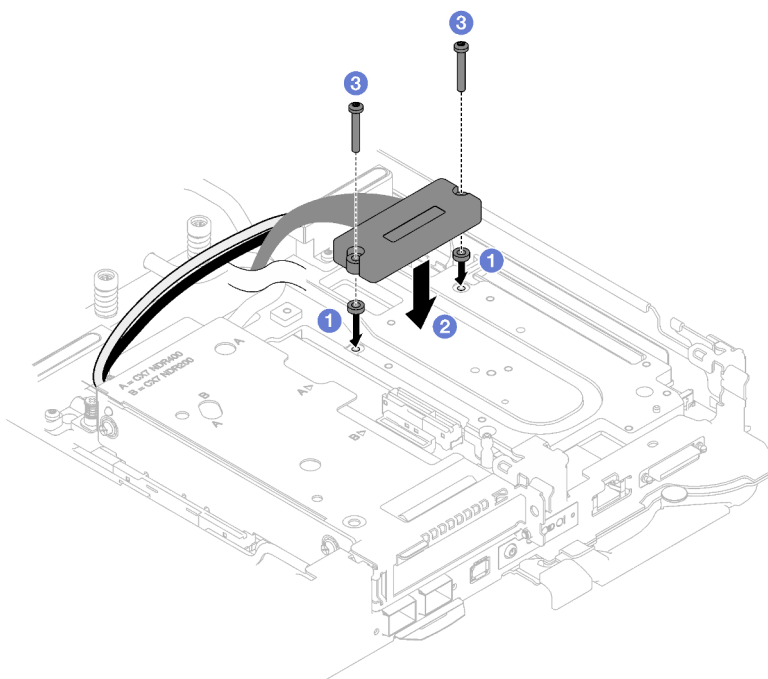


Figure 177. Interconnect cable installation

After you finish

1. For shared I/O or socket direct configurations, route the cables. See [Chapter 2 “Internal cable routing” on page 237](#) for cable routing details.
2. Install the cross braces. See [“Install the cross braces” on page 17](#).
3. Install the tray cover. See [“Install the tray cover” on page 14](#).
4. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
5. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

6. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

PCIe riser assembly replacement (ConnectX-7 NDR 400)

Use the following procedures to remove and install a PCIe riser assembly with ConnectX-7 NDR 400 adapter.

- For PCIe riser with ConnectX-6 adapter, see [“PCIe riser assembly replacement \(ConnectX-6\)” on page 133](#).
- For PCIe riser with ConnectX-7 NDR 200 adapter, see [“PCIe riser assembly replacement \(ConnectX-7 NDR 200\)” on page 141](#).

Remove a PCIe riser assembly (ConnectX-7 NDR 400)

Use this information to remove a PCIe riser assembly with ConnectX-7 NDR 400 adapter.

About this task

Required tools

Make sure you have the ConnectX-7 NDR400 Putty Pad Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Make preparations for this task.

- a. Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- b. Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- c. Remove the cross braces. See [“Remove the cross braces” on page 15](#).
- d. For shared I/O or socket direct configurations, disconnect the cable from the system board. See [Chapter 2 “Internal cable routing” on page 237](#).

Note: The following illustration might differ slightly from your hardware, but the installation method is the same.

- Step 2. If applicable, remove the interconnect cable from the node.
- 1 Remove the two screws from the interconnect cable.
 - 2 Remove the interconnect cable from the water loop.
 - 3 Remove the two washers from the water loop.

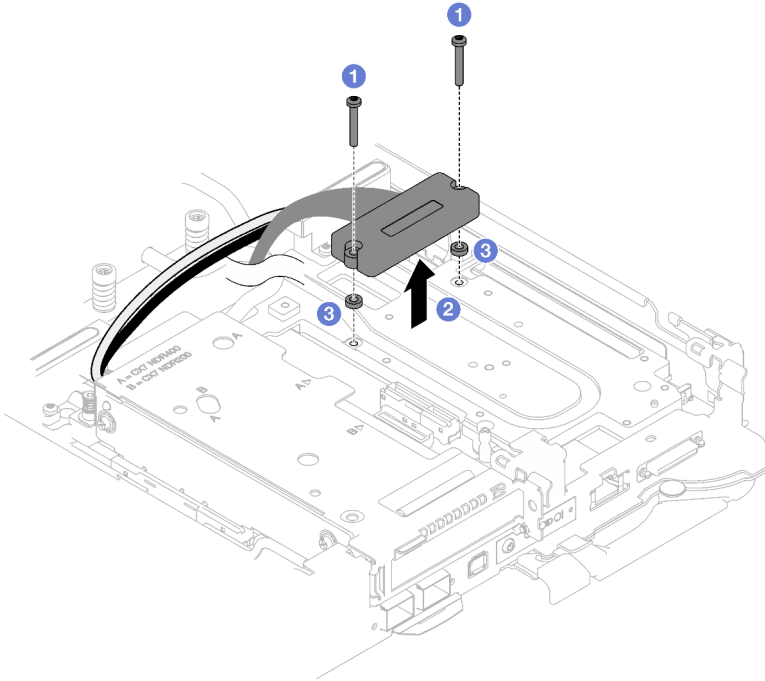


Figure 178. Interconnect cable removal

- Step 3. Remove the PCIe riser assembly.
- 1 Loosen the captive screw on the PCIe riser assembly.
 - 2 Remove the three screws that secure the riser assembly.

Note: The following illustration might differ slightly from your hardware, but the removal method is the same.

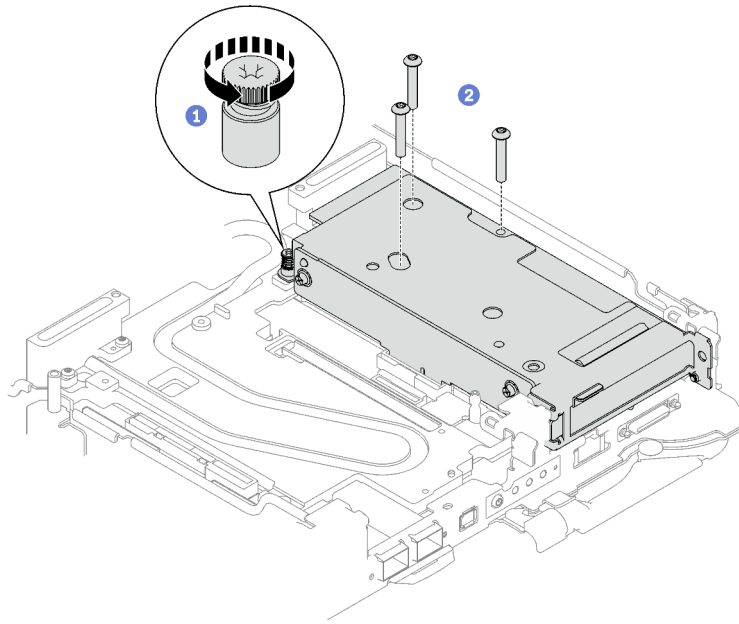


Figure 179. PCIe riser assembly removal

- c. Insert a flat head screwdriver into the gap between the PCIe adapter and the interface plate; then, slightly rotate the flat head screwdriver to release the PCIe riser cage from the water loop cold plate.

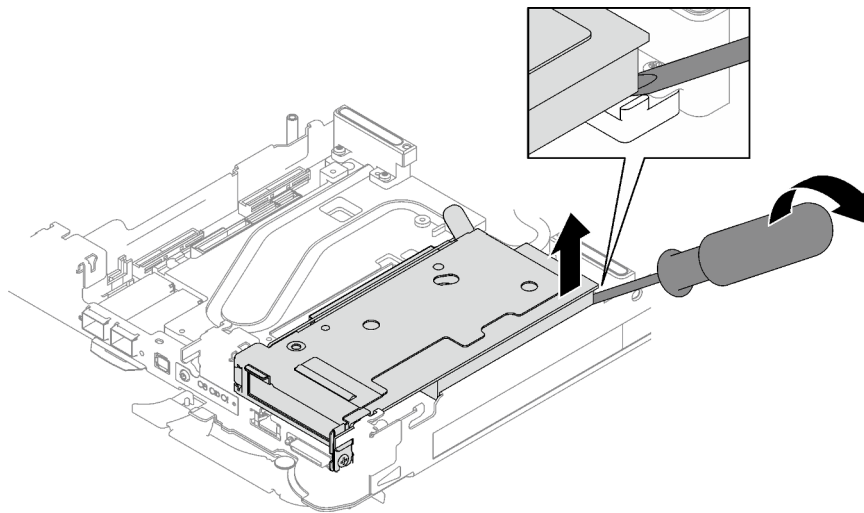


Figure 180. Releasing the PCIe riser cage from the water loop cold plate

- d. ④ Carefully grasp the PCIe riser-cage assembly by its edges and remove it out of the node.

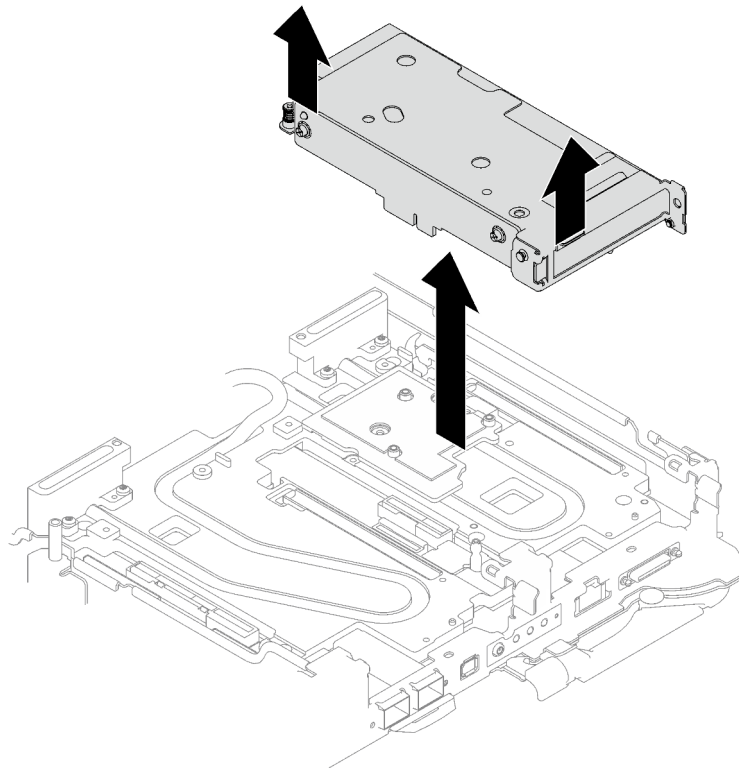


Figure 181. Removing the PCIe riser cage assembly

- Step 4. If necessary, remove the interface plate.
- a. Remove the two Phillips #2 screws that secure the interface plate.

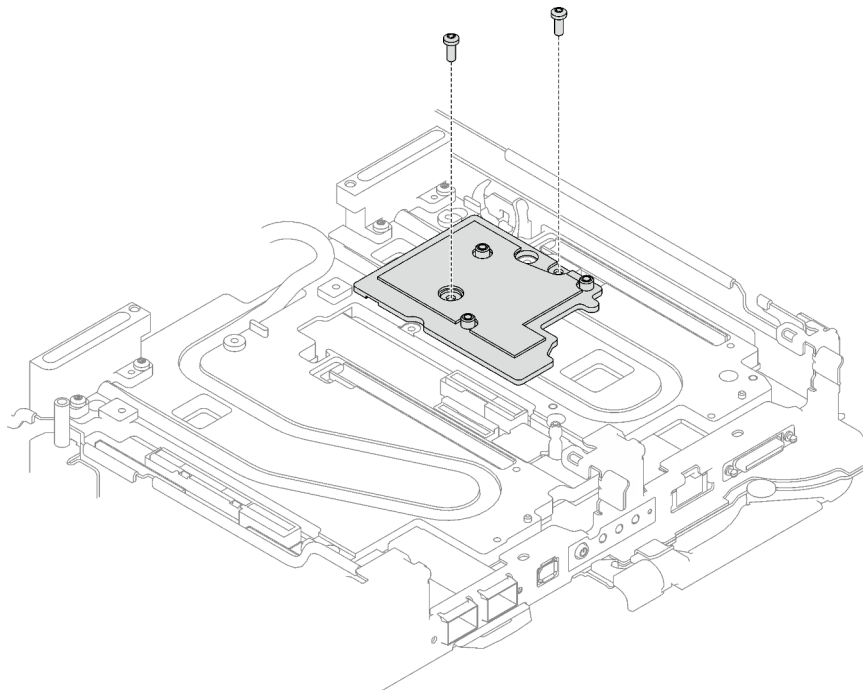


Figure 182. Interface plate removal

- b. Release the interface plate with a flat head screwdriver. (If a flat head screwdriver is not available, the DIMM tool can also be used.)
1. There are two openings (marked with black triangle in the illustration below) on the bottom side of the interface plate for inserting a flat head screwdriver—select the one that is accessible for the flat head screwdriver.
 2. Insert a flat head screwdriver into the opening; then, slightly rotate the screwdriver to release the interface plate from the water loop cold plate.

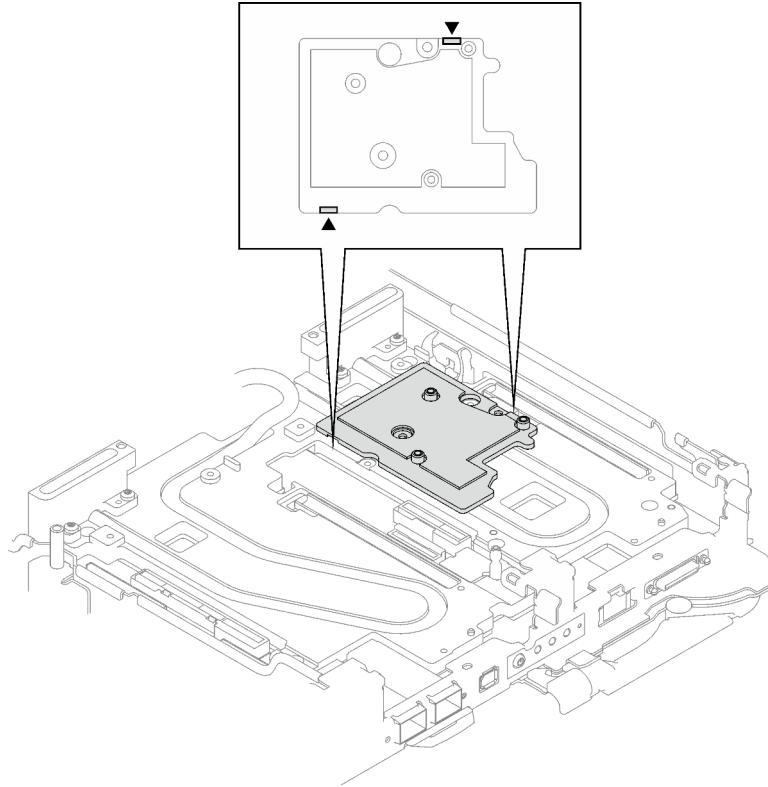


Figure 183. Locations of openings on the bottom side of the interface plate

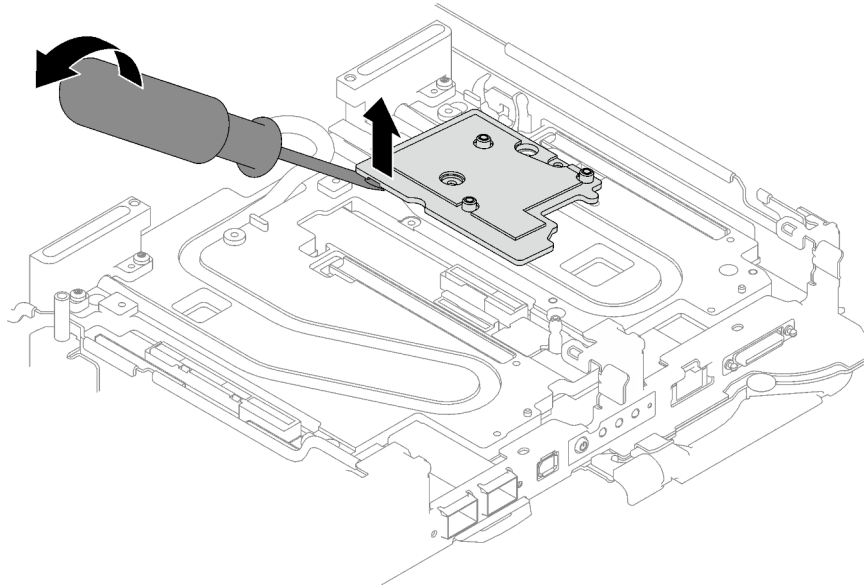


Figure 184. Releasing the interface plate from water loop cold plate

- c. Remove the interface plate from the tray.

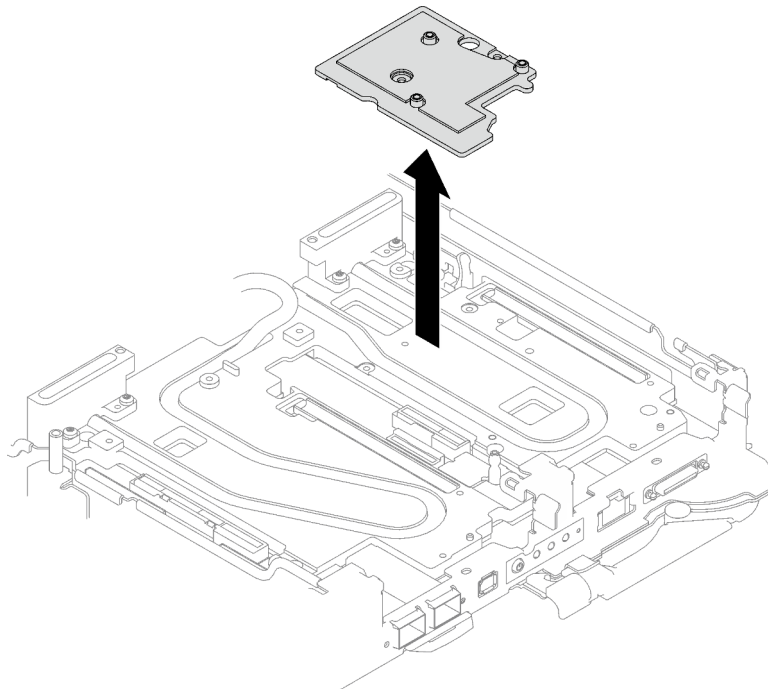
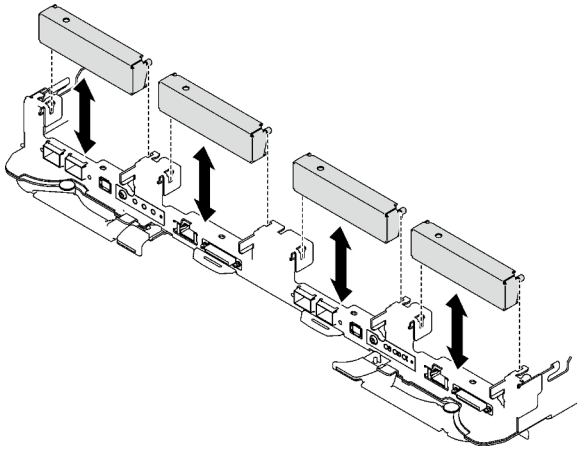


Figure 185. Removing the interface plate

- Step 5. If necessary, install the blank bezel fillers.

Figure 186. Blank bezel filler installation



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.

If you need to disassemble the PCIe riser assembly, follow the instructions below:

Attention: You can only disassemble a PCIe riser assembly for recycle. Do not disassemble it for any other purposes.

1. If necessary, remove Mylar film from the PCIe riser assembly.
2. Remove the two screws with a 3/16" hex head screwdriver; then, separate the expansion board from the cage.

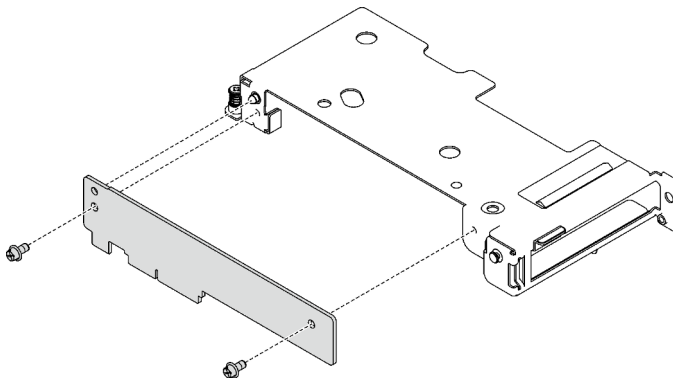


Figure 187. Expansion board removal

3. Recycle the unit in compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Install a PCIe riser assembly (ConnectX-7 NDR 400)

Use this information to install a PCIe riser assembly with ConnectX-7 NDR 400 adapter.

About this task

Required tools

Make sure you have the ConnectX-7 NDR400 Putty Pad Kit to properly replace the component.

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.

Notes:

- For more information on selecting riser slot for PCIe riser installation, see [Chapter 2 “Internal cable routing” on page 237](#).

Attention: The type of PCIe riser installed in slot 1 and slot 2 are different. Cable-ended riser must be installed in Slot 1. See the illustration below for proper PCIe riser installation.

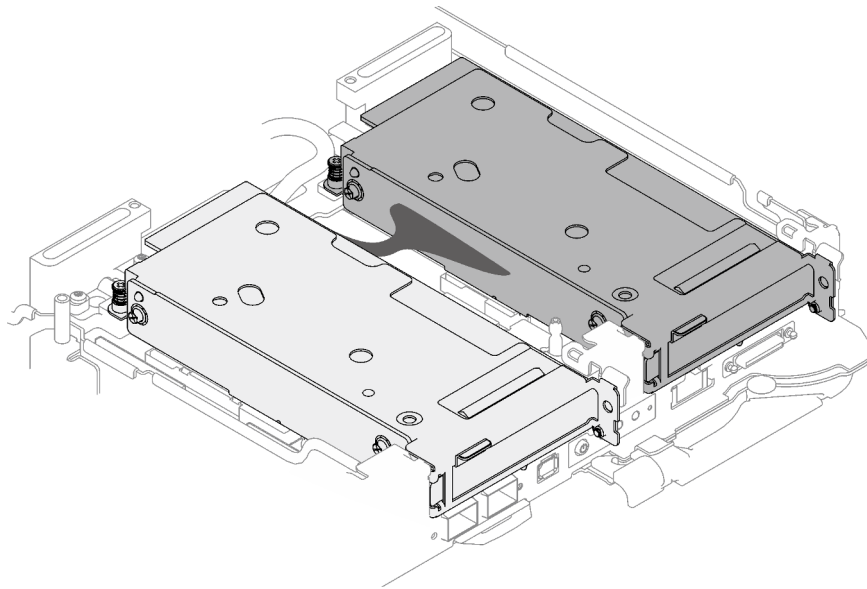


Figure 188. Types of PCIe riser installed in slot 1 and slot 2

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see [“Gap pad/Putty pad identification and location” on page 6](#).
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

Step 1. Remove the blank bezel fillers if they are installed.

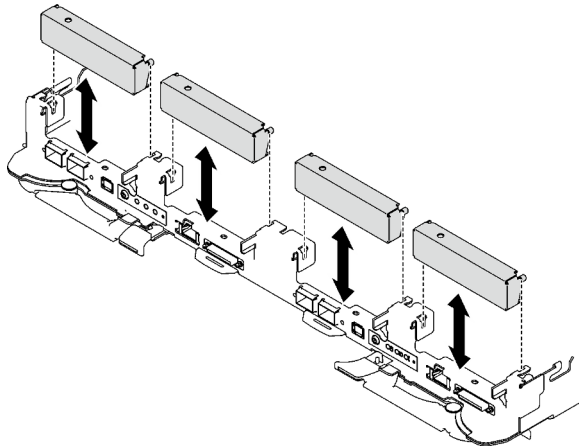


Figure 189. Blank bezel filler removal

Step 2. If the interface plate was removed, place the interface plate onto the node; then, secure the interface plate with two Phillips #2 screws.

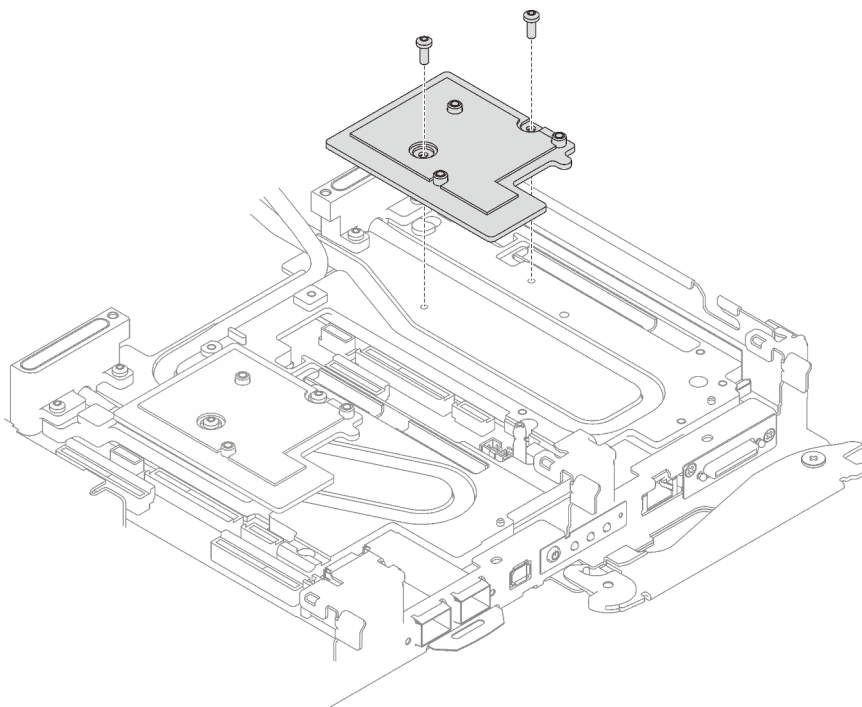


Figure 190. Interface plate installation

- Step 3. Replace the interface plate putty pad with a new one. Make sure to follow [Gap pad/putty pad replacement guidelines](#).

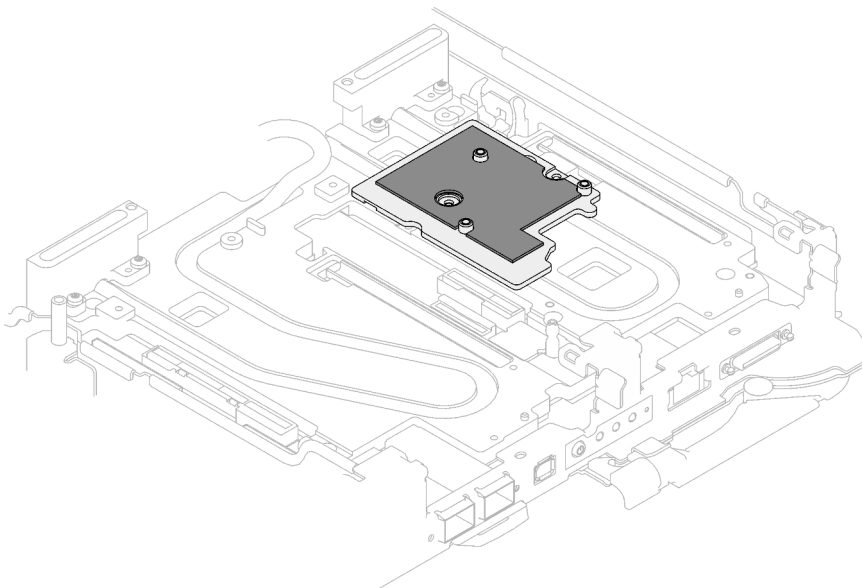


Figure 191. Gap pad on interface plate for CX-7 NDR 400

- Step 4. Install the PCIe riser assembly.
- a. ① Align the tab on the PCIe riser assembly with the slot on the front of the node; then, insert the PCIe riser assembly onto the system board.
 - b. ② Secure the riser assembly with three screws.

- c. ③ Fasten the captive screw on the PCIe riser assembly.

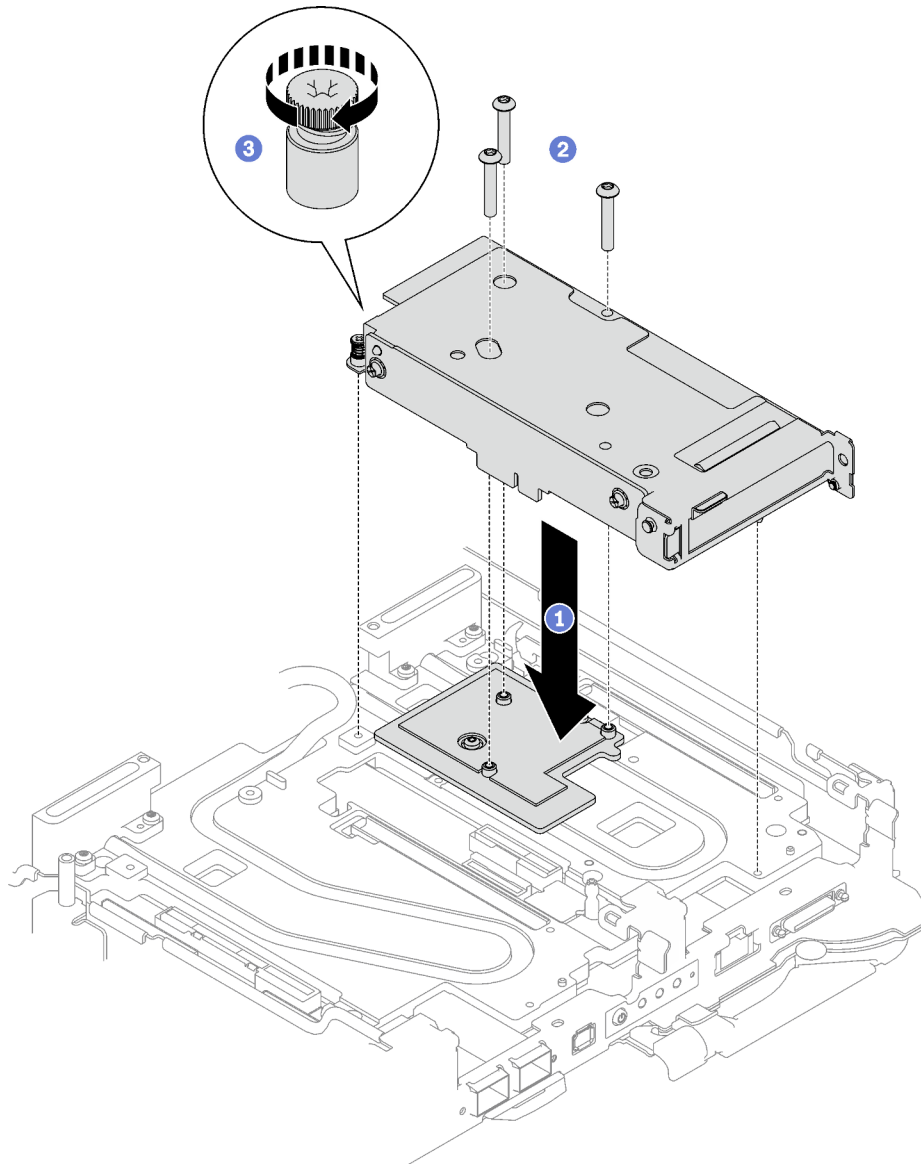


Figure 192. PCIe riser assembly installation

- Step 5. If applicable, install the interconnect cable to the node.
- ① Place the two washers onto the water loop.
 - ② Align the interconnect cable to the screw holes on the water loop.
 - ③ Install the two screws to secure the interconnect cable to the water loop.

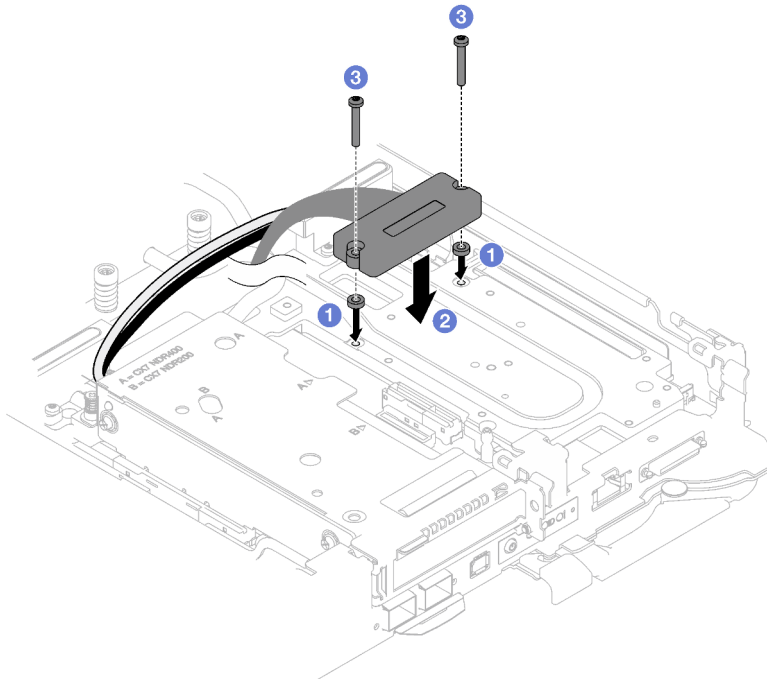


Figure 193. Interconnect cable installation

After you finish

1. For shared I/O or socket direct configurations, route the cables. See [Chapter 2 “Internal cable routing” on page 237](#) for cable routing details.
2. Install the cross braces. See [“Install the cross braces” on page 17](#).
3. Install the tray cover. See [“Install the tray cover” on page 14](#).
4. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
5. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

6. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

Power distribution board replacement

Use the following procedures to remove and install the power distribution board.

Remove the power distribution board

Use this information to remove the power distribution board.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Service Kit (The water loop carrier in the Service Kit is reusable, it is recommended to keep it at the facility where the server operates for future replacement needs.)
- SD665 V3 Water Loop Putty Pad Kit
- Drive gap pad or putty pad kits according to the drives installed in the tray. See their respective replacement procedures for more information.
- ConnectX series adapter putty pad kits according to the ConnectX adapter installed in the tray. See their respective replacement procedures for more information.
- Screws and screwdrivers

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T20 head screwdriver	Torx T20 screw
Phillips #2 head screwdriver	Phillips #2 screw
3/16" hex head screwdriver	M3 screw

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Procedure

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

Step 1. Make preparations for this task.

- Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- Remove the cross braces. See [“Remove the cross braces” on page 15](#).
- Remove the M.2 backplane assembly. See [“Remove the M.2 backplane assembly” on page 104](#).

Note: The M.2 backplane cold plate needs to be removed as well.

- Remove the drive cage. See [“Remove a drive cage assembly” on page 52](#).
- Remove the PCIe riser assembly. Depending on your configuration, see [“Remove a PCIe riser assembly \(ConnectX-6\)” on page 133](#), [“Remove a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 141](#), or [“Remove a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 154](#).

Step 2. Remove the five screws to loosen the quick connect.

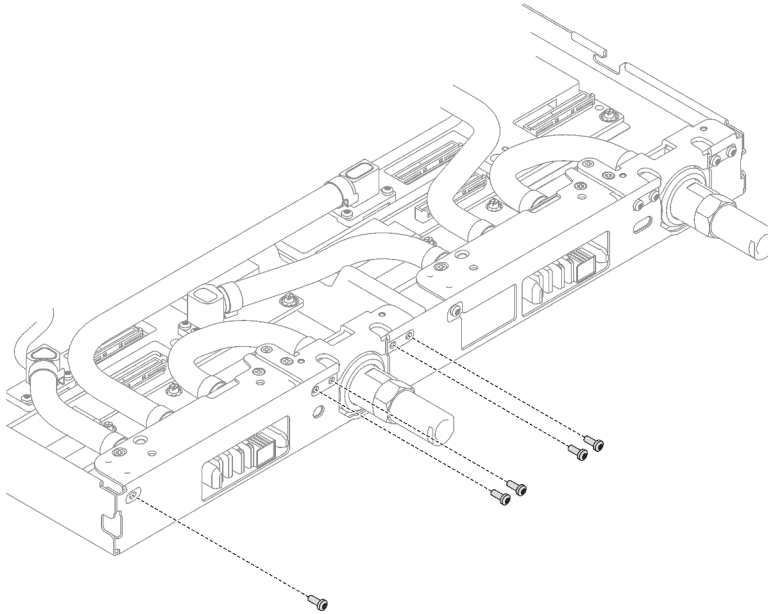


Figure 194. Quick connect screw removal

Step 3. Remove water loop screws and quick connect screws (14x Torx T10 screws per node) with a torque screwdriver set to the proper torque.

Notes:

- For reference, the torque required for the screws to be fully tightened/removed is 5.0+/- 0.5 lbf-in, 0.55+/- 0.05 N-M.
- When removing the **1** VR cold plate screws (x2), remove the washers, too. **Make sure** to keep the washers for future use. (Depending on the configurations, there may not be any washers on the VR cold plate. In this case, there is no need to remove and keep the washers.)

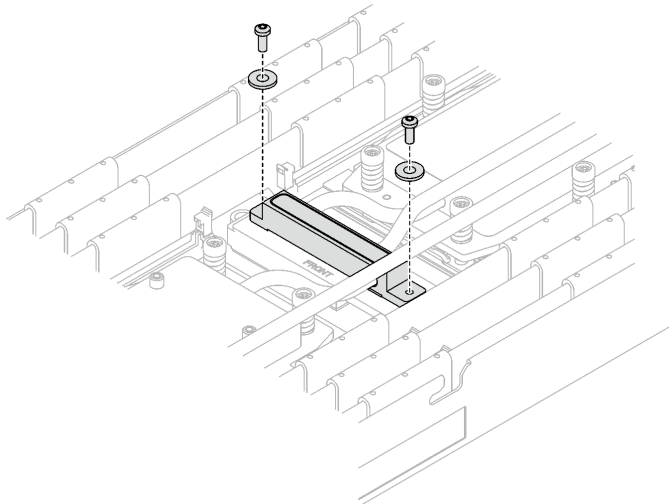


Figure 195. VR cold plate screws with washers

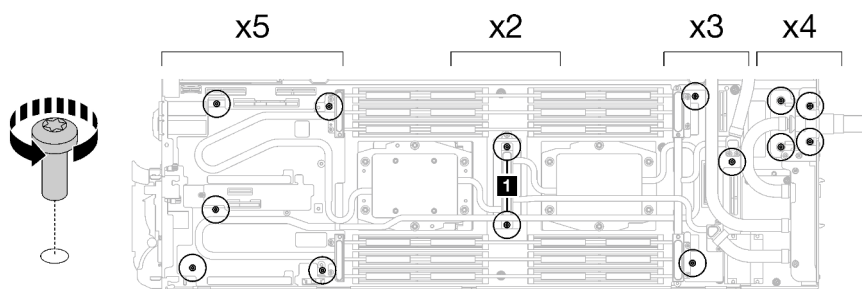


Figure 196. Water loop screw removal

- Step 4. Orient the water loop carrier with the guide pin; then, gently put the water loop carrier down and ensure it is seated firmly on the water loop.

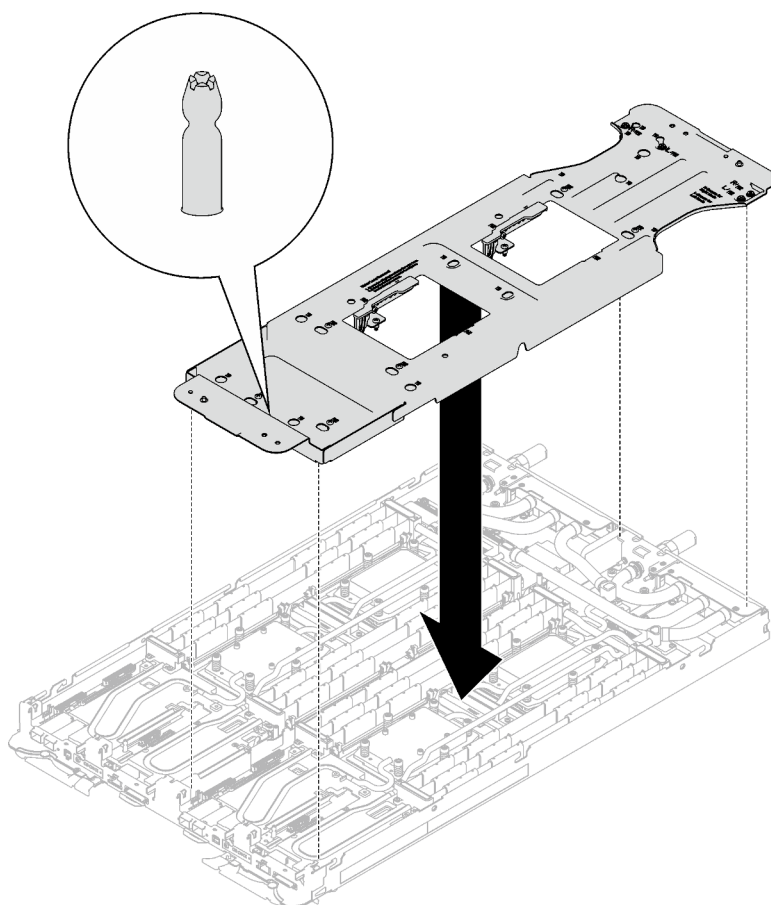


Figure 197. Water loop carrier installation

- Step 5. Tighten water loop carrier screws (12x Phillips #2 screws per node).

Note: The screw holes on the rear of the carrier are marked with **L** and **R**. Select screw holes marked as **L** when the carrier is on the **left** node, and **R** for the **right** node.

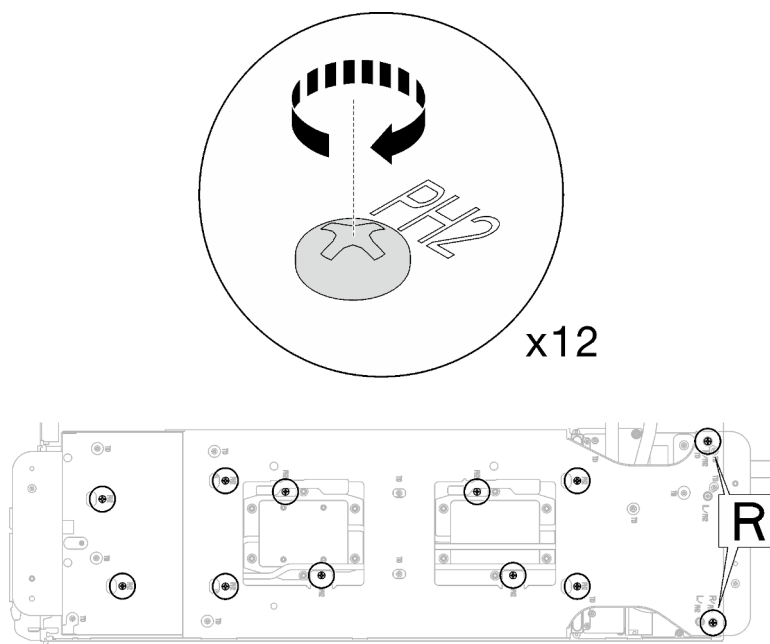


Figure 198. Water loop carrier screws installation

- Step 6. Remove processor cold plate screws (12x Torx T20 screws per node). Follow the screw sequence specified on the processor cold plate label and loosen the screws with a general screwdriver torque screwdriver. Fully loosen each screw; then, proceed to the next screw.

Note: For reference, the torque required for the screws to be fully tightened/removed is 1.12-1.46 newton-meters, 10-13 inch-pounds

Fully loosen each screw in this order: 6 → 5 → 4 → 3 → 2 → 1

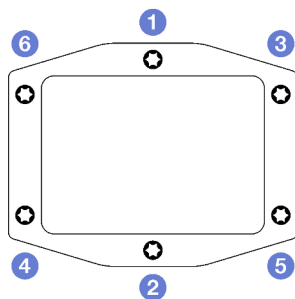


Figure 199. Processor cold plate label

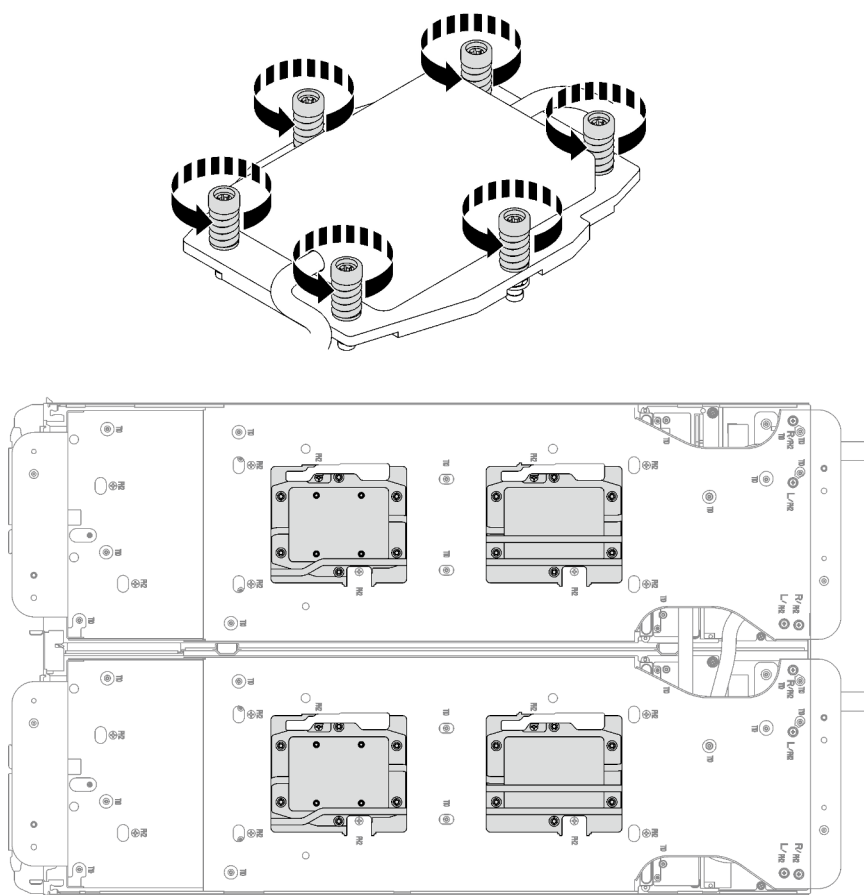


Figure 200. Processor cold plate removal

Step 7. Rotate the latches on the water loop carrier to separate the processor cold plates from processors.

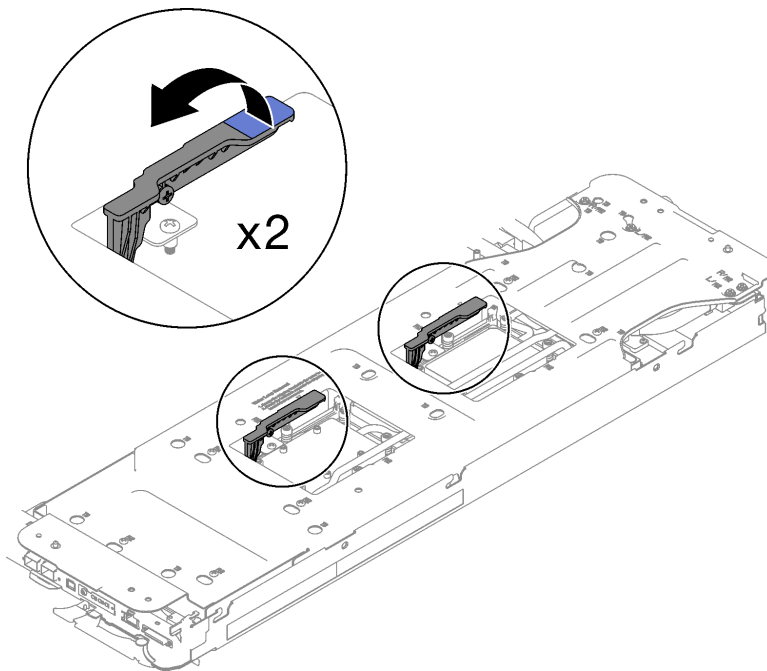


Figure 201. Separate water loop from processor

Step 8. Carefully rotate the water loop so one half is sitting on top of the other half.

Note: Do not tilt the water loop. Keep the water loop horizontal with the tray.

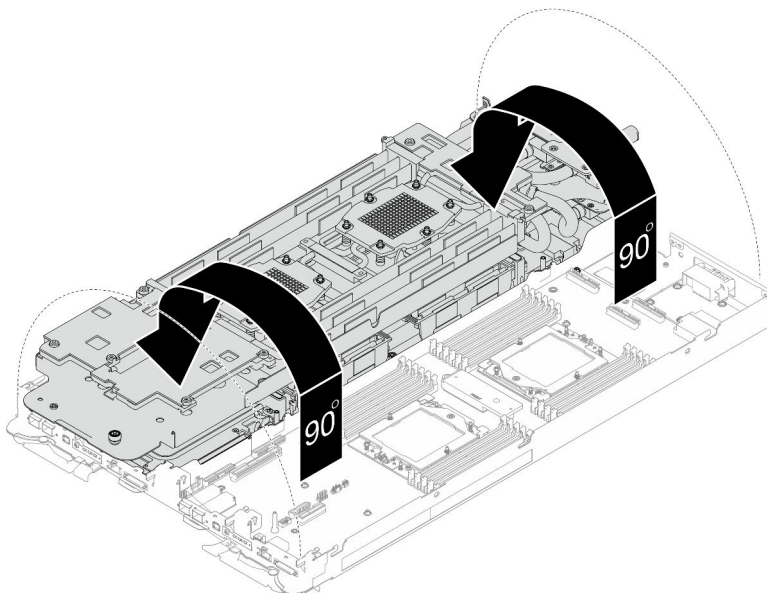


Figure 202. Folding the water loop

Step 9. Remove the power distribution board.

- a. ① Remove the five M3 screws (per node) with a 3/16" hex head screwdriver.
- b. ② Gently pull the power distribution board connector to disconnect it from the system board.
- c. ③ Carefully pull the power distribution board inwards to disengage it from the node.

Note: Use a 3/16" hex head screwdriver to ensure the proper removal and installation.

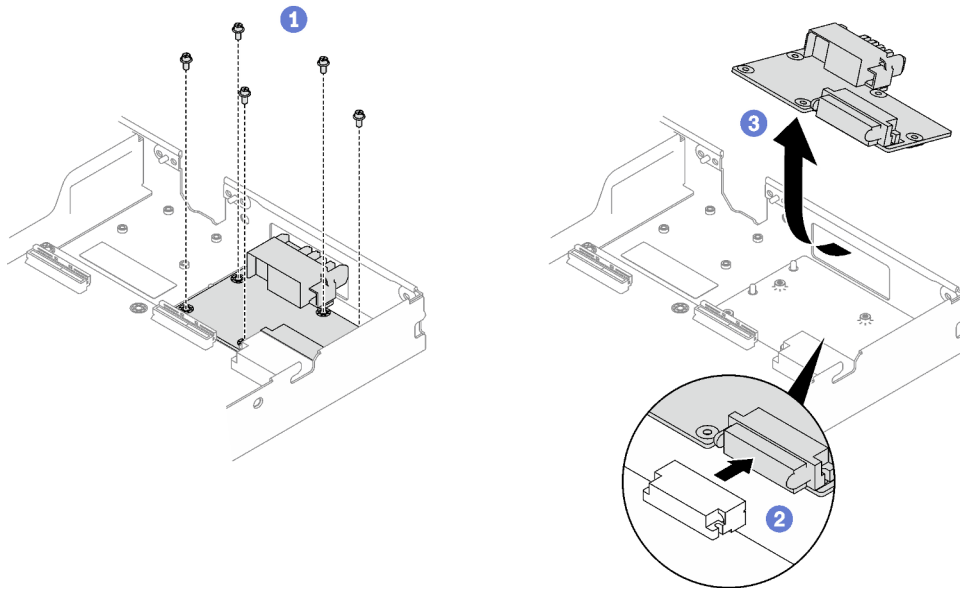


Figure 203. Power distribution board removal

Step 10. Wipe the thermal grease from the top of the processors with an alcohol cleaning pad.

Step 11. Wipe the thermal grease from the bottom of the cold plate with an alcohol cleaning pad.

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 power distribution board

Use this information to install the power distribution board.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Service Kit (The water loop carrier in the Service Kit is reusable, it is recommended to keep it at the facility where the server operates for future replacement needs.)
- SD665 V3 Water Loop Putty Pad Kit
- Drive gap pad or putty pad kits according to the drives installed in the tray. See their respective replacement procedures for more information.
- ConnectX series adapter putty pad kits according to the ConnectX adapter installed in the tray. See their respective replacement procedures for more information.
- Screws and screwdrivers

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T20 head screwdriver	Torx T20 screw
Phillips #2 head screwdriver	Phillips #2 screw
3/16" hex head screwdriver	M3 screw

Attention:

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see “[Gap pad/Putty pad identification and location](#)” on page 6.
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

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

Step 1. Install the power distribution board.

- 1 Tilt the power distribution board and align it with the hole; then, slide it into place.
- 2 Gently push the power distribution board connector to ensure it is connected to the system board.
- 3 Fasten the five M3 screws with a 3/16" hex head screwdriver.

Note: Use a 3/16" hex head screwdriver to ensure the proper removal and installation.

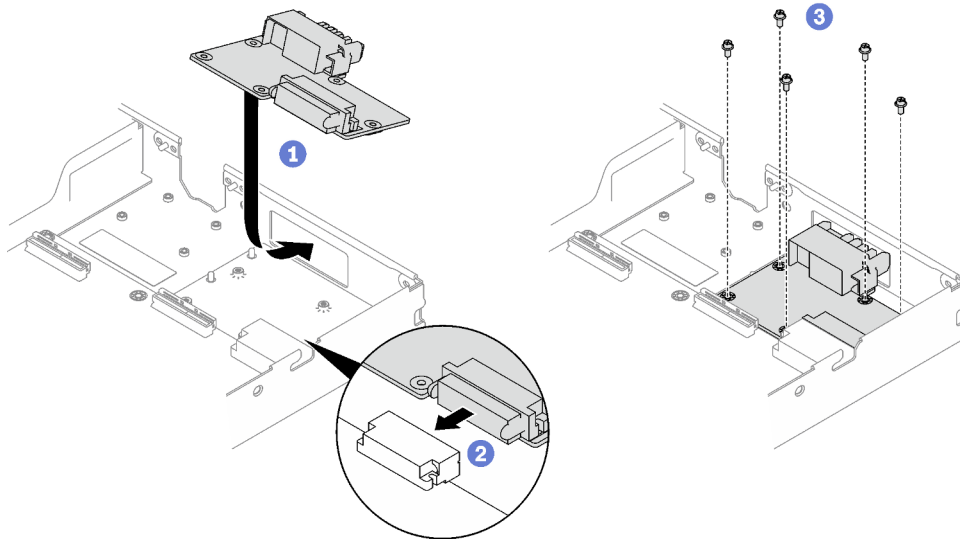


Figure 204. Power distribution board installation

Step 2. 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

Note: Carefully place the processor and retainer on a flat surface with the processor-contact side down.

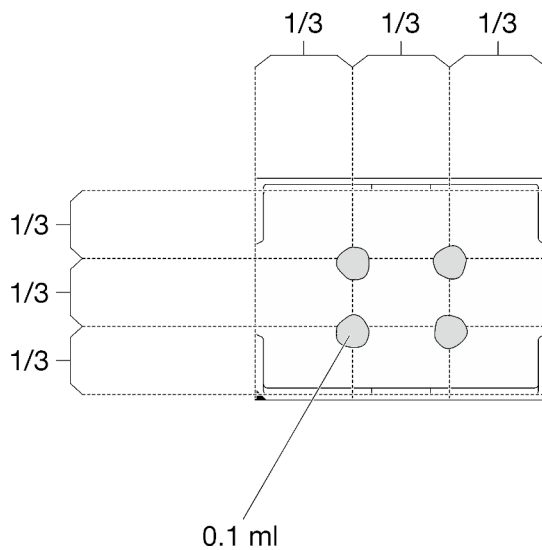


Figure 205. Thermal grease application

Step 3. Check the gap pads on the bottom side and top side of the water loop, if any of them are damaged, missing, or fallen off, replace them with the new ones.

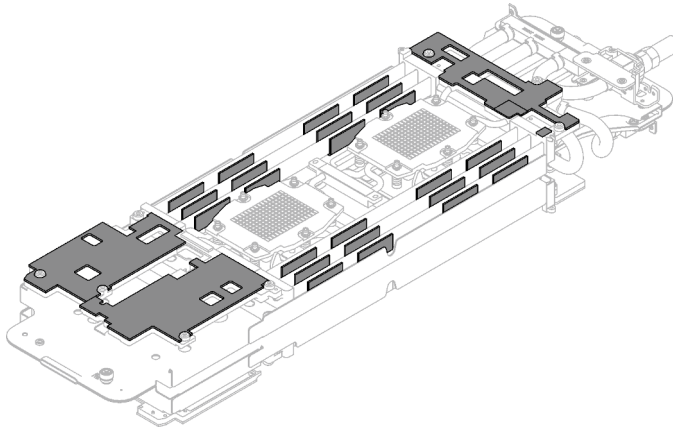


Figure 206. Water loop gap pads (bottom side)

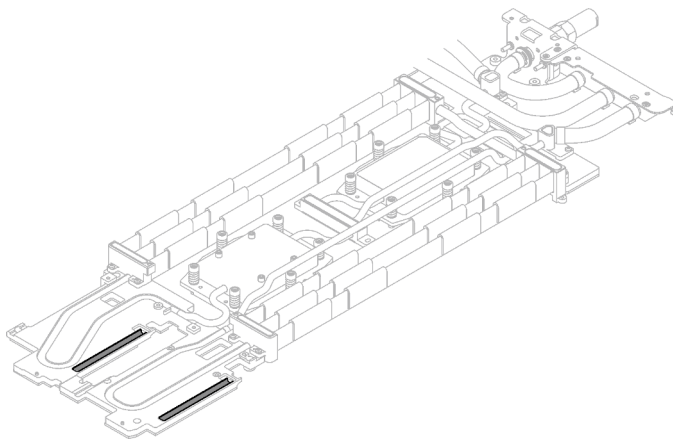


Figure 207. Water loop gap pads (top side)

Make sure to follow [Gap pad/putty pad replacement guidelines](#).

Step 4. Replace the putty pads on the water loop with new ones.

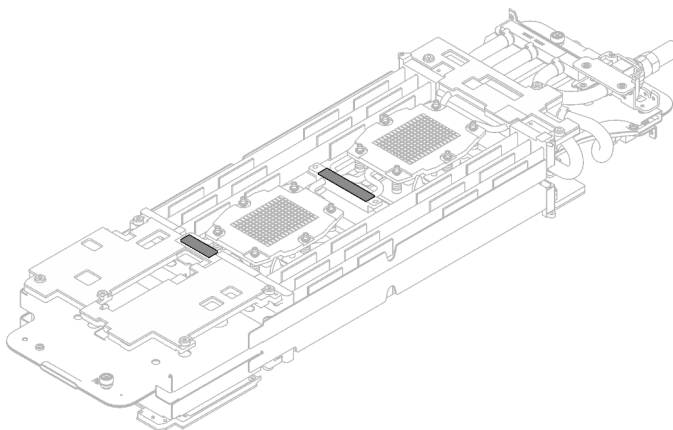


Figure 208. Water loop putty pads

Make sure to follow [Gap pad/putty pad replacement guidelines](#).

Step 5. Carefully rotate the top side of the water loop, position the water loop on the two guide pins near the rear of the node; then, gently put the water loop down and ensure it is firmly seated on the system board.

Attention: Make sure to align the water loop with the three guide pins on the right side compute node.

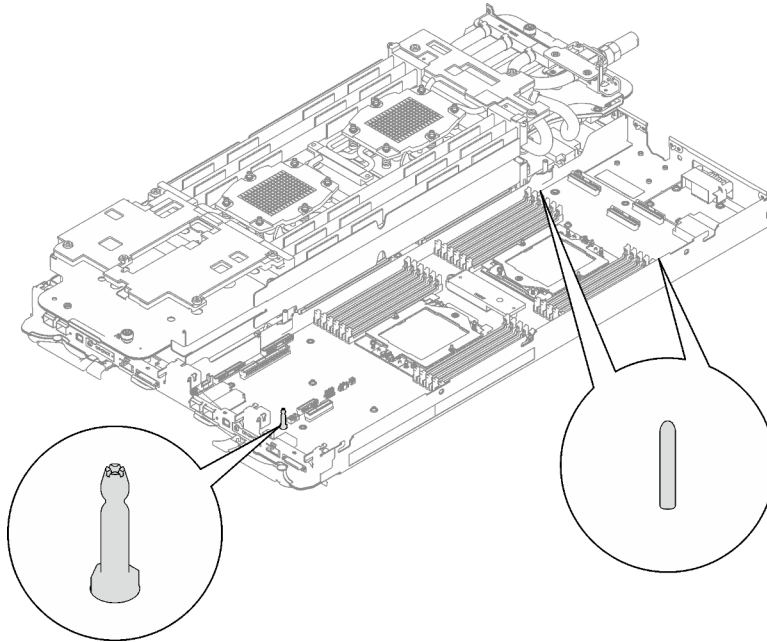


Figure 209. Guide pins on the right side compute node

Attention:

1. Slightly lift the water loop, then rotate it.
2. Do not tilt the water loop. Keep the water loop horizontal with the tray.
3. Install the water loop to the tray

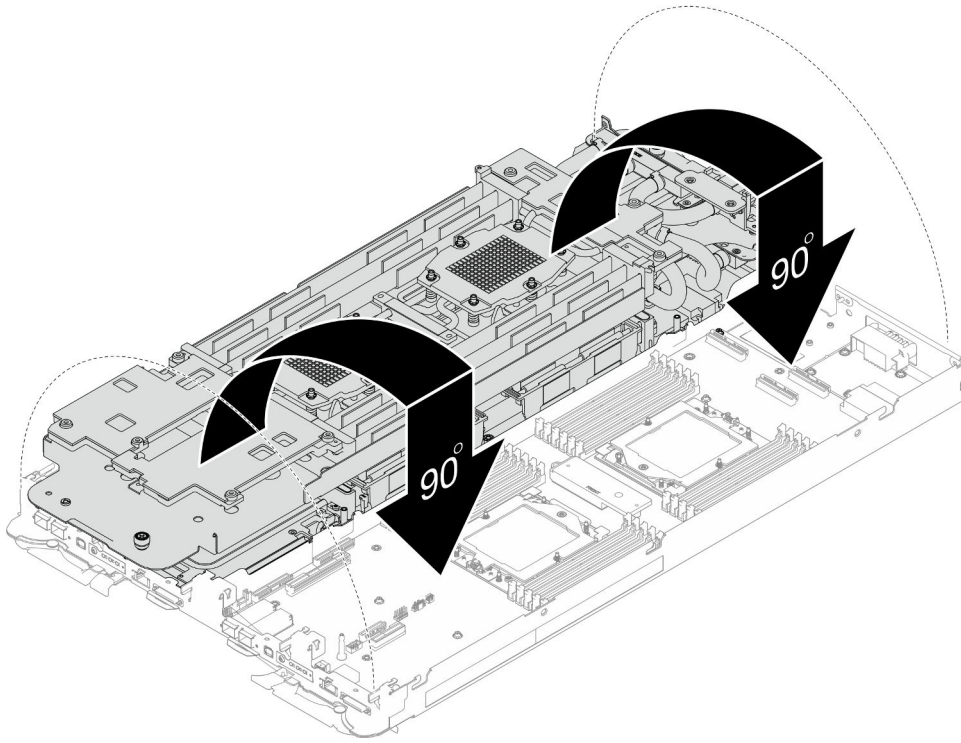


Figure 210. Water loop installation

Step 6. Install processor cold plate screws (12x Torx T20 screws per node). Follow the screw sequence specified below and tighten the screws with a torque screwdriver. Fully tighten each screw; then, proceed to the next screw.

Note: For reference, the torque required for the screws to be fully tightened/removed is 1.12-1.46 newton-meters, 10-13 inch-pounds

Fully tighten each screw the order below:

Pro- ces- sor	Screw sequence
A	1 → 2 → 6 → 4 → 3 → 5
B	1 → 2 → 3 → 5 → 6 → 4
C	2 → 1 → 4 → 6 → 5 → 3
D	2 → 1 → 5 → 3 → 4 → 6

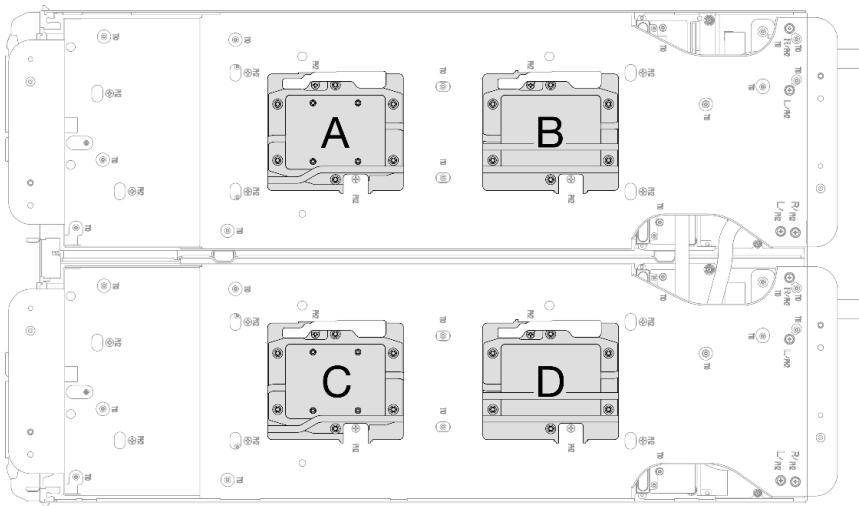
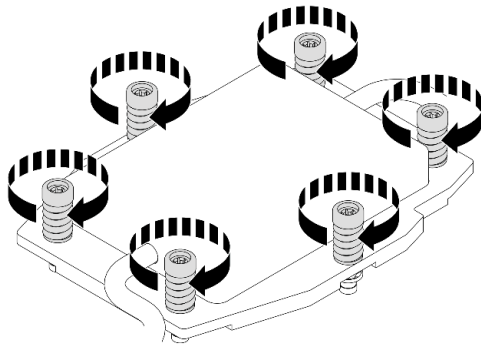
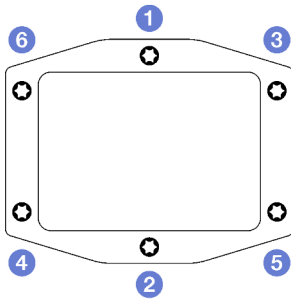


Figure 211. Processor cold plate installation

Step 7. Loosen water loop carrier screws (12x Phillips #2 screws per node).

Note: The screw holes on the rear of the carrier are marked with **L** and **R**. Select screw holes marked as **L** when the carrier is on the **left** node, and **R** for the **right** node.

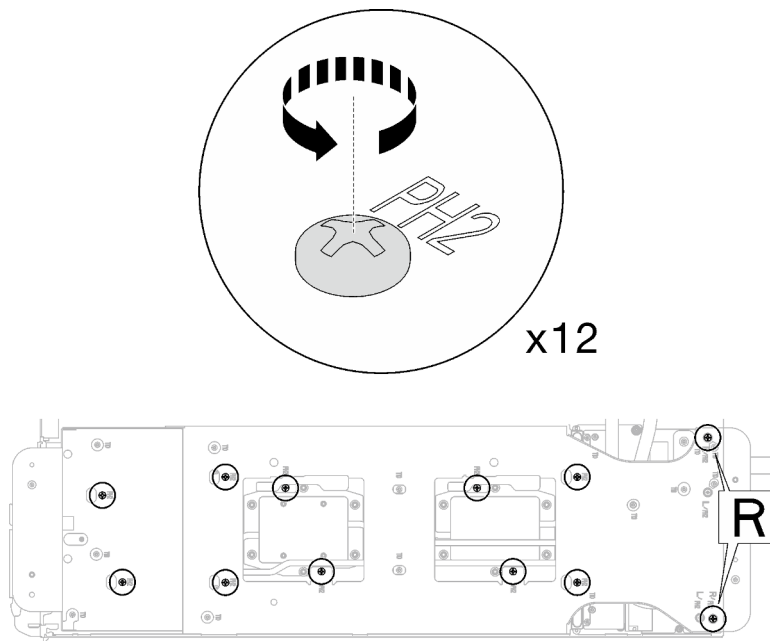


Figure 212. Loosening water loop carrier screws

Step 8. Carefully lift the water loop carrier up and away from the water loop.

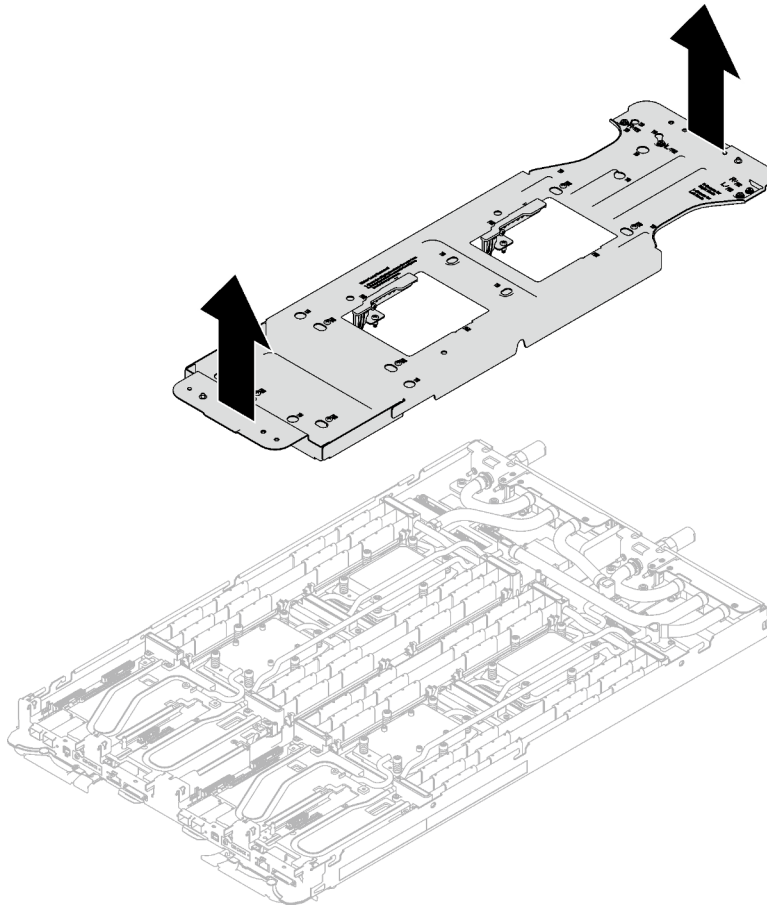


Figure 213. Water loop carrier removal

Step 9. Install water loop screws and quick connect screws (14x Torx T10 screws per node) with a torque screwdriver set to the proper torque.

Notes:

- For reference, the torque required for the screws to be fully tightened/removed is 5.0+/- 0.5 lbf-in, 0.55+/- 0.05 N-M.
- Install the **1** VR cold plate screws (x2) with washers.

– **Installing a new water loop:**

Use the washers previously removed from the defect water loop. If there were no washers on the VR cold plate originally, use the washers in VR Conduction Plate 12.4 (including washers).

– **Reinstalling the water loop:**

You may not be installing a new water loop, but is reinstalling the water loop after replacing the system board, processor, or power distribution board. In this case, use the washers previously removed from the water loop. If there were no washers on the VR cold plate originally, it is not required to install VR cold plate with washers.

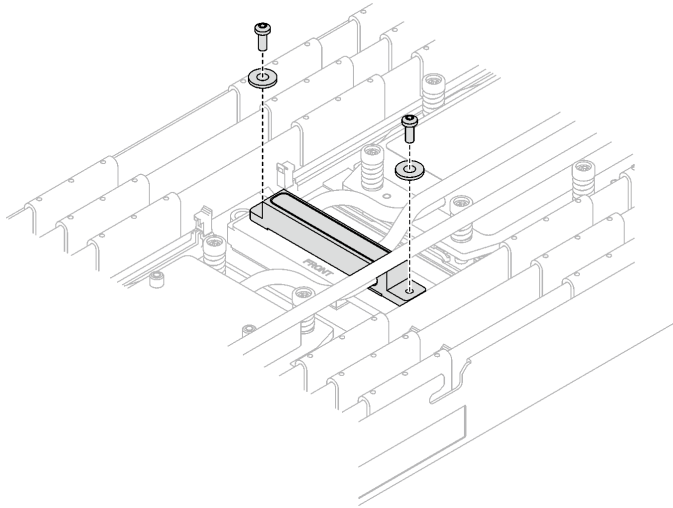


Figure 214. VR cold plate screws with washers

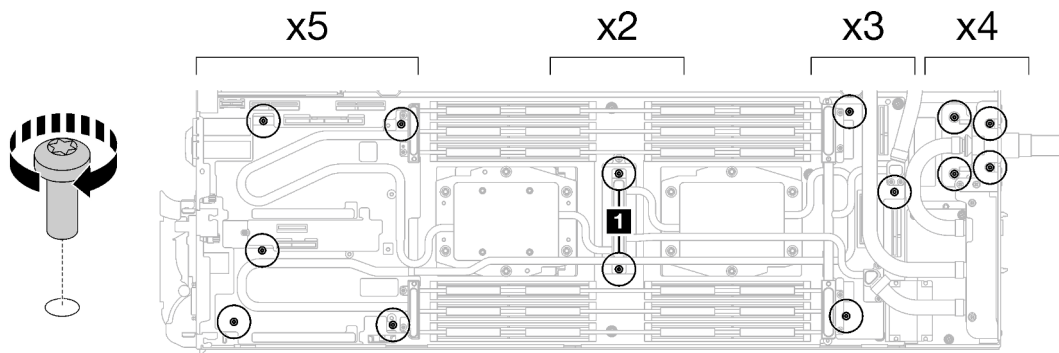


Figure 215. Water loop screws and quick connect screws installation

Step 10. Install the five Torx T10 screws to secure the quick connect.

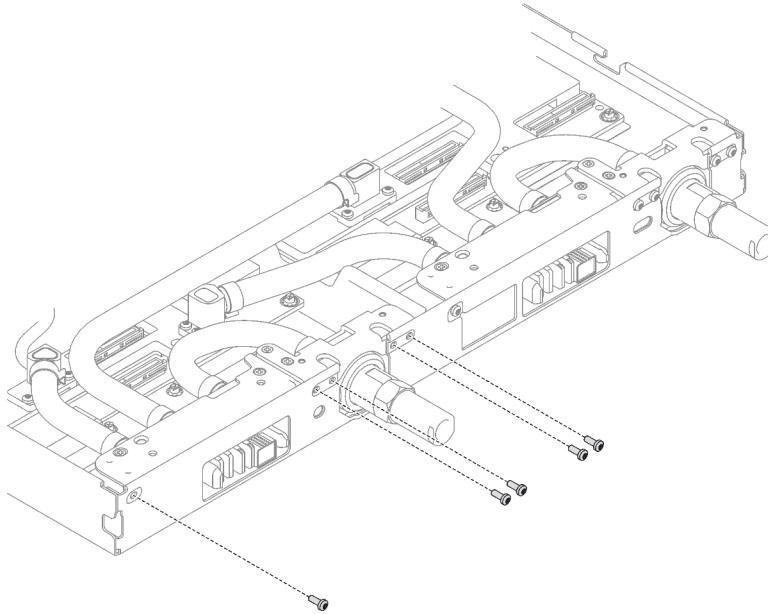


Figure 216. Quick connect screw installation

After you finish

1. Install the PCIe riser assembly. See [“Install a PCIe riser assembly \(ConnectX-6\)” on page 136](#) , [“Install a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 148](#), or [“Install a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 160](#).
2. Install the drive cage. See [“Install a drive cage assembly” on page 64](#).
3. Install the M.2 backplane assembly. See [“Install the M.2 backplane assembly” on page 110](#).
4. Install the cross braces. See [“Install the cross braces” on page 17](#).
5. Install the tray cover. See [“Install the tray cover” on page 14](#).
6. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
7. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

8. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

Processor replacement

Use the following procedures to replace an assembled processor.

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

Important:

- The processor in your solution 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.
- Before replacing a processor, check the current PSB fuse policy. See “Service process before replacement” at [Service process for updating PSB fuse state](#).
- After replacing a processor, ensure that the processor fuse status is expected without unexpected XCC event logs. See “Service process after replacing a processor” at [Service process for updating PSB fuse state](#).

Remove a processor

This task has instructions for removing an assembled processor. This task requires Torx 10 driver, T20 driver, Phillips #1 driver, and Phillips #2 driver.

About this task

Attention: The system will load factory default UEFI settings when Processor 1 is removed. In this case, make sure to back up the UEFI settings before processor 1 removal.

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Service Kit (The water loop carrier in the Service Kit is reusable, it is recommended to keep it at the facility where the server operates for future replacement needs.)
- SD665 V3 Water Loop Putty Pad Kit
- Drive gap pad or putty pad kits according to the drives installed in the tray. See their respective replacement procedures for more information.
- ConnectX series adapter putty pad kits according to the ConnectX adapter installed in the tray. See their respective replacement procedures for more information.
- Screws and screwdrivers

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T20 head screwdriver	Torx T20 screw
Phillips #1 head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

Attention:

- Read “[Installation Guidelines](#)” on page 1 and “[Safety inspection checklist](#)” on page 2 to ensure that you work safely.

- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.
- Each processor socket must always contain a cover. When removing or installing a processor, 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 water loop to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage components, such as electrical connectors in the processor socket. Do not remove the grease cover from the cold plate until you are instructed to do so.
- Before you install a new or replace a processor, update your system firmware to the latest level. See “Update the firmware” in *System Configuration Guide*.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

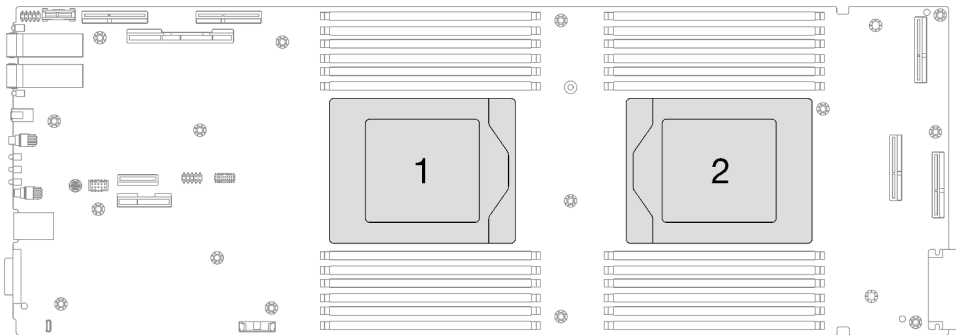


Figure 217. Processor locations

Procedure

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

Step 1. Make preparations for this task.

- Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- Remove the cross braces. See [“Remove the cross braces” on page 15](#).
- Remove the DIMM comb. See [“Remove a DIMM comb” on page 48](#).
- Remove memory modules. See [“Remove a memory module” on page 114](#).
- Remove the M.2 backplane assembly. See [“Remove the M.2 backplane assembly” on page 104](#).
- Remove the drive cage. See [“Remove a drive cage assembly” on page 52](#).
- Remove the PCIe riser assembly. Depending on your configuration, see [“Remove a PCIe riser assembly \(ConnectX-6\)” on page 133](#), [“Remove a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 141](#), or [“Remove a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 154](#).

Step 2. Remove the five screws to loosen the quick connect.

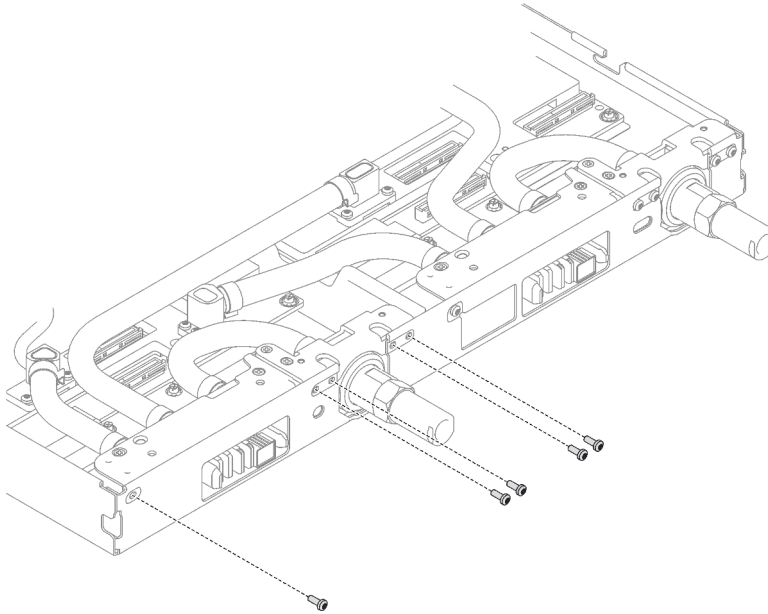


Figure 218. Quick connect screw removal

Step 3. Remove water loop screws and quick connect screws (14x Torx T10 screws per node) with a torque screwdriver set to the proper torque.

Notes:

- For reference, the torque required for the screws to be fully tightened/removed is 5.0+/- 0.5 lbf-in, 0.55+/- 0.05 N-M.
- When removing the **1** VR cold plate screws (x2), remove the washers, too. **Make sure** to keep the washers for future use. (Depending on the configurations, there may not be any washers on the VR cold plate. In this case, there is no need to remove and keep the washers.)

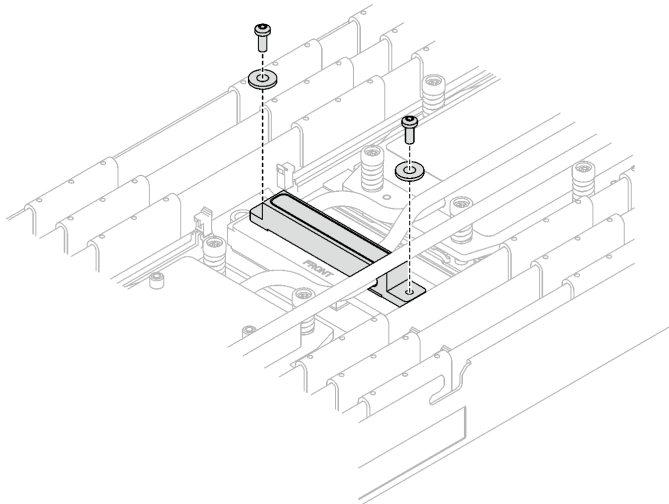


Figure 219. VR cold plate screws with washers

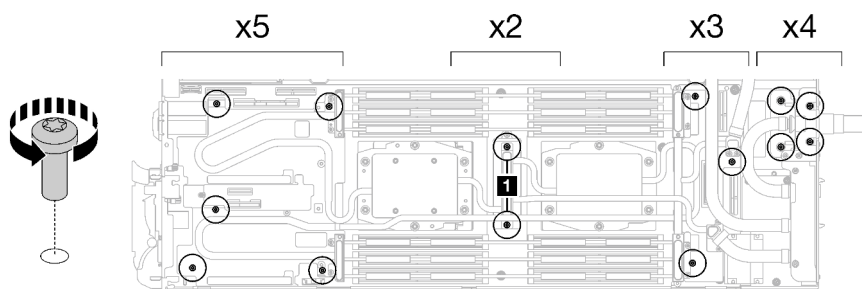


Figure 220. Water loop screw removal

- Step 4. Orient the water loop carrier with the guide pin; then, gently put the water loop carrier down and ensure it is seated firmly on the water loop.

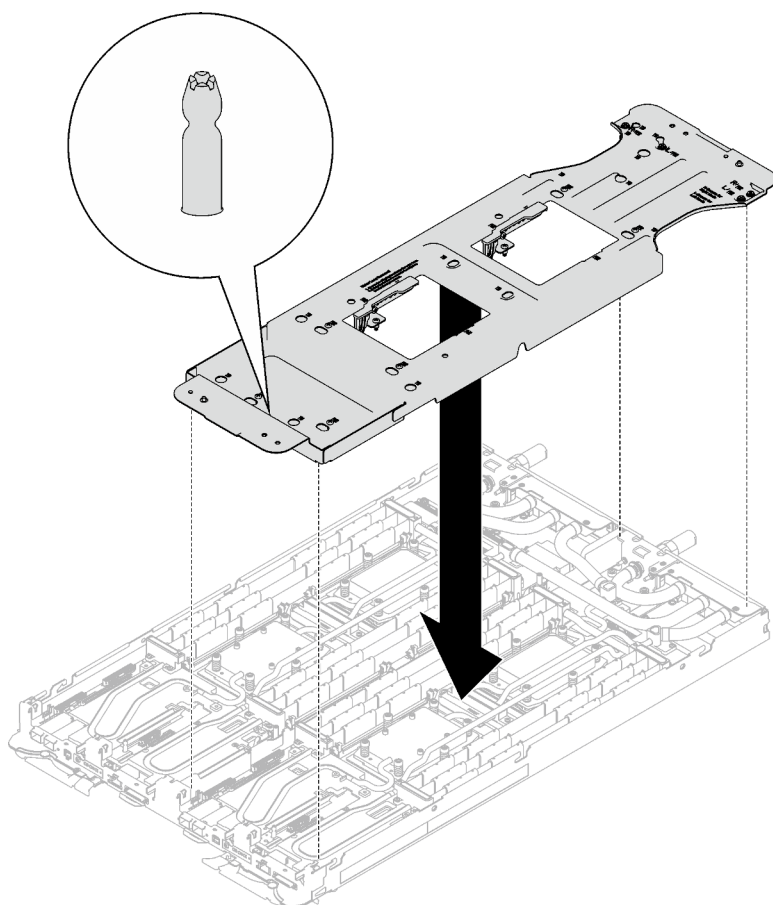


Figure 221. Water loop carrier installation

- Step 5. Tighten water loop carrier screws (12x Phillips #2 screws per node).

Note: The screw holes on the rear of the carrier are marked with **L** and **R**. Select screw holes marked as **L** when the carrier is on the **left** node, and **R** for the **right** node.

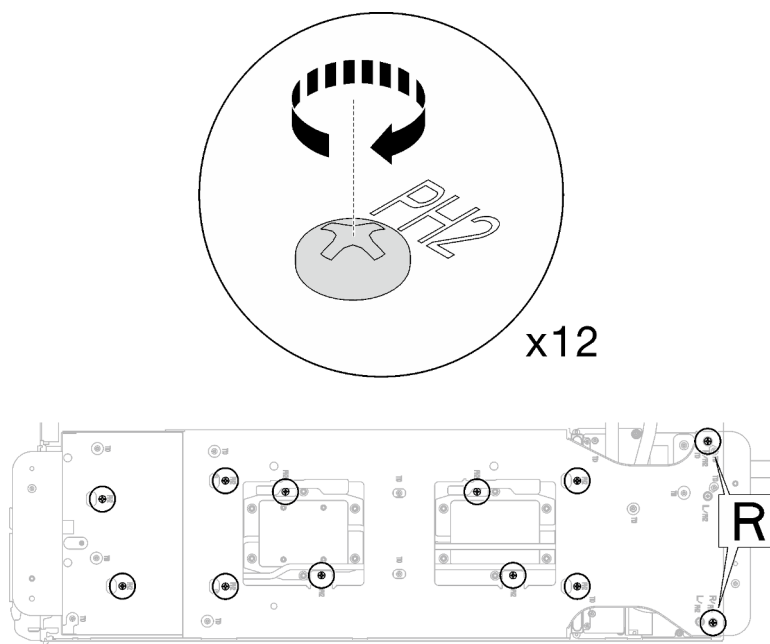


Figure 222. Water loop carrier screws installation

- Step 6. Remove processor cold plate screws (12x Torx T20 screws per node). Follow the screw sequence specified on the processor cold plate label and loosen the screws with a general screwdriver torque screwdriver. Fully loosen each screw; then, proceed to the next screw.

Note: For reference, the torque required for the screws to be fully tightened/removed is 1.12-1.46 newton-meters, 10-13 inch-pounds

Fully loosen each screw in this order: 6 → 5 → 4 → 3 → 2 → 1

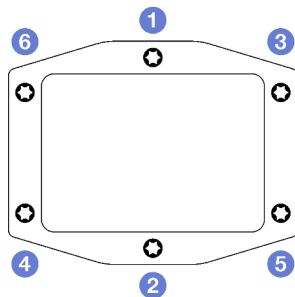


Figure 223. Processor cold plate label

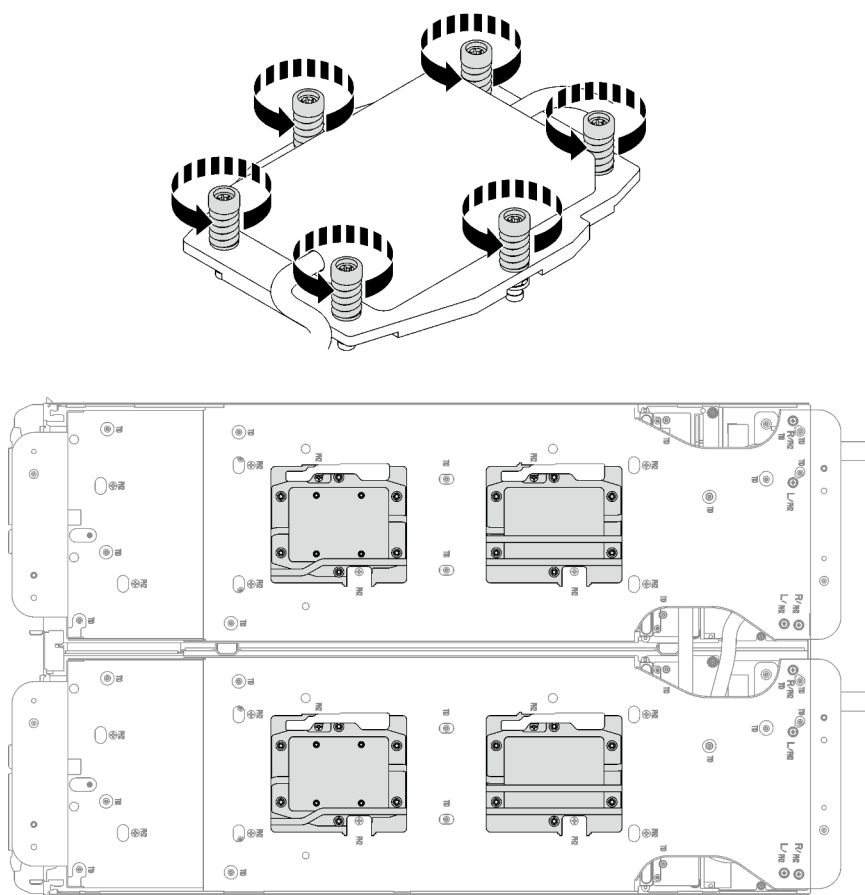


Figure 224. Processor cold plate removal

Step 7. Rotate the latches on the water loop carrier to separate the processor cold plates from processors.

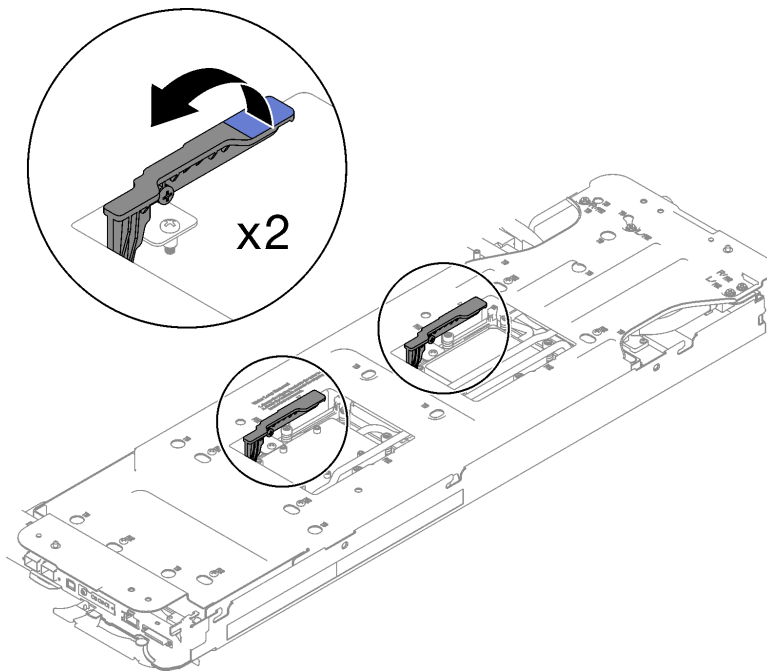


Figure 225. Separate water loop from processor

Step 8. Carefully rotate the water loop so one half is sitting on top of the other half.

Note: Do not tilt the water loop. Keep the water loop horizontal with the tray.

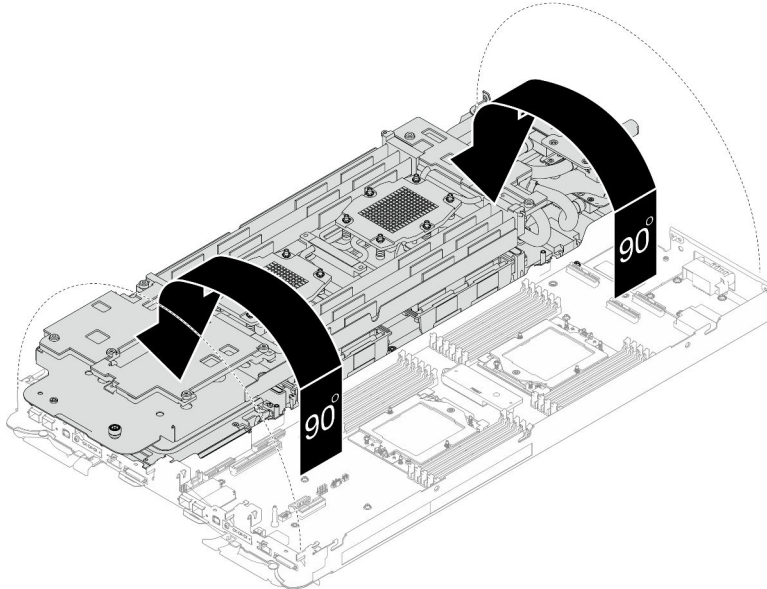


Figure 226. Folding the water loop

Step 9. Remove the processor

- a. ① Use a Torx T20 screwdriver to loosen the retention frame screw; then, rotate the retention frame to the open position.
- b. ② Slightly lift up the rail frame in the direction shown. The processor in the rail frame is spring-loaded.

- c. ③ Hold the blue tab of the processor carrier and slide the processor carrier out of the rail frame.

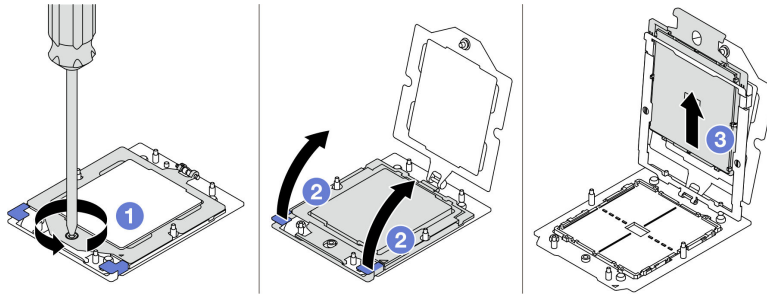


Figure 227. Processor removal

Step 10. 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.

Step 11. Wipe the thermal grease from the bottom of the cold plate with an alcohol cleaning pad.

After you finish

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

Demo video

[Watch the procedure on YouTube](#)

Install a processor

This task has instructions for installing a processor. This task requires Torx 10 driver, T20 driver, Philips #1 driver, and Philips #2 driver.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Service Kit (The water loop carrier in the Service Kit is reusable, it is recommended to keep it at the facility where the server operates for future replacement needs.)
- SD665 V3 Water Loop Putty Pad Kit
- Drive gap pad or putty pad kits according to the drives installed in the tray. See their respective replacement procedures for more information.
- ConnectX series adapter putty pad kits according to the ConnectX adapter installed in the tray. See their respective replacement procedures for more information.
- Screws and screwdrivers

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T20 head screwdriver	Torx T20 screw
Phillips #1 head screwdriver	Phillips #1 screw
Phillips #2 head screwdriver	Phillips #2 screw

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.
- Each processor socket must always contain a cover. When removing or installing a processor, 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 water loop to come in contact with anything. Contact with any surface can compromise the thermal grease, rendering it ineffective. Thermal grease can damage components, such as electrical connectors in the processor socket. Do not remove the grease cover from the cold plate until you are instructed to do so.
- Before you install a new or replace a processor, update your system firmware to the latest level. See [“Update the firmware” in System Configuration Guide](#).
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Notes:

- See <https://serverproven.lenovo.com> for a list of processors supported for your system. All processors on the system board must have the same speed, number of cores, and frequency.
- Optional devices available for your system might have specific processor requirements. See the documentation that comes with the optional device for information.

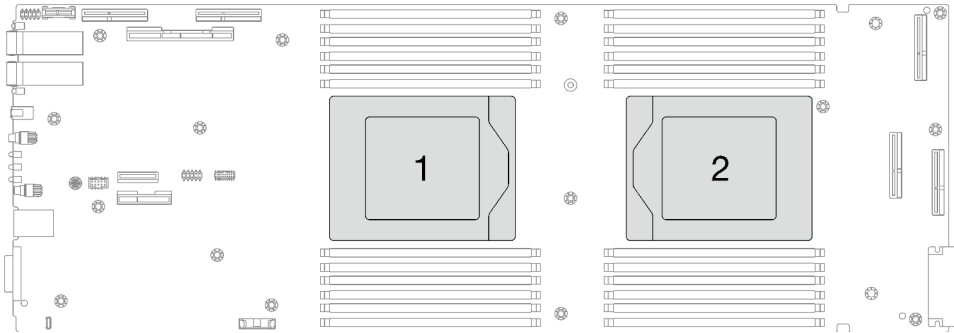


Figure 228. Processor locations

Important: Gap pad/putty pad replacement guidelines

- To identify the gap pad/putty pad location and orientation, see “Gap pad/Putty pad identification and location” on page 6.
- Before replacing the gap pad/putty pad, gently clean the interface plate or the hardware surface with an alcohol cleaning pad.
- Hold the gap pad/putty pad carefully to avoid deformation. Make sure no screw hole or opening is blocked by the gap pad/putty pad material.
- Do not use expired putty pad. Check the expiry date on putty pad package. If the putty pads are expired, acquire new ones to properly replace them.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Procedure

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

Step 1. Follow the following steps if you are replacing processors:

- If there is any old thermal grease on the bottom of the cold plate on water loop, gently clean the thermal grease using an alcohol cleaning pad.
- Remove the processor identification label from the water loop and replace it with the new label that comes with the replacement processor. If you are unable to remove the label and place it on the new water loop, or if the label is damaged during transfer, write the processor serial number from the processor identification label on the new water loop in the same location as the label would be placed using a permanent marker.

Step 2. Install the processor

- ① Slide the processor carrier into the rail frame.

Attention: Make sure the processor carrier is well seated inside the rail frame.

- b. ② Use index finger of both hands to press down the rail frame.
- c. ③ Use the index finger of both hands to push the rail frame down until the blue latches lock into place.
- d. ④ Close the retention frame.
- e. ⑤ Use a Torx T20 screwdriver to tighten the screw.

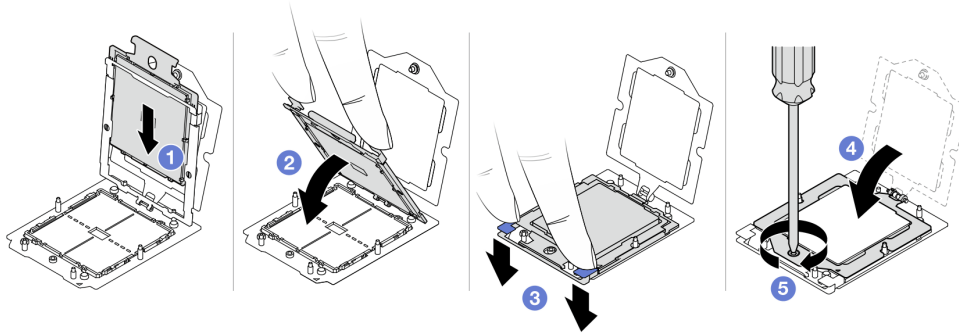


Figure 229. Processor installation

Step 3. 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

Note: Carefully place the processor and retainer on a flat surface with the processor-contact side down.

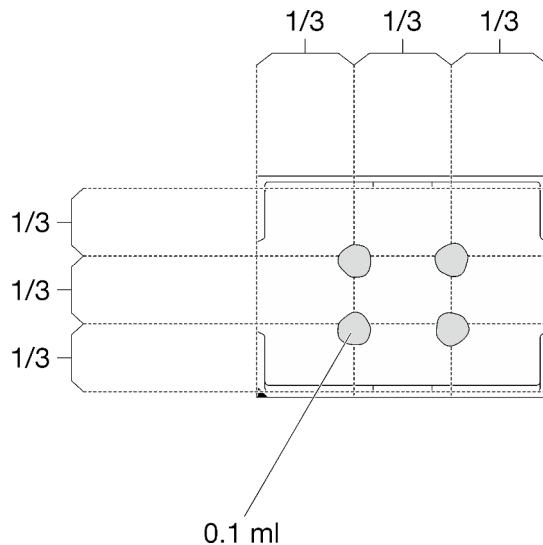


Figure 230. Thermal grease application

Step 4. If needed, remove plastic grease covers from the underside of processor cold plates.

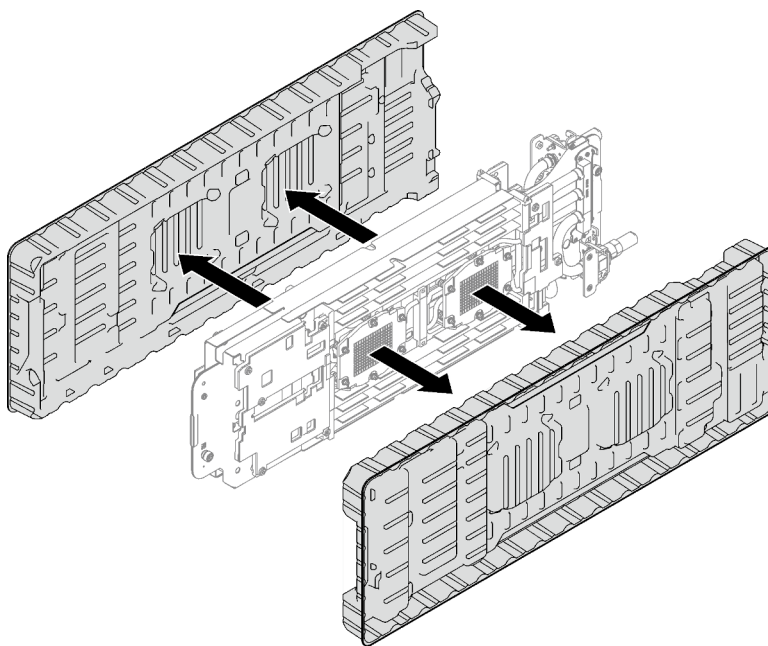


Figure 231. Plastic grease covers removal

- Step 5. Check the gap pads on the bottom side and top side of the water loop, if any of them are damaged, missing, or fallen off, replace them with the new ones.

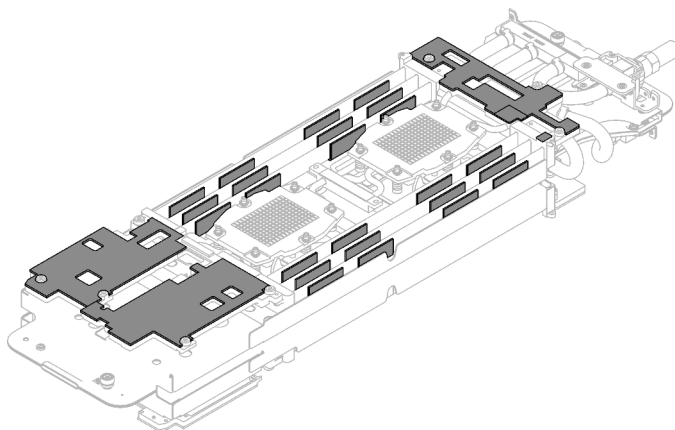


Figure 232. Water loop gap pads (bottom side)

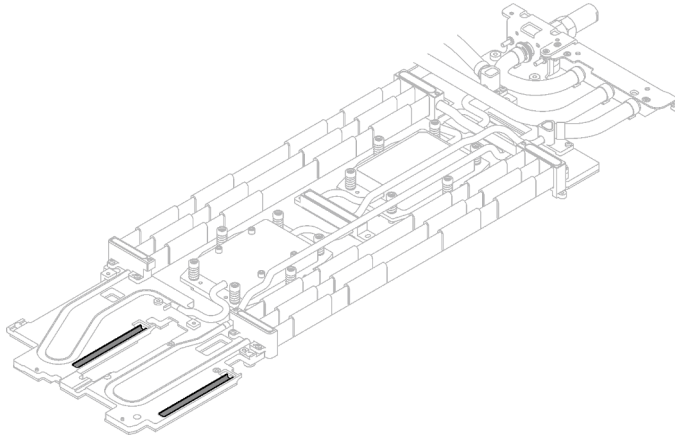


Figure 233. Water loop gap pads (top side)

Make sure to follow [Gap pad/putty pad replacement guidelines](#).

Step 6. Replace the putty pads on the water loop with new ones.

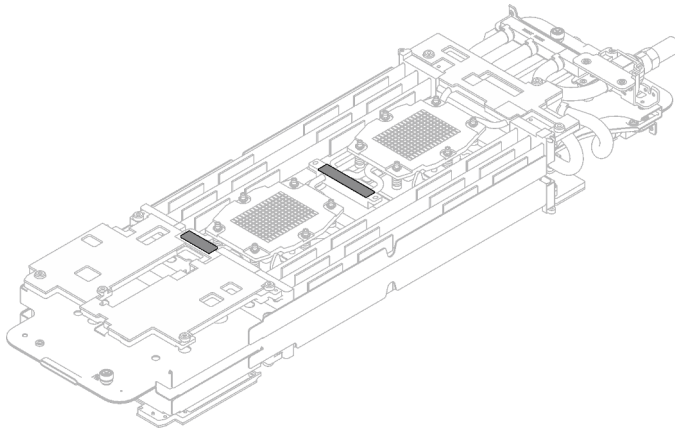


Figure 234. Water loop putty pads

Make sure to follow [Gap pad/putty pad replacement guidelines](#).

Step 7. Carefully rotate the top side of the water loop, position the water loop on the two guide pins near the rear of the node; then, gently put the water loop down and ensure it is firmly seated on the system board.

Attention: Make sure to align the water loop with the three guide pins on the right side compute node.

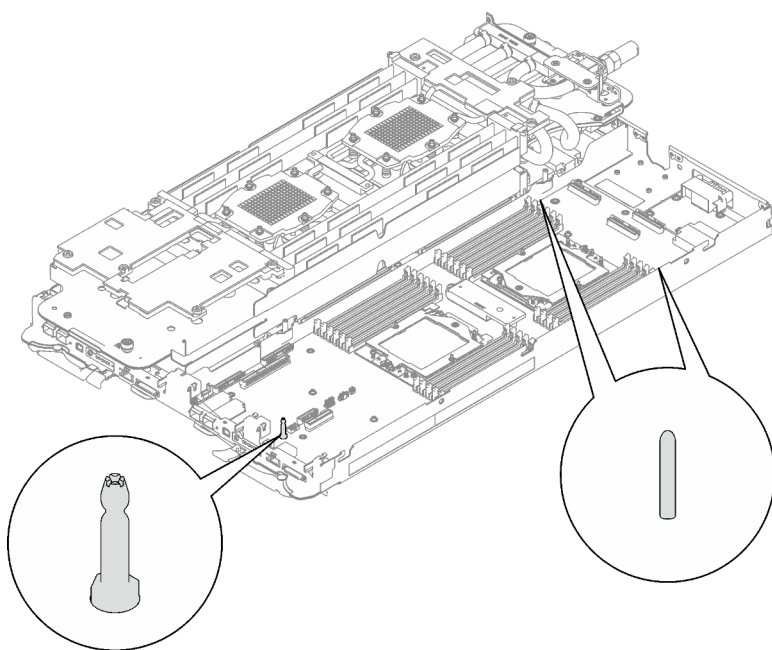


Figure 235. Guide pins on the right side compute node

Attention:

1. Slightly lift the water loop, then rotate it.
2. Do not tilt the water loop. Keep the water loop horizontal with the tray.
3. Install the water loop to the tray

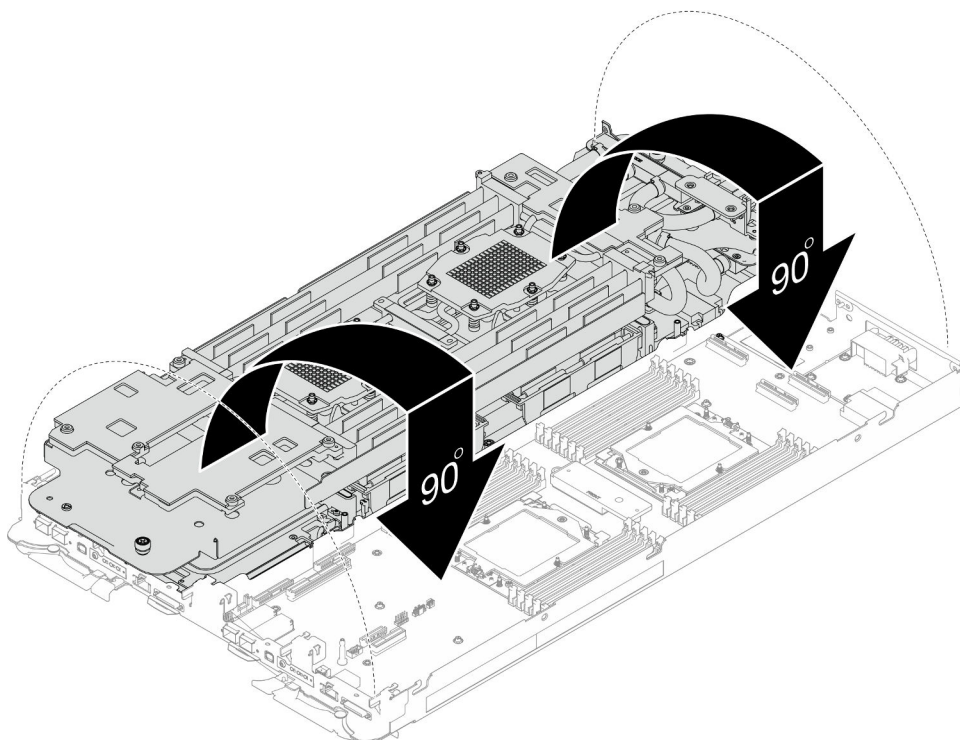


Figure 236. Water loop installation

Step 8. Install processor cold plate screws (12x Torx T20 screws per node). Follow the screw sequence specified below and tighten the screws with a torque screwdriver. Fully tighten each screw; then, proceed to the next screw.

Note: For reference, the torque required for the screws to be fully tightened/removed is 1.12-1.46 newton-meters, 10-13 inch-pounds

Fully tighten each screw the order below:

Pro- ces- sor	Screw sequence
A	1 → 2 → 6 → 4 → 3 → 5
B	1 → 2 → 3 → 5 → 6 → 4
C	2 → 1 → 4 → 6 → 5 → 3
D	2 → 1 → 5 → 3 → 4 → 6

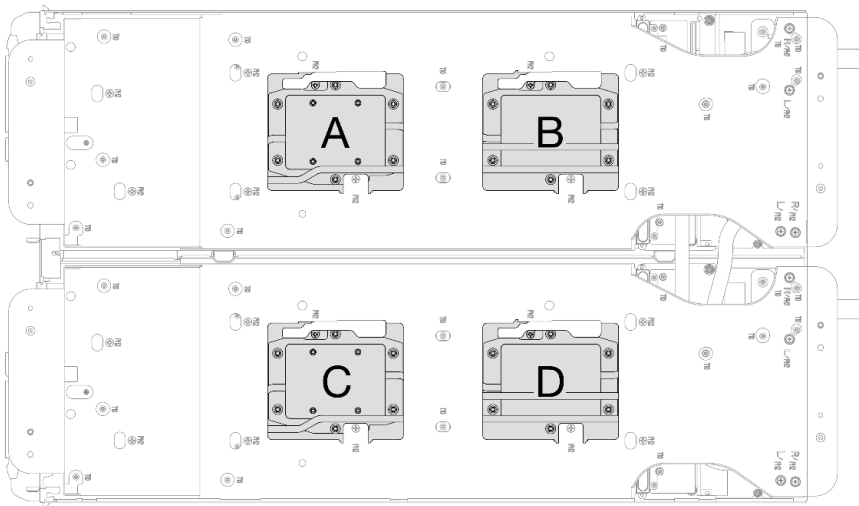
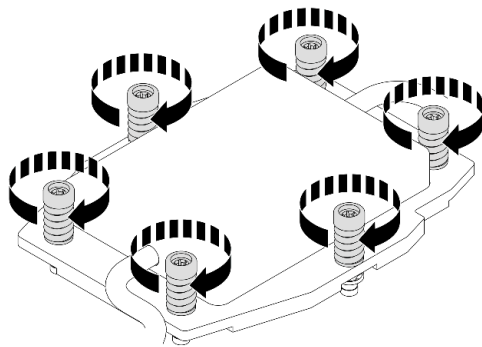
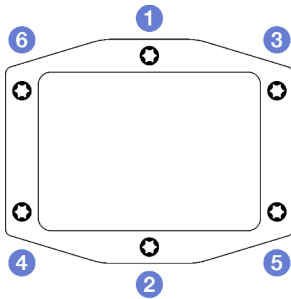


Figure 237. Processor cold plate installation

Step 9. Loosen water loop carrier screws (12x Phillips #2 screws per node).

Note: The screw holes on the rear of the carrier are marked with **L** and **R**. Select screw holes marked as **L** when the carrier is on the **left** node, and **R** for the **right** node.

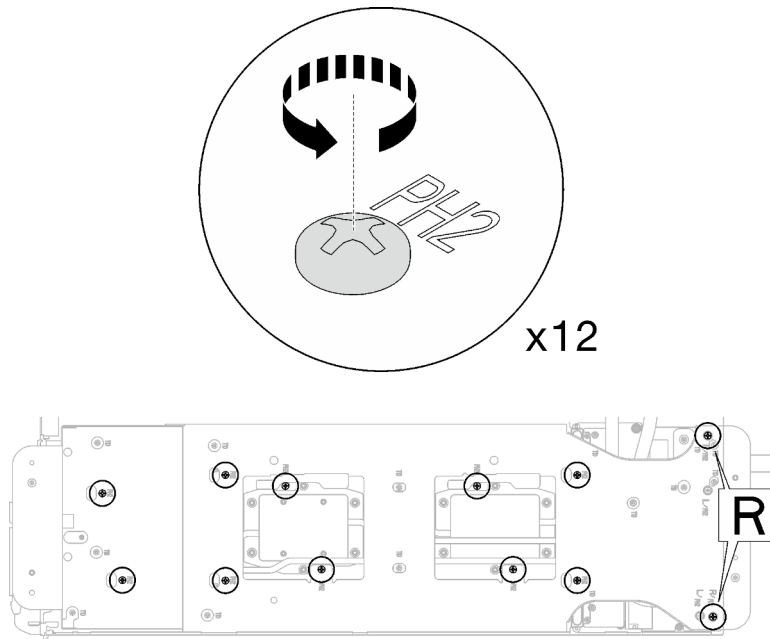


Figure 238. Loosening water loop carrier screws

Step 10. Carefully lift the water loop carrier up and away from the water loop.

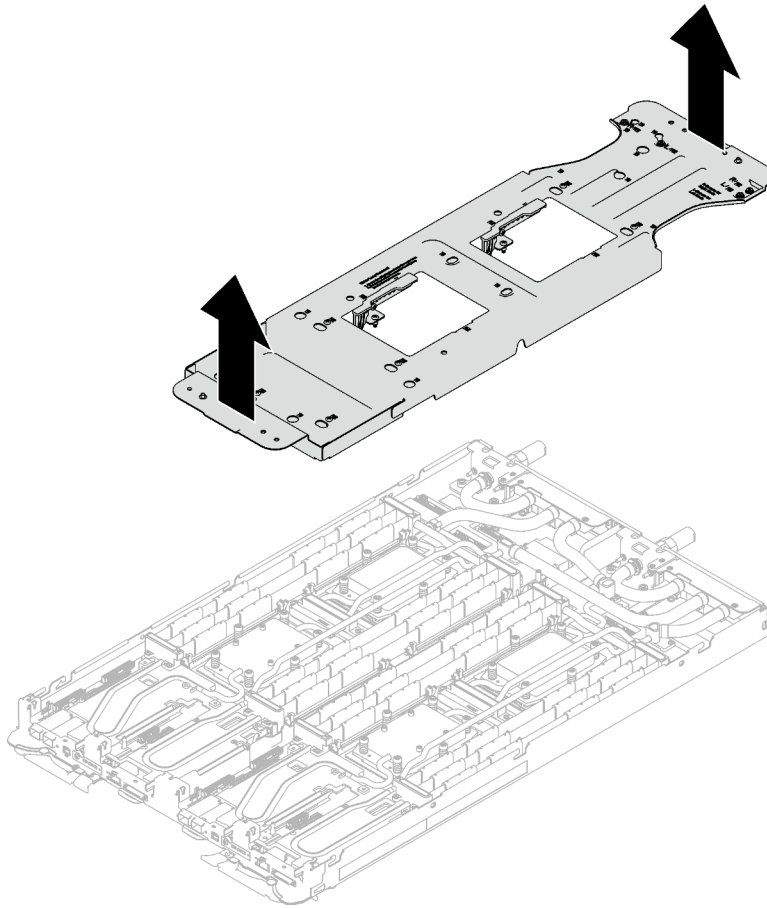


Figure 239. Water loop carrier removal

Step 11. Install water loop screws and quick connect screws (14x Torx T10 screws per node) with a torque screwdriver set to the proper torque.

Notes:

- For reference, the torque required for the screws to be fully tightened/removed is 5.0+/- 0.5 lbf-in, 0.55+/- 0.05 N-M.
- Install the **1** VR cold plate screws (x2) with washers.

– **Installing a new water loop:**

Use the washers previously removed from the defect water loop. If there were no washers on the VR cold plate originally, use the washers in VR Conduction Plate 12.4 (including washers).

– **Reinstalling the water loop:**

You may not be installing a new water loop, but is reinstalling the water loop after replacing the system board, processor, or power distribution board. In this case, use the washers previously removed from the water loop. If there were no washers on the VR cold plate originally, it is not required to install VR cold plate with washers.

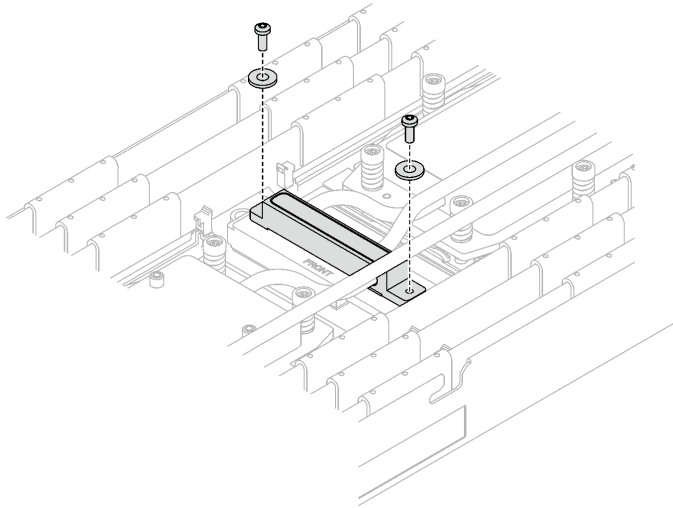


Figure 240. VR cold plate screws with washers

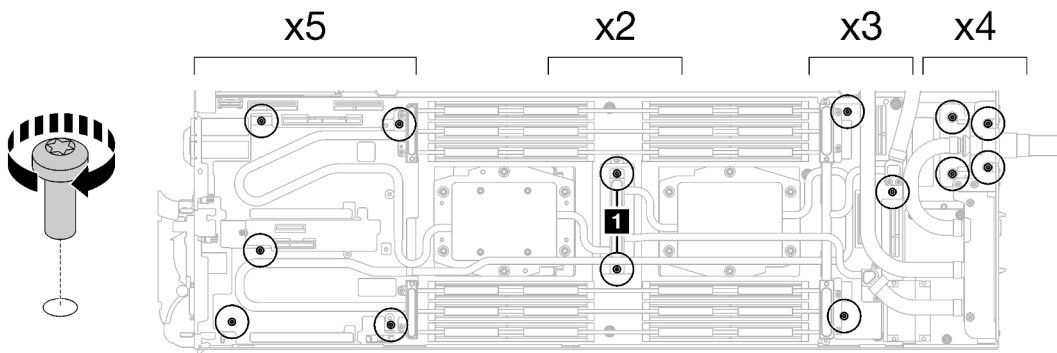


Figure 241. Water loop screws and quick connect screws installation

Step 12. Install the five Torx T10 screws to secure the quick connect.

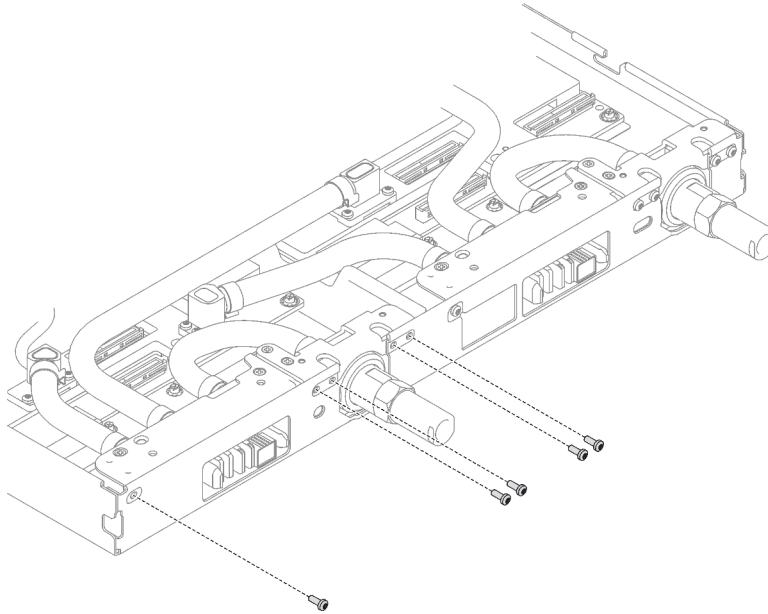


Figure 242. Quick connect screw installation

After you finish

1. Install the memory modules. See [“Install a memory module” on page 121](#).
2. Install the DIMM comb. See [“Install a DIMM comb” on page 50](#).
3. Install the M.2 backplane assembly. See [“Install the M.2 backplane assembly” on page 110](#).
4. Install the drive cage. See [“Install a drive cage assembly” on page 64](#).
5. Install the PCIe riser assembly. See [“Install a PCIe riser assembly \(ConnectX-6\)” on page 136](#), [“Install a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 148](#), or [“Install a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 160](#).
6. Install the cross braces. See [“Install the cross braces” on page 17](#).
7. Install the tray cover. See [“Install the tray cover” on page 14](#).
8. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
9. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

10. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

[Watch the procedure on YouTube](#)

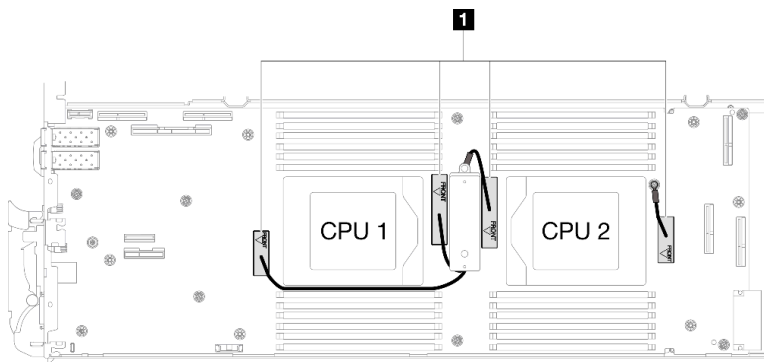
System board replacement (trained technician only)

Follow instructions in this section to remove and install the system board.

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

1. Take a dust cover from the CPU socket assembly on the new system board and orient it correctly above the CPU socket assembly on the removed system board.

2. Gently press down the dust cover legs to the CPU socket assembly, pressing on the edges to avoid damage to the socket pins. You might hear a click on the dust cover is securely attached.
3. **Make sure** that the dust cover is securely attached to the CPU socket assembly.
4. This task must be operated by trained technicians that are certified by Lenovo Service. Do no attempt to remove or install it without proper training and qualification
5. Before replacing a system board, go to [Service process for updating PSB fuse state](#) and do the following:
 - Check the current PSB fuse policy before replacement.
 - Ensure that the processor fuse status is expected without unexpected XCC event logs after replacement.
6. When removing the system board, **do not** remove the shielding cables (1) from the system board.



Remove the system board

Use this information to remove the system board.

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Service Kit (The water loop carrier in the Service Kit is reusable, it is recommended to keep it at the facility where the server operates for future replacement needs.)
- SD665 V3 Water Loop Putty Pad Kit
- VR 2.5 mm Putty Pad
- Shielding cable 1, 2, and 3
- Drive gap pad or putty pad kits according to the drives installed in the tray. See their respective replacement procedures for more information.
- ConnectX series adapter putty pad kits according to the ConnectX adapter installed in the tray. See their respective replacement procedures for more information.
- Screws and screwdrivers

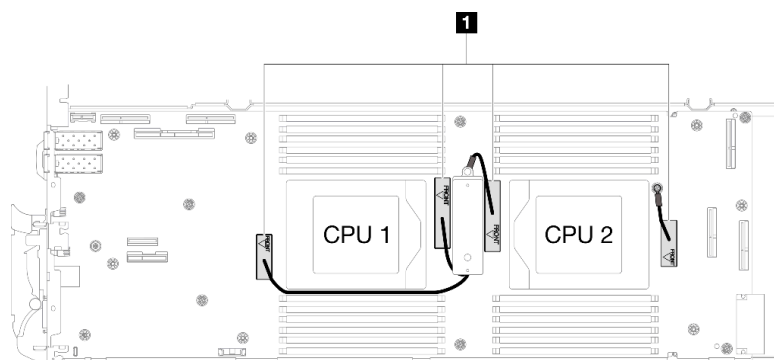
Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T20 head screwdriver	Torx T20 screw
Phillips #1 head screwdriver	M3 screw

Screwdriver Type	Screw Type
Phillips #2 head screwdriver	Phillips #2 screw
3/16" hex head screwdriver	M3 screw

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.
- When removing the system board, **do not** remove the shielding cables (1) from the system board.



Procedure

Step 1. Make preparations for this task.

- Remove the tray from the enclosure. See [“Remove a DWC tray from the enclosure” on page 10](#).
- Remove the tray cover. See [“Remove the tray cover” on page 13](#).
- Remove the cross braces. See [“Remove the cross braces” on page 15](#).
- Remove the DIMM comb. See [“Remove a DIMM comb” on page 48](#).
- Remove memory modules. See [“Remove a memory module” on page 114](#).
- Remove the M.2 backplane assembly. See [“Remove the M.2 backplane assembly” on page 104](#).
- Remove the drive cage. See [“Remove a drive cage assembly” on page 52](#).
- Remove the PCIe riser assembly. Depending on your configuration, see [“Remove a PCIe riser assembly \(ConnectX-6\)” on page 133](#), [“Remove a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 141](#), or [“Remove a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 154](#).
- Remove the processors, and carefully rotate the water loop so one half is sitting on top of the other half. See [“Remove a processor” on page 183](#).
- Remove the power distribution board. See [“Remove the power distribution board” on page 165](#).

Step 2. Remove the two KVM screws from the front of the node with a torque screwdriver set to the proper torque.

Note: For reference, the torque required for the screws to fully tightened/removed is 1.3+/-0.5 lb-in, 0.15+/- 0.05 N-M.

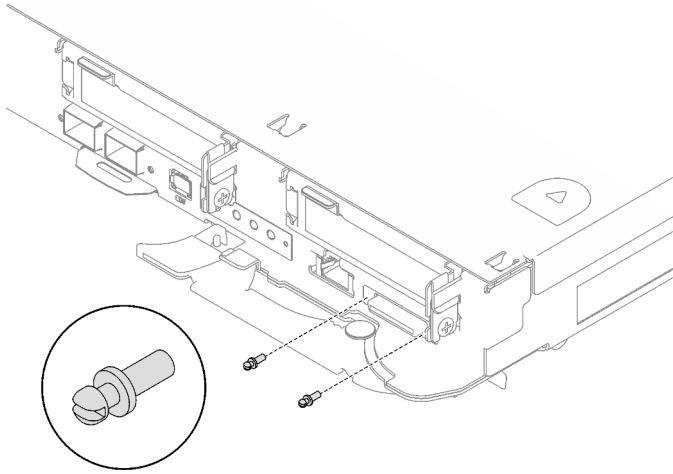


Figure 243. KVM screws removal

Step 3. Remove the two M3 screws (two screws per node) to remove the VR conduction plate out of the system board.

Note: Keep the VR conduction plate for future use.

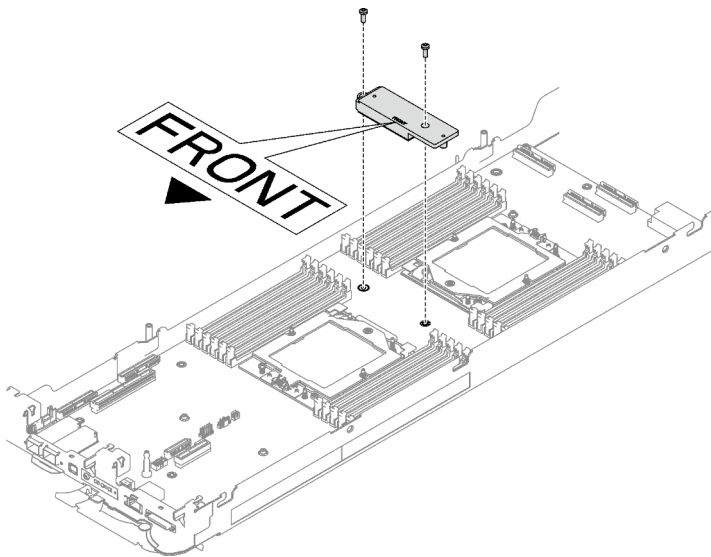


Figure 244. VR conduction plate removal

Step 4. Remove eight M3 screws per node on the system board with a 3/16" hex head screwdriver set to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 5.0+/- 0.5 lbf-in, 0.55+/- 0.05 N-M.

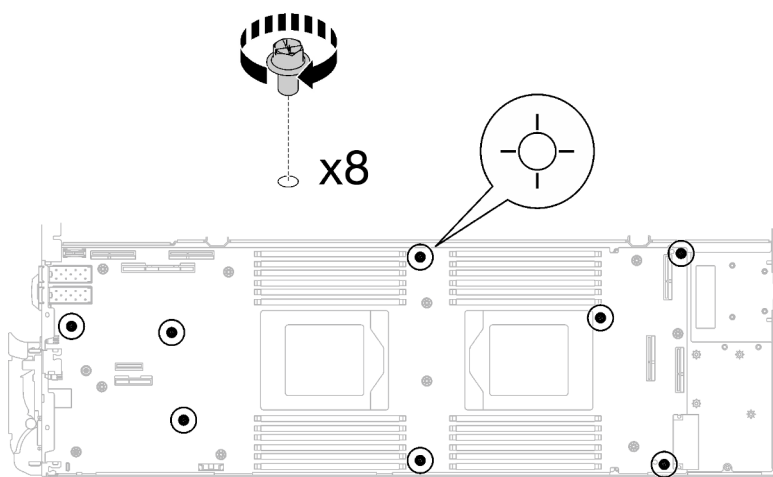


Figure 245. System board screws removal

- Step 5. Carefully hold the guide pin and tilt the system board at an angle; then, gently slide and lift the system board backwards to remove the system board from the node.

Note: Avoid touching the connectors on the system board. Be careful not to damage any surrounding components inside the node.

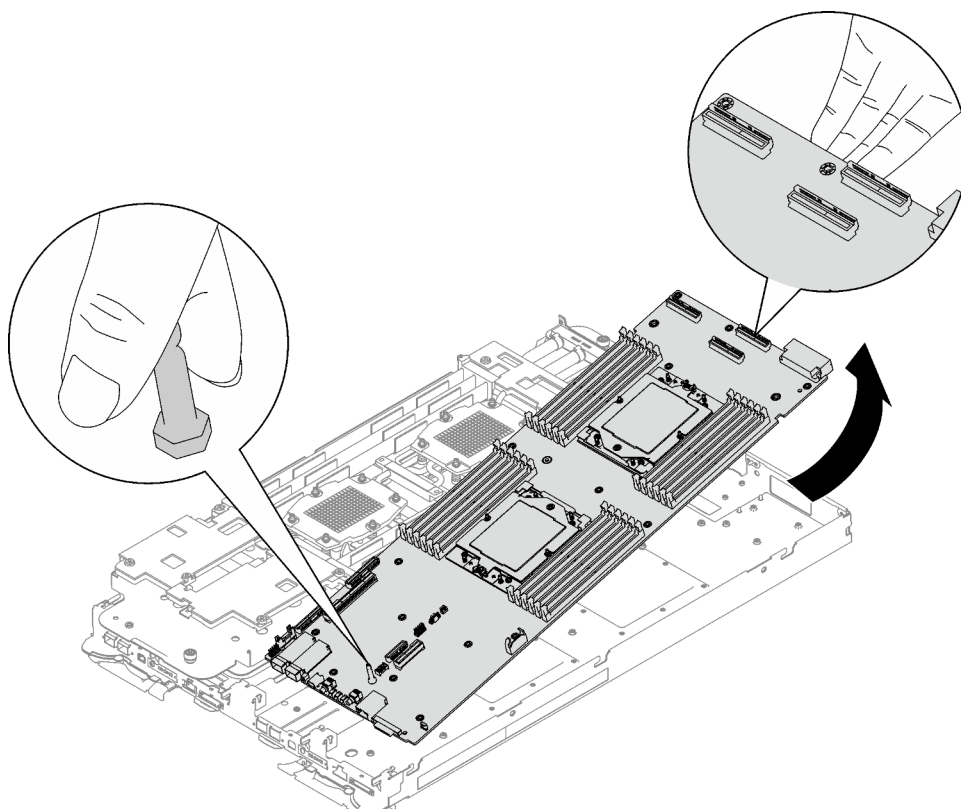


Figure 246. System board removal

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.

- For installing a new system board, see [“Install the system board” on page 207](#).
- For transferring the system board to another tray, see [“Transfer the system board” on page 221](#).

Important: Before you return the system board, make sure that you install the processor socket dust covers from the new system board. To replace a processor socket dust cover:

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

If you need to disassemble the system board, follow the instructions below:

Attention: You can only disassemble the system board for recycle. Do not disassemble it for any other purposes.

1. Remove the guide pin out of the system board.

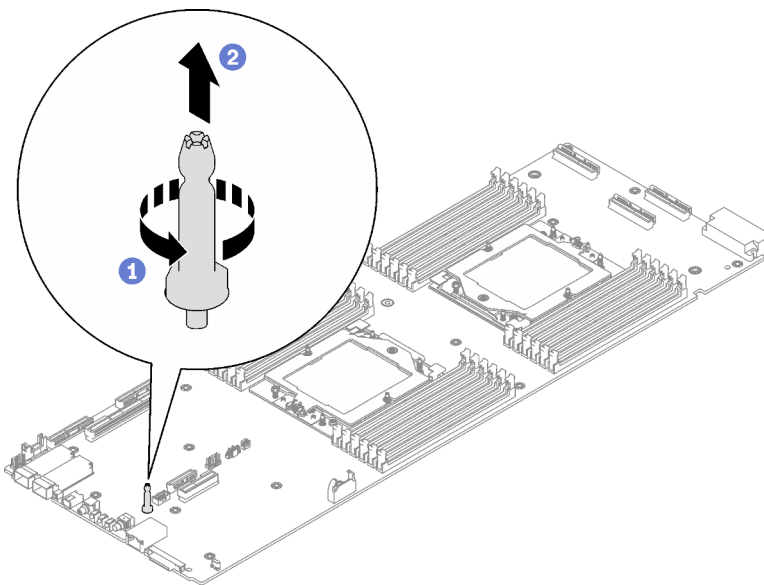


Figure 247. Guide pin removal

2. Recycle the unit in compliance with local regulations.

Demo video

[Watch the procedure on YouTube](#)

Install the system board

Use this information to install a new system board to the tray..

Note: If you are transferring the system board to another tray, see [“Transfer the system board” on page 221](#).

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Service Kit (The water loop carrier in the Service Kit is reusable, it is recommended to keep it at the facility where the server operates for future replacement needs.)
- SD665 V3 Water Loop Putty Pad Kit
- VR 2.5 mm Putty Pad
- Shielding cable 1, 2, and 3
- Drive gap pad or putty pad kits according to the drives installed in the tray. See their respective replacement procedures for more information.
- ConnectX series adapter putty pad kits according to the ConnectX adapter installed in the tray. See their respective replacement procedures for more information.
- Screws and screwdrivers

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T20 head screwdriver	Torx T20 screw
Phillips #1 head screwdriver	M3 screw
Phillips #2 head screwdriver	Phillips #2 screw
3/16" hex head screwdriver	M3 screw

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Note: After XCC and UEFI firmware updates, more than one system reboot cycles are to be expected. Times of reboot cycle depends on firmware update revision. Do not shut down the system until entering UEFI setup menu or the operating system.

Procedure

Notes:

- Depending on the model, your solution might look slightly different from the illustration.
- If you are transferring the system board to another tray, see [“Transfer the system board” on page 221](#).

Step 1. Replace the VR conduction plate putty pad.

- a. ① With an alcohol cleaning pad, remove the residual putty pad from the VR conduction plate removed previously. The putty pads are on the bottom side of the VR conduction plate.
- b. ② Paste the VR 2.5 mm Putty Pad to the bottom side of the VR conduction plate.

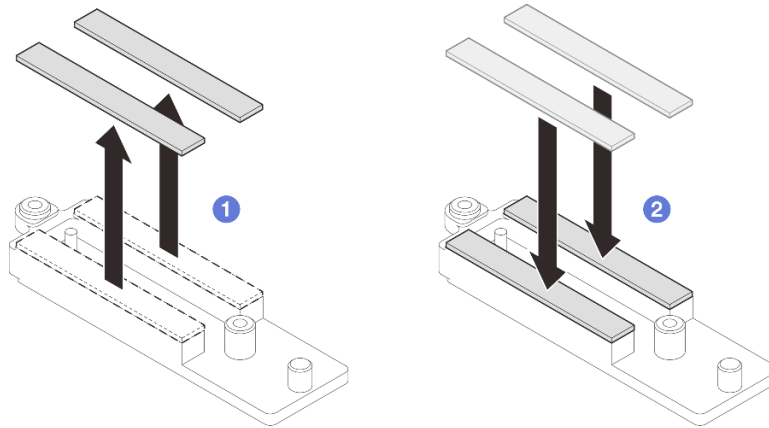


Figure 248. Replacing the VR conduction plate putty pads

Step 2. Install the system board.

- a. Carefully hold the front guide pin and tilt the system board at an angle.
- b. Align the connectors with the corresponding holes on the front of the node; then, gently slide the system board forward.

Note: Avoid touching the connectors on the system board. Be careful not to damage any surrounding components inside the node.

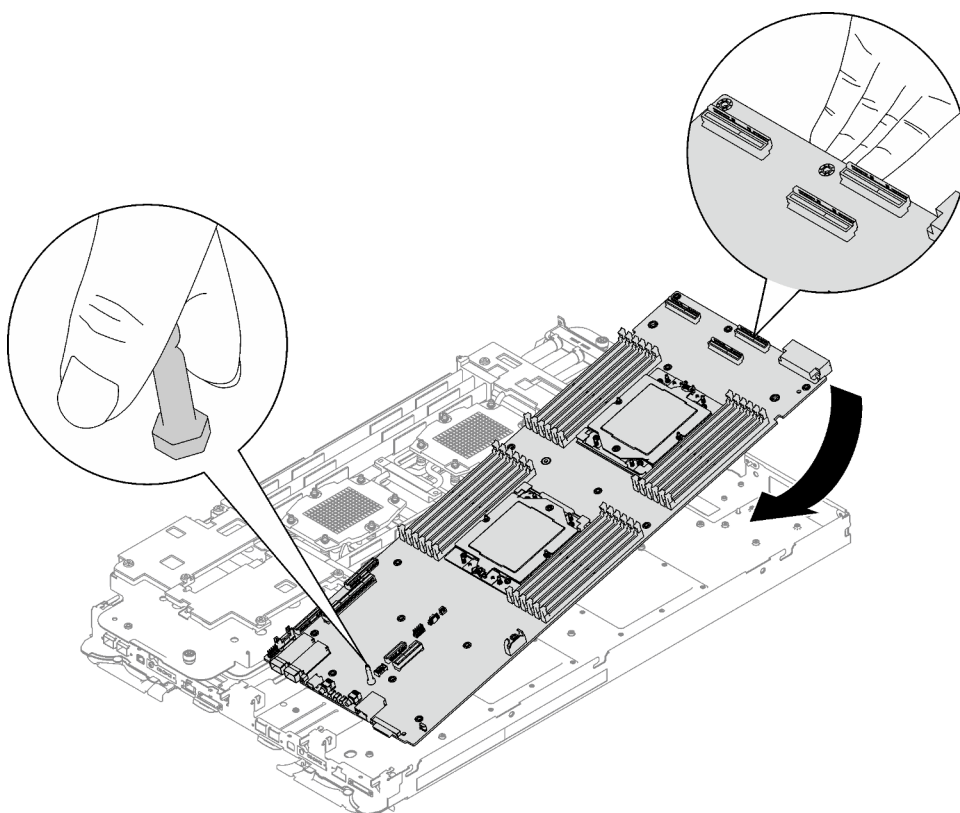


Figure 249. System board installation

Install the shielding cables

Step 3. Identify the shielding cables.

Shielding cable
1 Shielding cable 1 (connected with shielding cable 2 by Y cable)
2 Shielding cable 2 (connected with shielding cable 1 by Y cable)
3 Shielding cable 3
4 Shielding cable 4 (attached shielding cage is smaller than shielding cable 3)

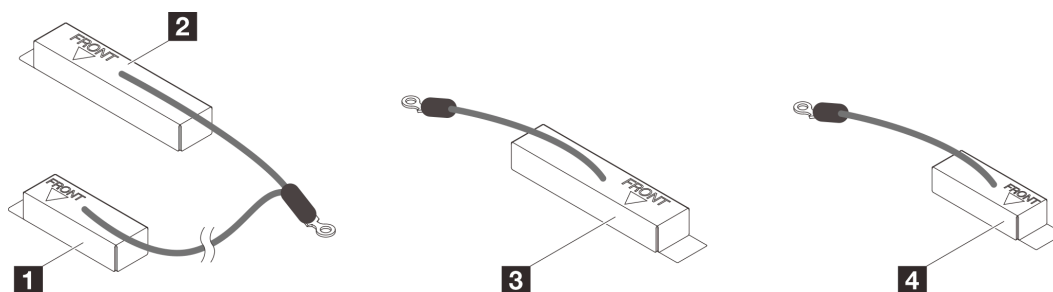


Figure 250. Shielding cable 1/2, 3, and 4

- Step 4. Place shielding cable 1/2 and shielding cable 3 on top of the screw holes on system board.
- Locate the screw holes for shielding cable 1/2 and shielding cable 3.

1 Screw hole for shielding cable 1/2

2 Screw hole for shielding cable 3

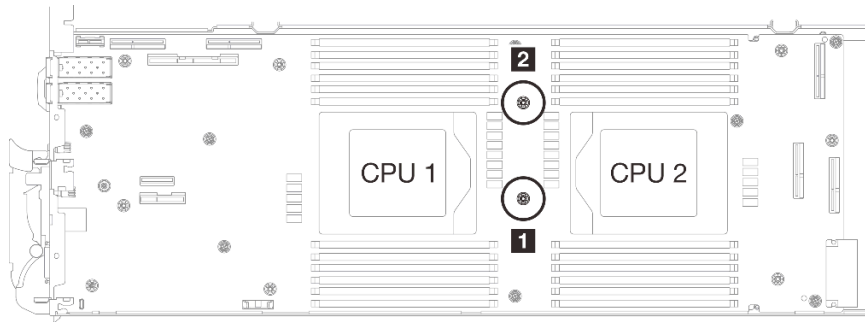


Figure 251. Location of screw holes of shielding cable 1/2 and 3

- b. Align shielding cable 1/2 and shielding cable 3 to the screw holes on system board. **Make sure the ring terminals of the cable are placed in the angle shown below.**

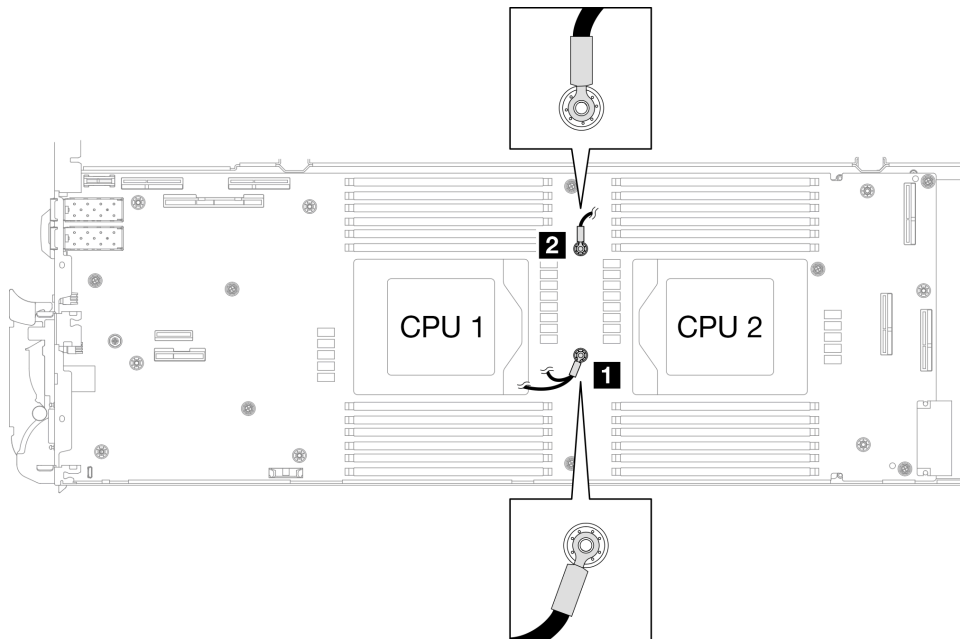


Figure 252. Aligning shielding cable 1/2 and shielding cable 3 with screw holes

Step 5. Install shielding cable 1/2 and 3.

- a. **1** Keep the FRONT marking on the VR conduction plate pointing the front of the tray. Then, place the VR conduction plate on top of the two cable ring terminals.

Note: A putty pad is attached to the bottom side of the VR conduction plate. Carefully hold the VR conduction plate to avoid damaging the putty pad.

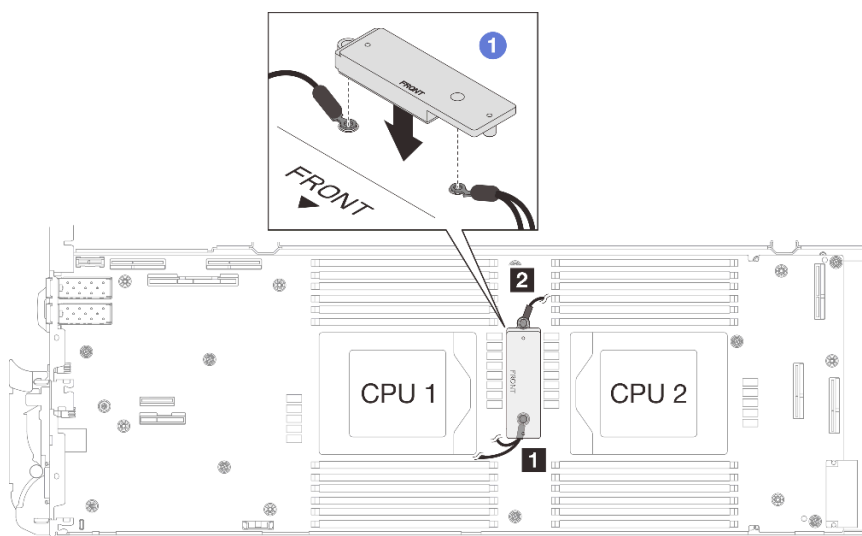


Figure 253. Aligning VR conduction plate, shielding cables, and system board screw holes

- b. ② Slightly press down the VR conduction plate.

Attention: The following items will be secured by screw. Make sure they are aligned and do not block each other.

- Screw hole on the system board
- The hole on the ring terminal of the shielding cage cable
- Screw hole on the VR conduction plate

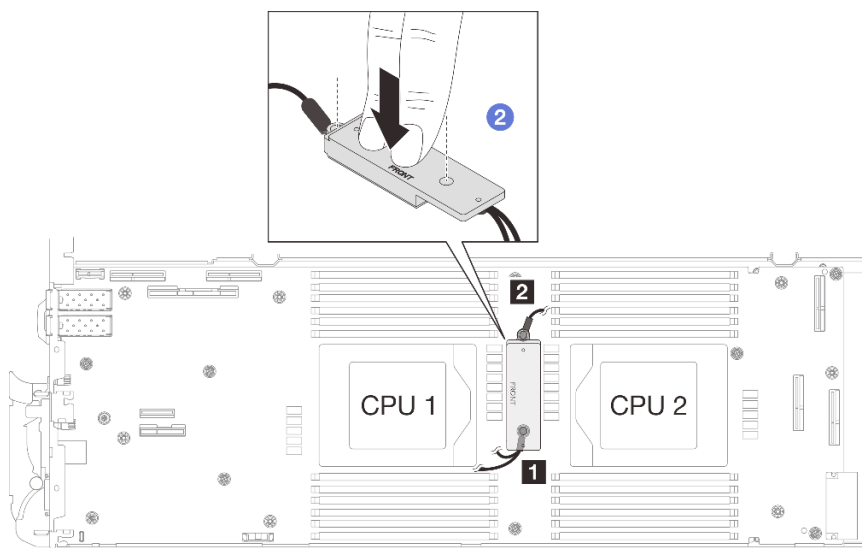


Figure 254. Pressing on the VR conduction plate

- c. ③ While pressing down the VR conduction plate, place the screws into the two screw holes on the VR conduction plate. Then, fasten the two screws to secure the cables to the system board. **DO NOT fasten the screws until both screws are placed into the VR conduction plate.**

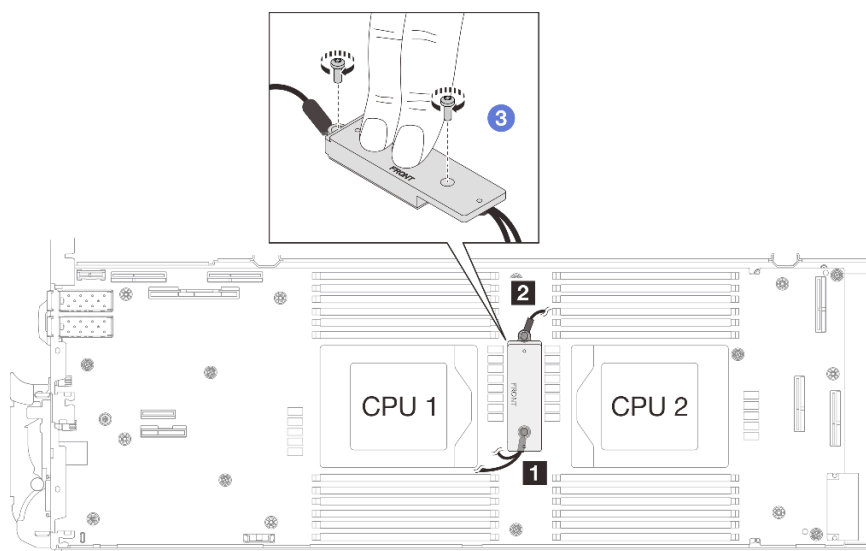


Figure 255. Installing shielding cable 1/2 and 3

Step 6. Locate the screw hole for braided cable 4. Then, align shielding cable 4 to the screw holes on system board as shown below. **Make sure the ring terminal of the cable is placed in the angle shown below.** Fasten the screw to secure the shielding cable to the system board.

1 Screw hole for shielding cable 4

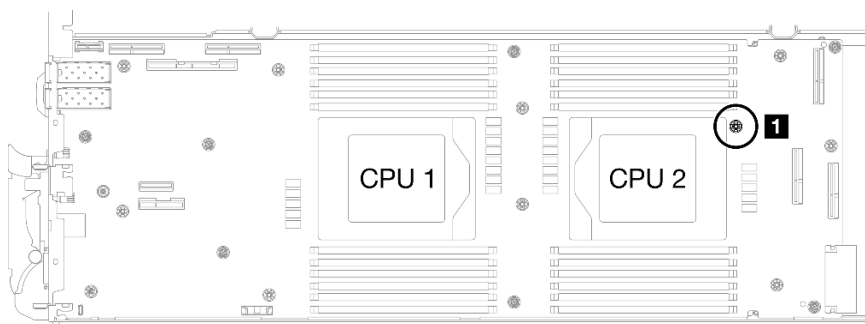


Figure 256. Location of screw hole of shielding cable 4

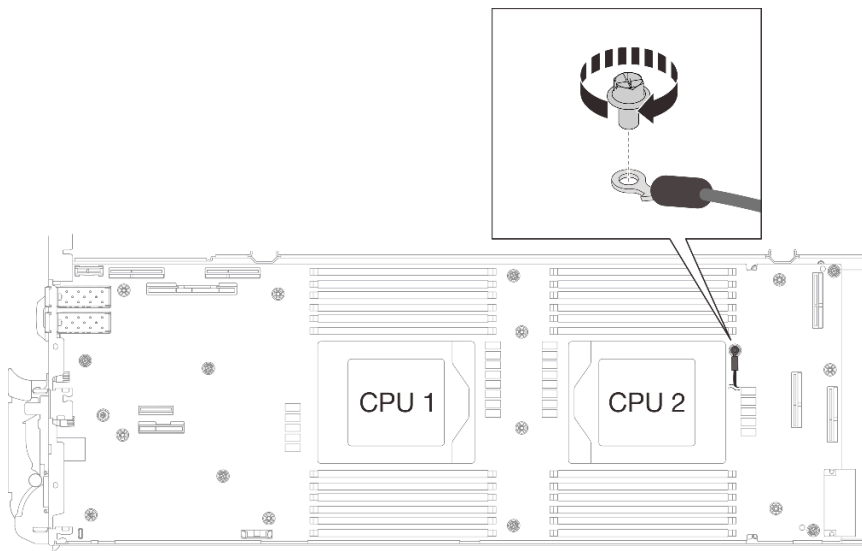


Figure 257. Installing shielding cable 4

- Step 7. There are labels attached to shielding cable 1, 3, and 4. Roll the label around the cable all the way through to prevent label interfering with system connectors and water loop.

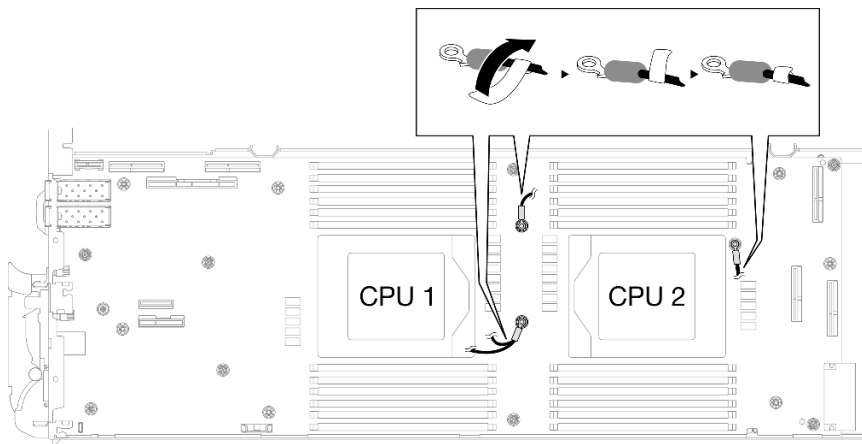


Figure 258. Rolling label around the shielding cable

- Step 8. From the inside of the shielding cages, hold the tab and peel off the adhesive tapes. Complete the step for all four shielding cages.

1 Adhesive tape tab

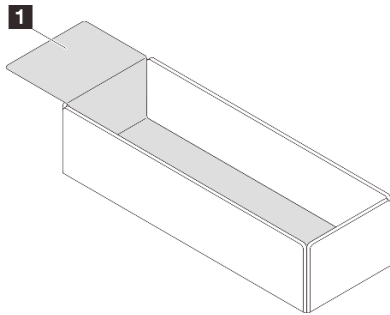


Figure 259. Peeling off the adhesive tape

- Step 9. Cover the inductors on system board with shielding cages.
- Follow the inductors and shielding cable mapping table below.

Table 16. Shielding cage and inductors mapping table

Shielding cage (attached to the shielding cable)	Inductor on the system board to be covered by the shielding cage
Shielding cable 1 (connected with shielding cable 2 by Y cable)	A
Shielding cable 2 (connected with shielding cable 1 by Y cable)	B
Shielding cable 3	C
Shielding cable 4 (attached shielding cage is smaller than shielding cable 3)	D

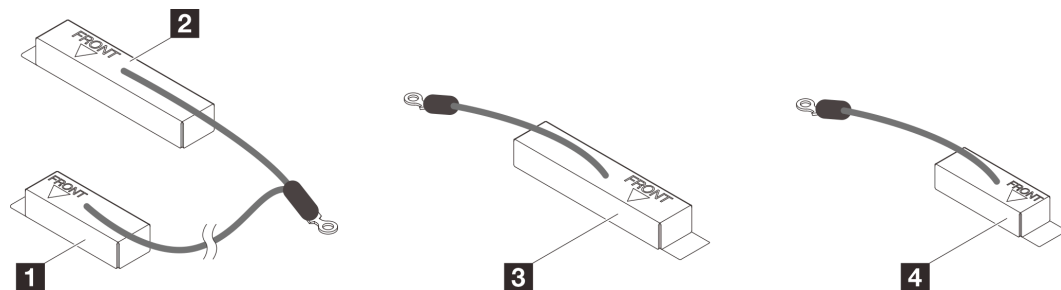


Figure 260. shielding cable 1/2, 3, and 4

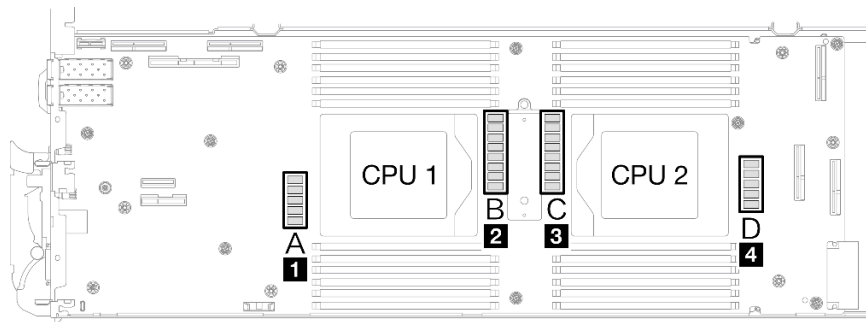


Figure 261. Inductors locations on the system board

- b. Before covering the inductors with shielding cages, make sure the FRONT marking on the shielding cage points at the front of the tray.

Attention: After covering the inductors with shielding cages, **DO NOT** remove the shielding cages from the system board to avoid system board damages.

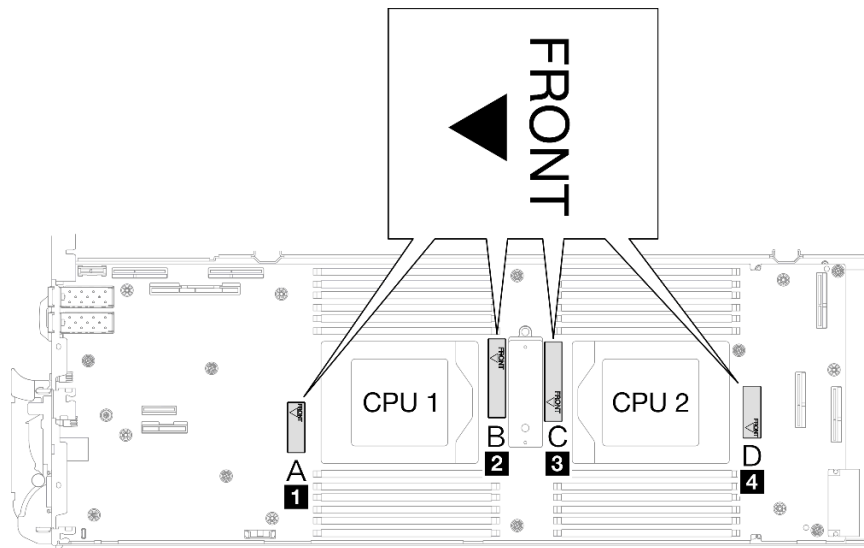


Figure 262. Front marking on the cage pointing at the front

- c. Attach the inside of the shielding cage to the **inductor attaching point**. In the graphic below, the dotted lines specify the inductor attaching points for the inside of the cage. The inductor attaching point is where the inside of the cage and the inductors attach to each other seamlessly without any gap.

Notes:

- Shielding cage 1 and 4: **one** attaching point
- Shielding cage 2 and 3: **two** attaching points
- For the non-attaching-point side of cage 1 and 4, balance the gap between the inside of the cage and inductors.

1 Shielding cage
2 Inductor
3 Inductor attaching point

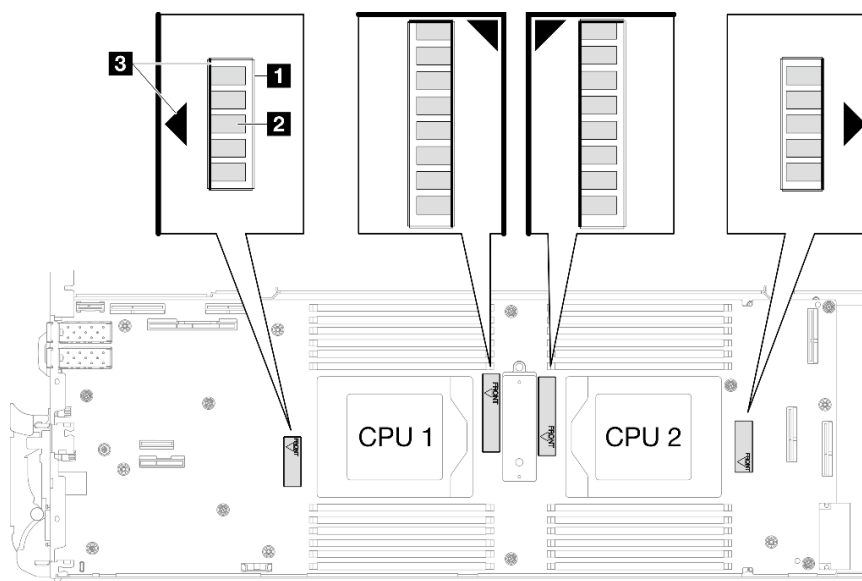


Figure 263. Inductor attaching points

- d. Keep the shielding cage attached to the inductor attaching point and make sure the inductors are completely covered; then, lower the cage into the system board.

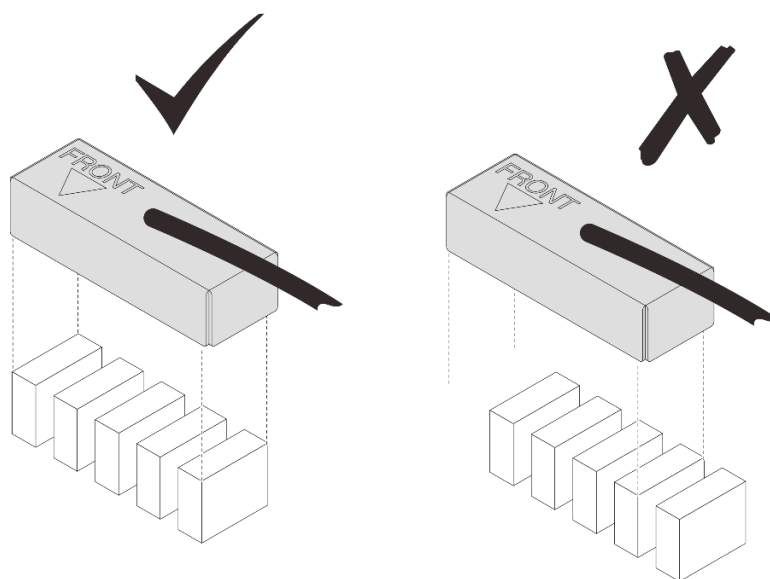


Figure 264. Covering the inductors with the shielding cage

- e. Gently press the top of the shielding cage for three seconds to secure the shielding cage to the inductor. To make sure it is secured to the system board, try to gently pull the cage. If it is not moved, then the shielding cage is successfully installed.

Step 10. Route the shielding cable 1 between CPU 1 socket and the DIMM slots. Make sure all shielding cable are cleared from CPU sockets, DIMM slots, and other system board connectors.

Note: Make sure the FRONT marking on the cage points at the front of the tray.

Shielding cable
1 Shielding cable 1 (connected with shielding cable 2 by Y cable)
2 Shielding cable 2 (connected with shielding cable 1 by Y cable)
3 Shielding cable 3
4 Shielding cable 4 (attached shielding cage is smaller than shielding cable 3)

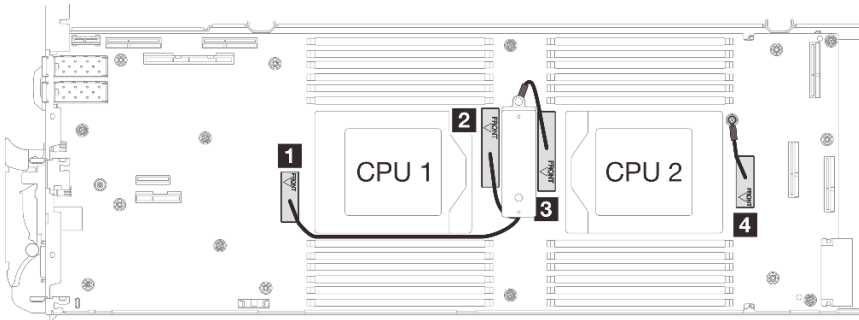
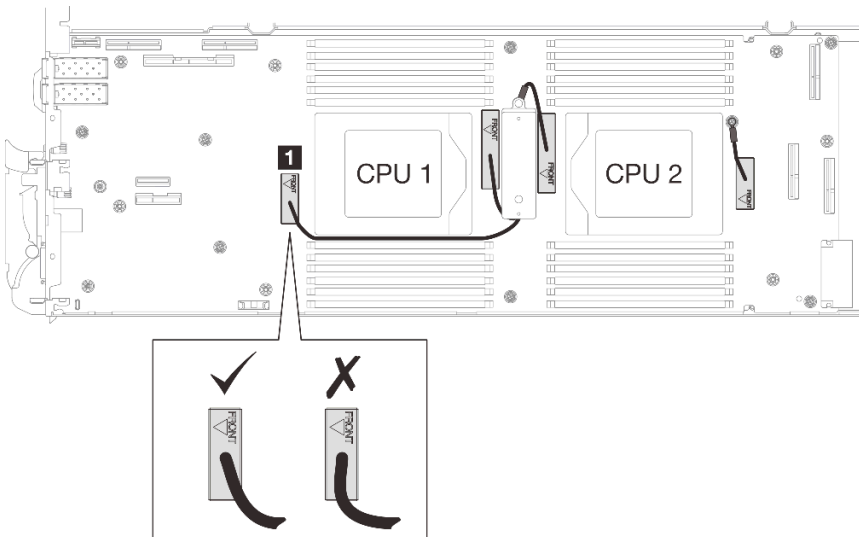
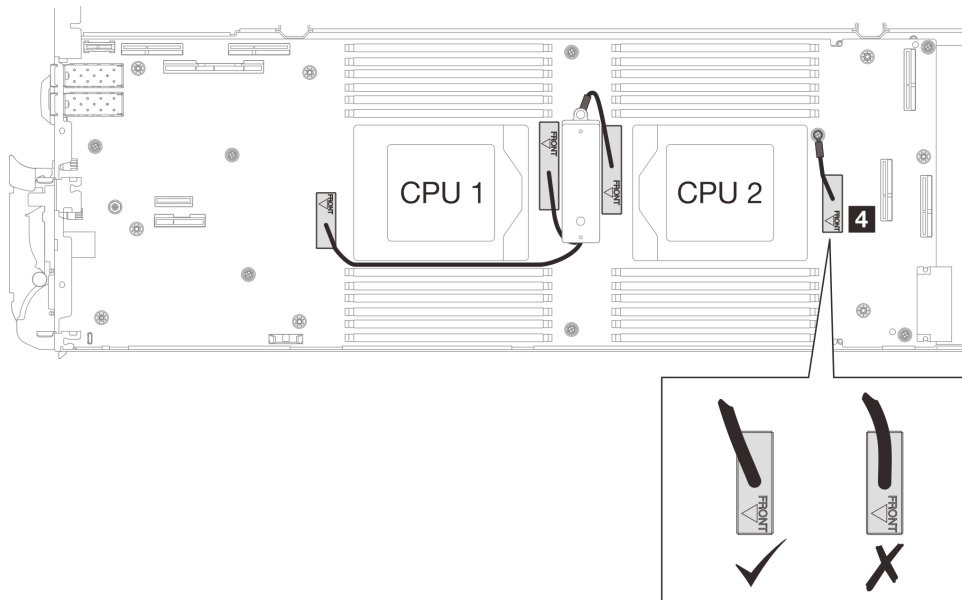


Figure 265. Cable routing for shielding cages

The shielding cable 1 should be angled toward CPU 1.



The shielding cable 4 cable should be angled toward the CPU 2.



Step 11. Install and tighten seven M3 screws per node on the system board with a 3/16" hex head screwdriver set to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 5.0+/- 0.5 lbf-in, 0.55+/- 0.05 N-M.

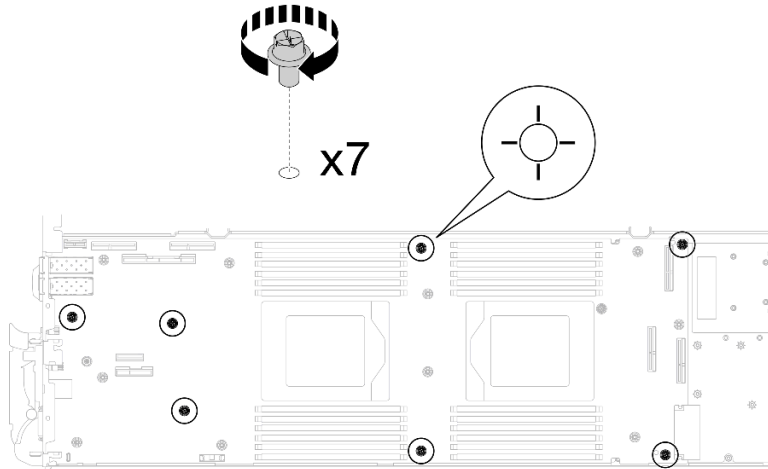


Figure 266. System board screws installation

Step 12. Install the two KVM screws to the front of the node with a torque screwdriver set to the proper torque.

Note: For reference, the torque required for the screws to fully tightened/removed is 1.3+/-0.5 lb-in, 0.15+/- 0.05 N-M.

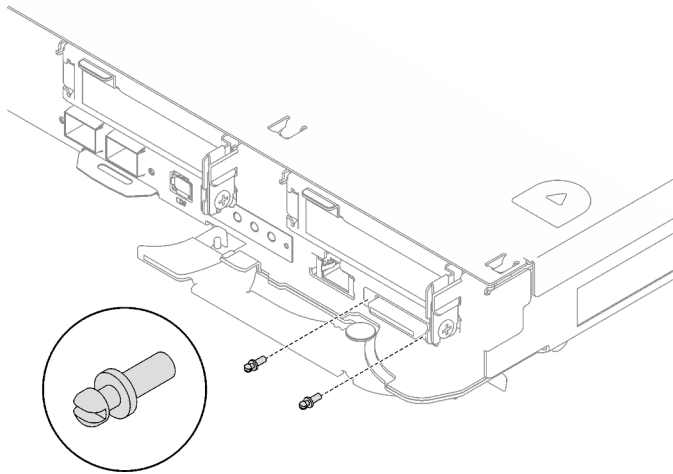


Figure 267. KVM screws installation

After you finish

1. Install the power distribution board. See [“Install the power distribution board” on page 172.](#)
2. Install the processor. See [“Install a processor” on page 191.](#)
3. Install the PCIe riser assembly. See [“Install a PCIe riser assembly \(ConnectX-6\)” on page 136](#) , [“Install a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 148](#), or [“Install a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 160.](#)
4. Install the drive cage. See [“Install a drive cage assembly” on page 64.](#)
5. Install the M.2 backplane assembly. See [“Install the M.2 backplane assembly” on page 110.](#)
6. Install the memory modules. See [“Install a memory module” on page 121.](#)
7. Install the DIMM comb. See [“Install a DIMM comb” on page 50.](#)
8. Install the cross braces. See [“Install the cross braces” on page 17.](#)
9. Install the tray cover. See [“Install the tray cover” on page 14.](#)
10. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11.](#)
11. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

12. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.
13. Update the vital product data (VPD). See [“Update the Vital Product Data \(VPD\)” on page 230.](#)

Machine type number and serial number can be found on the ID label, see [“Identify the solution and access to the Lenovo XClarity Controller” in User Guide or System Configuration Guide.](#)

14. Enable TPM/TCM. See [“Enable TPM” in User Guide or System Configuration Guide.](#)
15. If hiding TPM or updating TPM firmware is needed, see [“Hide/observe TPM” on page 233](#) or [“Update the TPM firmware” on page 234.](#)
16. Optionally, enable UEFI Secure Boot. See [“Enable UEFI Secure Boot” in User Guide or System Configuration Guide.](#)

Demo video

[Watch the procedure on YouTube](#)

Transfer the system board

Use this information to transfer the system board to another tray.

Note: If you are installing a new system board to another tray, see [“Install the system board” on page 207](#).

About this task

Required tools

Make sure you have the required tools listed below in hand to properly replace the component.

- SD665 V3 Water Loop Service Kit (The water loop carrier in the Service Kit is reusable, it is recommended to keep it at the facility where the server operates for future replacement needs.)
- SD665 V3 Water Loop Putty Pad Kit
- VR 1.5mm Putty Pad
- VR 2.5 mm Putty Pad
- Drive gap pad or putty pad kits according to the drives installed in the tray. See their respective replacement procedures for more information.
- ConnectX series adapter putty pad kits according to the ConnectX adapter installed in the tray. See their respective replacement procedures for more information.
- Screws and screwdrivers

Prepare the following screwdrivers to ensure you can install and remove corresponding screws properly.

Screwdriver Type	Screw Type
Torx T10 head screwdriver	Torx T10 screw
Torx T20 head screwdriver	Torx T20 screw
Phillips #1 head screwdriver	M3 screw
Phillips #2 head screwdriver	Phillips #2 screw
3/16" hex head screwdriver	M3 screw

Attention:

- Read [“Installation Guidelines” on page 1](#) and [“Safety inspection checklist” on page 2](#) to ensure that you work safely.
- Turn off the corresponding DWC tray that you are going to perform the task on.
- Disconnect all external cables from the enclosure.
- Use extra force to disconnect QSFP cables if they are connected to the solution.
- To avoid damaging the water loop, always use the water loop carrier when removing, installing or folding the water loop.

Firmware and driver download: You might need to update the firmware or driver after replacing a component.

- Go to <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/> to see the latest firmware and driver updates for your server.
- Go to “Update the firmware” in *User Guide* or *System Configuration Guide* for more information on firmware updating tools.

Note: After XCC and UEFI firmware updates, more than one system reboot cycles are to be expected. Times of reboot cycle depends on firmware update revision. Do not shut down the system until entering UEFI setup menu or the operating system.

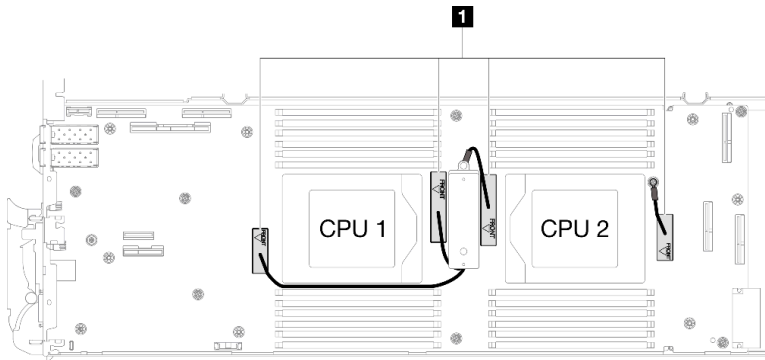
Procedure

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

Step 1. Reinstall the system board to the tray.

- If the system board is **with** shielding cables, follow the procedures in [Transferring system board with shielding cables](#).
- If the system board is **without** shielding cables, follow the procedures in [Transferring system board without shielding cables](#).

1 Shielding cables



Transferring system board with shielding cables

Step 2. Replace the VR conduction plate putty pads.

- 1 With an alcohol cleaning pad, remove the residual putty pad from the VR conduction plate removed previously. The putty pads are on the bottom side of the VR conduction plate.
- 2 Paste the VR 2.5 mm Putty Pad to the bottom side of the VR conduction plate.

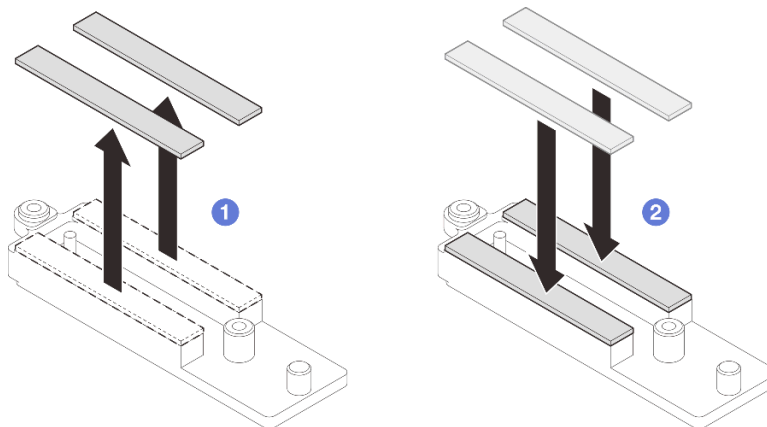


Figure 268. Replacing the VR conduction plate putty pads

Step 3. Install the system board.

- a. Carefully hold the front guide pin and tilt the system board at an angle.

- b. Align the connectors with the corresponding holes on the front of the node; then, gently slide the system board forward.

Note: Avoid touching the connectors on the system board. Be careful not to damage any surrounding components inside the node.

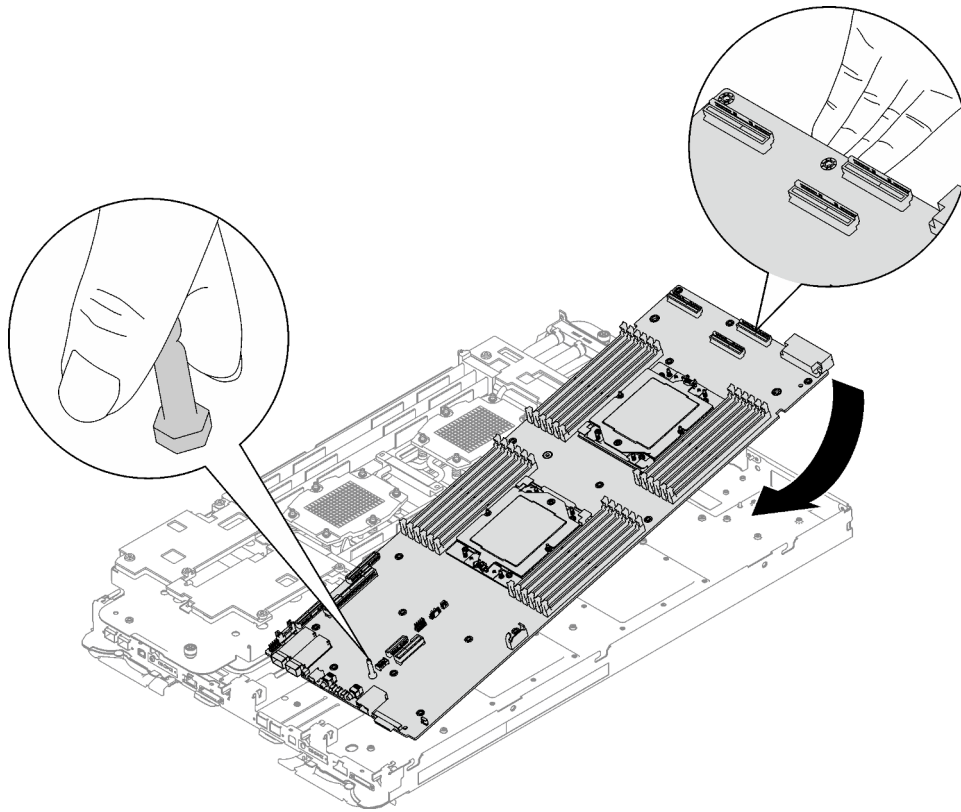


Figure 269. System board installation

Step 4. Install the VR conduction plate.

- a. 1 Keep the FRONT marking on the VR conduction plate pointing the front of the tray. Then, place the VR conduction plate on top of the two cable ring terminals.

Note: A putty pad is attached to the bottom side of the VR conduction plate. Carefully hold the VR conduction plate to avoid damaging the putty pad.

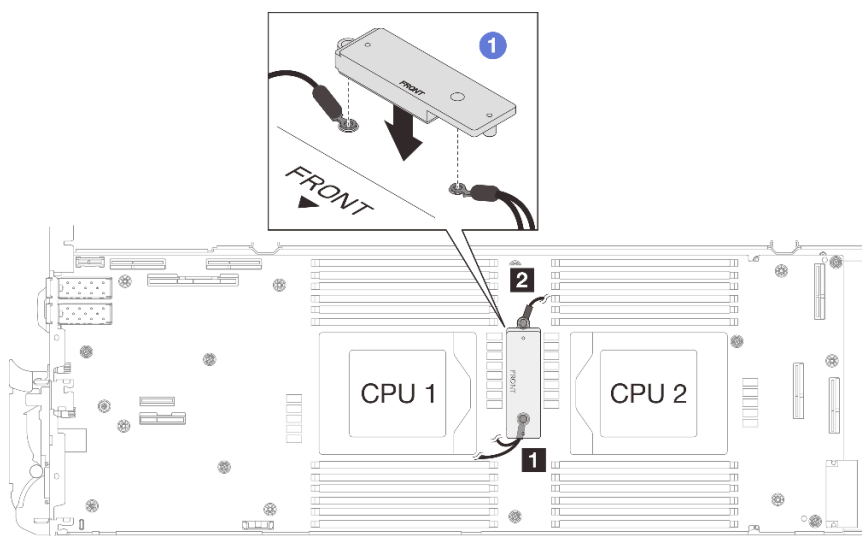


Figure 270. Aligning VR conduction plate, shielding cables, and system board screw holes

- b. 2 Slightly press down the VR conduction plate.

Attention: The following items will be secured by screw. Make sure they are aligned and do not block each other.

- Screw hole on the system board
- The hole on the ring terminal of the shielding cage cable
- Screw hole on the VR conduction plate

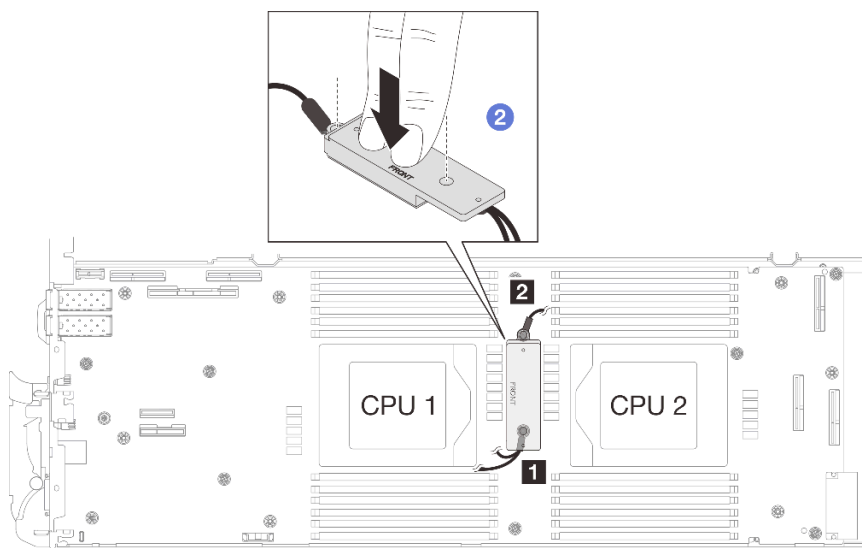


Figure 271. Pressing on the VR conduction plate

- c. 3 While pressing down the VR conduction plate, place the screws into the two screw holes on the VR conduction plate. Then, fasten the two screws to secure the cables to the system board. **DO NOT fasten the screws until both screws are placed into the VR conduction plate.**

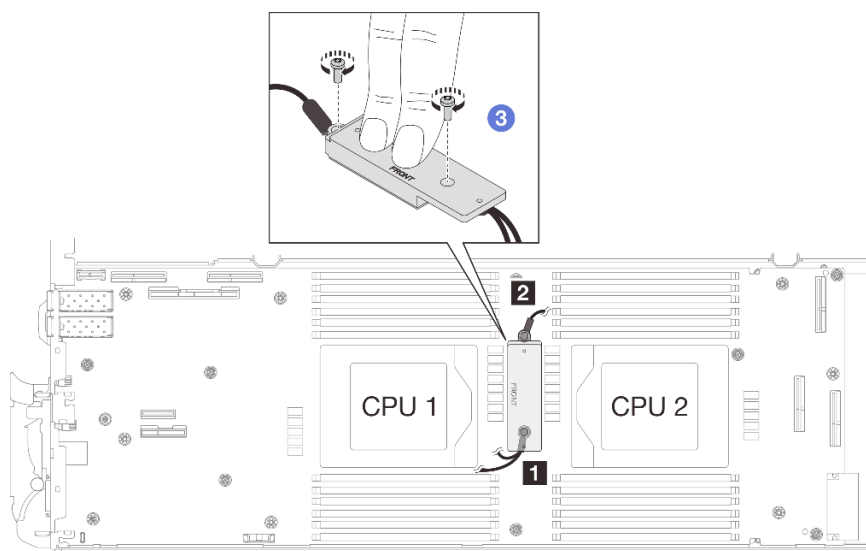


Figure 272. Installing shielding cable 1/2 and 3

Step 5. Locate the screw hole for braided cable 4. Then, align shielding cable 4 to the screw holes on system board as shown below. **Make sure the ring terminal of the cable is placed in the angle shown below.** Fasten the screw to secure the shielding cable to the system board.

1 Screw hole for shielding cable 4

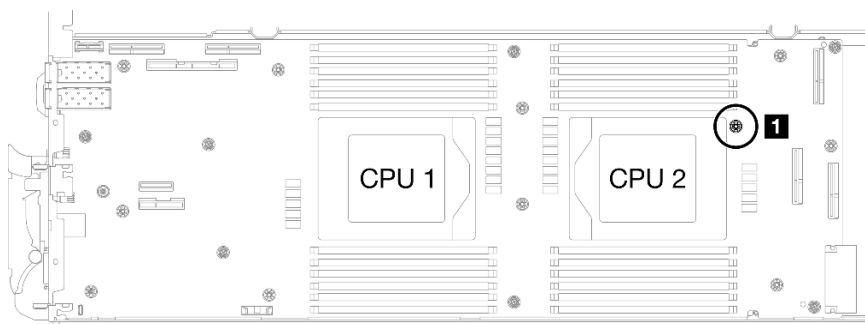


Figure 273. Location of screw hole of shielding cable 4

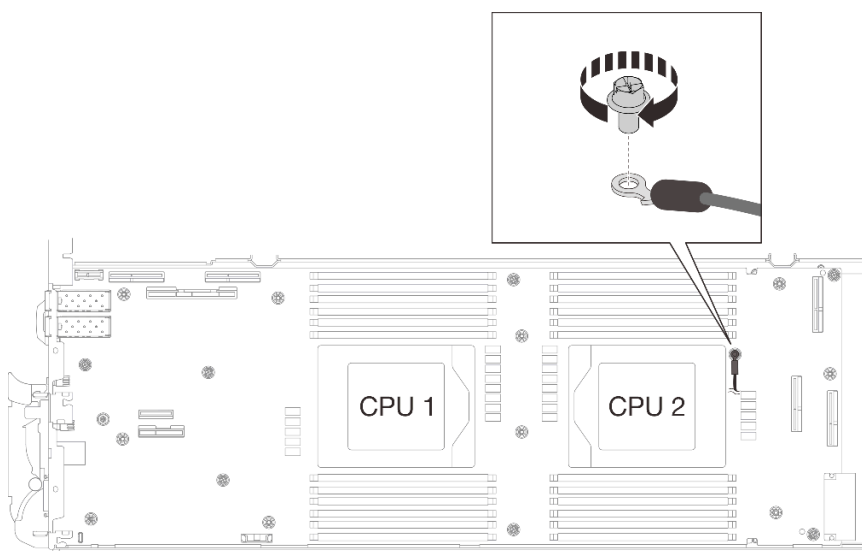


Figure 274. Installing shielding cable 4

- Step 6. There are labels attached to shielding cable 1, 3, and 4. Roll the label around the cable all the way through to prevent label interfering with system connectors and water loop.

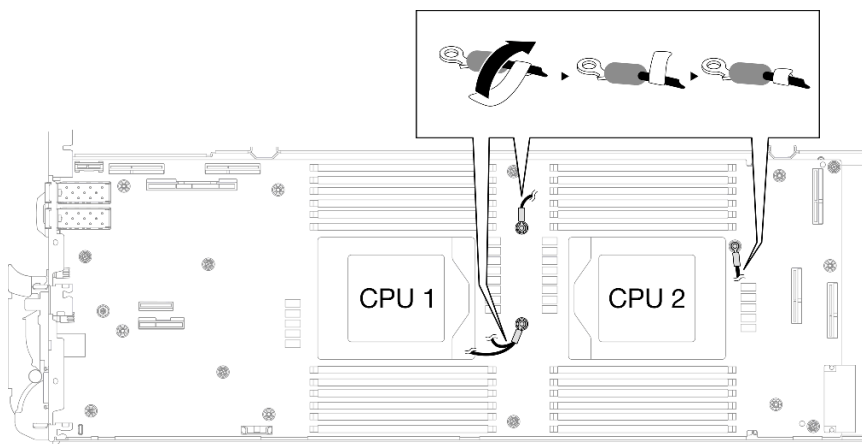


Figure 275. Rolling label around the shielding cable

- Step 7. Install and tighten seven M3 screws per node on the system board with a 3/16" hex head screwdriver set to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 5.0+/- 0.5 lbf-in, 0.55+/- 0.05 N-M.

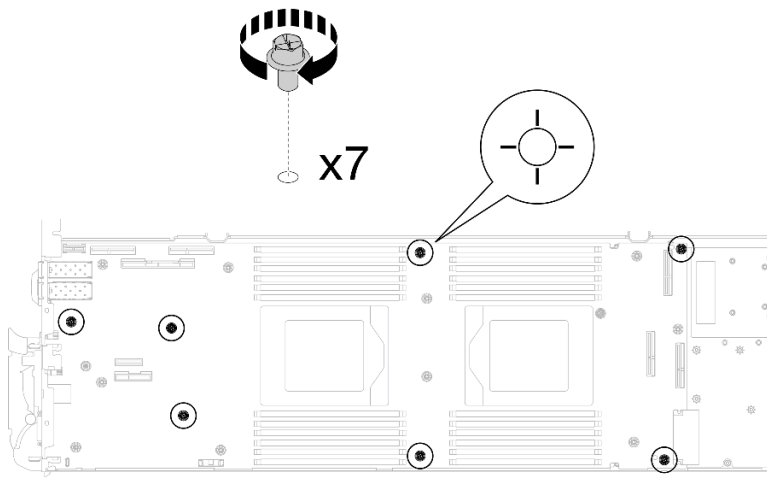


Figure 276. System board screws installation

Step 8. Install the two KVM screws to the front of the node with a torque screwdriver set to the proper torque.

Note: For reference, the torque required for the screws to fully tightened/removed is 1.3+/-0.5 lb-in, 0.15+/- 0.05 N-M.

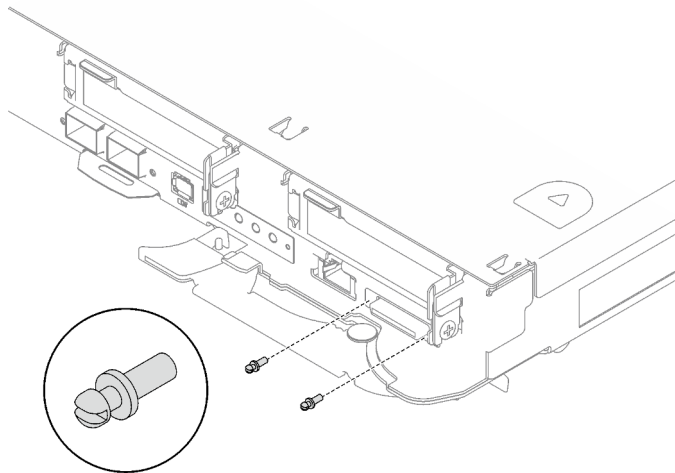


Figure 277. KVM screws installation

Transferring system board without shielding cables

Step 9. Replace the VR conduction plate putty pads.

- a. ① With an alcohol cleaning pad, remove the residual putty pad from the VR conduction plate removed previously. The putty pads are on the bottom side of the VR conduction plate.
- b. ② Paste the VR 1.5mm Putty Pad to the bottom side of the VR conduction plate.

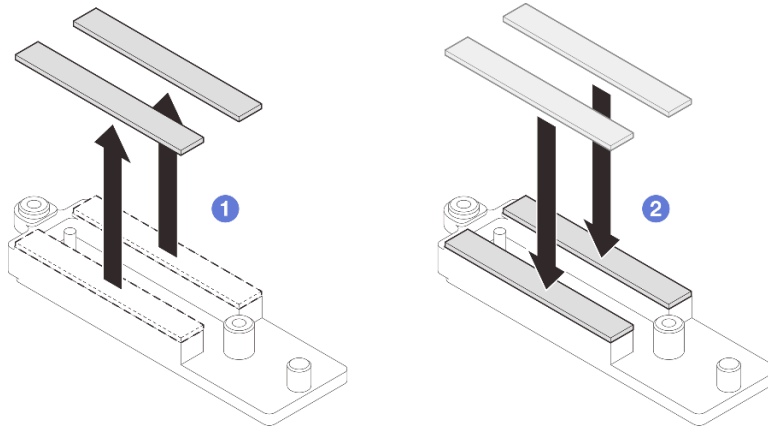


Figure 278. Replacing the VR conduction plate putty pads

Step 10. Align the VR conduction plate with the holes on the system board; then, fasten the two M3 screws (per node).

Note: A putty pad is attached to the bottom side of the VR conduction plate. Carefully hold the VR conduction plate to avoid damaging the putty pad.

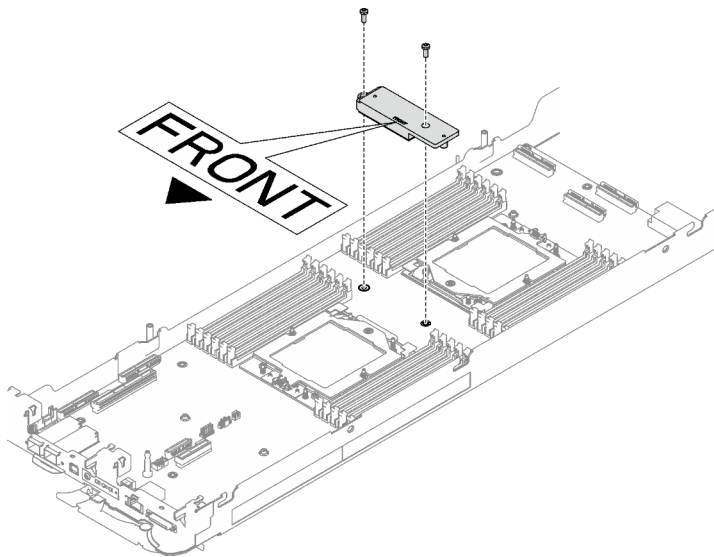


Figure 279. VR conduction plate installation

Step 11. Install and tighten eight M3 screws per node on the system board with a 3/16" hex head screwdriver set to the proper torque.

Note: For reference, the torque required for the screws to be fully tightened/removed is 5.0+/- 0.5 lbf-in, 0.55+/- 0.05 N-M.

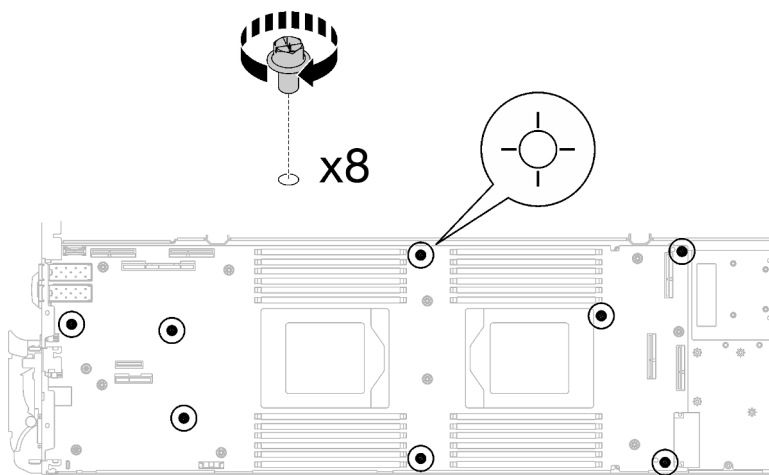


Figure 280. System board screws installation

Step 12. Install the two KVM screws to the front of the node with a torque screwdriver set to the proper torque.

Note: For reference, the torque required for the screws to fully tightened/removed is 1.3+/-0.5 lb-in, 0.15+/- 0.05 N-M.

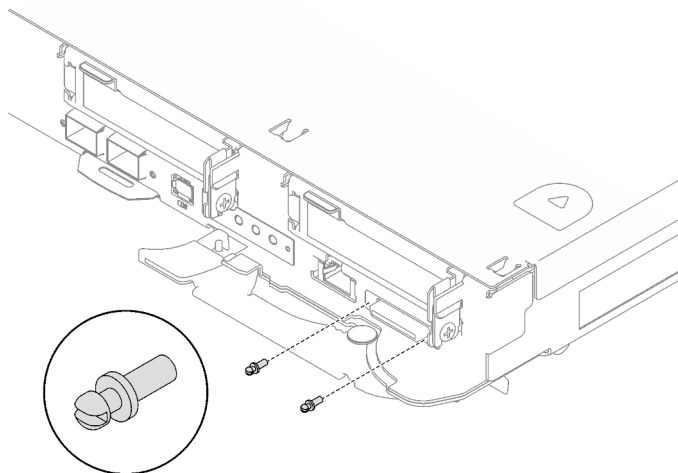


Figure 281. KVM screws installation

After you finish

1. Install the power distribution board. See [“Install the power distribution board” on page 172.](#)
2. Install the processor. See [“Install a processor” on page 191.](#)
3. Install the PCIe riser assembly. See [“Install a PCIe riser assembly \(ConnectX-6\)” on page 136](#) , [“Install a PCIe riser assembly \(ConnectX-7 NDR 200\)” on page 148](#), or [“Install a PCIe riser assembly \(ConnectX-7 NDR 400\)” on page 160.](#)
4. Install the drive cage. See [“Install a drive cage assembly” on page 64.](#)
5. Install the M.2 backplane assembly. See [“Install the M.2 backplane assembly” on page 110.](#)

6. Install the memory modules. See [“Install a memory module” on page 121](#).
7. Install the DIMM comb. See [“Install a DIMM comb” on page 50](#).
8. Install the cross braces. See [“Install the cross braces” on page 17](#).
9. Install the tray cover. See [“Install the tray cover” on page 14](#).
10. Install the tray into the enclosure. See [“Install a DWC tray in the enclosure” on page 11](#).
11. Connect all required external cables to the solution.

Note: Use extra force to connect QSFP cables to the solution.

12. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.
13. Update the vital product data (VPD). See [“Update the Vital Product Data \(VPD\)” on page 230](#).
Machine type number and serial number can be found on the ID label, see “Identify the solution and access to the Lenovo XClarity Controller” in *User Guide* or *System Configuration Guide*.
14. Enable TPM/TCM. See “Enable TPM” in *User Guide* or *System Configuration Guide*.
15. If hiding TPM or updating TPM firmware is needed, see [“Hide/observe TPM” on page 233](#) or [“Update the TPM firmware” on page 234](#).
16. Optionally, enable UEFI Secure Boot. See “Enable UEFI Secure Boot” in *User Guide* or *System Configuration Guide*.

Update the Vital Product Data (VPD)

Use this topic to update the Vital Product Data (VPD).

- **(Required)** Machine type
- **(Required)** Serial number
- **(Required)** System model
- (Optional) Asset tag
- (Optional) UUID

Recommended tools:

- Lenovo XClarity Provisioning Manager
- Lenovo XClarity Essentials OneCLI commands

Using Lenovo XClarity Provisioning Manager

Steps:

1. Start the server and press the key according to the on-screen instructions. The Lenovo XClarity Provisioning Manager interface is displayed by default.
2. Choose **System Summary**. The “System Summary” tab page is displayed.
3. Click **Update VPD**, then, follow on-screen instructions to update the VPD.

Using Lenovo XClarity Essentials OneCLI commands

- Updating **machine type**
`onecli config set SYSTEM_PROD_DATA.SysInfoProdName <m/t_model> [access_method]`
- Updating **serial number**
`onecli config set SYSTEM_PROD_DATA.SysInfoSerialNum <s/n> [access_method]`
- Updating **system model**
`onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifier <system model> [access_method]`

```
onecli config set SYSTEM_PROD_DATA.SysInfoProdIdentifierEx <system_model> --override [access_method]
```

- Updating **asset tag**

```
onecli config set SYSTEM_PROD_DATA.SysEncloseAssetTag <asset_tag> [access_method]
```

- Updating **UUID**

```
onecli config createuuid SYSTEM_PROD_DATA.SysInfoUUID [access_method]
```

Variable	Description
<m/t_model>	The server machine type and model number. Type xxxxyyy, where xxxx is the machine type and yyy is the server model number.
<s/n>	The serial number on the server. Type zzzzzzz, where zzzzzzz is the serial number.
<system_model>	The system model on the server. Type system yyyyyyyyy, where yyyyyyyy is the product identifier.
<asset_tag>	The server asset tag number. Type aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa, where aaaaaaaaaaaaaaaaaaaaaaaaaaaaaa is the asset tag number.
[access_method]	<p>The access method that you select to access the target server.</p> <ul style="list-style-type: none"> • Online KCS (unauthenticated and user restricted): You can directly delete [access_method] from the command. • Online authenticated LAN: In this case, specify below LAN account information at the end of the OneCLI command: --bmc-username <user_id> --bmc-password <password> • Remote WAN/LAN: In this case, specify below XCC account information and IP address at the end of the OneCLI command: --bmc <bmc_user_id>:<bmc_password>@<bmc_external_IP> <p>Notes:</p> <ul style="list-style-type: none"> – <bmc_user_id> The BMC account name (1 of 12 accounts). The default value is USERID. – <bmc_password> The BMC account password (1 of 12 accounts).

Enable TPM

The server supports Trusted Platform Module (TPM), Version 1.2 or Version 2.0

Note: For customers in Chinese Mainland, integrated TPM is not supported. However, customers in Chinese Mainland can install a Trusted Cryptographic Module (TCM) adapter or a TPM adapter (sometimes called a daughter card).

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

CAUTION:

Take special care when setting the TPM 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 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 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.

Hide/observe TPM

TPM is enabled by default to encrypt data transfer for system operation. Optionally, you can disable TPM using Lenovo XClarity Essentials OneCLI.

To disable TPM, do the following:

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:

```
OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "Yes" --imm <userid>:<password>@<ip_address>
--override
```

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.

Example:

```
D:\onecli>OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "Yes" --imm USERID:PASSWORD=1@10.245.39.79 --override
Lenovo XClarity Essentials OneCLI 1xce_onecli01p-2.3.0
Licensed Materials - Property of Lenovo
(C) Copyright Lenovo Corp. 2013-2018 All Rights Reserved
If the parameters you input includes password, please Note that:
* The password must consist of a sequence of characters from `0-9a-zA-Z_+.$%!'&*()=` set
* Use `"' to quote when password parameters include special characters
* Do not use reserved characters in path name when parameter contains path
Invoking SET command ...
Connected to BMC at IP address 10.245.39.79 by IPMI
TrustedComputingGroup.HideTPMfromOS=Yes
Success.
```

3. Reboot the system.

If you want to enable TPM again, run the following command and reboot the system:

OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "No" --imm <userid>:<password>@<ip_address> --override

Example:

```
D:\onecli3>OneCli.exe config set TrustedComputingGroup.HideTPMfromOS "No" --imm USERID:PASSWORD=1@10.245.39.79 --override
Lenovo XClarity Essentials OneCLI 1xce_onecli01h-3.0.1
(C) Lenovo 2013-2020 All Rights Reserved
OneCLI License Agreement and OneCLI Legal Information can be found at the following location:
"D:\onecli3\Lic"
[ls]Certificate check finished [100%]=====
Invoking SET command ...
Connected to BMC at IP address 10.245.39.79 by IPMI
TrustedComputingGroup.HideTPMfromOS=No
Configure successfully, please reboot system.
Succeed.
```

Update the TPM firmware

Optionally, you can update the TPM firmware using Lenovo XClarity Essentials OneCLI.

Note: TPM firmware update is irreversible. After update, the TPM firmware cannot be downgraded to earlier versions.

TPM firmware version

Follow the procedure below to see the TPM firmware version:

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** → **Trusted Platform Module** → **TPM 2.0** → **TPM Firmware Version**.

Update the TPM firmware

To update the TPM firmware, do the following:

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:

```
OneCli.exe config set TrustedComputingGroup.DeviceOperation "Update to TPM 2.0 firmware version <x.x.x.x>" --bmc <userid>:<password>@<ip_address>
```

where:

- <x.x.x.x> is the target TPM version.

e.g. TPM 2.0 (7.2.1.0) -> TPM 2.0 (7.2.2.0):

```
OneCli.exe config set TrustedComputingGroup.DeviceOperation "Update to TPM 2.0 firmware version 7.2.2.0" --bmc <userid>:<password>@<ip_address>
```

- <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.

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.

Note: If disabling UEFI secure boot is needed, select Disable in step 4.

- 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

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 solution.
2. Properly route and secure the cables in the solution. Refer to the cable connecting and routing information for each component.
3. Reconnect external cables and power cords to the solution.

Attention: To avoid component damage, connect the power cords last.

4. Power on the solution and any peripheral devices. See [“Power on the solution” on page 9](#).
5. Update the solution configuration.
 - Download and install the latest device drivers: <http://datacentersupport.lenovo.com>.
 - Update the system firmware. See “Update the firmware” in *User Guide* or *System Configuration Guide*.
 - Update the UEFI configuration. See <https://pubs.lenovo.com/uefi-overview/>.

For DW612S Enclosure User Guide, see https://pubs.lenovo.com/dw612s_neptune_enclosure/.

Chapter 2. Internal cable routing

See this section to do cable routing for specific components.

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

PCIe adapter in compute node cable routing

Use this information to route the cables for PCIe adapters in the compute node.

PCIe adapter configuration and cable routing

- [“Balanced I/O configuration” on page 238](#)
- [“Shared I/O configuration” on page 239](#)
- [“Socket direct configuration \(ConnectX-7 NDR 400\)” on page 240](#)

Balanced I/O configuration

Balanced I/O configuration is supported by the following PCIe adapters:

- ConnectX-6
- ConnectX-7 NDR 200
- ConnectX-7 NDR 400

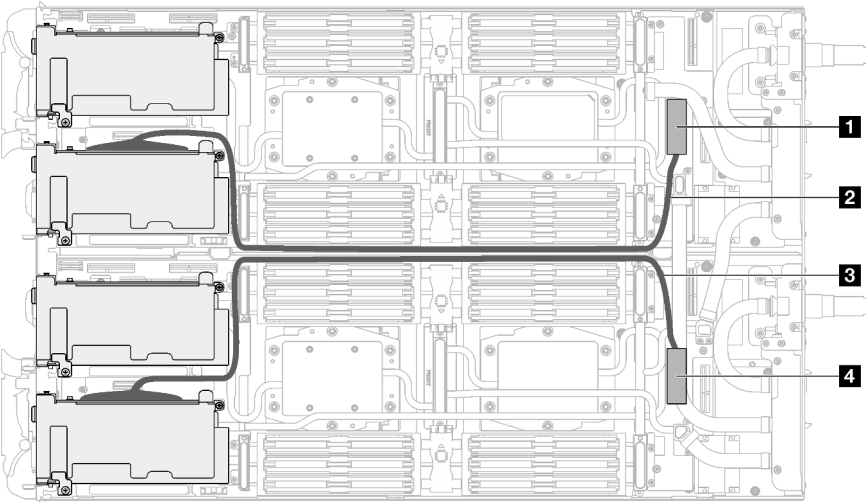


Figure 282. Balanced I/O configuration

Table 17. Balanced I/O configuration

System board connectors and cables	Node
1 PCIe 1/SATA – PCIe x16 Gen 5 connector	Left node
2 640 mm PCIe cable (direct-soldering on PCIe slot 1)	
3 660 mm PCIe cable (direct-soldering on PCIe slot 1)	Right node
4 PCIe 1/SATA – PCIe x16 Gen 5 connector	

Shared I/O configuration

Shared I/O configuration for the following PCIe adapters:

- ConnectX-6
- ConnectX-7 NDR 200
- ConnectX-7 NDR 400

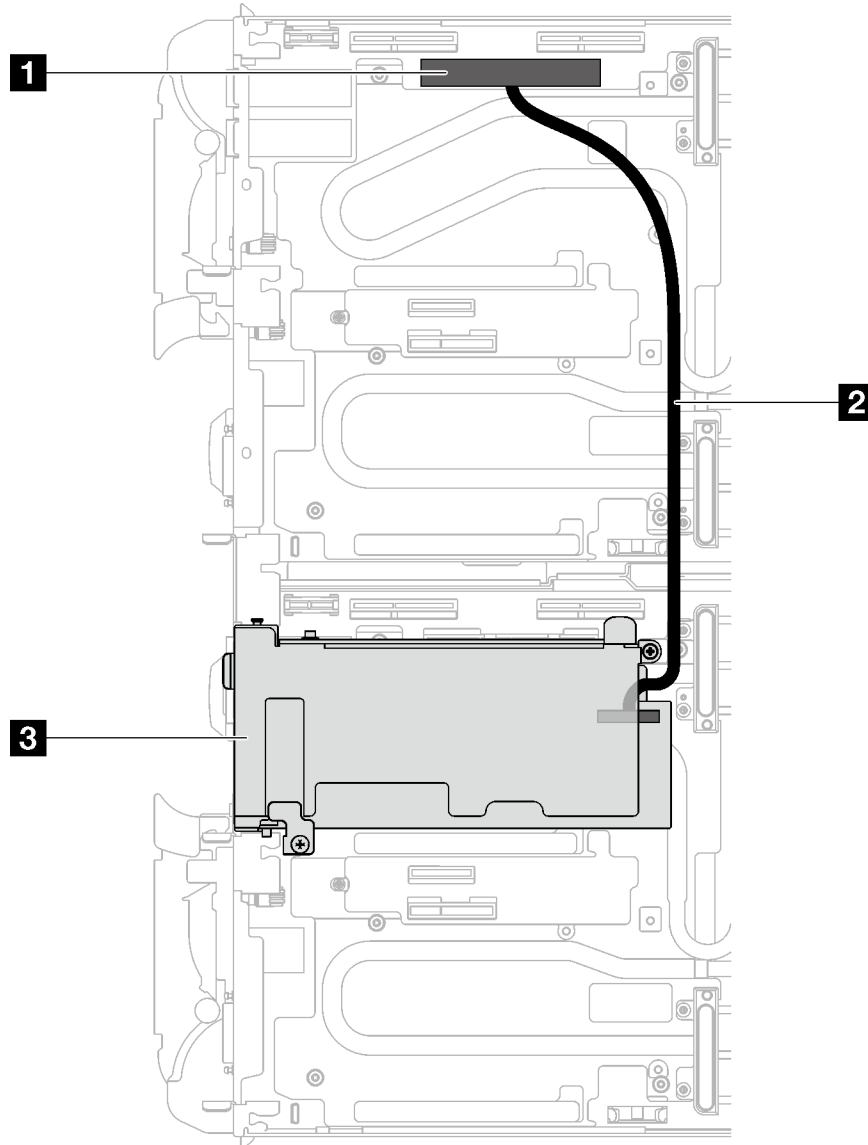


Figure 283. Shared I/O configuration

Table 18. Shared I/O configuration

Component index	Node
1 PCIe 2 – PCIe x16 connector	Left node
2 310 mm interconnect cable	From left node to PCIe adapter in right node.
3 PCIe slot 2	Right node

Socket direct configuration (ConnectX-7 NDR 400)

Socket direct configuration is supported by the following PCIe adapters:

- ConnectX-7 NDR 400

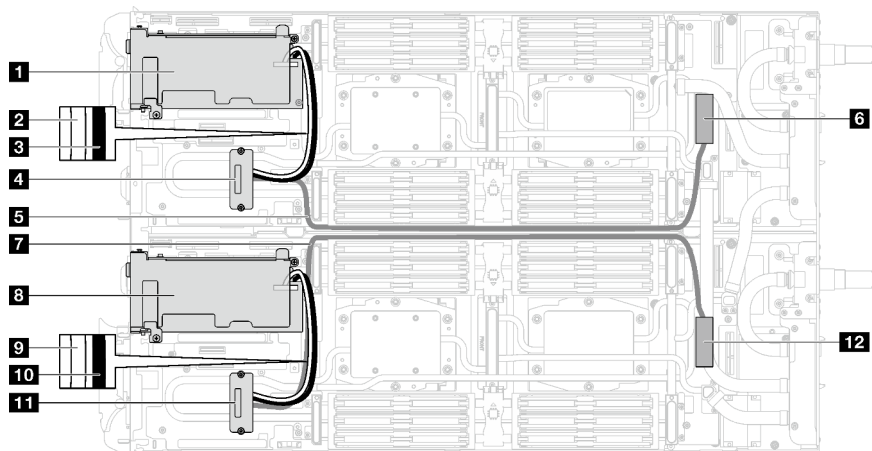


Figure 284. Socket direct configuration cable routing

Table 19. Socket direct configuration cable routing

Component index	Node
1 PCIe slot 2	Left node
2 200 mm interconnect cable (white, connected to the connector marked as “white” on the PCIe adapter)	
3 200 mm interconnect cable (black, connected to the connector marked as “black” on the PCIe adapter)	
4 Interposer installed on water loop cold plate	
5 745 mm PCIe cable	
6 PCIe 1/SATA – PCIe x16 connector	
7 745 mm PCIe cable	Right node
8 PCIe slot 2	
9 200 mm interconnect cable (white, connected to the connector marked as “white” on the PCIe adapter)	
10 200 mm interconnect cable (black, connected to the connector marked as “black” on the PCIe adapter)	
11 Interposer installed on water loop cold plate	
12 PCIe 1/SATA – PCIe x16 connector	

Chapter 3. 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 using some other management application, begin with the Lenovo XClarity Controller event log.

Web resources

- **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.

- **Lenovo Data Center Forum**

- Check https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg to see if someone else has encountered a similar problem.

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/sd665-v3/pdf_files.

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

The Event log provides a history of hardware and management conditions that have been detected.

Show: [Warning] [Error] [Critical]

All Event Sources [Filter]

All Dates [Filter]

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 285. Lenovo XClarity Administrator event log

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

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

System Management Module 2 event log

The SMM2 event log contains all events received from all nodes in the enclosure. In addition, it includes events related to power and cooling.

Note: New SMM2 events are appended to the end of the event log. The log can store up to 4, 096 events; you must clear the log to add additional events.

Event Log

To sort system event logs, click the 'Date/Time'.

System Event Count (Current / Maximum) 8 / 4090

Event ID	Severity	Date/Time ↓	Description
0x21070841	✓	2017-04-18 13:30:42 (UTC+0000)	NODE2_PRESENT: Slot Or Connector sensor, Informational was asserted
0x080707a5	✓	2017-04-18 13:30:42 (UTC+0000)	PS2_EPOW: Power Supply sensor, Monitor was asserted
0x080701aa	!	2017-04-18 13:30:42 (UTC+0000)	PSU_Policy_Lost: Power Supply sensor, transition to Non-Critical from OK was asserted
0x086f03e1	✓	2017-04-18 13:30:42 (UTC+0000)	PS2: Power Supply sensor, Power Supply input lost (AC/DC) was asserted
0x086f00e1	✓	2017-04-18 13:30:42 (UTC+0000)	PS2: Power Supply sensor, Presence detected was asserted
0x086f00e0	✓	2017-04-18 13:30:42 (UTC+0000)	PS1: Power Supply sensor, Presence detected was asserted
0x1d6f0030	✓	2017-04-18 13:30:42 (UTC+0000)	SMM_POWER_ON: System Boot Initiated sensor, Initiated by power up was asserted
0x106f0202	✓	2017-04-18 13:29:41 (UTC+0000)	EvtLogDisabled: Event Logging Disabled sensor, Log Area Reset/Cleared was asserted

1

Figure 286. SMM2 event log

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.

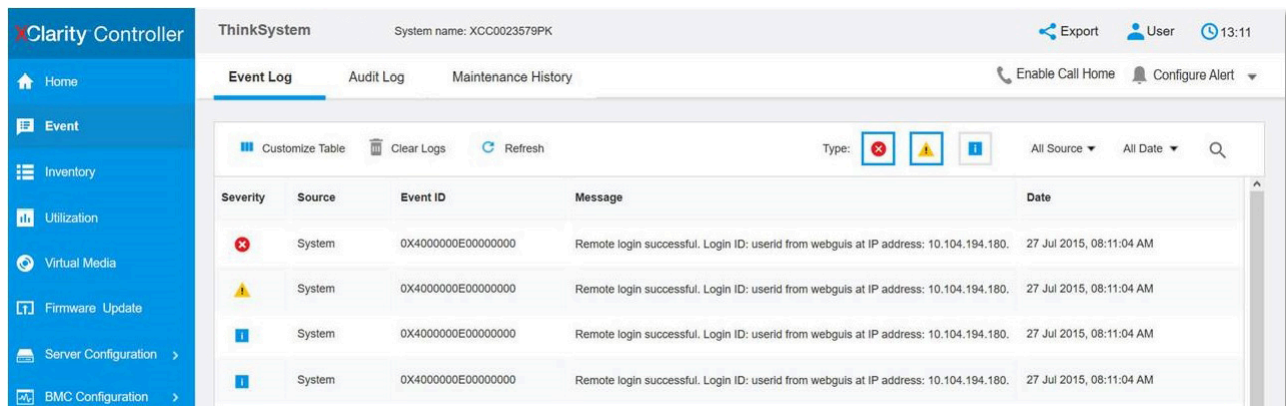


Figure 287. Lenovo XClarity Controller event log

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/lxcc-overview/>

Specifications

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

Notes:

- SD665 V3 tray contains two nodes; one left node and one right node (when viewed from front of enclosure). Both are compute nodes.
- Up to six SD665 V3 trays can be installed in the DW612S 6U enclosure.

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

Specification category	Technical specifications	Mechanical specifications	Environmental specifications
Content	<ul style="list-style-type: none"> • Processor • Memory • Storage expansion • Expansion slots • Integrated functions and I/O connectors • Network • Electrical input • Minimal configuration for debugging • Operating systems 	<ul style="list-style-type: none"> • Dimension • Weight 	<ul style="list-style-type: none"> • Acoustical noise emissions • Environment • Water requirements

Technical specifications

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

Notes:

- SD665 V3 tray contains two nodes; one left node and one right node (when viewed from front of enclosure). Both are compute nodes.
- Up to six SD665 V3 trays can be installed in the DW612S 6U enclosure.

Processor

- Supports two 4th Gen AMD® EPYC™ processors per node.
- Supports processors with up to 96 cores, and configured TDP ratings up to 400W.
- Up to 4 XGMI links at up to 32 GT/s
- SP5 socket (LGA 6096)

Notes:

1. Use the Setup Utility to determine the type and speed of the processors in the node.
2. For a list of supported processors, see <https://serverproven.lenovo.com>.

Memory

See for detailed information about memory configuration and setup.

- Slots:
 - 24 DIMM slots per node, 12 DIMMs per processor.
 - Type:
 - Lenovo DDR5 at up to 4800 MT/s
 - Protection:
 - ECC
 - Supports (depending on the model):
 - 16 GB, 32 GB, 64 GB, and 128 GB ECC RDIMM
 - 24GB, 48GB, and 96 GB ECC RDIMM
- Note:** 128 GB RDIMM is supported with thermal limitation.
- Minimum:
 - 256 GB per node with sixteen 16 GB RDIMMs per node. (8 DIMMs per processor)
 - Maximum:
 - Up to 3 TB memory with twenty-four 128 GB RDIMMs per node. (12 DIMMs per processor)

Important:

- The tray supports independent mode with the following configurations:
 - 8 DIMMs per processor, total of 16 DIMMs per node
 - 12 DIMMs per processor, total of 24 DIMMs per node
- Mixing DIMM speed is not supported.
- Before installing 24 Gb DRAM RDIMMs, make sure to update the UEFI firmware to the latest version first, then remove all existing 16 Gb DRAM RDIMMs.

Storage expansion

- Supports up to four 7 mm simple-swap SATA / NVMe solid-state drives (SSD) per node.
- Supports up to two 15 mm simple-swap SATA / NVMe solid-state drive (SSD) per node.
- Supports up to four E3.s 1T simple-swap NVMe solid-state drives (SSD) per compute node.
- Supports one M.2 drive per node. (Requires the M.2 interposer assembly)

For a list of supported M.2 drives, see <https://serverproven.lenovo.com>.

Expansion slots

- Two PCIe 5.0 x16 PCIe slots on the front per node, supports one of the following:
 - Supports up to two 75W Half-Height Half-Length PCIe 5.0 x16 PCIe adapters with riser card. (Mutually exclusive with internal storage drives)

Integrated functions and I/O connectors

- Lenovo XClarity Controller (XCC), which provides service processor control and monitoring functions, video controller, and remote keyboard, video, mouse, and remote drive capabilities.
 - The server supports Lenovo XClarity Controller 2 (XCC2). For additional information about Lenovo XClarity Controller 2 (XCC2), refer to <https://pubs.lenovo.com/lxcc-overview/>.

- Front operator panel

- KVM breakout cable connector.

The KVM breakout cable includes VGA connector, serial port connector, and USB 3.0 (5 Gbps) / 2.0 connector. XCC mobile management is supported by USB connector on the KVM breakout cable.

For more information, see “KVM breakout cable” section in *User Guide* or *System Configuration Guide*.

- External LCD diagnostics handset connector
- One Gigabit RJ45 Ethernet port, shared between operating system and Lenovo XClarity Controller.
- Two 25Gb SFP28 ports. Port 1 is shared between operating system and Lenovo XClarity Controller.

Note: Lenovo XClarity Controller connection is mutually exclusive between RJ45 Ethernet connector and 25Gb SFP28 Port 1.

- Video controller (integrated into Lenovo XClarity Controller)
 - ASPEED
 - SVGA compatible video controller
 - Avocent Digital Video Compression
 - Video memory is not expandable

Note: Maximum video resolution is 1920 x 1200 at 60 Hz.

- Hot-swappable System Management Module 2 (SMM2)

Note: See https://pubs.lenovo.com/mgt_tools_smm2/ for more details about System Management Module.

Network

Compute node

- One Gigabit Ethernet port with RJ45 connector, shared between operating system and Lenovo XClarity Controller.
- Two 25Gb SFP28 ports. Port 1 is shared between operating system and Lenovo XClarity Controller.

Lenovo XClarity Controller connection is mutually exclusive between RJ45 Ethernet connector and 25Gb SFP28 Port 1.

Electrical input

SD665 V3 tray installed in DW612S enclosure

- Supports six or nine hot-swap 2400W or 2600W power supplies.
 - Sine-wave input (50-60 Hz) required
 - Input voltage for 2400W power supplies:
 - 200-240 Vac, 240 Vdc
 - Input voltage for 2600W power supplies:
 - 200-208 Vac, 240 Vdc (output up to 2400W only)
 - 208-240 Vac, 240 Vdc
 - Six power supplies: 5+1 with oversubscription, or Non-redundancy
 - Nine power supplies: 8+1 without oversubscription
- Supports two or three hot-swap DWC 7200W power supplies.
 - Input voltage:
 - 200-208 Vac (work as 6900W)
 - 220-240 Vac, 240 Vdc (work as 7200W)
 - Two DWC PSUs: work as 5+1 with oversubscription, or Non-redundancy
 - Three DWC PSUs: work as 8+1 without oversubscription

CAUTION:

- **Power supplies and redundant power supplies in the enclosure must be with the same brand, power rating, wattage or efficiency level.**
- **Installing different DWC trays in the DW612S enclosure requires specific PSU configuration, see “Guidance on mixing trays configuration for the DW612S enclosure” in *User Guide*.**

Notes:

- Refer to https://thinksystem.lenovofiles.com/help/topic/mgt_tools_smm2/c_overview.html for more details of solution power status.
- Mixing PSUs manufactured by different vendors is not supported.

Minimal configuration for debugging

SD665 V3 tray installed in DW612S enclosure

- One DW612S Enclosure
- One SD665 V3 tray (with two compute nodes)
- Two processors per node
- 2 DIMMs per node in slot 6 and slot 19. (one DIMM per processor)
- Two CFF v4 power supplies (2400W or above) or one DWC PSU
- One drive (any type) (If OS is needed for debugging)

Operating systems

Supported and certified operating systems:

- Red Hat Enterprise Linux
- SUSE Linux Enterprise Server

References:

- Complete list of available operating systems: <https://lenovopress.lenovo.com/osig>.
- OS deployment instructions, see “Deploy the operating system” in *User Guide* or *System Configuration Guide*.

Mechanical specifications

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

Notes:

- SD665 V3 tray contains two nodes; one left node and one right node (when viewed from front of enclosure). Both are compute nodes.
- Up to six SD665 V3 trays can be installed in the DW612S 6U enclosure.

Dimension

- Height: 41.0 mm (1.61 inches)
- Depth: 684 mm (26.92 inches)
- Width: 437.5 mm (17.22 inches)

Weight

SD665 V3 Tray:

- Weight estimation: 21 kg (46.3 lbs)
- DW612S enclosure with six SD665 V3 trays and three DWC PSU: approximately 173.7 kg (382.9 lbs)

Environmental specifications

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

Notes:

- SD665 V3 tray contains two nodes; one left node and one right node (when viewed from front of enclosure). Both are compute nodes.
- Up to six SD665 V3 trays can be installed in the DW612S 6U enclosure.

Acoustical noise emissions

SD665 V3 Tray:

- Sound power level (LWAd):
 - Idle: 6.5 Bel
 - Operation: 7.7 Bel

Notes:

- These levels were measured in controlled acoustical environments according to procedures specified by ISO 7779, and are reported in accordance with ISO 9296.
- The declared acoustic noise levels are based on specified configurations with 6 air-cooling PSUs in the DW612S 6U enclosure, and may change depending on configuration/condition changes.
- Government regulations (such as those prescribed by OSHA or European Community Directives) may govern noise level exposure in the workplace and may apply to you and your server installation. The actual sound pressure levels in your installation depend upon a variety of factors, including the number of racks in the installation; the size, materials, and configuration of the room; the noise levels from other equipment; the room ambient temperature, and employee's location in relation to the equipment. Further, compliance with such government regulations depends on a variety of additional factors, including the duration of employees' exposure and whether employees wear hearing protection. Lenovo recommends that you consult with qualified experts in this field to determine whether you are in compliance with the applicable regulations.

Environment

- Air temperature requirements:
 - Operating:
 - ASHRAE class A2: 10°C - 35°C (50°F - 95°F); when the altitude exceeds 900 m (2953 ft), the maximum ambient temperature value decreases by 1°C (1.8°F) with every 300 m (984 ft) of altitude increase.
 - Powered off: 5°C - 45°C (41°F - 113°F)
 - Shipping/storage: -40°C - 60°C (-40°F - 140°F)
- Relative humidity (non-condensing):
 - Operating: ASHRAE Class A2: 8% - 80%, maximum dew point : 21°C (70°F)
 - Shipment/storage: 8% - 90%
- Maximum altitude: 3048 m (10 000 ft)

Note: The solution is designed for standard data center environment and recommended to be placed in industrial data center.

Water requirements

6900W (200-208 Vac) DWC power supply

- Water temperature:
 - ASHRAE class W+: up to 50°C (122°F)
- Maximum pressure: 4.4 bars
- Minimum water flow rate: 1.0 liters per minute per power supply
 - For inlet water temperatures up to 45°C (113°F), 1.0 liters per minute per power supply
 - For inlet water temperatures between 45°C - 50°C (113°F - 122°F), 1.5 liters per minute per power supply

7200W (220-240 Vac and 240 Vdc) DWC power supply

- Water temperature:
 - ASHRAE class W+: up to 50°C (122°F)
- Maximum pressure: 4.4 bars
- Minimum water flow rate: 1.5 liters per minute per power supply
 - For inlet water temperatures up to 45°C (113°F), 1.5 liters per minute per power supply
 - For inlet water temperatures between 45°C - 50°C (113°F - 122°F), 2.0 liters per minute per power supply

SD665 V3 tray installed in the DW612S enclosure is supported in the following water temperature

- Water temperature:
 - ASHRAE class W45: up to 45°C (113°F)
 - CPU up to 400W TDP
 - DIMMs up to 64 GB capacity
 - ASHRAE class W32: up to 32°C (89.6°F)
 - 128GB DIMMs
- Maximum pressure: 3.5 bars
- Typical water flow rate for **ASHRAE class W45**: 12 liters per minute (lpm) per enclosure, assuming 2.0 liters per minute per compute tray with 6 trays per enclosure (1 tray consists of 2 compute nodes)
- Minimum water flow rate for **ASHRAE class W32**: 9 liters per minute (lpm) per enclosure, assuming 1.5 liters per minute per compute tray with 6 trays per enclosure (1 tray consists of 2 compute nodes)

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

Particulate contamination

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

Risks that are posed by the presence of excessive particulate levels or concentrations of harmful gases include damage that might cause the device to malfunction or cease functioning altogether. This specification sets forth limits for particulates and gases that are intended to avoid such damage. The limits must not be viewed or used as definitive limits, because numerous 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 20. Limits for particulates and gases

Contaminant	Limits
Reactive gases	<p>Severity level G1 as per ANSI/ISA 71.04-1985¹:</p> <ul style="list-style-type: none"> The copper reactivity level shall be less than 200 Angstroms per month ($\text{\AA}/\text{month} \approx 0.0035 \mu\text{g}/\text{cm}^2\text{-hour weight gain}$).² The silver reactivity level shall be less than 200 Angstroms per month ($\text{\AA}/\text{month} \approx 0.0035 \mu\text{g}/\text{cm}^2\text{-hour weight gain}$).³ The reactive monitoring of gaseous corrosivity must be conducted approximately 5 cm (2 in.) in front of the rack on the air inlet side at one-quarter and three-quarter frame height off the floor or where the air velocity is much higher.
Airborne particulates	<p>Data centers must meet the cleanliness level of ISO 14644-1 class 8.</p> <p>For data centers without airside economizer, the ISO 14644-1 class 8 cleanliness might be met by choosing one of the following filtration methods:</p> <ul style="list-style-type: none"> The room air might be continuously filtered with MERV 8 filters. Air entering a data center might be filtered with MERV 11 or preferably MERV 13 filters. <p>For data centers with airside economizers, the choice of filters to achieve ISO class 8 cleanliness depends on the specific conditions present at that data center.</p> <ul style="list-style-type: none"> The deliquescent relative humidity of the particulate contamination should be more than 60% RH.⁴ Data centers must be free of zinc whiskers.⁵

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

² The derivation of the equivalence between the rate of copper corrosion growth in the thickness of the corrosion product in $\text{\AA}/\text{month}$ and the rate of weight gain assumes that Cu_2S and Cu_2O grow in equal proportions.

³ The derivation of the equivalence between the rate of silver corrosion growth in the thickness of the corrosion product in $\text{\AA}/\text{month}$ and the rate of weight gain assumes that Ag_2S is the only corrosion product.

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

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

Troubleshooting by system LEDs and diagnostics display

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

Front LEDs

The following illustration shows LEDs on the front of the solution. By viewing the status of LEDs, you can often identify the source of the error.

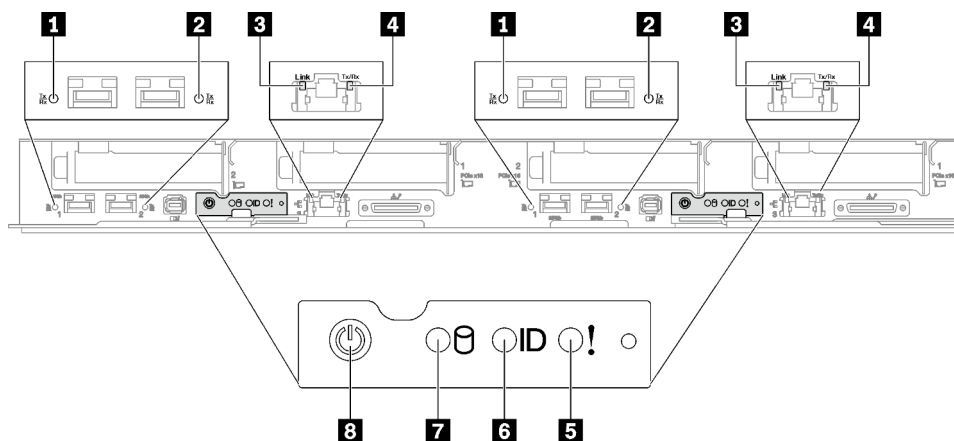


Figure 288. SD665 V3 tray front LEDs

Table 21. Front LEDs

1 25 Gb Ethernet port link and activity LED (left) (green)	5 Check log LED (yellow)
2 25 Gb Ethernet port link and activity LED (right) (green)	6 Identification LED (blue)
3 1 Gb Ethernet port link LED (green)	7 Drive activity LED (green)
4 1 Gb Ethernet port activity LED (green)	8 Node power button with LED (green)

1 2 25 Gb Ethernet port link and activity LED (green): Use this green LED to distinguish the network status.

Off: The network is disconnected.

Blinking: The network is accessing.

On: The network is established.

3 1 Gb Ethernet port link LED (green): Use this green LED to distinguish the network status.

Off: The network link is disconnected.

On: The network link is established.

4 1 Gb Ethernet port activity LED (green): Use this green LED to distinguish the network status.

Off: The node is disconnected from a LAN.

Blinking: The network is connected and active.

5 Check log LED (yellow): When this yellow LED is lit, it indicates that a system error has occurred. Check the XCC event log for additional information.

6 Identification LED (blue): Use this blue LED to visually locate the node among other nodes. This LED is also used as a presence detection button. You can use Lenovo XClarity Administrator to light this LED remotely.

7 Drive activity LED (green): If the LED is lit, it indicates that the drive is powered, but not actively reading or writing data. If the LED is flashing, the drive is being accessed.

8 Node power button with LED (green): Press this button to turn the node on and off manually. The states of the power LED are as follows:

Off: Power is not present or the power supply, or the LED itself has failed.

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

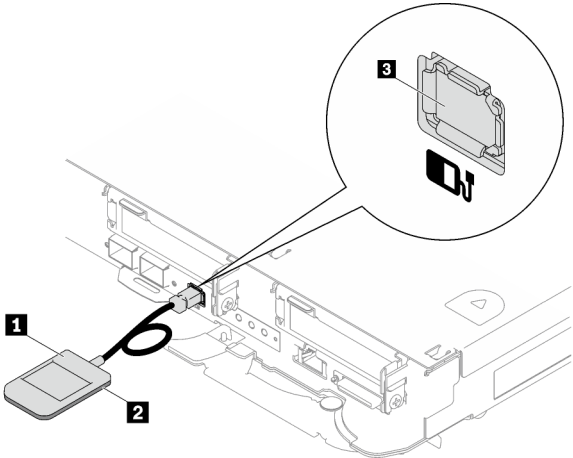
Flashing slowly (once per second): The node is turned off and is ready to be turned on. You can press the power button to turn on the node.

On: The node is turned on.

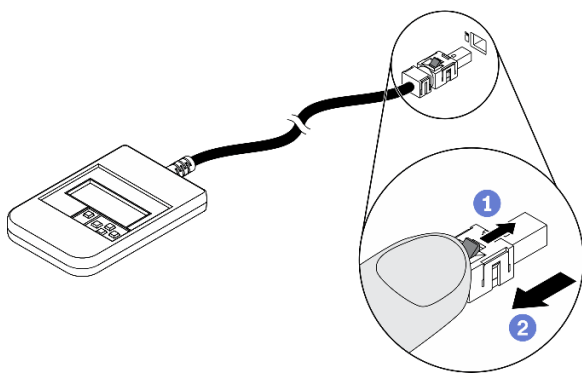
External Diagnostics Handset

The External Diagnostics Handset is an external device that is connected to the server with a cable, and it allows quick access to system information such as errors, system status, firmware, network, and health information.

Location of the External Diagnostics Handset

Location	Callouts
<p>The External Diagnostics Handset is connected to the server with an external cable.</p> 	<p>1 External Diagnostics Handset</p>
	<p>2 Magnetic bottom With this component, the diagnostic handset can be attached to the top or side of the rack with hands spared for service tasks.</p>
	<p>3 External diagnostics connector This connector is located on the front of the server, and is used to connect an External Diagnostics Handset.</p>

Note: When unplugging the External Diagnostics Handset, see the following instructions:

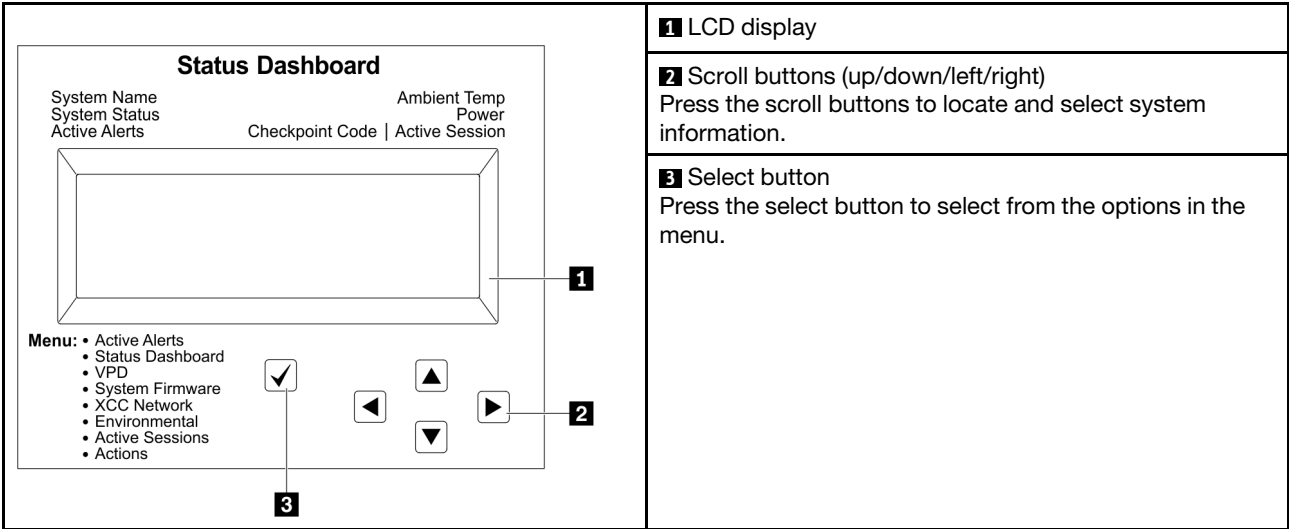


1 Press the plastic clip on the plug forward.

2 Hold the clip and remove the cable from the connector.

Display panel overview

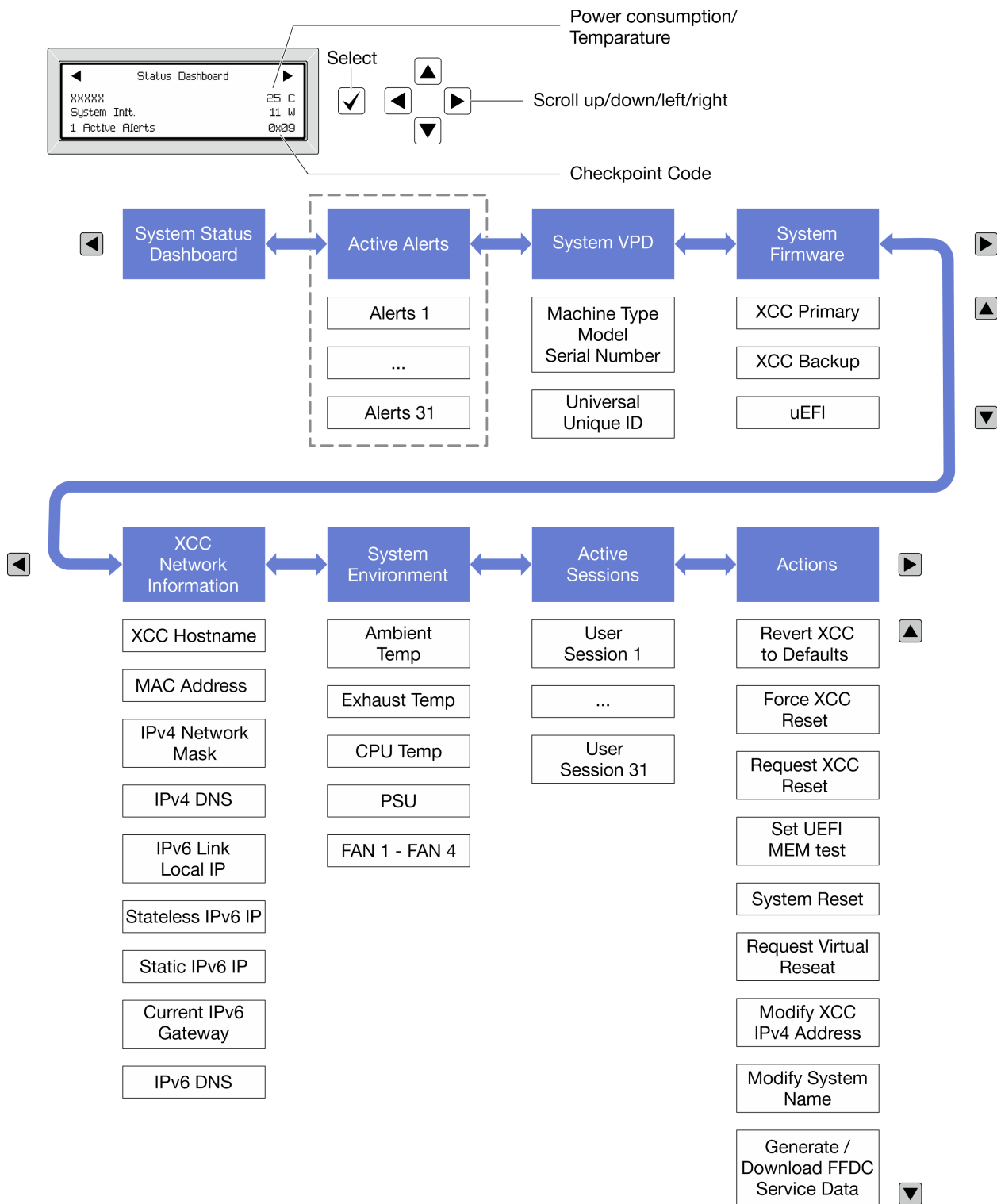
The diagnostics device consists of an LCD display and 5 navigation buttons.



Option flow diagram

The LCD panel displays various system information. Navigate through the options with the scroll keys.

Depending on the model, the options and entries on the LCD display might be different.

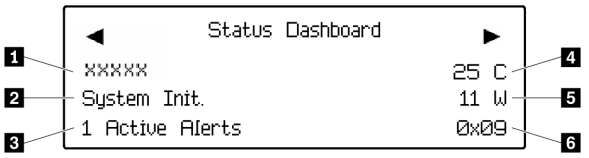


Full menu list

Following is the list of available options. Switch between an option and the subordinate information entries with the select button, and switch among options or information entries with the scroll buttons.

Depending on the model, the options and entries on the LCD display might be different.

Home Menu (System Status Dashboard)

Home Menu	Example
1 System name 2 System status 3 Active alert quantity 4 Temperature 5 Power consumption 6 Checkpoint code	 <p>The screenshot shows a 'Status Dashboard' with the following information: 'xxxxxx' (1), 'System Init.' (2), '1 Active Alerts' (3), '25 C' (4), '11 W' (5), and '0x09' (6).</p>

Active Alerts

Sub Menu	Example
Home screen: Active error quantity Note: The “Active Alerts” menu displays only the quantity of active errors. If no errors occur, the “Active Alerts” menu will not be available during navigation.	1 Active Alerts
Details screen: <ul style="list-style-type: none"> • Error message ID (Type: Error/Warning/Information) • Occurrence time • Possible sources of the error 	Active Alerts: 1 Press ▼ to view alert details FQXSPPU009N(Error) 04/07/2020 02:37:39 PM CPU 1 Status: Configuration Error

System VPD Information

Sub Menu	Example
<ul style="list-style-type: none"> • Machine type and serial number • Universal Unique ID (UUID) 	Machine Type: xxxx Serial Num: xxxxxx Universal Unique ID: xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx

System Firmware

Sub Menu	Example
XCC Primary <ul style="list-style-type: none">Firmware level (status)Build IDVersion numberRelease date	XCC Primary (Active) Build: DVI399T Version: 4.07 Date: 2020-04-07
XCC Backup <ul style="list-style-type: none">Firmware level (status)Build IDVersion numberRelease date	XCC Backup (Active) Build: D8BT05I Version: 1.00 Date: 2019-12-30
UEFI <ul style="list-style-type: none">Firmware level (status)Build IDVersion numberRelease date	UEFI (Inactive) Build: D0E101P Version: 1.00 Date: 2019-12-26

XCC Network Information

Sub Menu	Example
<ul style="list-style-type: none">XCC hostnameMAC addressIPv4 Network MaskIPv4 DNSIPv6 Link Local IPStateless IPv6 IPStatic IPv6 IPCurrent IPv6 GatewayIPv6 DNS <p>Note: Only the MAC address that is currently in use is displayed (extension or shared).</p>	XCC Network Information XCC Hostname: XCC-xxxx-SN MAC Address: xx:xx:xx:xx:xx:xx IPv4 IP: xx.xx.xx.xx IPv4 Network Mask: x.x.x.x IPv4 Default Gateway: x.x.x.x

System Environmental Information

Sub Menu	Example
<ul style="list-style-type: none">• Ambient temperature• Exhaust temperature• CPU temperature• PSU status• Spinning speed of fans by RPM	Ambient Temp: 24 C Exhaust Temp: 30 C CPU1 Temp: 50 C PSU1: Vin= 213 w Inlet= 26 C FAN1 Front: 21000 RPM FAN2 Front: 21000 RPM FAN3 Front: 21000 RPM FAN4 Front: 21000 RPM

Active Sessions

Sub Menu	Example
Quantity of active sessions	Active User Sessions: 1

Actions

Sub Menu	Example
Several quick actions are available: <ul style="list-style-type: none">• Revert XCC to Defaults• Force XCC Reset• Request XCC Reset• Set UEFI Memory Test• Request Virtual Reseat• Modify XCC Static IPv4 Address/Net mask/Gateway• Modify System Name• Generate/Download FFDC Service Data	Request XCC Reset? This will request the BMC to reboot itself. Hold √ for 3 seconds

System Management Module 2 (SMM 2) LEDS

The following illustration shows the LEDs on the SMM2 module.

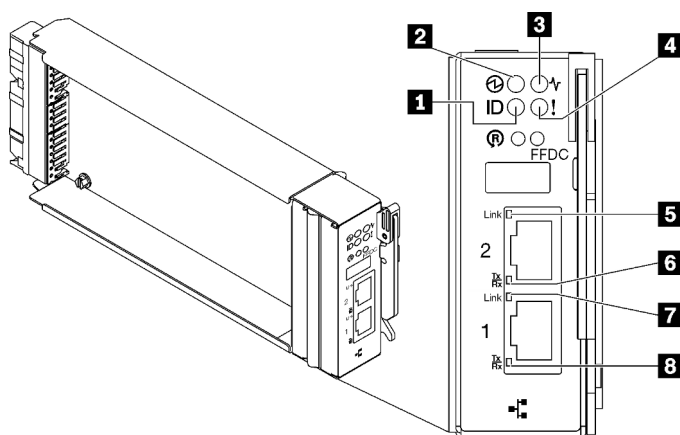


Figure 289. SMM2 LEDs

Table 22. SMM2 connectors and LEDs

1 Identification LED (blue)	5 Ethernet port 2 link (RJ-45) LED (green)
2 Power LED (green)	6 Ethernet port 2 activity (RJ-45) LED (green)
3 Status LED (green)	7 Ethernet port 1 link (RJ-45) LED (green)
4 Check log LED (yellow)	8 Ethernet port 1 activity (RJ-45) LED (green)

1 Identification LED: When this LED is lit (blue), it indicates the enclosure location in a rack.

2 Power-on LED: When this LED is lit (green), it indicates that the SMM2 has power.

3 Status LED: This LED (green) indicates the operating status of the SMM2.

- **Continuously on:** The SMM2 has encountered one or more problems.
- **Off:** When the enclosure power is on, it indicates the SMM2 has encountered one or more problems.
- **Flashing:** The SMM2 is working.
 - During the pre-boot process, the LED flashes rapidly.
 - Ten times per second: The SMM2 hardware is working and the firmware is ready to initialize.
 - Two times per second: The firmware is initializing.
 - When the pre-boot process is completed and the SMM2 is working correctly, the LED flashes at a slower speed (about once every two seconds).

4 Check log LED: When this LED is lit (yellow), it indicates that a system error has occurred. Check the SMM2 event log for additional information.

5 Ethernet port 2 link (RJ-45) LED: When this LED is lit (green), it indicates that there is an active connection through the remote management and console (Ethernet) port 2 to the management network.

6 Ethernet port 2 activity (RJ-45) LED: When this LED is flashing (green), it indicates that there is an activity through the remote management and console (Ethernet) port 2 over the management network.

7 Ethernet port 1 link (RJ-45) LED: When this LED is lit (green), it indicates that there is an active connection through the remote management and console (Ethernet) port 1 to the management network.

8 Ethernet port 1 activity (RJ-45) LED: When this LED is flashing (green), it indicates that there is an activity through the remote management and console (Ethernet) port 1 over the management network.

Power supply LEDs

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

The following minimal configuration is required for the solution to start:

- One DW612S Enclosure
- One SD665 V3 tray (with two compute nodes)
- Two processors per node
- 2 DIMMs per node in slot 6 and slot 19. (one DIMM per processor)
- Two CFF v4 power supplies (2400W or above) or one DWC PSU
- One drive (any type) (If OS is needed for debugging)

The power supplies get electrical power from a 200 - 240 V ac power source and convert the ac input into 12 V outputs. The power supplies are capable of autoranging within the input voltage range. There is one common power domain for the enclosure that distributes power to each of the DWC tray and modules through the system midplane.

AC redundancy is achieved by distributing the ac power cord connections between independent ac circuits.

Each power supply has internal fans and a controller. The power supply controller can be powered by any installed power supply that is providing power through the midplane.

Attention: The power supplies contain internal cooling fans. Do not obstruct the fan exhaust vents.

The enclosure does not support mixing of low input voltage power supplies with high input voltage power supplies. For example, if you install a power supply with an input voltage of 100 - 127 V ac in a enclosure that is powered by 200 - 240 V ac power supplies, the 100 - 127 V power supply will not power on. The same restriction applies to a enclosure that is powered by 100 - 127 V ac power supplies. If you install a 200 - 240 V ac power supply in a enclosure that is powered by 100 - 127 V ac power supplies, the 200 - 240 V ac power supply will not power on.

The following illustration shows the LEDs on the power supply:

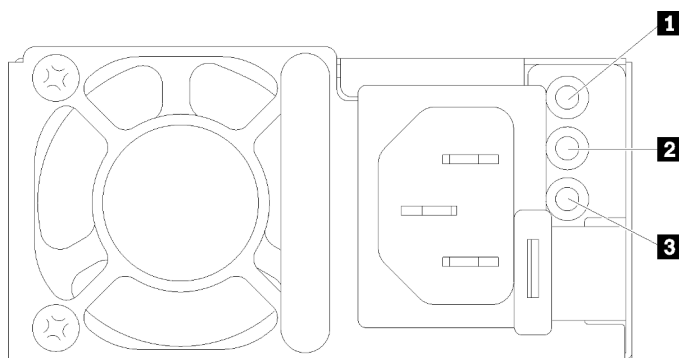


Figure 290. AC power supply LEDs

1 Input (AC) power LED (green)	3 Power supply error LED (yellow)
2 Output (DC) power LED (green)	

There are three LEDs on each power supply:

1 AC power LED (green): When this LED is lit (green), it indicates that ac power is being supplied to the power supply.

2 DC power LED (green): When this LED is lit (green), it indicates that dc power is being supplied from the power supply to the enclosure midplane.

3 Power supply error LED (yellow): When this LED is lit (yellow), it indicates that there is a fault with the power supply. Dump the FFDC log from the system and contact Lenovo back end support team for PSU data log reviewing.

Note: Before unplugging the ac power cord from the power supply, or removing the power supply from the enclosure, verify that the capacity of the remaining power supplies are sufficient to meet the minimum power requirements for all components in the enclosure.

DWC power supply LEDs

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

The following minimal configuration is required for the solution to start:

- One DW612S Enclosure
- One SD665 V3 tray (with two compute nodes)
- Two processors per node
- 2 DIMMs per node in slot 6 and slot 19. (one DIMM per processor)
- Two CFF v4 power supplies (2400W or above) or one DWC PSU
- One drive (any type) (If OS is needed for debugging)

The power supplies get electrical power from a 200 - 240 V ac power source and convert the ac input into 12 V outputs. The power supplies are capable of autoranging within the input voltage range. There is one common power domain for the enclosure that distributes power to each of the DWC tray and modules through the system midplane.

AC redundancy is achieved by distributing the ac power cord connections between independent ac circuits.

Each DWC power supply has internal water loops and a controller. The power supply controller can be powered by any installed power supply that is providing power through the midplane.

The enclosure does not support mixing of low input voltage power supplies with high input voltage power supplies. For example, if you install a power supply with an input voltage of 100 - 127 V ac in a enclosure that is powered by 200 - 240 V ac power supplies, the 100 - 127 V power supply will not power on. The same restriction applies to a enclosure that is powered by 100 - 127 V ac power supplies. If you install a 200 - 240 V ac power supply in a enclosure that is powered by 100 - 127 V ac power supplies, the 200 - 240 V ac power supply will not power on.

The following illustration shows the LEDs on the DWC power supply:

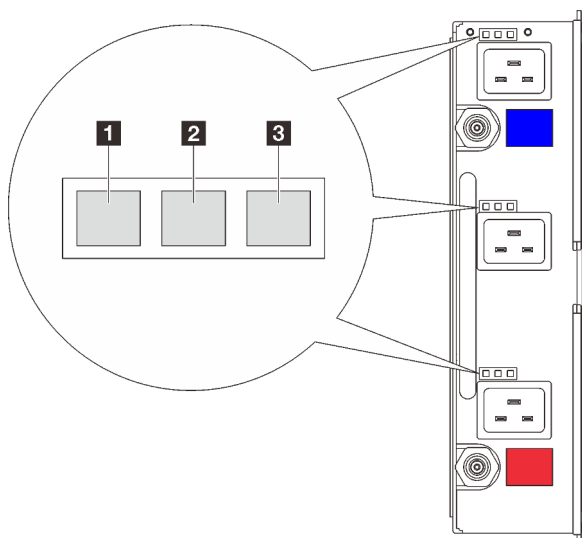


Figure 291. DWC power supply LEDs

1 Input (AC) power LED (green)	3 Power supply error LED (yellow)
2 Output (DC) power LED (green)	

There are nine LEDs on each DWC power supply (three per power supply bay):

1 AC power LED (green): When this LED is lit (green), it indicates that ac power is being supplied to the DWC power supply in the corresponding power supply bay.

2 DC power LED (green): When this LED is lit (green), it indicates that dc power is being supplied from the corresponding power supply bay to the enclosure midplane.

3 Power supply error LED (yellow): When this LED is lit (yellow), it indicates that there is a fault with the corresponding power supply bay. Dump the FFDC log from the system and contact Lenovo back end support team for PSU data log reviewing.

Note: Before unplugging the ac power cord from the DWC power supply, or removing the DWC power supply from the enclosure, verify that the capacity of the remaining power supplies are sufficient to meet the minimum power requirements for all components in the enclosure.

Drip sensor LED

The following illustration shows the light-emitting diodes (LEDs) on the drip sensor.

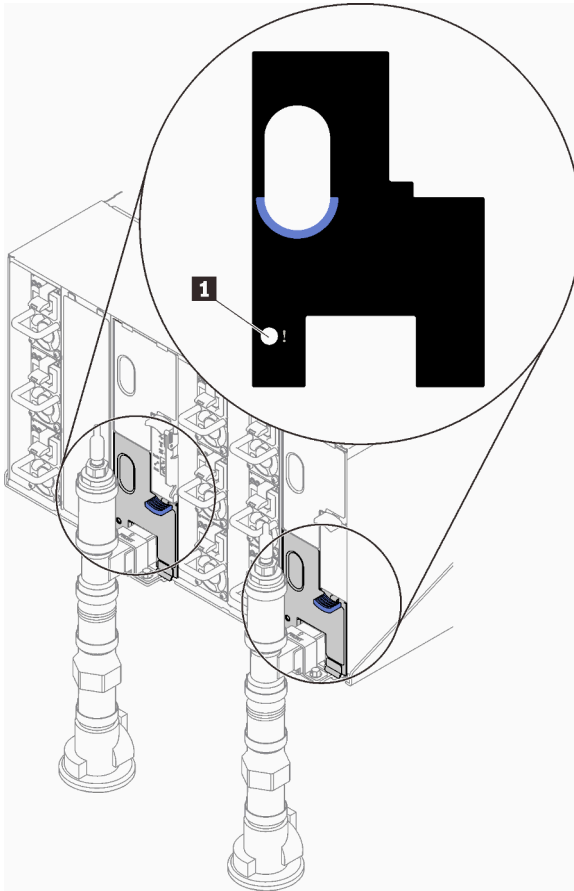


Figure 292. Drip sensor LED

Table 23. Drip sensor LED

1 Drip sensor LED (yellow)

1 Drip sensor LED: When this LED is lit (yellow), it indicates that the drip sensor detects water in its respective catch basin.

System-board LEDs

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

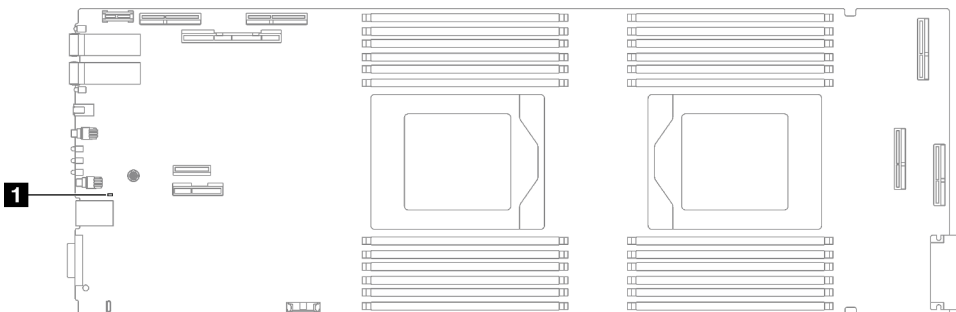


Figure 293. System-board LEDs

Table 24. System-board LEDs

1 BMC (XCC heartbeat LED) (green)

1 XCC heartbeat LED (green) behavior:

Blinking slowly: XCC is functioning.

Blinking rapidly and constantly: XCC is initializing or malfunctioning.

On: XCC is malfunctioning.

Off: XCC is malfunctioning.

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 minimal configuration for debugging that is supported for the server.

To determine the minimal configuration for your server, see “Minimal configuration for debugging” in [“Technical specifications” on page 244](#):

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.

Resolving suspected power problems

Power problems can be difficult to solve. For example, a short circuit can exist anywhere on any of the power distribution buses. Usually, a short circuit will cause the power subsystem to shut down because of an overcurrent condition.

Complete the following steps to diagnose and resolve a suspected power problem.

Step 1. Check the event log and resolve any errors related to the power.

Note: Start with the event log of the application that is managing the server. For more information about event logs, see [“Event logs” on page 241](#).

Step 2. Check for short circuits, for example, if a loose screw is causing a short circuit on a circuit board.

- Step 3. Remove the adapters and disconnect the cables and power cords to all internal and external devices until the server is at the minimal configuration for debugging that is required for the server to start. To determine the minimal configuration for your server, see “Minimal configuration for debugging” in [“Technical specifications” on page 244](#).
- Step 4. Reconnect all AC power cords and turn on the server. If the server starts successfully, reseal the adapters and devices one at a time until the problem is isolated.

If the server does not start from the minimal configuration, replace the components in the minimal configuration one at a time until the problem is isolated.

Resolving suspected Ethernet controller problems

The method that you use to test the Ethernet controller depends on which operating system you are using. See the operating-system documentation for information about Ethernet controllers, and see the Ethernet controller device-driver readme file.

Complete the following steps to attempt to resolve suspected problems with the Ethernet controller.

- Step 1. Make sure that the correct device drivers, which come with the server are installed and that they are at the latest level.
- Step 2. Make sure that the Ethernet cable is installed correctly.
- The cable must be securely attached at all connections. If the cable is attached but the problem remains, try a different cable.
 - If you set the Ethernet controller to operate at 100 Mbps or 1000 Mbps, you must use Category 5 cabling.
- Step 3. Determine whether the hub supports auto-negotiation. If it does not, try configuring the integrated Ethernet controller manually to match the speed and duplex mode of the hub.
- Step 4. Check the Ethernet controller LEDs on the server. These LEDs indicate whether there is a problem with the connector, cable, or hub.

Ethernet controller LED locations are specified in [“Troubleshooting by system LEDs and diagnostics display” on page 250](#).

- The Ethernet link status LED is lit when the Ethernet controller receives a link pulse from the hub. If the LED is off, there might be a defective connector or cable or a problem with the hub.
 - The Ethernet transmit/receive activity LED is lit when the Ethernet controller sends or receives data over the Ethernet network. If the Ethernet transmit/receive activity is off, make sure that the hub and network are operating and that the correct device drivers are installed.
- Step 5. Check the Network activity LED on the server. The Network activity LED is lit when data is active on the Ethernet network. If the Network activity LED is off, make sure that the hub and network are operating and that the correct device drivers are installed.

Network activity LED location is specified in [“Troubleshooting by system LEDs and diagnostics display” on page 250](#).

- Step 6. Check for operating-system-specific causes of the problem, and also make sure that the operating system drivers are installed correctly.
- Step 7. Make sure that the device drivers on the client and server are using the same protocol.

If the Ethernet controller still cannot connect to the network but the hardware appears to be working, the network administrator must investigate other possible causes of the error.

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 using some other management application, begin with the Lenovo XClarity Controller event log.

For more information about event logs (see [“Event logs” on page 241](#)).

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 287](#)).

Intermittent problems

Use this information to solve intermittent problems.

- [“Intermittent external device problems” on page 265](#)
- [“Intermittent KVM problems” on page 265](#)
- [“Intermittent unexpected reboots” on page 266](#)

Intermittent external device problems

Complete the following steps until the problem is solved.

1. Update the UEFI and XCC firmware to the latest versions.
2. Make sure that the correct device drivers are installed. See the manufacturer's website for documentation.
3. For a USB device:
 - a. Make sure that the device is configured correctly.

Restart the server and press the key according to 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 uncorrectable 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.

1. If the reset occurs during POST and the POST watchdog timer is enabled, make sure that sufficient time is allowed in the watchdog timeout value (POST Watchdog Timer).

To check the POST watchdog time, restart the server and press the key according to 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 **BMC Settings → POST Watchdog Timer**.

2. If the reset occurs after the operating system starts, enter the operating system when the system operates normally and set up operating system kernel dump process (Windows and Linux base operating systems will be using different method). Enter the UEFI setup menus and disable the feature, or disable it with the following OneCli command.

```
OneCli.exe config set SystemRecovery.RebootSystemOnNMI Disable --bmcxcc_userid PASSWORD@xcc_ipaddress
```

3. See the management controller event log to check for an event code that indicates a reboot. See “[Event logs](#)” on page 241 for information about viewing the event log. If you are using Linux base operating system, then capture all logs back to Lenovo support for further investigation.

Keyboard, mouse, KVM switch or USB-device problems

Use this information to solve problems related to a keyboard, mouse, KVM switch or USB-device problems.

- “[All or some keys on the keyboard do not work](#)” on page 266
- “[Mouse does not work](#)” on page 266
- “[KVM switch problems](#)” on page 267
- “[USB-device does not work](#)” on page 267

All or some keys on the keyboard do not work

1. Make sure that:
 - The keyboard cable is securely connected.
 - The server and the monitor are turned on.
2. If you are using a USB keyboard, run the Setup utility and enable keyboardless operation.
3. If you are using a USB keyboard and it is connected to a USB hub, disconnect the keyboard from the hub and connect it directly to the server.
4. Try to install the USB keyboard into a different USB port as available.
5. Replace the keyboard.

Mouse does not work

1. Make sure that:
 - The mouse cable is securely connected to the server.
 - The mouse device drivers are installed correctly.

- The server and the monitor are turned on.
 - The mouse option is enabled in the Setup utility.
2. If you are using a USB mouse and it is connected to a USB hub, disconnect the mouse from the hub and connect it directly to the server.
 3. Try to install the USB mouse into a different USB port as available.
 4. Replace the mouse.

KVM switch problems

1. Make sure that the KVM switch is supported by your server.
2. Make sure that the KVM switch is powered on correctly.
3. If the keyboard, mouse or monitor can be operated normally with direct connection to the server, then replace the KVM switch.

USB-device does not work

1. Make sure that:
 - The correct USB device driver is installed.
 - The operating system supports USB devices.
2. Make sure that the USB configuration options are set correctly in system setup.

Restart the server and press the key according to 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**.

3. If you are using a USB hub, disconnect the USB device from the hub and connect it directly to the server.

Memory problems

See this section to resolve issues related to memory.

Common memory problems

- “Multiple memory modules in a channel identified as failing” on page 267
- “Displayed system memory is less than installed physical memory” on page 268
- “Invalid memory population detected” on page 268

Multiple memory modules in a channel identified as failing

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

Complete the following procedure to solve the problem.

1. Reseat the memory modules; then, restart the server.
2. Remove the highest-numbered memory module of those that are identified and replace it with an identical known good memory module; then, restart the server. Repeat as necessary. If the failures continue after all identified memory modules are replaced, go to step 4.
3. Return the removed memory modules, one at a time, to their original connectors, restarting the server after each memory module, until a memory module fails. Replace each failing memory module with an identical known good memory module, restarting the server after each memory module replacement. Repeat step 3 until you have tested all removed memory modules.

4. Replace the highest-numbered memory module of those identified; then, restart the server. Repeat as necessary.
5. Reverse the memory modules between the channels (of the same processor), and then restart the server. If the problem is related to a memory module, replace the failing memory module.
6. (Trained technician only) Install the failing memory module into a memory module connector for processor 2 (if installed) to verify that the problem is not the processor or the memory module connector.
7. (Trained technician only) Replace the system board (system board assembly).

Displayed system memory is less than installed physical memory

Complete the following procedure to solve the problem.

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

1. Make sure that:
 - No error LEDs are lit. See [“Troubleshooting by system LEDs and diagnostics display” on page 250](#).
 - No memory module error LEDs are lit on the system board (system board assembly).
 - Memory mirrored channel does not account for the discrepancy.
 - The memory modules are seated correctly.
 - You have installed the correct type of memory module (see [“Memory module installation rules and order” on page 4](#) for requirements).
 - After changing or replacing a memory module, memory configuration is updated accordingly in the Setup Utility.
 - All banks of memory are enabled. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled.
 - There is no memory mismatch when the server is at the minimum memory configuration.
2. Reseat the memory modules, and then restart the server.
3. Check the POST error log:
 - If a memory module was disabled by a systems-management interrupt (SMI), replace the memory module.
 - If a memory module was disabled by the user or by POST, reseat the memory module; then, run the Setup Utility and enable the memory module.
4. Run memory diagnostics. When you start a solution and press the key according to the on-screen instructions, the LXPM interface is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) You can perform memory diagnostics with this interface. From the Diagnostic page, go to **Run Diagnostic → Memory test → Advanced Memory Test**.
5. Reverse the modules between the channels (of the same processor), and then restart the server. If the problem is related to a memory module, replace the failing memory module.
6. Re-enable all memory modules using the Setup Utility, and then restart the server.
7. (Trained technician only) Install the failing memory module into a memory module connector for processor 2 (if installed) to verify that the problem is not the processor or the memory module connector.
8. (Trained technician only) Replace the system board (system board assembly).

Invalid memory population detected

If this warning message appears, complete the following steps:

Invalid memory population (unsupported DIMM population) detected. Please verify memory configuration is valid.

1. See [“Memory module installation rules and order” on page 4](#) to make sure the present memory module population sequence is supported.
2. If the present sequence is indeed supported, see if any of the modules is displayed as “disabled” in Setup Utility.
3. Reseat the module that is displayed as “disabled,” and reboot the system.
4. If the problem persists, replace the memory module.

Monitor and video problems

Use this information to solve problems related to a monitor or video.

- [“Screen is blank” on page 269](#)
- [“Screen goes blank when you start some application programs” on page 269](#)
- [“The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted” on page 269](#)

Screen is blank

Note: Make sure that the expected boot mode has not been changed from the UEFI to Legacy or vice versa.

1. If the server is attached to a KVM switch, bypass the KVM switch to eliminate it as a possible cause of the problem: connect the monitor cable directly to the correct connector on the rear of the server.
2. The management controller remote presence function is disabled if you install an optional video adapter. To use the management controller remote presence function, remove the optional video adapter.
3. If the server is installed with the graphical adapters while turning on the server, the Lenovo logo is displayed on the screen after approximately 3 minutes. This is normal operation while the system loads.
4. Make sure that:
 - The server is turned on and there is power supplied to the server.
 - The monitor cables are connected correctly.
 - The monitor is turned on and the brightness and contrast controls are adjusted correctly.
5. Make sure that the correct server is controlling the monitor, if applicable.
6. Make sure that corrupted server firmware is not affecting the video; see “Update the firmware” in *User Guide* or *System Configuration Guide*.
7. Observe the LEDs on the system board (system board assembly); if the codes are changing, go to step 6.
8. Replace the following components one at a time, in the order shown, restarting the server each time:
 - a. Monitor
 - b. Video adapter (if one is installed)
 - c. (Trained technician only) System board (system board assembly)

Screen goes blank when you start some application programs

1. Make sure that:
 - The application program is not setting a display mode that is higher than the capability of the monitor.
 - You installed the necessary device drivers for the application.

The monitor has screen jitter, or the screen image is wavy, unreadable, rolling, or distorted

1. If the monitor self-tests show that the monitor is working correctly, consider the location of the monitor. Magnetic fields around other devices (such as transformers, appliances, fluorescents, and other monitors) can cause screen jitter or wavy, unreadable, rolling, or distorted screen images. If this happens, turn off the monitor.

Attention: Moving a color monitor while it is turned on might cause screen discoloration.

Move the device and the monitor at least 305 mm (12 in.) apart, and turn on the monitor.

Notes:

- a. To prevent diskette drive read/write errors, make sure that the distance between the monitor and any external diskette drive is at least 76 mm (3 in.).
- b. Non-Lenovo monitor cables might cause unpredictable problems.
2. Reseat the monitor cable.
3. Replace the components listed in step 2 one at a time, in the order shown, restarting the server each time:
 - a. Monitor cable
 - b. Video adapter (if one is installed)
 - c. Monitor
 - d. (Trained technician only) System board (system board assembly)

Network problems

Use this information to resolve issues related to networking.

- [“Could not log in using LDAP account with SSL enabled” on page 270](#)

Could not log in using LDAP account with SSL enabled

Complete the following steps until the problem is resolved:

1. Make sure that the license key is valid.
2. Generate a new license key and log in again.

Observable problems

Use this information to solve observable problems.

- [“Server hangs during the UEFI boot process” on page 270](#)
- [“The server immediately displays the POST Event Viewer when it is turned on” on page 271](#)
- [“Server is unresponsive \(POST is complete and operating system is running\)” on page 271](#)
- [“Server is unresponsive \(POST failed and cannot start System Setup\)” on page 272](#)
- [“Voltage planar fault is displayed in the event log” on page 272](#)
- [“Unusual smell” on page 272](#)
- [“Server seems to be running hot” on page 272](#)
- [“Cracked parts or cracked chassis” on page 272](#)

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

Complete the following steps until the problem is solved.

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

You can view processor details from system setup.

To determine if the processor is supported for the server, see <https://serverproven.lenovo.com>.

3. (Trained technician only) Make sure that processor 1 and processor 2 are seated correctly
4. (Trained technician only) Restart the server.
5. Replace the following components one at a time, in the order shown, restarting the server each time:
 - a. (Trained technician only) Processor
 - b. (Trained technician only) System board (system board assembly)

Server 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.

Server is unresponsive (POST failed and cannot start System Setup)

Configuration changes, such as added devices or adapter firmware updates, and firmware or application code problems can cause the server to fail POST (the power-on self-test).

If this occurs, the server responds in either of the following ways:

- The server restarts automatically and attempts POST again.
- The server hangs, and you must manually restart the server for the server to attempt POST again.

After a specified number of consecutive attempts (automatic or manual), the server reverts to the default UEFI configuration and starts System Setup so that you can make the necessary corrections to the configuration and restart the server. If the server is unable to successfully complete POST with the default configuration, there might be a problem with the system board (system board assembly). You can specify the number of consecutive restart attempts in System Setup. Click **System Settings → Recovery → POST Attempts → POST Attempts Limit**. Available options are 3, 6, 9, and 255.

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 243](#) 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 (system board assembly).

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.

Server 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, inlet water temperature, and flow rate are within the specified range (see [“Specifications” on page 243](#)).
2. Update the UEFI and XCC firmware to the latest versions.
3. Make sure that the fillers in the server are installed correctly (see [Chapter 1 “Hardware replacement procedures” on page 1](#) for detailed installation procedures).
4. 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.

Cracked parts or cracked chassis

Contact Lenovo Support.

Optional-device problems

Use this information to solve problems related to optional devices.

- [“Insufficient PCIe resources are detected” on page 273](#)
- [“A Lenovo optional device that was just installed does not work” on page 273](#)
- [“A Lenovo optional device that worked previously does not work now” on page 273](#)

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.

Power on and power off problems

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

- [“Server does not power on” on page 274](#)
- [“Server does not power off” on page 274](#)

Server does not power on

Complete the following steps until the problem is resolved:

Note: The power button will not function until approximately one to two minutes after the server has been connected to power to allow the BMC to complete initialization.

1. Make sure that the power button is working correctly:
 - a. Disconnect the server power cords.
 - b. Reconnect the power cords.
 - c. (Trained technician only) Reseat the front operator panel cable, and then repeat steps 1a and 1b.
 - (Trained technician only) If the server starts, reseat the front operator panel. If the problem remains, replace the front operator panel.
 - If the server does not start, bypass the power button by using the force power-on jumper. If the server starts, reseat the front operator panel. If the problem remains, replace the front operator panel.
2. Make sure that the reset button is working correctly:
 - a. Disconnect the server power cords.
 - b. Reconnect the power cords.
 - c. (Trained technician only) Reseat the front operator panel cable, and then repeat steps 2a and 2b.
 - (Trained technician only) If the server starts, replace the front operator panel.
 - If the server does not start, go to step 3.
3. Make sure that both power supplies installed in the server are of the same type. Mixing different power supplies in the server will cause a system error (the system-error LED on the front operator panel turns on).
4. Make sure that:
 - The power cords are correctly connected to the server and to a working electrical outlet.
 - The type of memory that is installed is correct and the installation rules are met.
 - The DIMMs are fully seated with lock latches fully closed.
 - The LEDs on the power supply do not indicate a problem.
 - The processors are installed in the correct sequence.
5. Reseat the following components:
 - a. Front operator panel connector
 - b. Power supplies
6. Replace the following components and restart the server each time:
 - a. Front operator panel connector
 - b. Power supplies
7. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports.
8. Implement the minimum configuration (one processor and one DIMM) to check whether any specific components lock the power permission.
9. Collect the failure information by capturing the system logs and provide it to Lenovo support.
10. See [“Power supply LEDs” on page 259](#) and [“DWC power supply LEDs” on page 260](#).

Server does not power off

Complete the following steps until the problem is resolved:

1. Determine whether you are using an Advanced Configuration and Power Interface (ACPI) or a non-ACPI operating system. If you are using a non-ACPI operating system, complete the following steps:
 - a. Press Ctrl+Alt+Delete.
 - b. Turn off the server by pressing the power button and holding it down for 5 seconds.
 - c. Restart the server.
 - d. If the server fails POST and the power button does not work, disconnect the power cord for 20 seconds; then, reconnect the power cord and restart the server.
2. If the problem remains or if you are using an ACPI-aware operating system, suspect the system board (system board assembly).

Power problems

Use this information to resolve issues related to power.

System error LED is on and event log "Power supply has lost input" is displayed

To resolve the problem, ensure that:

1. The power supply is properly connected to a power cord.
2. The power cord is connected to a properly grounded electrical outlet for the server.
3. Make sure that the power supply AC source is stable within the supported range.
4. Swap the power supply to see if the issue follows the power supply, if it follows the power supply, then replace the failing one.
5. Review the event log and see how the problem it is to follow the event log actions to resolved the problems.

Serial-device problems

Use this information to solve problems related to serial devices.

- [“Number of serial ports identified by the operating system is less than the number of installed ports” on page 275](#)
- [“Serial device does not work” on page 275](#)

Number of serial ports identified by the operating system is less than the number of installed ports

1. Make sure that:
 - Each port is assigned a unique address in the Setup utility and none of the serial ports is disabled.
 - The serial-port adapter (if one is present) is seated correctly.
2. Reseat the serial port adapter.
3. Replace the serial port adapter.

Serial device does not work

1. Make sure that:
 - The device is compatible with the server.
 - The serial port is enabled and is assigned a unique address.
 - The device is connected to the correct connector (see “System-board connectors” section in *User Guide* or *System Configuration Guide*).
2. Reseat the following components:
 - a. Failing serial device
 - b. Serial cable

3. Replace the following components one at a time, restarting the server each time:
 - a. Failing serial device
 - b. Serial cable
4. (Trained technician only) Replace the system board (system board assembly).

Software problems

Use this information to solve software problems.

1. To determine whether the problem is caused by the software, make sure that:
 - The server 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 server might have a memory-address conflict.

 - The software is designed to operate on the server.
 - Other software works on the server.
 - The software works on another server.
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.

Storage drive problems

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

- [“Server cannot recognize a hard drive” on page 276](#)

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 according to the on-screen instructions, the LXPm interface is displayed by default. (For more information, see the “Startup” section in the LXPm documentation compatible with your server at <https://pubs.lenovo.com/lxpm-overview/>.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → Disk Drive Test**.

Based on those tests:

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

System Management Module 2 problems

Use this information to resolve issues related to the System Management Module.

- [“System Management Module 2 does not power on” on page 277](#)
- [“System Management Module 2 status LED is not flashing normally” on page 277](#)
- [“System Management Module 2 ping failure” on page 277](#)

System Management Module 2 does not power on

Complete the following steps until the problem is resolved:

1. Check if the power supplies are installed correctly and power supply LEDs are lit normally.
2. Reseat the SMM2 and check the LED status again.
3. If the problem persists, replace the SMM2.

System Management Module 2 status LED is not flashing normally

When the SMM2 is working, its status LED flashes at a slower speed (about once every two seconds).

If the SMM2 status LED is continuously on or off, or it has been flashing rapidly (two or 10 times per second) for more than 15 minutes, it indicates that the SMM2 may have encountered a problem.

Complete the following steps until the problem is resolved:

1. Reseat the SMM2.
2. If the problem persists, replace the SMM2.

System Management Module 2 ping failure

Complete the following steps until the problem is solved.

1. Check the SMM2 IP address and network status via Lenovo XClarity Controller.
2. Alternatively, you can check SMM2 LEDs to diagnose the SMM2 status (see [“System Management Module 2 \(SMM 2\) LEDs” on page 257](#) for SMM2 LEDs details).
 - If the SMM2 power LED and the status LED are working abnormally, reseat the SMM2.
3. If the problem persists, replace the SMM2.

Water leak problems

Use this information to resolve issues related to water leaks.

The SD665 V3 design is robust, and is unlikely to leak. If the water is observed outside of the enclosure, make sure the both enclosure and rack power supplies have been disconnected. If no water is observed outside of the enclosure, but there is a suspicion of a water leak in the enclosure or in one of the six compute trays, complete the following steps to determine the source of the leak. The enclosure is equipped with a pair of drip sensor assemblies to help detect any water leaks.

Note: A small leak may not reach either of the drip sensors to trigger a warning. Visual confirmation of a small leak may be required.

Suspicious leakage symptoms

The following situations might occur due to leakage problems:

- **Processor over temperature error indicated by the System Error "!" LED being solid ON at the front of the node**
- **One or more of the nodes shut down unexpectedly**
- **Enclosure SMM2 management may report the following events:**
 - [18040179](#) : DripSensor 1 Out: Chassis, Predictive Failure asserted was asserted.

- [1804017A](#) : DripSensor 2 Out: Chassis, Predictive Failure asserted was asserted.
- [18080076](#) : DripSensor 1: Chassis, Device Removed / Device Absent was asserted.
- [18080077](#) : DripSensor 2: Chassis, Device Removed / Device Absent was asserted.

Possible causes of a leak:

- **Leak at quick connects during installation or removal procedures**
- **Leak in the water loop tubing**

Complete the following steps in order until you are able to isolate the cause of the potential leak:

1. Check enclosure SMM2 messages to see if any leakage warnings have been reported. See https://pubs.lenovo.com/dw612s_neptune_enclosure/messages_introduction for more information.
2. Walk to the rear of the rack and visually check the status of each enclosure's left and right side drip sensor LEDs.

Users usually have multiple enclosures per rack. Each enclosure has two drip sensors.

Note: Each enclosure has two drip sensors that should turn on a yellow LED visible through a hole located in the lower left leg of the lower EMC shield if the sensor detects moisture in its drip sensor catch basin.

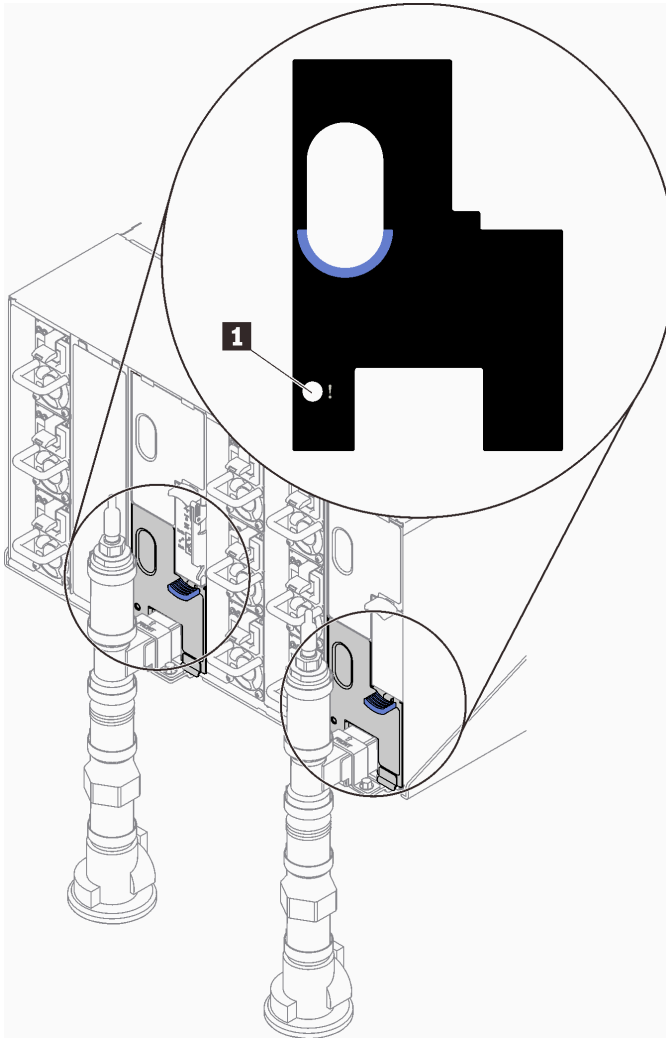
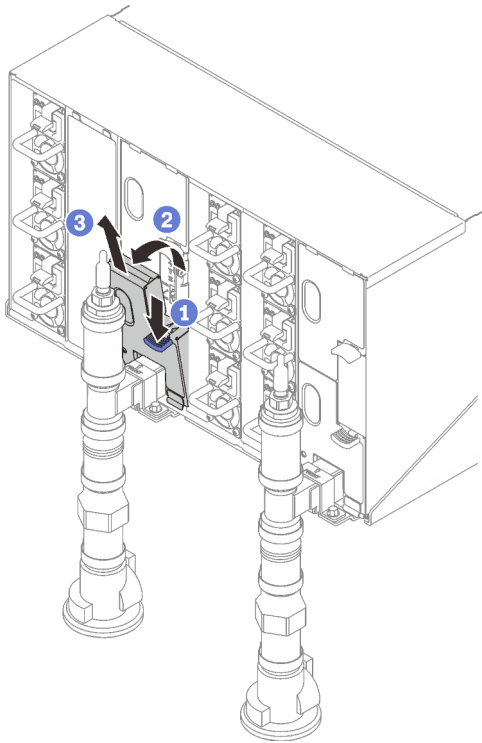


Figure 294. Drip sensor LED

Table 25. Drip sensor LED

1 Drip sensor LED (yellow)

3. Visually check the drip sensor catch basin for any moisture.
 - a. Remove the lower and upper EMC shields in the front of the left drip sensor.



Note: If there is a manifold vertical pipe in front of the EMC shield, you need to slide it sideways out from underneath the pipe.

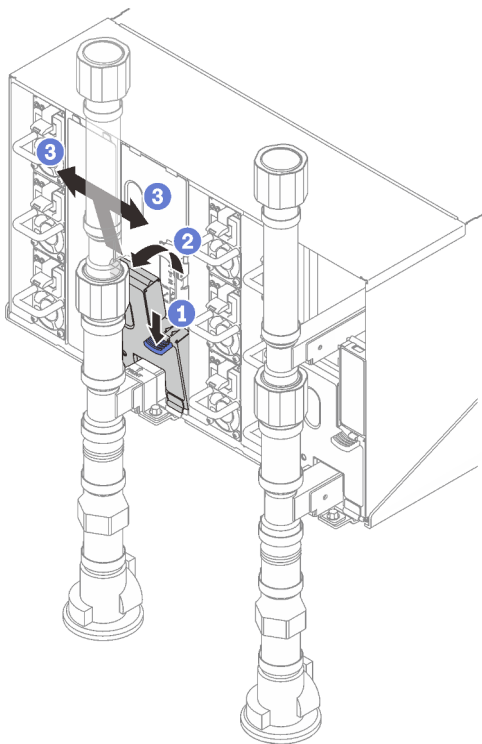


Figure 295. Lower EMC shield removal

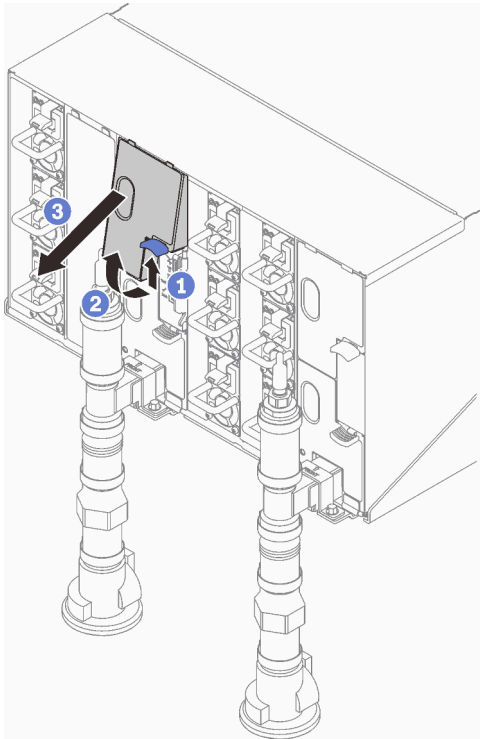


Figure 296. Upper EMC shield removal

- b. Use a flashlight to visually inspect the plastic catch basin for any moisture.
- c. Re-install the upper and lower EMC shields.

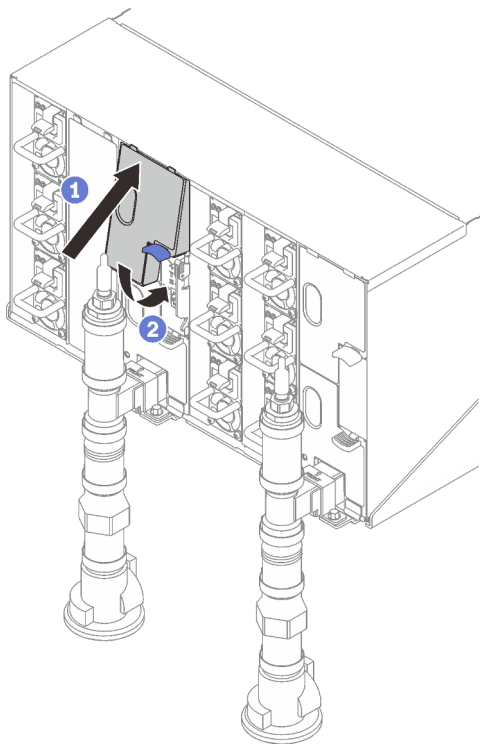


Figure 297. Upper EMC shield installation

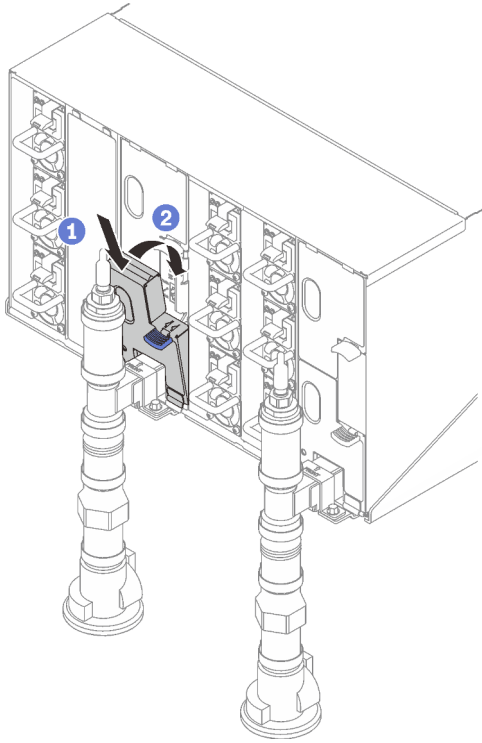


Figure 298. Lower EMC shield installation

- d. Repeat steps for the right side drip sensor catch basin.
4. Power down all nodes either through the OS or by pressing and holding the power button for five seconds.

Note: Green Power LED for each node (two per compute nodes) should be blinking to indicate the nodes are in standby state.

5. Disconnect power cords from all six enclosure power supplies.

Important: Fully disconnect the power to the entire enclosure prior to attempting to identify a leak within an enclosure.

6. Check the water loop for any moisture.
 - a. Remove the top node (bays 11&12) from the enclosure (see [“Remove a DWC tray from the enclosure” on page 10](#)), place it on a stable work surface, remove the cover (see [“Remove the tray cover” on page 13](#)), and carefully inspect the entire water loop (both rubber and copper tubing) for any signs of moisture. Re-install the tray into enclosure (see [“Install a DWC tray in the enclosure” on page 11](#)).
 - b. Repeat steps for the tray in bays 9 and 10.
 - c. Repeat steps for the tray in bays 7 and 8.
 - d. Repeat steps for the tray in bays 5 and 6.
 - e. Repeat steps for the tray in bays 3 and 4.
 - f. Repeat steps for the tray in bays 1 and 2.

Note: It is important to visually inspect the bottom of the enclosure with a flashlight prior to re-installing the bottom most tray (bays 1 and 2) into the enclosure.

7. If you are unable to identify the problem in the steps above, then you may need to replace one or more of the tray water loops (see [“Water loop replacement ” on page 18](#)). Contact Product Engineer for the further assistance.

Important: The procedures above only cover the Lenovo DWC solution (from the Eaton Ball valves up through the manifold and into the enclosures and compute trays). If your datacenter Cooling Distribution Unit experiences repeated or frequent low water alerts then you should inspect the data center plumbing between the cooling distribution unit and the Lenovo DWC solution (rack).

Appendix A. Getting help and technical assistance

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

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

<http://datacentersupport.lenovo.com>

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

Before you call

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

Attempt to resolve the problem yourself

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

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

<https://pubs.lenovo.com/>

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

- Check all cables to make sure that they are connected.
- Check the power switches to make sure that the system and any optional devices are turned on.
- Check for updated software, firmware, and operating-system device drivers for your Lenovo product. (See the following links) The Lenovo Warranty terms and conditions state that you, the owner of the Lenovo product, are responsible for maintaining and updating all software and firmware for the product (unless it is covered by an additional maintenance contract). Your service technician will request that you upgrade your software and firmware if the problem has a documented solution within a software upgrade.
 - Drivers and software downloads
 - <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/>
 - Operating system support center
 - <https://datacentersupport.lenovo.com/solutions/server-os>
 - Operating system installing instructions
 - <https://pubs.lenovo.com/thinksystem#os-installation>
- If you have installed new hardware or software in your environment, check <https://serverproven.lenovo.com> to make sure that the hardware and software are supported by your product.
- Refer to [Chapter 3 “Problem determination” on page 241](#) for instructions on isolating and solving issues.

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

To find the Tech Tips available for your server:

1. Go to <http://datacentersupport.lenovo.com> and 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.

- Check Lenovo Data Center Forum at https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg to see if someone else has encountered a similar problem.

Gathering information needed to call Support

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

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

- Hardware and Software Maintenance agreement contract numbers, if applicable
- Machine type number (Lenovo 4-digit machine identifier). Machine type number can be found on the ID label, see “Identifying the server and access the Lenovo XClarity Controller” in *User Guide* or *System Configuration Guide*.
- Model number
- Serial number
- Current system UEFI and firmware levels
- Other pertinent information such as error messages and logs

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

Collecting service data

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

Service data can be collected through the following tools:

- **Lenovo XClarity Provisioning Manager**

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

- **Lenovo XClarity Controller**

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

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

- **Lenovo XClarity Administrator**

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

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

- **Lenovo XClarity Essentials OneCLI**

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

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

Contacting Support

You can contact Support to obtain help for your issue.

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

Appendix B. Documents and supports

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

Documents download

This section provides introduction and download link for handy documents.

Documents

Download the following product documentations at:

https://pubs.lenovo.com/sd665-v3/pdf_files

- **Rail Installation Guides**

- Rail Installation Guide for DW612S Enclosure

- **SD665 V3 Neptune DWC Tray User Guide**

Complete overview, system configuration, hardware components replacing, and troubleshooting.

Selected chapters from *User Guide*:

- **System Configuration Guide** : Server overview, components identification, system LEDs and diagnostics display, product unboxing, setting up and configuring the server.
- **Hardware Maintenance Guide** : Installing hardware components, cable routing, and troubleshooting.

- **SD665 V3 Message and Code Reference**

XClarity Controller, LXPM, and uEFI events

For SMM2 Messages, see **ThinkSystem DW612S Neptune DWC Enclosure SMM2 Messages and Codes Reference**.

- **UEFI Manual**

- UEFI setting introduction

Notes: SD665 V3 tray can be installed in the DW612S 6U enclosure, which can be installed in the ThinkSystem Heavy Duty Full Depth Rack Cabinets. The documentations below are available for download:

- *DW612S Enclosure User Guide*
- *ThinkSystem Heavy Duty Full Depth Rack Cabinets User Guide*

Support websites

This section provides driver and firmware downloads and support resources.

Support and downloads

- Drivers and Software download website for ThinkSystem SD665 V3
 - <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p/downloads/driver-list/>
- Lenovo Data Center Forum
 - https://forums.lenovo.com/t5/Datacenter-Systems/ct-p/sv_eg
- Lenovo Data Center Support for ThinkSystem SD665 V3
 - <https://datacentersupport.lenovo.com/products/servers/thinksystem/sd665v3/7d9p>

- Lenovo License Information Documents
 - <https://datacentersupport.lenovo.com/documents/lnvo-eula>
- Lenovo Press website (Product Guides/Datasheets/White papers)
 - <https://lenovopress.lenovo.com/>
- Lenovo Privacy Statement
 - <https://www.lenovo.com/privacy>
- Lenovo Product Security Advisories
 - https://datacentersupport.lenovo.com/product_security/home
- Lenovo Product Warranty Plans
 - <http://datacentersupport.lenovo.com/warrantylookup>
- Lenovo Server Operating Systems Support Center website
 - <https://datacentersupport.lenovo.com/solutions/server-os>
- Lenovo ServerProven website (Options compatibility lookup)
 - <https://serverproven.lenovo.com>
- Operating System Installation Instructions
 - <https://pubs.lenovo.com/thinksystem#os-installation>
- Submit an eTicket (service request)
 - <https://support.lenovo.com/servicerequest>
- Subscribe to Lenovo Data Center Group product notifications (Stay up to date on firmware updates)
 - <https://datacentersupport.lenovo.com/solutions/ht509500>

Appendix C. Notices

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

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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.

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

Electronic emission notices

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

Additional electronic emissions notices are available at:

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

Taiwan region BSMI RoHS declaration

單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr ⁶⁺)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機架	—	○	○	○	○	○
外部蓋板	—	○	○	○	○	○
機械組零件	—	○	○	○	○	○
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	—	○	○	○	○	○
儲備設備	—	○	○	○	○	○
印刷電路板	—	○	○	○	○	○
<p>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.</p> <p>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.</p> <p>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.</p>						

Taiwan Region import and export contact information

Contacts are available for Taiwan Region import and export information.

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進口商地址: 台北市南港區三重路 66 號 8 樓
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