Precision 7960 Rack

Service Manual

Regulatory Model: E82S
Regulatory Type: E82S001
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DELL Technologies

Notes, cautions, and warnings

NOTE: A NOTE indicates important information that helps you make better use of your product.

CAUTION: A CAUTION indicates either potential damage to hardware or loss of data and tells you how to avoid the problem.

WARNING: A WARNING indicates a potential for property damage, personal injury, or death.

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Working inside your computer

Safety instructions

Use the following safety guidelines to protect your computer from potential damage and to ensure your personal safety. Unless otherwise noted, each procedure included in this document assumes that you have read the safety information that shipped with your computer.

WARNING: Before working inside your computer, read the safety information that is shipped with your computer. For more safety best practices, see the Regulatory Compliance home page at www.dell.com/regulatory_compliance.

WARNING: Disconnect your computer from all power sources before opening the computer cover or panels. After you finish working inside the computer, replace all covers, panels, and screws before connecting your computer to an electrical outlet.

CAUTION: To avoid damaging the computer, ensure that the work surface is flat, dry, and clean.

CAUTION: To avoid damaging the components and cards, handle them by their edges, and avoid touching the pins and the contacts.

CAUTION: You should only perform troubleshooting and repairs as authorized or directed by the Dell technical assistance team. Damage due to servicing that is not authorized by Dell is not covered by your warranty. See the safety instructions that is shipped with the product or at www.dell.com/regulatory_compliance.

CAUTION: Before touching anything inside your computer, ground yourself by touching an unpainted metal surface, such as the metal at the back of the computer. While you work, periodically touch an unpainted metal surface to dissipate static electricity which could harm internal components.

CAUTION: When you disconnect a cable, pull it by its connector or its pull tab, not the cable itself. Some cables have connectors with locking tabs or thumbscrews that you must disengage before disconnecting the cable. When disconnecting cables, keep them evenly aligned to avoid bending the connector pins. When connecting cables, ensure that the ports and the connectors are correctly oriented and aligned.

CAUTION: Press and eject any installed card from the media-card reader.

CAUTION: Exercise caution when handling rechargeable Li-ion batteries in laptops. Swollen batteries should not be used and should be replaced and disposed properly.

NOTE: The color of your computer and certain components may appear differently than shown in this document.

Before working inside your computer

NOTE: The images in this document may differ from your computer depending on the configuration you ordered.

1. Save and close all open files and exit all open applications.
2. Shut down your computer. For Windows operating system, click **Start** > **Power** > **Shut down**.

   NOTE: If you are using a different operating system, see the documentation of your operating system for shut-down instructions.

3. Disconnect your computer and all attached devices from their electrical outlets.
4. Disconnect all attached network devices and peripherals, such as keyboard, mouse, and monitor from your computer.

CAUTION: To disconnect a network cable, first unplug the cable from your computer and then unplug the cable from the network device.

5. Remove any media card and optical disc from your computer, if applicable.

Safety precautions

The safety precautions chapter details the primary steps to be taken before performing any disassembly instructions.

Observe the following safety precautions before you perform any installation or break/fix procedures involving disassembly or reassembly:

- Turn off the system and all attached peripherals.
- Disconnect the system and all attached peripherals from AC power.
- Disconnect all network cables, telephone, and telecommunications lines from the system.
- Use an ESD field service kit when working inside any to avoid electrostatic discharge (ESD) damage.
- After removing any system component, carefully place the removed component on an anti-static mat.
- Wear shoes with non-conductive rubber soles to reduce the chance of getting electrocuted.

Standby power

Dell products with standby power must be unplugged before you open the case. Systems that incorporate standby power are essentially powered while turned off. The internal power enables the system to be remotely turned on (wake on LAN) and suspended into a sleep mode and has other advanced power management features.

Unplugging, pressing, and holding the power button for 15 seconds should discharge residual power in the system board.

Bonding

Bonding is a method for connecting two or more grounding conductors to the same electrical potential. This is done through the use of a field service electrostatic discharge (ESD) kit. When connecting a bonding wire, ensure that it is connected to bare metal and never to a painted or non-metal surface. The wrist strap should be secure and in full contact with your skin, and ensure that you remove all jewelry such as watches, bracelets, or rings prior to bonding yourself and the equipment.

Electrostatic discharge—ESD protection

ESD is a major concern when you handle electronic components, especially sensitive components such as expansion cards, processors, memory DIMMs, and system boards. Very slight charges can damage circuits in ways that may not be obvious, such as intermittent problems or a shortened product life span. As the industry pushes for lower power requirements and increased density, ESD protection is an increasing concern.

Due to the increased density of semiconductors used in recent Dell products, the sensitivity to static damage is now higher than in previous Dell products. For this reason, some previously approved methods of handling parts are no longer applicable.

Two recognized types of ESD damage are catastrophic and intermittent failures.

- **Catastrophic** – Catastrophic failures represent approximately 20 percent of ESD-related failures. The damage causes an immediate and complete loss of device functionality. An example of catastrophic failure is a memory DIMM that has received a static shock and immediately generates a "No POST/No Video" symptom with a beep code emitted for missing or nonfunctional memory.
- **Intermittent** – Intermittent failures represent approximately 80 percent of ESD-related failures. The high rate of intermittent failures means that most of the time when damage occurs, it is not immediately recognizable. The DIMM receives a static shock, but the tracing is merely weakened and does not immediately produce outward symptoms related to the damage. The weakened trace may take weeks or months to melt, and in the meantime may cause degradation of memory integrity, intermittent memory errors, etc.

The more difficult type of damage to recognize and troubleshoot is the intermittent (also called latent or "walking wounded") failure.

Perform the following steps to prevent ESD damage:

- Use a wired ESD wrist strap that is properly grounded. The use of wireless anti-static straps is no longer allowed; they do not provide adequate protection. Touching the chassis before handling parts does not ensure adequate ESD protection on parts with increased sensitivity to ESD damage.

- Handle all static-sensitive components in a static-safe area. If possible, use anti-static floor pads and workbench pads.
- When unpacking a static-sensitive component from its shipping carton, do not remove the component from the anti-static packing material until you are ready to install the component. Before unwrapping the anti-static packaging, ensure that you discharge static electricity from your body.
- Before transporting a static-sensitive component, place it in an anti-static container or packaging.

ESD field service kit

The unmonitored Field Service kit is the most commonly used service kit. Each Field Service kit includes three main components: anti-static mat, wrist strap, and bonding wire.

Components of an ESD field service kit

The components of an ESD field service kit are:

- **Anti-Static Mat** – The anti-static mat is dissipative and parts can be placed on it during service procedures. When using an anti-static mat, your wrist strap should be snug and the bonding wire should be connected to the mat and to any bare metal on the system being worked on. Once deployed properly, service parts can be removed from the ESD bag and placed directly on the mat. ESD-sensitive items are safe in your hand, on the ESD mat, in the system, or inside a bag.
- **Wrist Strap and Bonding Wire** – The wrist strap and bonding wire can be either directly connected between your wrist and bare metal on the hardware if the ESD mat is not required, or connected to the anti-static mat to protect hardware that is temporarily placed on the mat. The physical connection of the wrist strap and bonding wire between your skin, the ESD mat, and the hardware is known as bonding. Use only Field Service kits with a wrist strap, mat, and bonding wire. Never use wireless wrist straps. Always be aware that the internal wires of a wrist strap are prone to damage from normal wear and tear, and must be checked regularly with a wrist strap tester in order to avoid accidental ESD hardware damage. It is recommended to test the wrist strap and bonding wire at least once per week.
- **ESD Wrist Strap Tester** – The wires inside of an ESD strap are prone to damage over time. When using an unmonitored kit, it is a best practice to regularly test the strap prior to each service call, and at a minimum, test once per week. A wrist strap tester is the best method for doing this test. If you do not have your own wrist strap tester, check with your regional office to find out if they have one. To perform the test, plug the wrist-strap's bonding-wire into the tester while it is strapped to your wrist and push the button to test. A green LED is lit if the test is successful; a red LED is lit and an alarm sounds if the test fails.
- **Insulator Elements** – It is critical to keep ESD sensitive devices, such as plastic heat sink casings, away from internal parts that are insulators and often highly charged.
- **Working Environment** – Before deploying the ESD Field Service kit, assess the situation at the customer location. For example, deploying the kit for a server environment is different than for a desktop or portable environment. Servers are typically installed in a rack within a data center; desktops or portables are typically placed on office desks or cubicles. Always look for a large open flat work area that is free of clutter and large enough to deploy the ESD kit with additional space to accommodate the type of system that is being repaired. The workspace should also be free of insulators that can cause an ESD event. On the work area, insulators such as Styrofoam and other plastics should always be moved at least 12 inches or 30 centimeters away from sensitive parts before physically handling any hardware components
- **ESD Packaging** – All ESD-sensitive devices must be shipped and received in static-safe packaging. Metal, static-shielded bags are preferred. However, you should always return the damaged part using the same ESD bag and packaging that the new part arrived in. The ESD bag should be folded over and taped shut and all the same foam packing material should be used in the original box that the new part arrived in. ESD-sensitive devices should be removed from packaging only at an ESD-protected work surface, and parts should never be placed on top of the ESD bag because only the inside of the bag is shielded. Always place parts in your hand, on the ESD mat, in the system, or inside an anti-static bag.
- **Transporting Sensitive Components** – When transporting ESD sensitive components such as replacement parts or parts to be returned to Dell, it is critical to place these parts in anti-static bags for safe transport.

ESD protection summary

It is recommended to use the traditional wired ESD grounding wrist strap and protective anti-static mat at all times when servicing Dell products. In addition, it is critical to keep sensitive parts separate from all insulator parts while performing service and that they use anti-static bags for transporting sensitive components.

Transporting sensitive components

When transporting ESD sensitive components such as replacement parts or parts to be returned to Dell, it is critical to place these parts in anti-static bags for safe transport.

Lifting equipment

Adhere to the following guidelines when lifting heavy weight equipment:

CAUTION: Do not lift greater than 50 pounds. Always obtain additional resources or use a mechanical lifting device.

1. Get a firm balanced footing. Keep your feet apart for a stable base, and point your toes out.
2. Tighten stomach muscles. Abdominal muscles support your spine when you lift, offsetting the force of the load.
3. Lift with your legs, not your back.
4. Keep the load close. The closer it is to your spine, the less force it exerts on your back.
5. Keep your back upright, whether lifting or setting down the load. Do not add the weight of your body to the load. Avoid twisting your body and back.
6. Follow the same techniques in reverse to set the load down.

After working inside your computer

NOTE: Leaving stray or loose screws inside your computer may severely damage your computer.

1. Replace all screws and ensure that no stray screws remain inside your computer.
2. Connect any external devices, peripherals, or cables you removed before working on your computer.
3. Replace any media cards, discs, or any other parts that you removed before working on your computer.
4. Connect your computer and all attached devices to their electrical outlets.
5. Turn on your computer.

BitLocker

CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress, and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system reinstall. For more information about this subject, see Knowledge Article: updating the BIOS on Dell systems with BitLocker enabled.

The installation of the following components triggers BitLocker:

- Hard disk drive or solid state drive
- System board

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Removing and installing components

NOTE: The images in this document may differ from your computer depending on the configuration you ordered.

Recommended tools

The procedures in this document may require the following tools:

- Phillips screwdriver #1
- Phillips screwdriver #2
- Torx T30 screwdriver
- 5 mm hex nut screwdriver
- 1/4-inch flat blade screwdriver
- Plastic scribe

Screw list

NOTE: When removing screws from a component, it is recommended to note the screw type, the quantity of screws, and then place them in a screw storage box. This is to ensure that the correct number of screws and correct screw type is restored when the component is replaced.

NOTE: Some computers have magnetic surfaces. Ensure that the screws are not left attached to such surfaces when replacing a component.

NOTE: Screw color may vary with the configuration ordered.

Table 1. Screw list

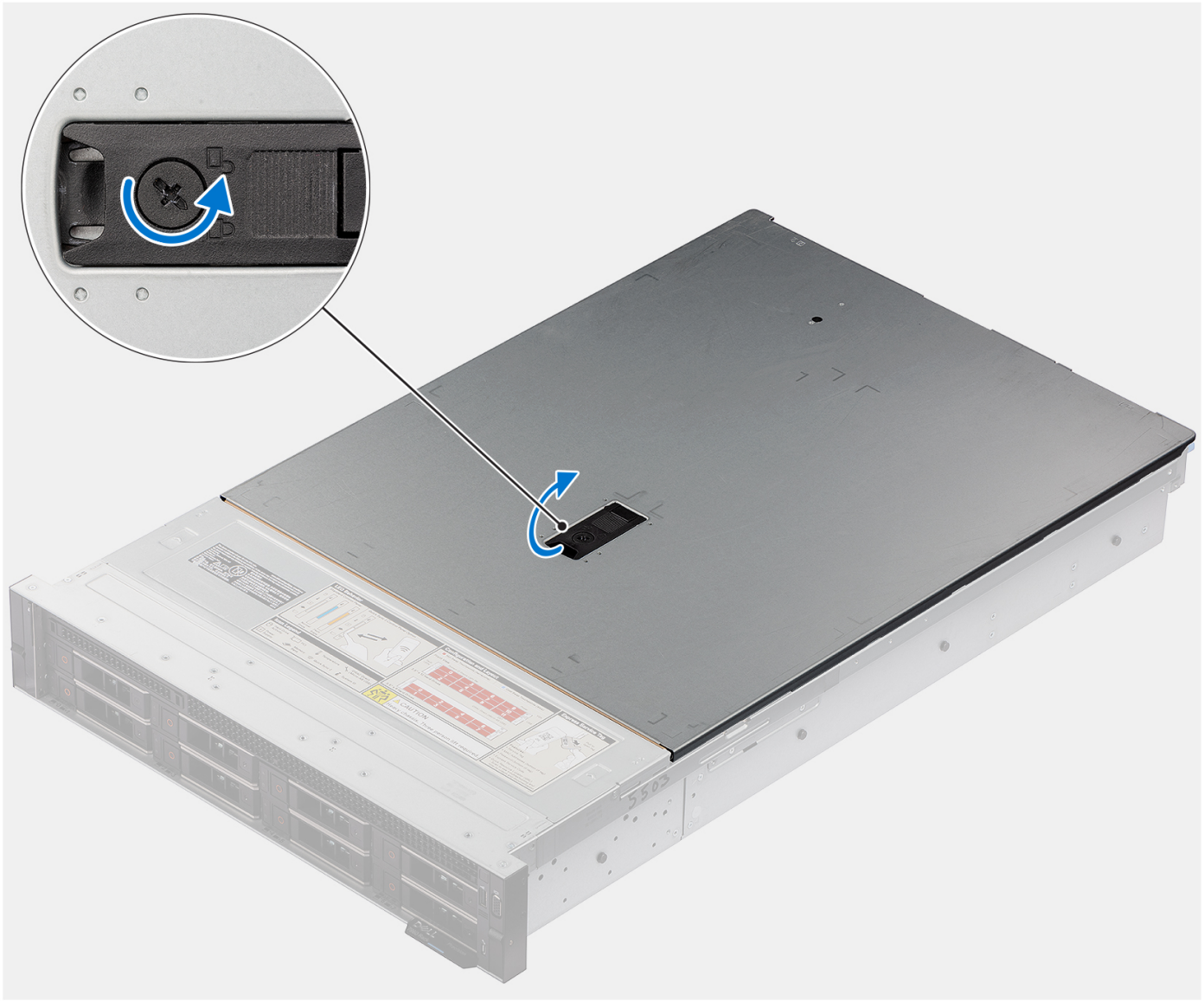
Component	Screw type	Quantity
Processor and heat-sink module	Captive screws	4
Front PowerEdge RAID Controller (PERC) module	Thumb screw - M3	2
Left control panel	M3	8
Right control panel	M3	8
Riser card 1	Captive screws	3
Riser card 3	Captive screws	1

System cover

Removing the system cover

1. Follow the procedure in Before working inside your computer.

The following images indicate the location of the system cover and provide a visual representation of the removal procedure.



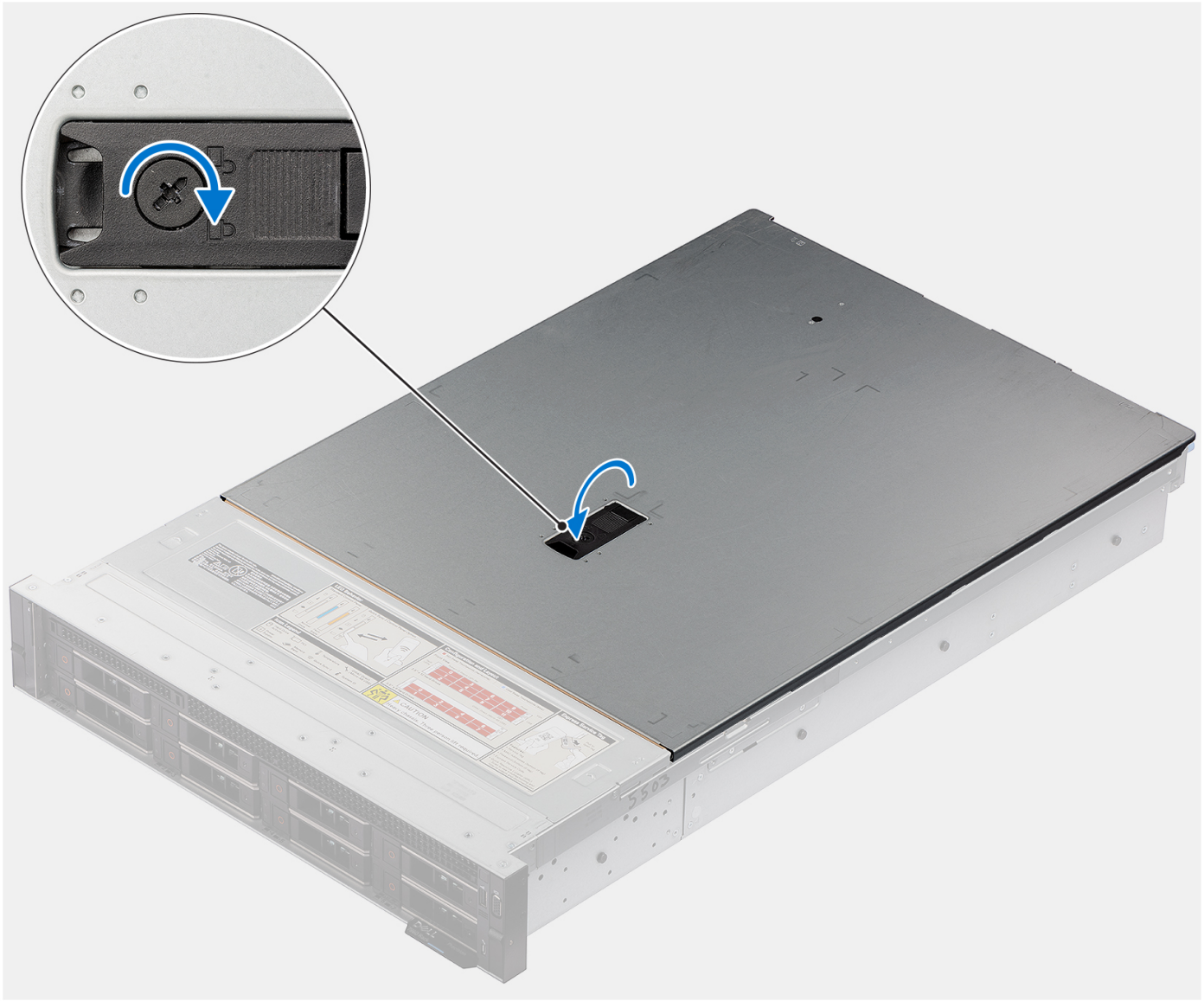
1. Using a 1/4-inch flat head or a Phillips #2 screwdriver, rotate the lock counterclockwise to the unlock position.
2. Lift the release latch until the system cover slides back.
3. Lift to remove the system cover from the computer.

Installing the system cover

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the system cover and provide a visual representation of the installation procedure.


RISER
1



1. Align the tabs on the system cover with the guide slots on the computer and slide the system cover.
2. Close the system cover release latch.
3. Using a 1/4-inch flat head or a Phillips #2 screwdriver, rotate the lock clockwise to the lock position.

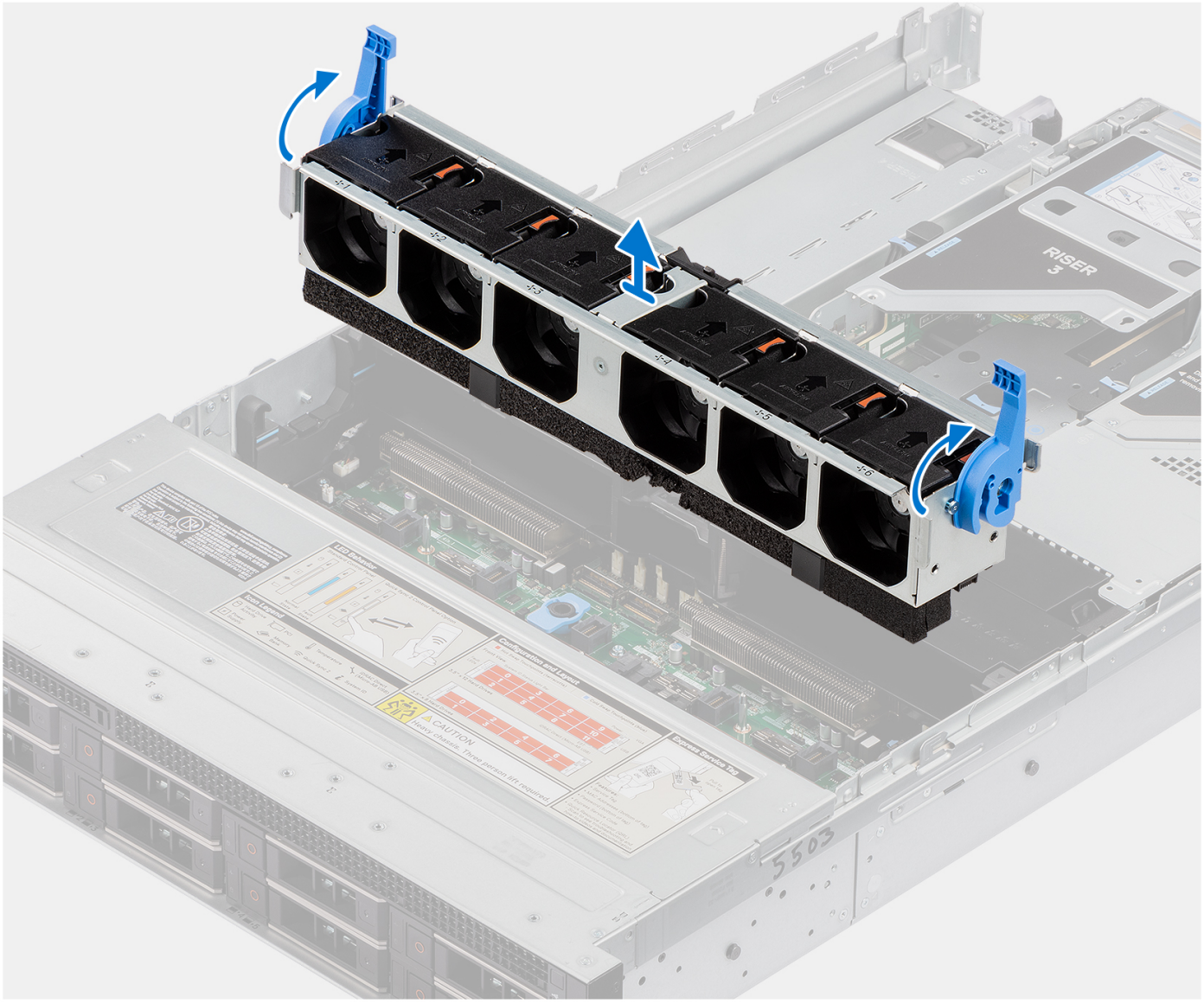
1. Follow the procedure in After working inside your computer.

Cooling fan assembly

Removing the cooling fan assembly

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.

The following images indicate the location of the cooling fan assembly and provide a visual representation of the removal procedure.

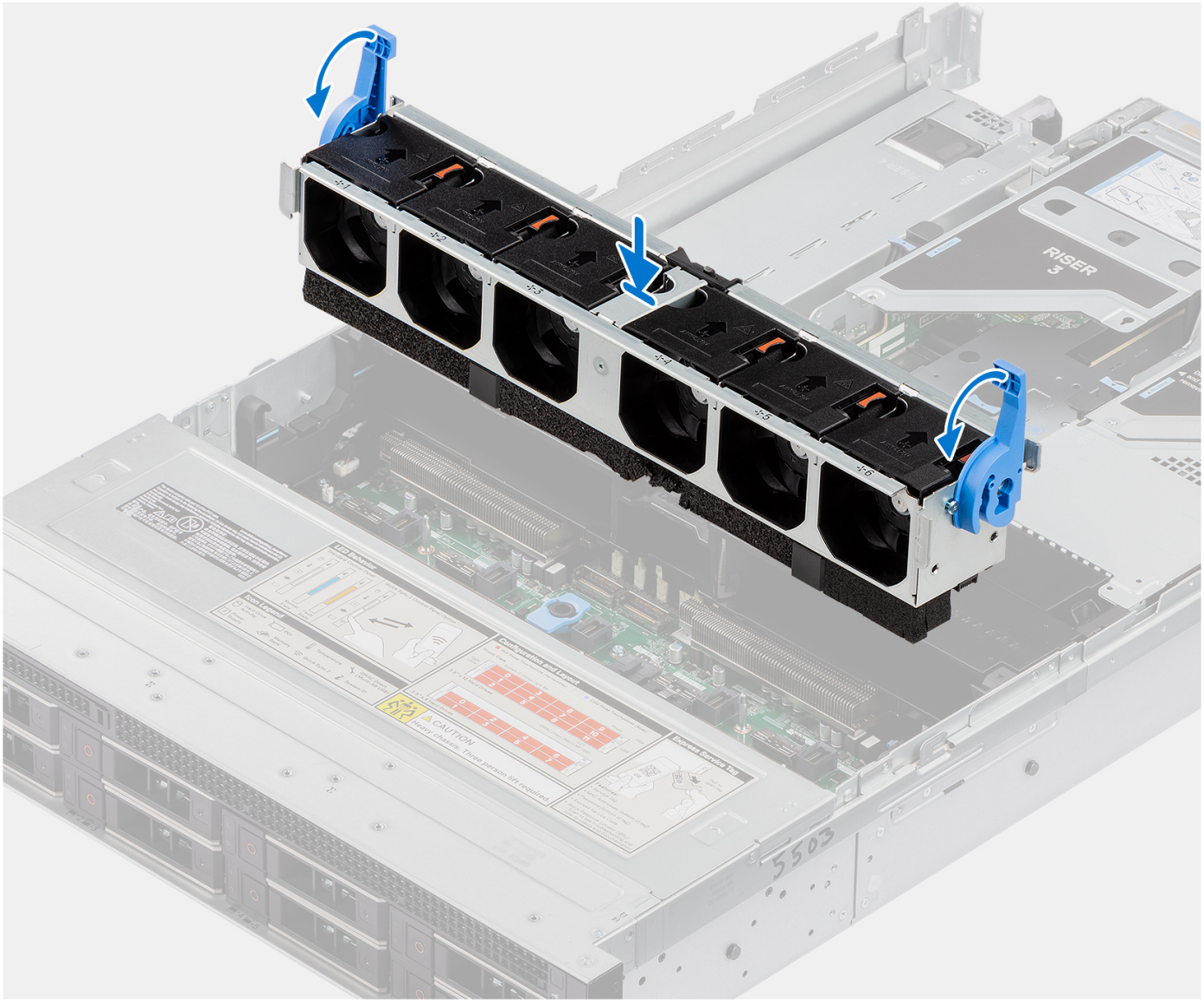


1. Lift the blue release levers to unlock the cooling fan cage assembly from the computer.
2. Hold the release levers, and lift the cooling fan cage assembly away from the computer.

Installing the cooling fan assembly

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the cooling fan assembly and provide a visual representation of the installation procedure.



1. Hold the blue release levers of the cooling fan cage, align the guide rails with the guides on the computer.
2. Lower the cooling fan assembly into its slot on the computer until seated firmly.
3. Lower the blue release levers and press to lock the cooling fan assembly into the computer.

1. Install the system cover.
2. Follow the procedure in After working inside your computer.

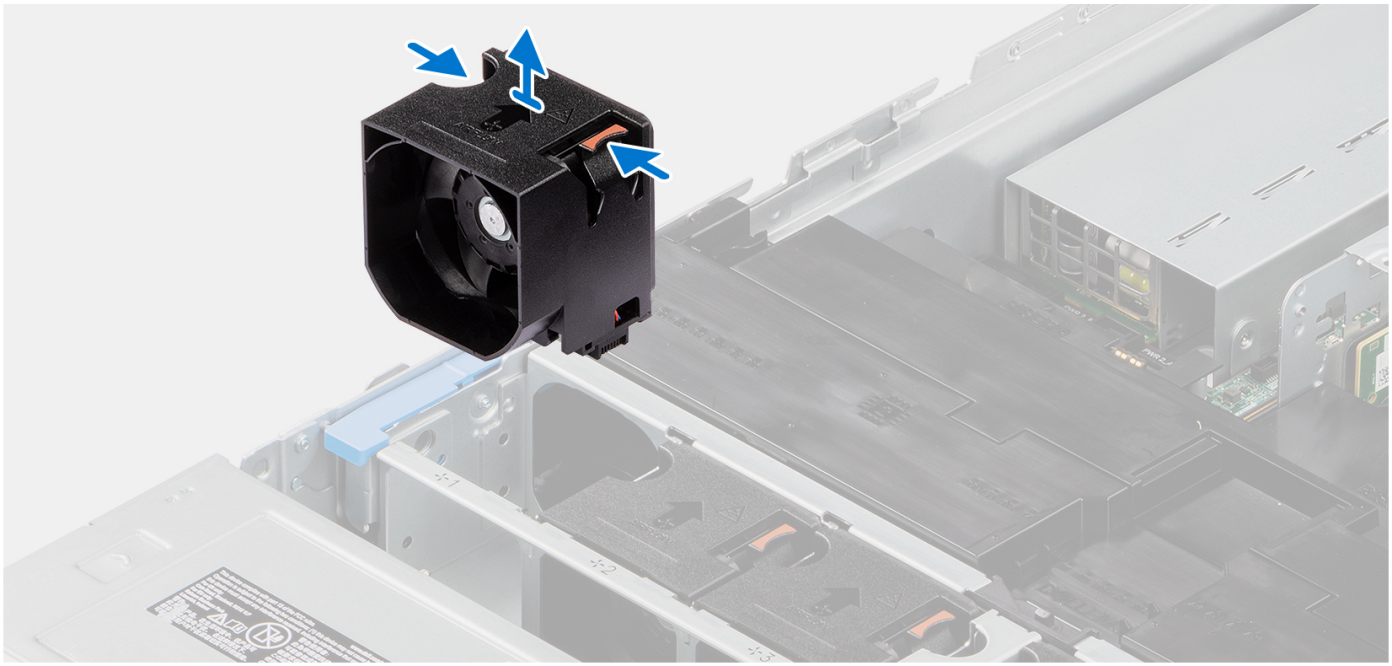
Cooling fans

Removing the cooling fan

CAUTION: The cooling fans are hot swappable. To maintain proper cooling while the system is on, replace only one fan at a time.

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.

The following images indicate the location of the cooling fan and provide a visual representation of the removal procedure.

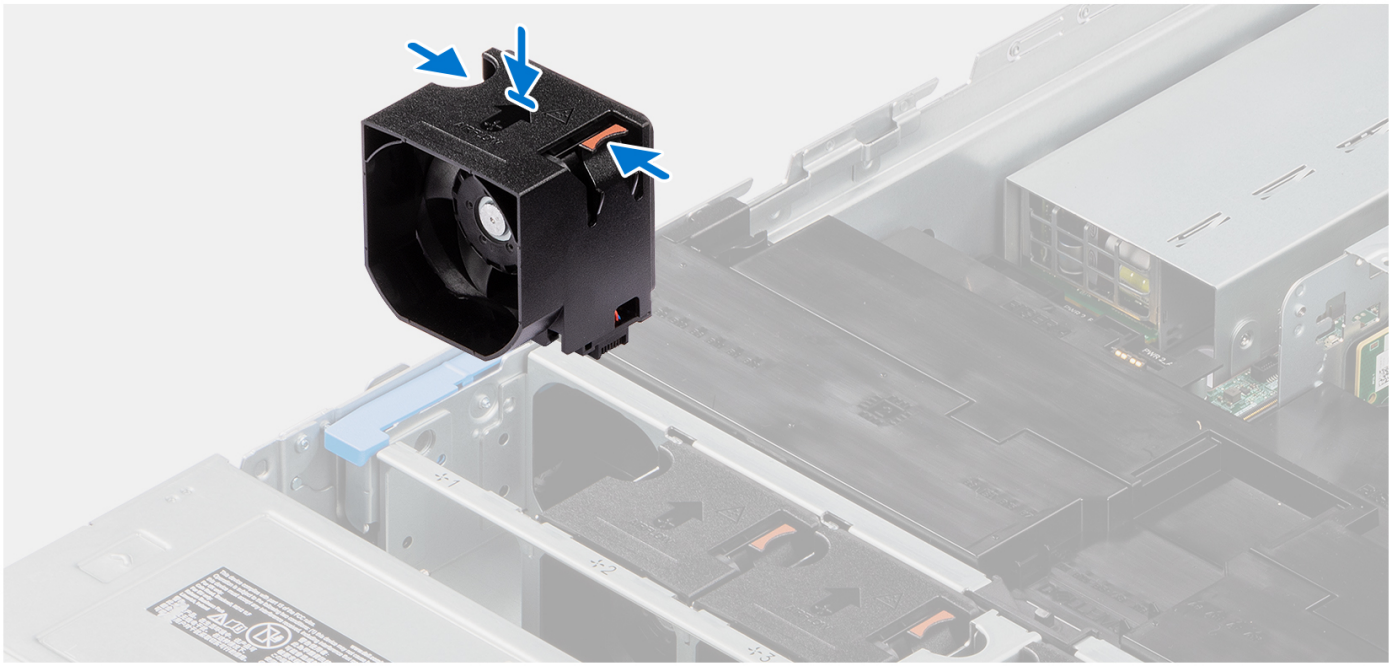


Press the orange release tab and lift the cooling fan to disconnect the fan from the connector on the system board.

Installing the cooling fan

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the cooling fan and provide a visual representation of the installation procedure.



Align and lower the cooling fan into the cooling fan assembly until the fan clicks into place.

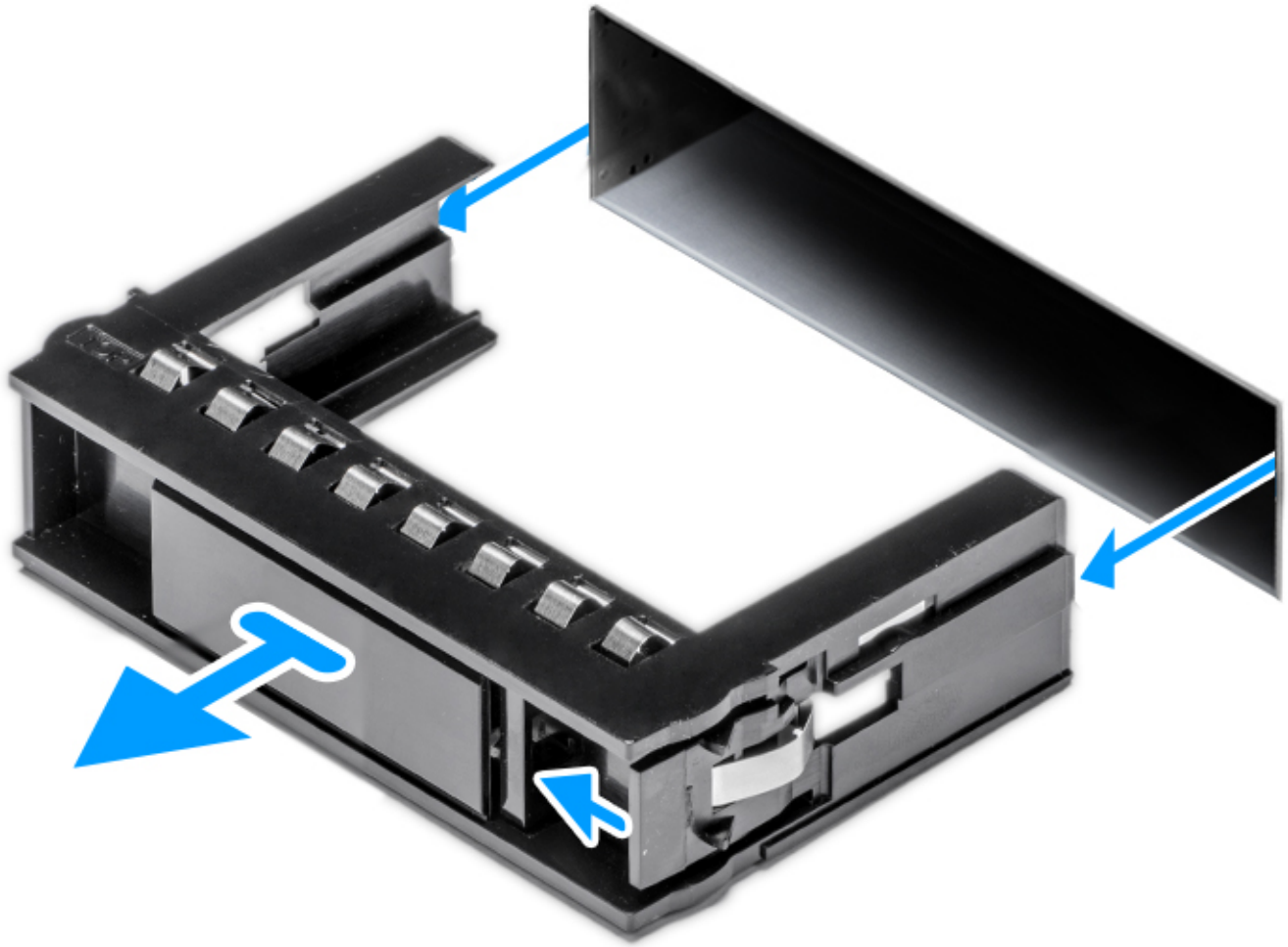
1. Install the system cover.
2. Follow the procedure in After working inside your computer.

Hard drive assembly

Removing a drive blank

1. Follow the procedure in Before working inside your computer.

The following images indicate the location of a drive blank and provide a visual representation of the removal procedure.

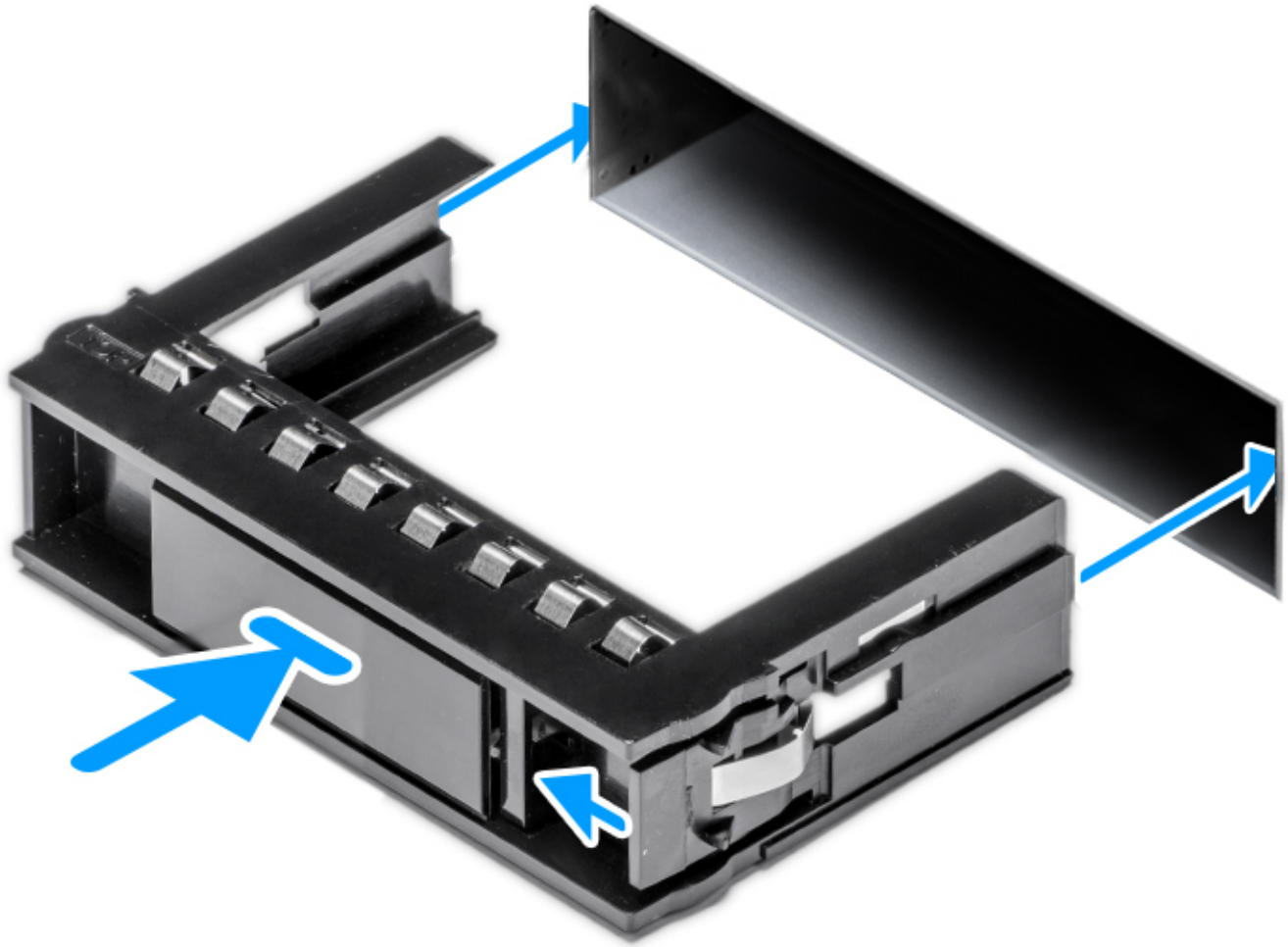


Press the release button, and slide the drive blank out of the drive slot.

Installing a drive blank

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of a drive blank and provide a visual representation of the installation procedure.



Slide the drive blank into the drive slot until the release button clicks into place.

1. Follow the procedure in After working inside your computer.

Removing a drive carrier

1. Follow the procedure in Before working inside your computer.

The following images indicate the location of a drive carrier and provide a visual representation of the removal procedure.

1. Press the release button to open the drive carrier release handle.
2. Hold the drive carrier release handle and slide it out of the drive slot.

Installing a drive carrier

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of a drive carrier and provide a visual representation of the installation procedure.

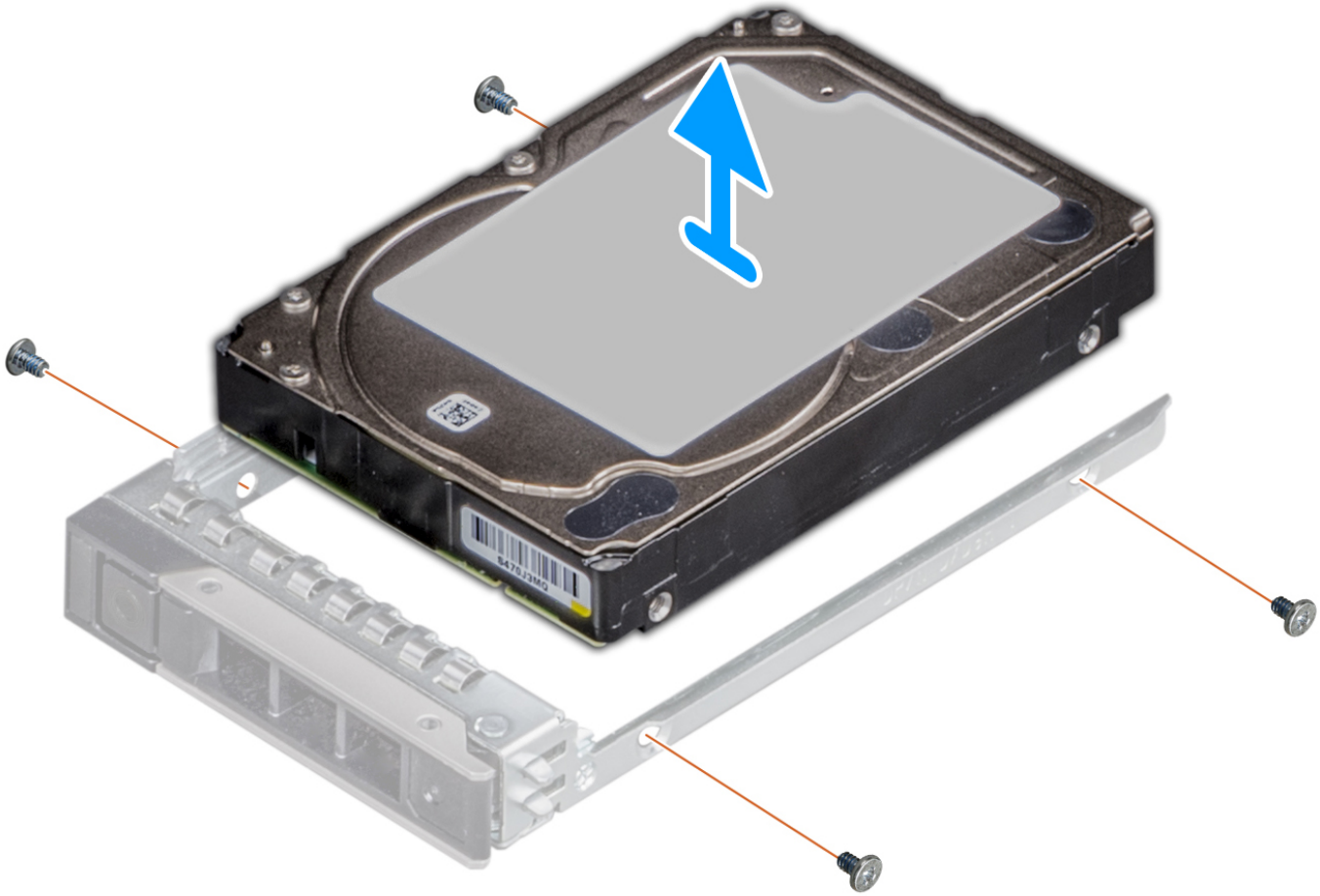
1. Slide the drive carrier into the drive slot and push until the drive connects with the backplane.
2. Close the drive carrier release handle to lock the drive in place.

1. Follow the procedure in After working inside your computer.

Removing the hard-drive from the drive carrier

1. Follow the procedure in Before working inside your computer.

The following images indicate the location of the hard-drive from the drive carrier and provide a visual representation of the removal procedure.



1. Remove the four screws from the slide rails on the drive carrier.

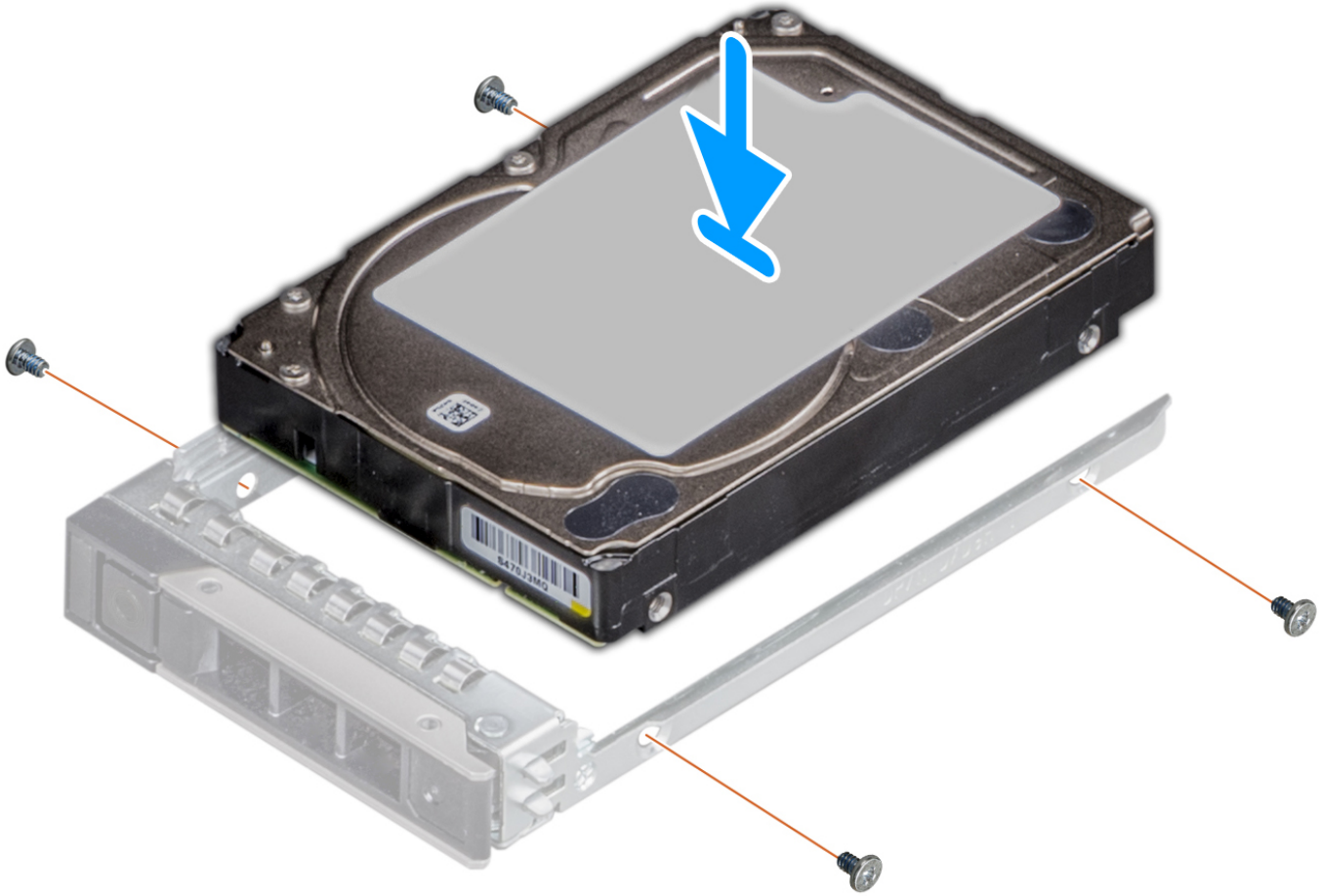
   NOTE: If the drive carrier has Torx screw, use Torx 6 (for 2.5-inch drive) or Torx 8 (for 3.5-inch drive) screwdriver to remove the drive.

2. Lift the hard-drive out of the drive carrier.

Installing the hard-drive from the drive carrier

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the hard-drive from the drive carrier and provide a visual representation of the installation procedure.



1. Insert the hard-drive into the drive carrier with the drive connector facing towards the rear of the carrier.
2. Align the screw holes on the hard-drive with the screws holes on the drive carrier.
3. Replace the four screws to secure the hard-drive to the drive carrier.

   NOTE: If the drive carrier has Torx screw, use Torx 6 (for 2.5-inch drive) or Torx 8 (for 3.5-inch drive) screwdriver to install the drive.

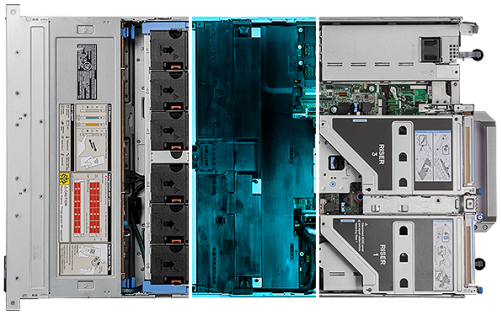
1. Follow the procedure in After working inside your computer.

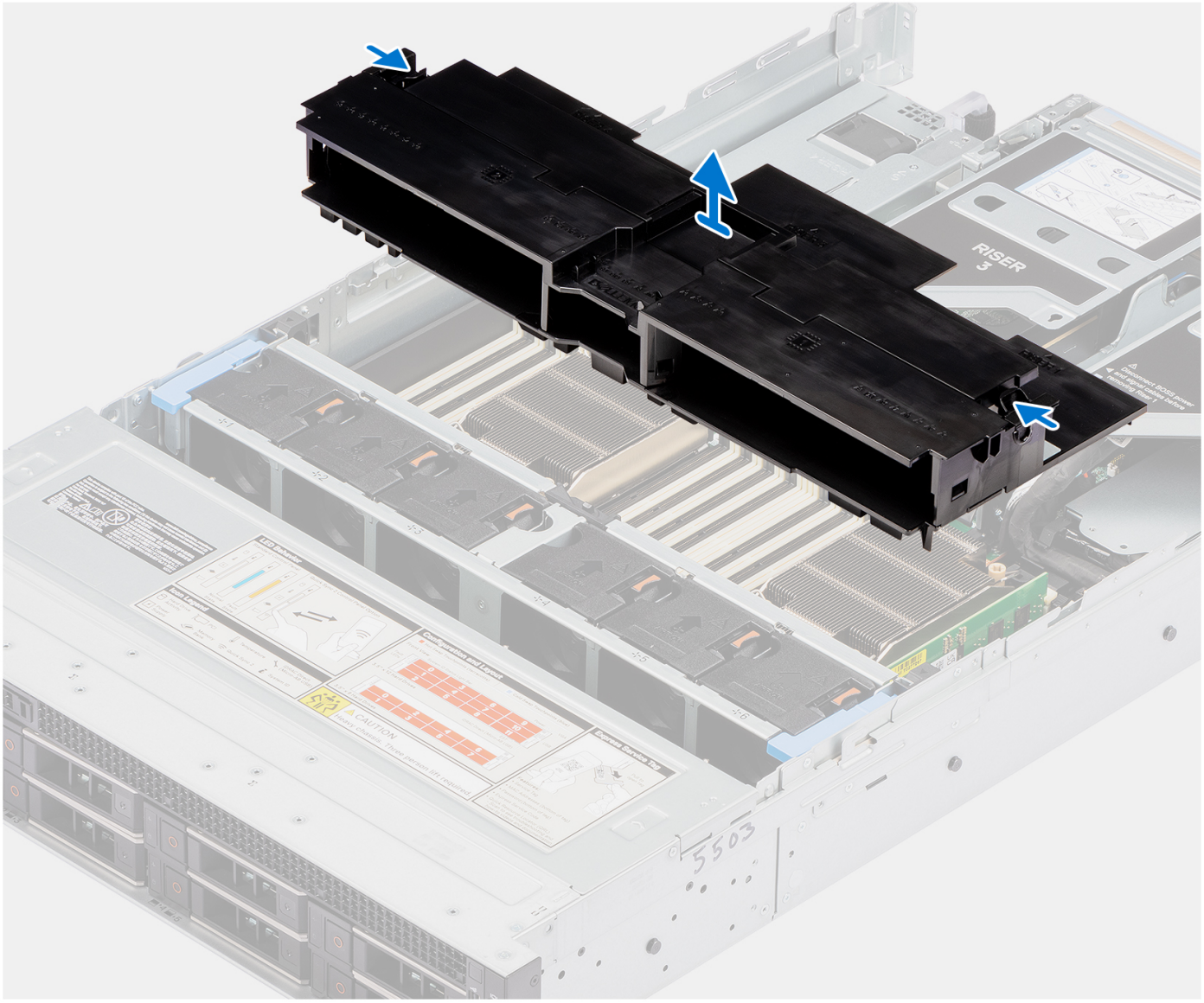
Air shroud

Removing the air shroud

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.

The following image indicates the location of the air shroud and provides a visual representation of the removal procedure.



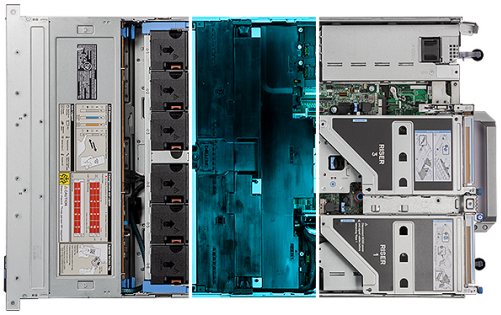


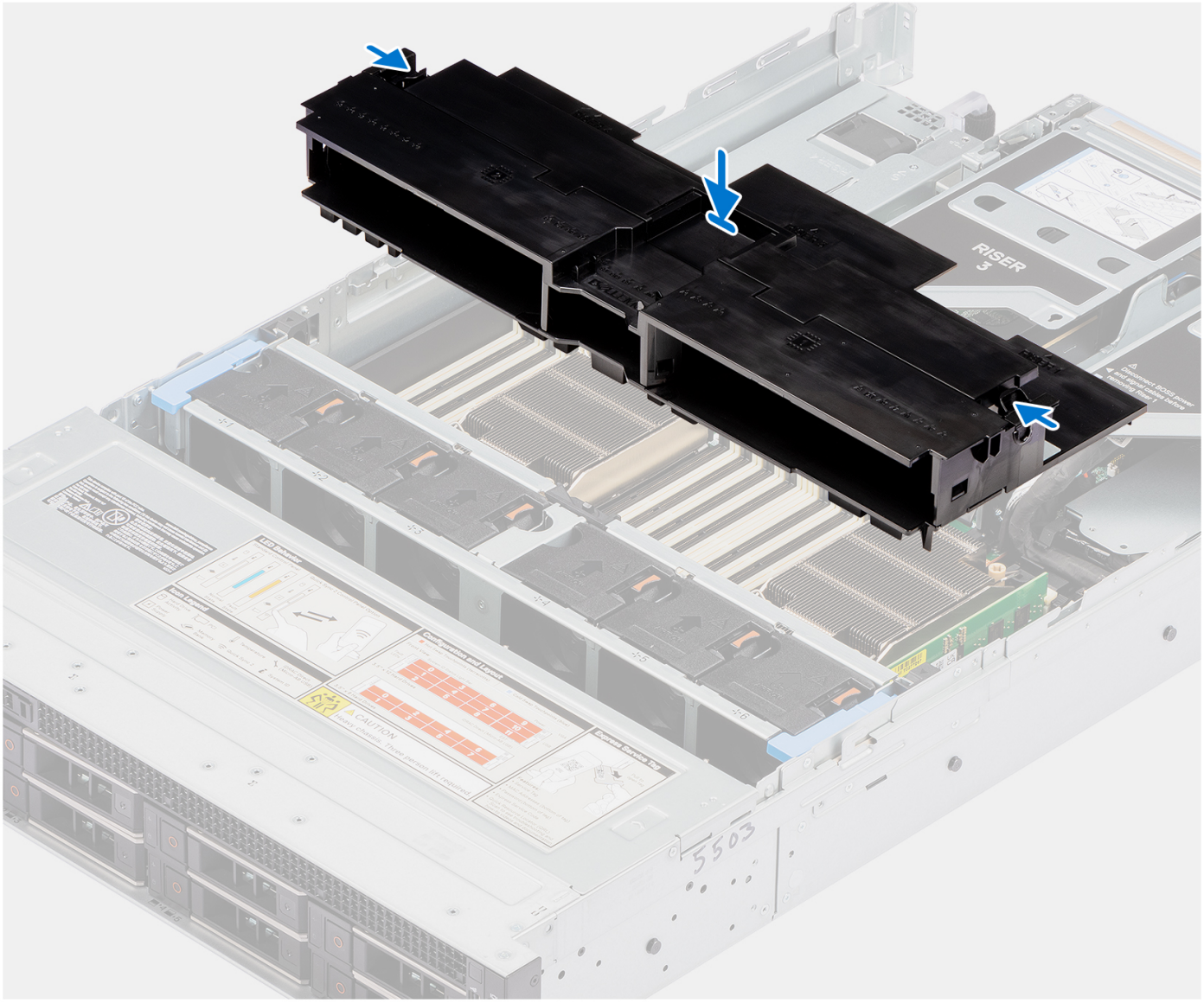
1. Press the gripping points on the air shroud.
2. Pull the air shroud upwards to lift it out of the computer.

Installing the air shroud

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the air shroud and provides a visual representation of the installation procedure.





1. Align the air shroud tabs with the slots in the computer.

   NOTE: Ensure that the air shroud tabs are below the surface of the cooling cage fan assembly.

2. Press the air shroud down until the tabs clicks into place.

1. Install the system cover.
2. Follow the procedure in After working inside your computer.

Processors and heat sinks

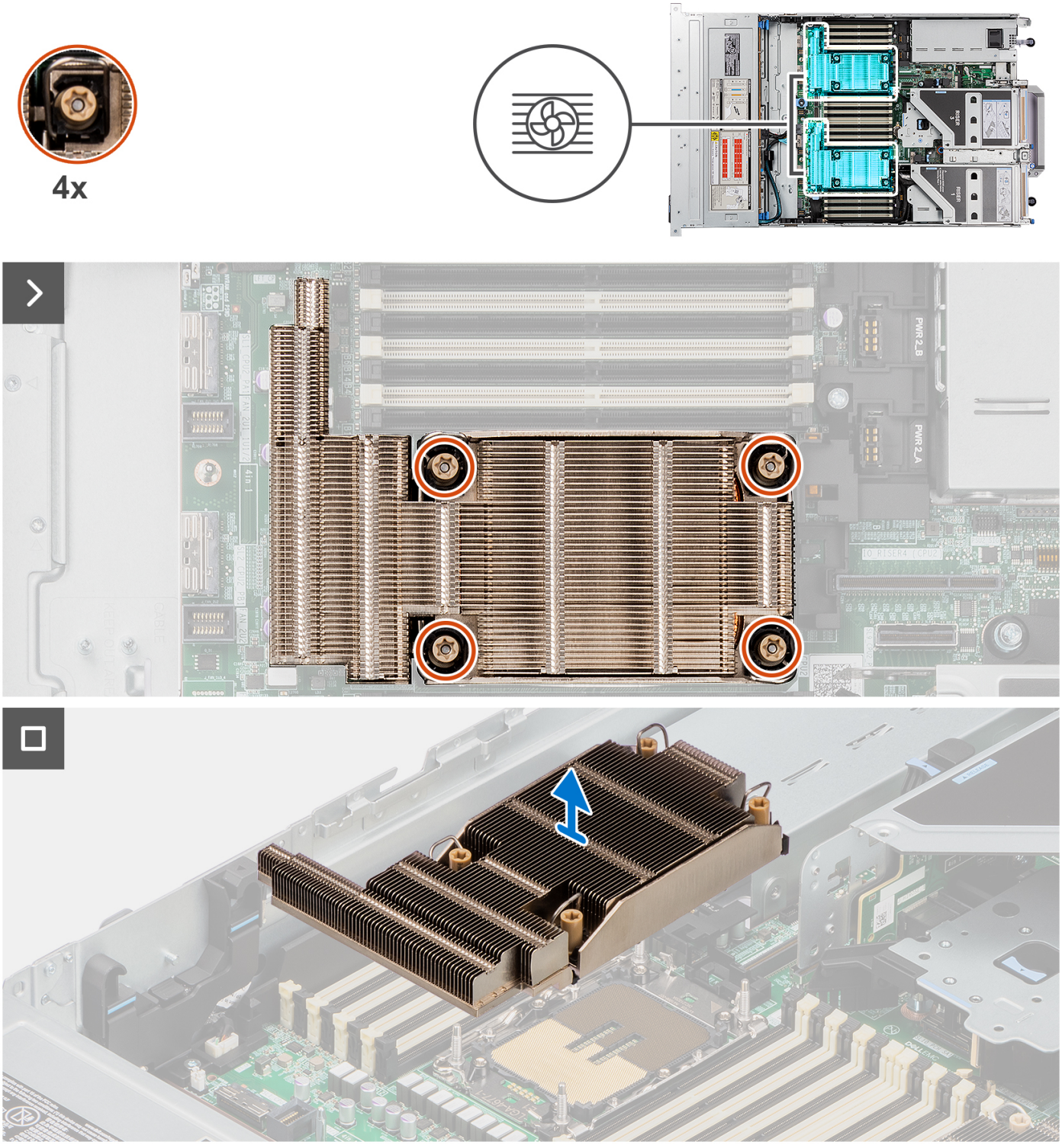
Removing the processor and heat-sink module

1. Follow the procedure in Before working inside your computer.

   WARNING: The heat-sink may become hot during normal operation. Allow sufficient time for the heat-sink to cool before you touch it.

   CAUTION: For maximum cooling of the processor, do not touch the heat transfer areas on the heat-sink. The oils in your skin can reduce the heat transfer capability of the thermal grease.
2. Remove the system cover.
3. Remove the air shroud.

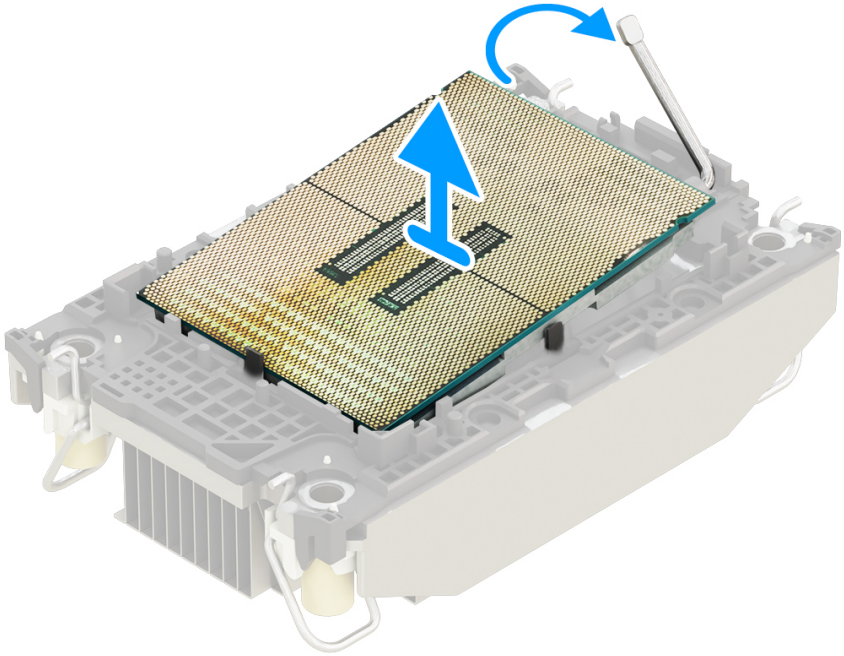
The following images indicate the location of the processor and heat-sink module and provide a visual representation of the removal procedure.

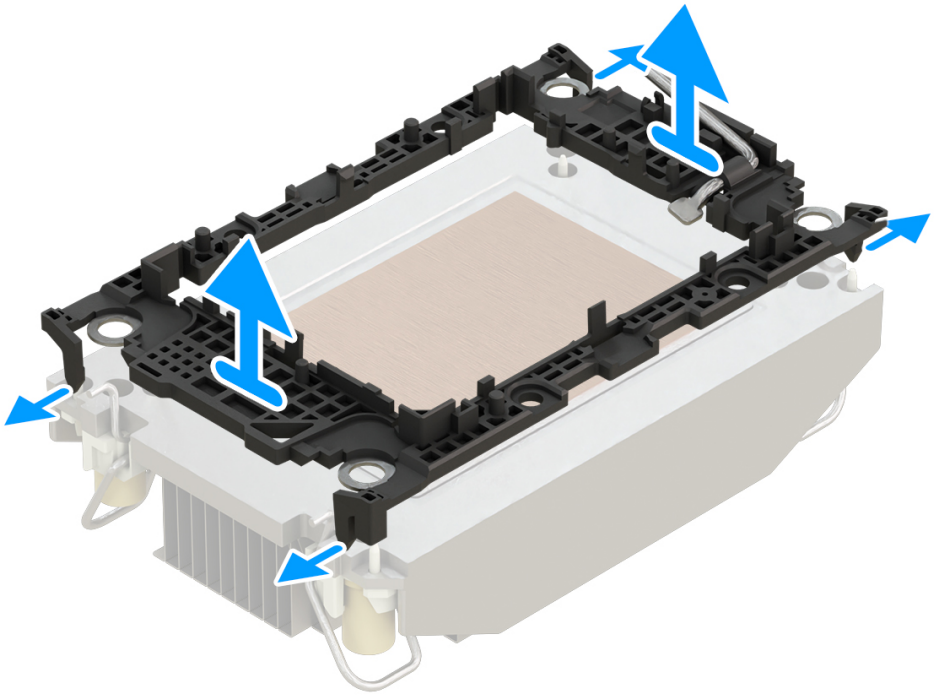


1. Using a Torx T30 screwdriver, in reverse sequential order (4->3->2->1), loosen the four captive screws that secure the processor and heat-sink module to the system board.
2. Lift the processor and heat-sink module from the system board.

Removing processor from processor heat-sink module

The following images indicate the location of the processor and provides a visual representation of the removal procedure.





1. Place the heat sink with the processor side facing up.
2. Using your thumb, lift the thermal interface material (TIM) break lever to release the processor from the TIM and retaining clip.
3. Holding the processor by the edges, lift the processor away from the retaining clip.

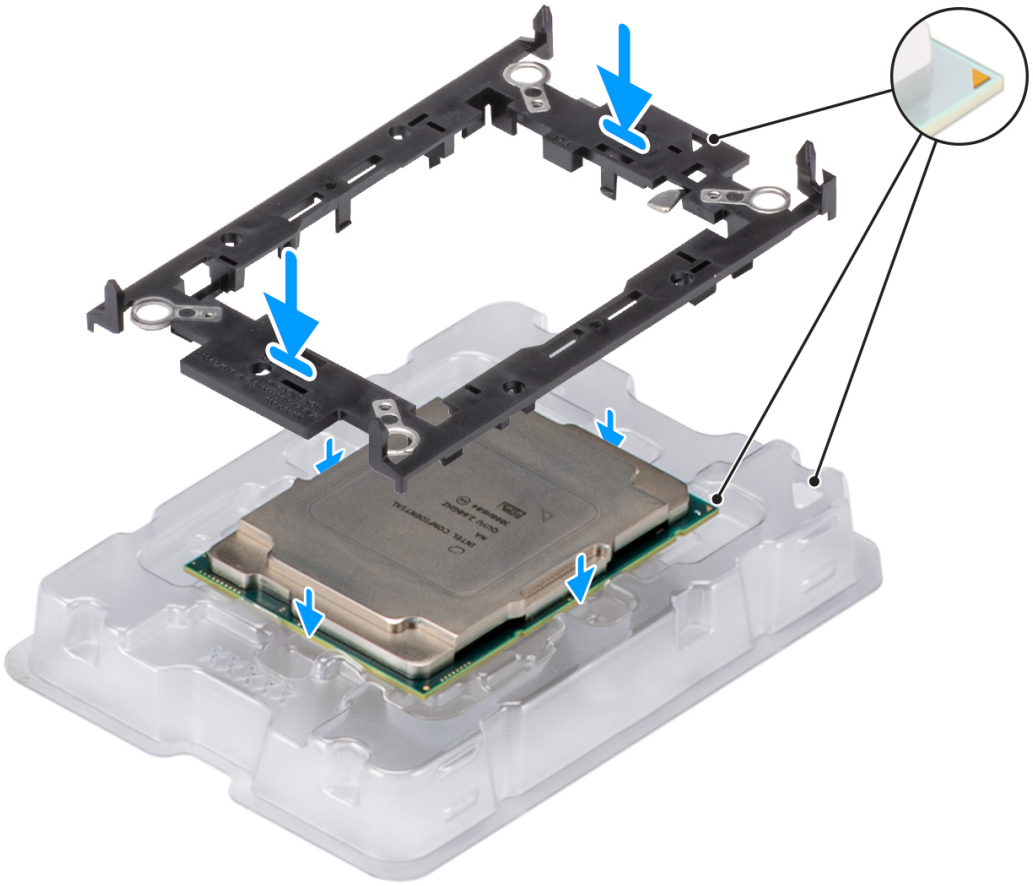
NOTE: Ensure to hold the retaining clip to the heat sink as you lift the TIM break lever.

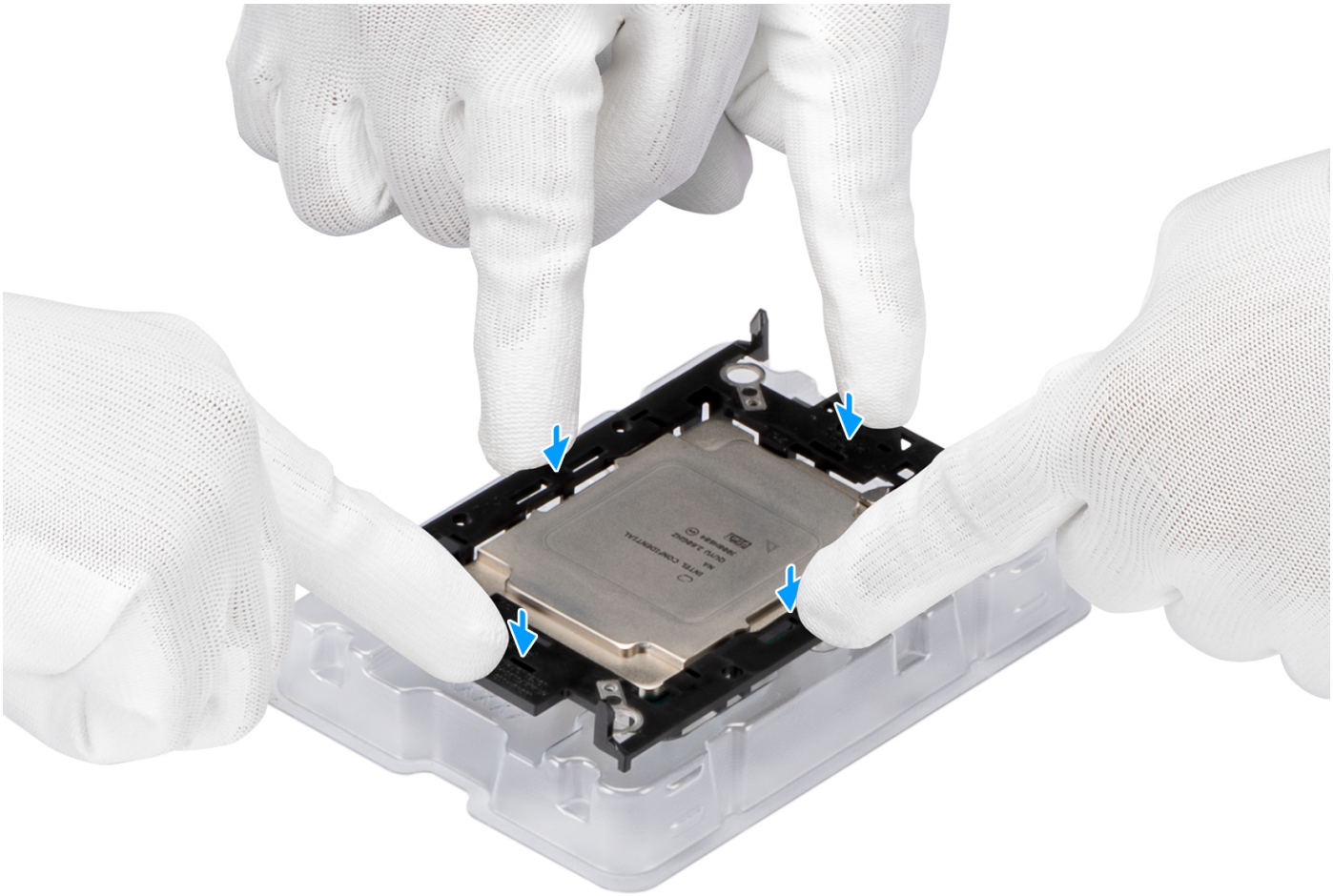
NOTE: Ensure to return the TIM break lever back to original position.

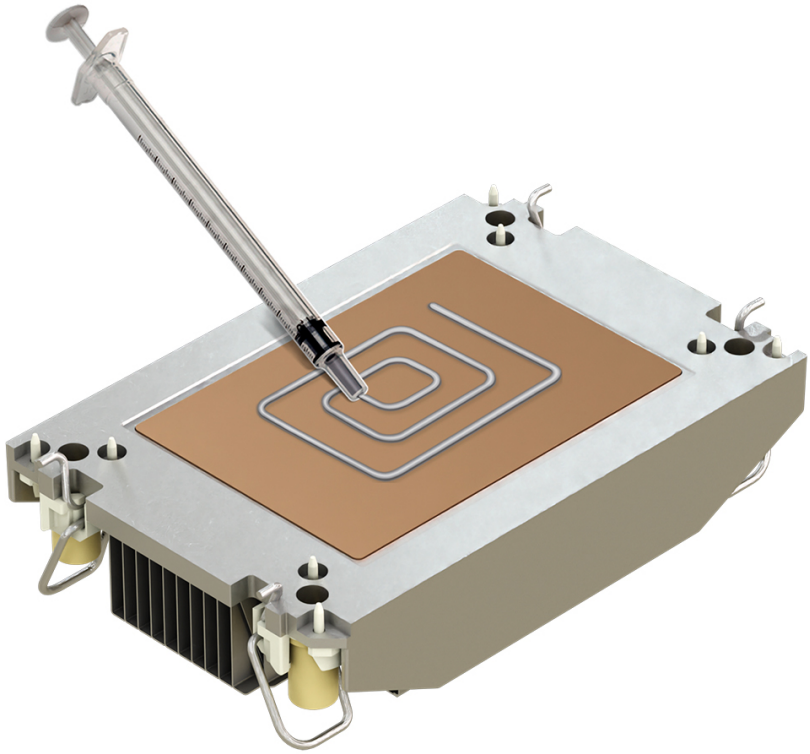
4. Using your thumb and index finger, first hold the retaining clip release tab at the pin 1 connector, pull out the tip of the retaining clip release tab, and then lift the retaining clip partially from the heat sink.
5. Repeat the procedure at the remaining three corners of the retaining clip.
6. After all the corners are released from the heat sink, lift the retaining clip from the pin 1 corner of the heat sink.

Installing processor into processor heat-sink module

The following images indicate the location of the processor and provides a visual representation of the installation procedure.







1. Place the processor in the processor tray.

   NOTE: Ensure that pin 1 indicator on the CPU tray is aligned with the pin 1 indicator on the processor.

2. Place the retaining clip on top of the processor in the processor tray aligning pin 1 indicator on the processor.

   NOTE: Ensure the pin 1 indicator on the retaining clip is aligned with the pin 1 indicator on the processor before placing the retaining clip on the processor.

   NOTE: Before you install the heat-sink, ensure to place the processor and retaining clip in the tray.

3. Align the processor with retaining clip, by using your fingers press the retaining clip on all the four sides until it clicks into place.

   NOTE: Ensure that the processor is securely latched to the retaining clip.

4. If you are using an existing heat sink, remove the thermal grease from the heat sink by using a clean lint-free cloth.
5. Use the thermal grease syringe included with your processor kit to apply the grease in a thin spiral design on the bottom of the heat sink.

   CAUTION: Applying too much thermal grease can result in excess grease coming in contact with and contaminating the processor socket.

   NOTE: The thermal grease syringe is intended for single use only. Dispose the syringe after you use it.

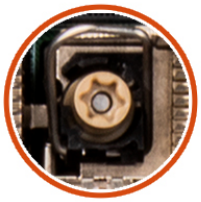
6. For new heat sink, pull and remove the plastic cover from the base of heat sink.
7. Place the heat sink on the processor and press the base of the heat sink until the retaining clip locks onto the heat sink at all the four corners.

Installing the processor and heat-sink module

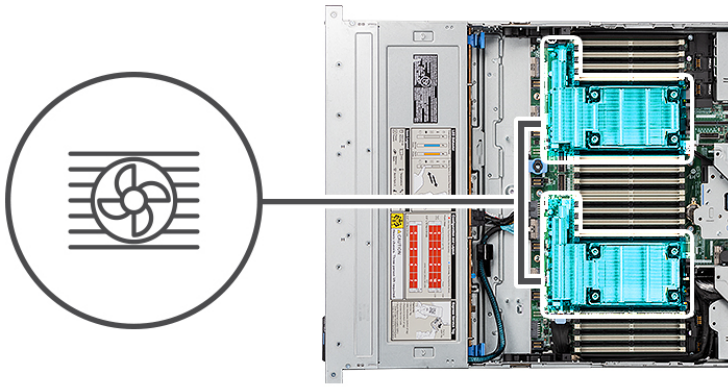
If you are replacing a component, remove the existing component before performing the installation procedure.

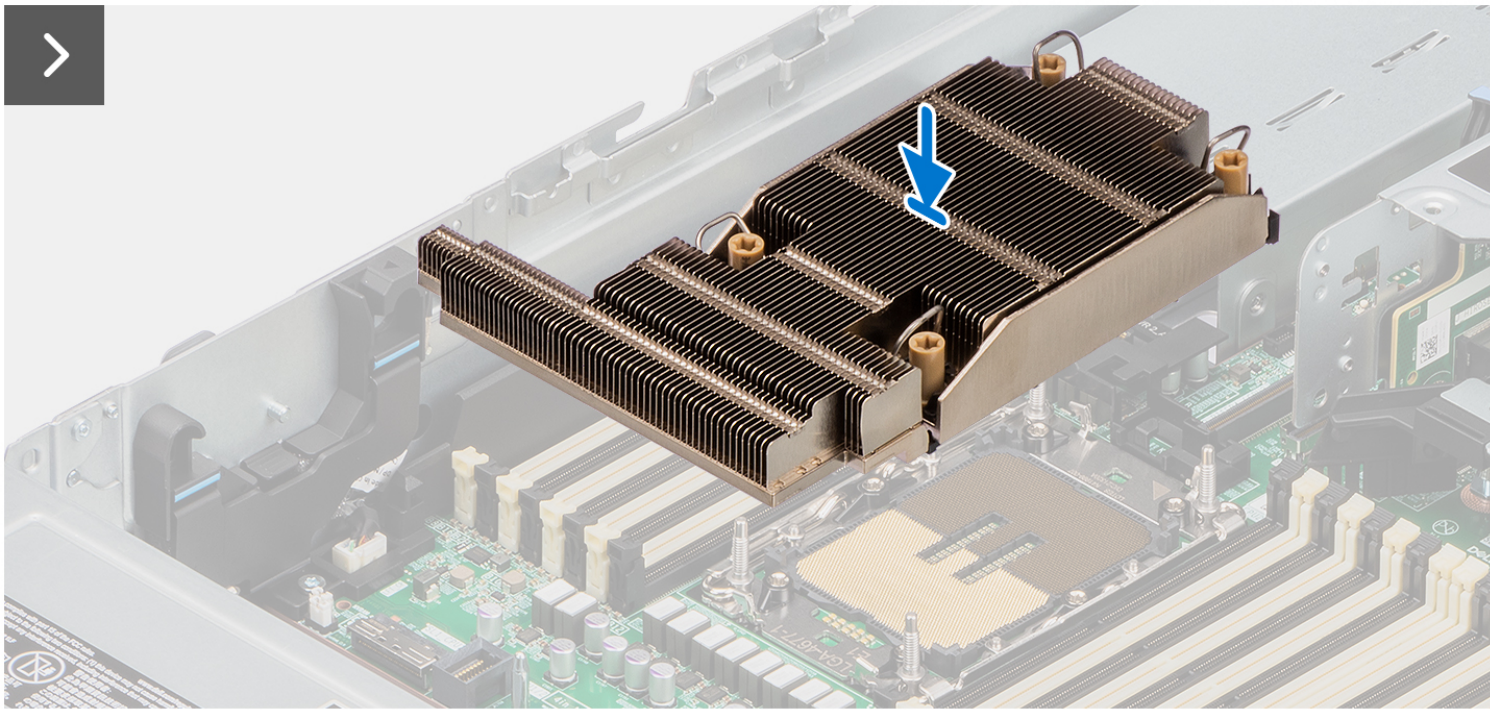
NOTE: If either the processor or the heat-sink is replaced, use the thermal grease that is provided in the kit to ensure that thermal conductivity is achieved.

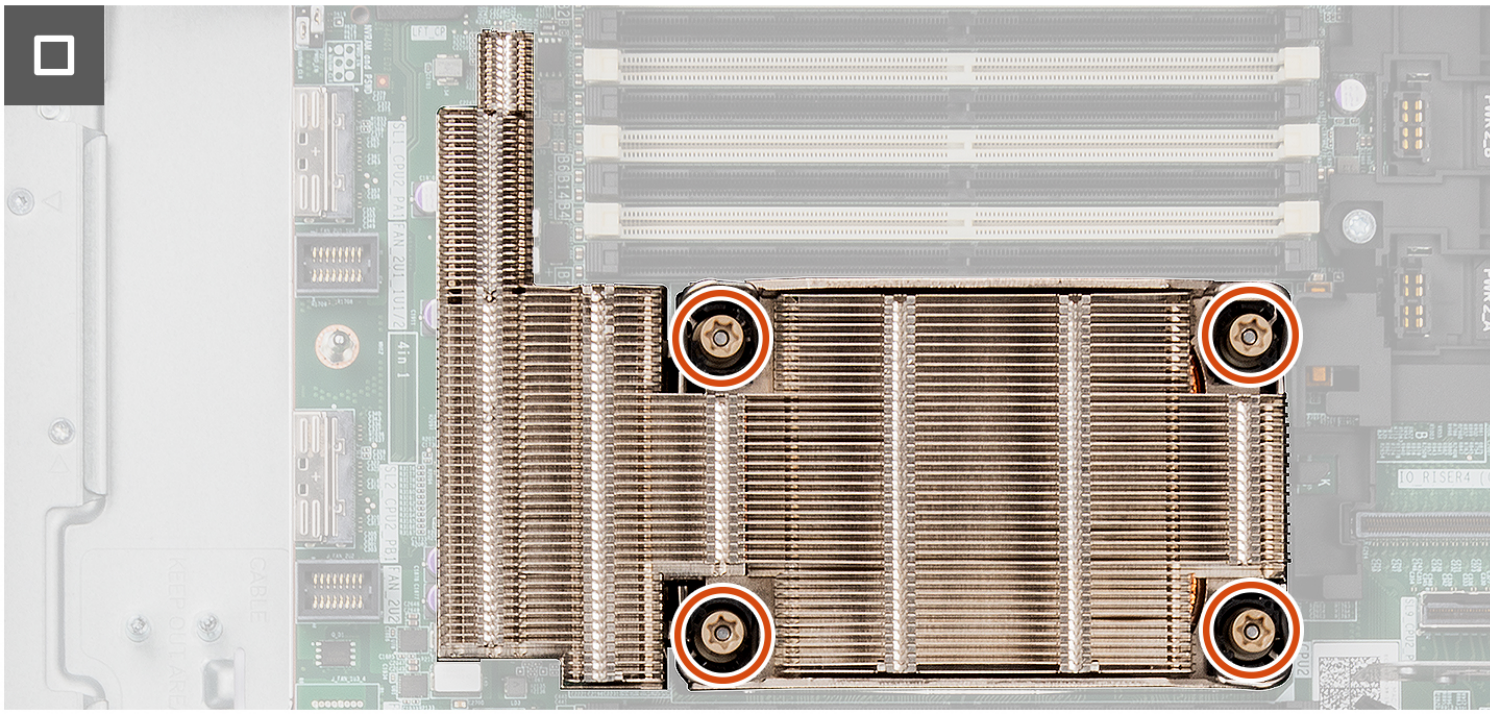
The following images indicate the location of the processor and heat-sink module and provides a visual representation of the installation procedure.



4x







1. Align the pin 1 indicator of the heat-sink to the system board and then place the processor and heat-sink module on the processor socket.

   NOTE: To avoid damaging the fins on the heat-sink, do not press down on the heat-sink fins.

   NOTE: Ensure that the processor and heat-sink is held parallel to the system board to prevent damaging the components.

2. In the sequential order (1->2->3->4), tighten the captive screws to secure the processor and heat-sink module to the system board.

   NOTE: Tighten the screws in a sequential order (1,2,3,4) as printed on the system board.

1. Install the air shroud.
2. Install the system cover.
3. Follow the procedure in After working inside your computer.

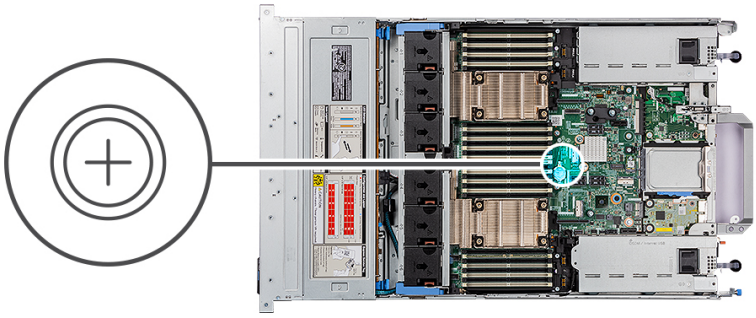
Coin-cell battery

Removing the coin-cell battery

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the air shroud.

NOTE: Removing the coin-cell battery resets the BIOS setup program settings to default. It is recommended that you note the BIOS setup program settings before removing the coin-cell battery.

The following images indicate the location of the coin-cell battery and provide a visual representation of the removal procedure.



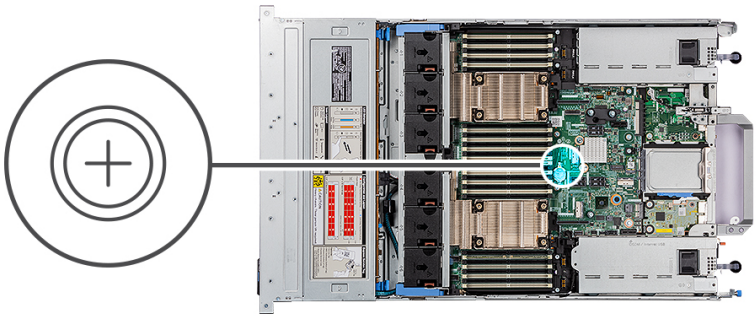
1. Using a plastic scribe, gently pry the coin-cell battery out of the slot on the system board.

2. Remove the coin-cell battery away from the computer.

Installing the coin-cell battery

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the coin-cell battery and provides a visual representation of the installation procedure.



1. Insert the coin-cell battery with the "+" sign facing up and slide it under the securing tabs at the positive side of the connector.
2. Press the battery into the connector until it locks into place.

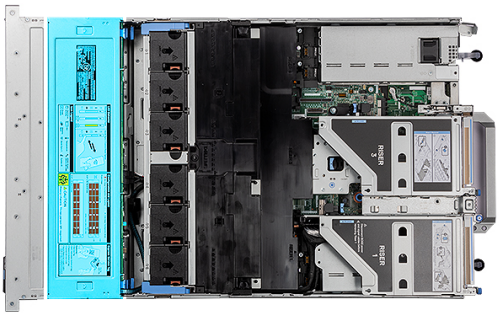
1. Install the air shroud.
2. Install the system cover.
3. Follow the procedure in After working inside your computer.

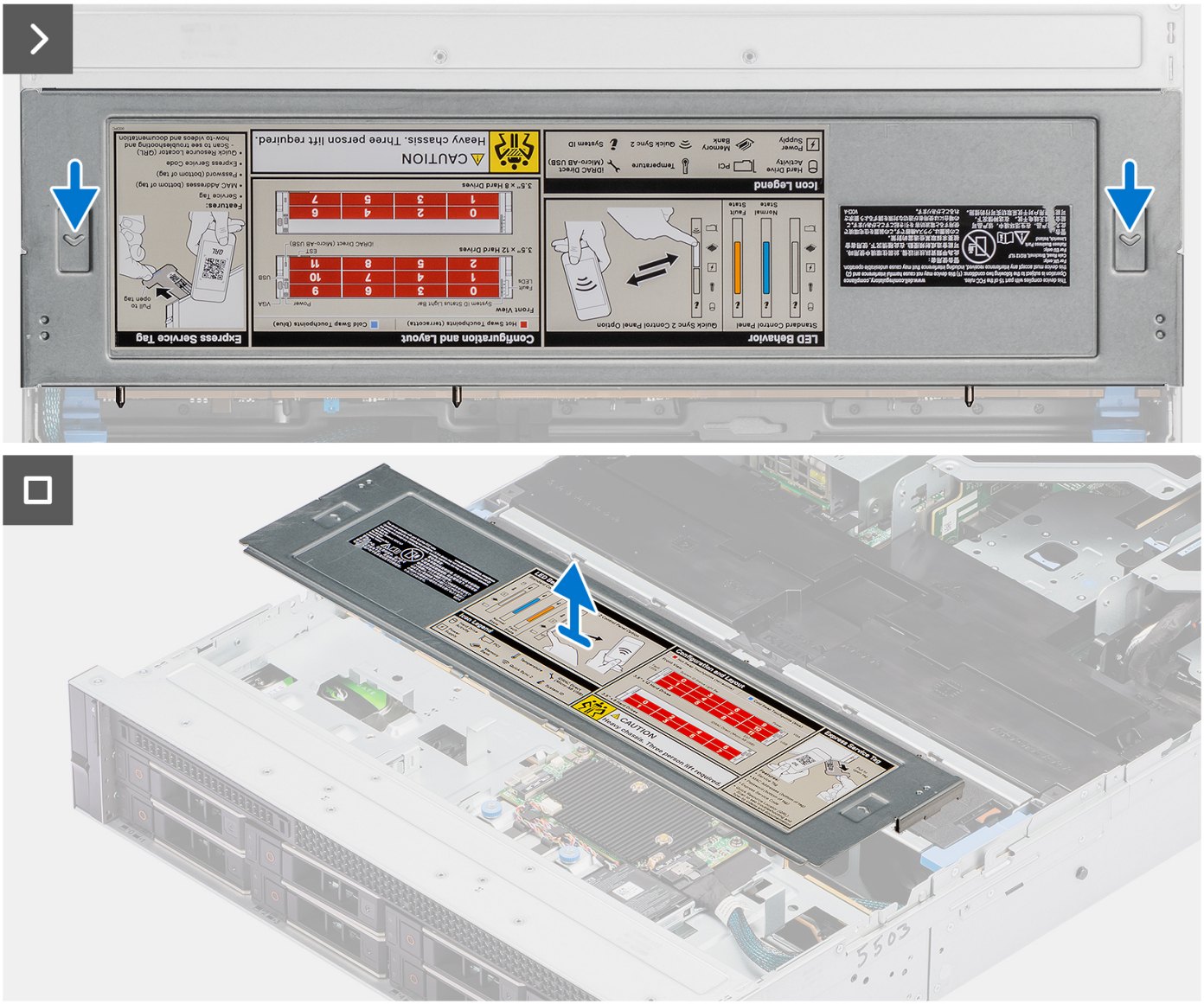
Backplane cover

Removing the backplane cover

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.

The following images indicate the location of the backplane cover and provide a visual representation of the removal procedure.



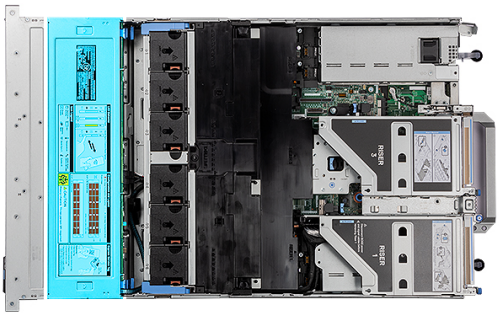


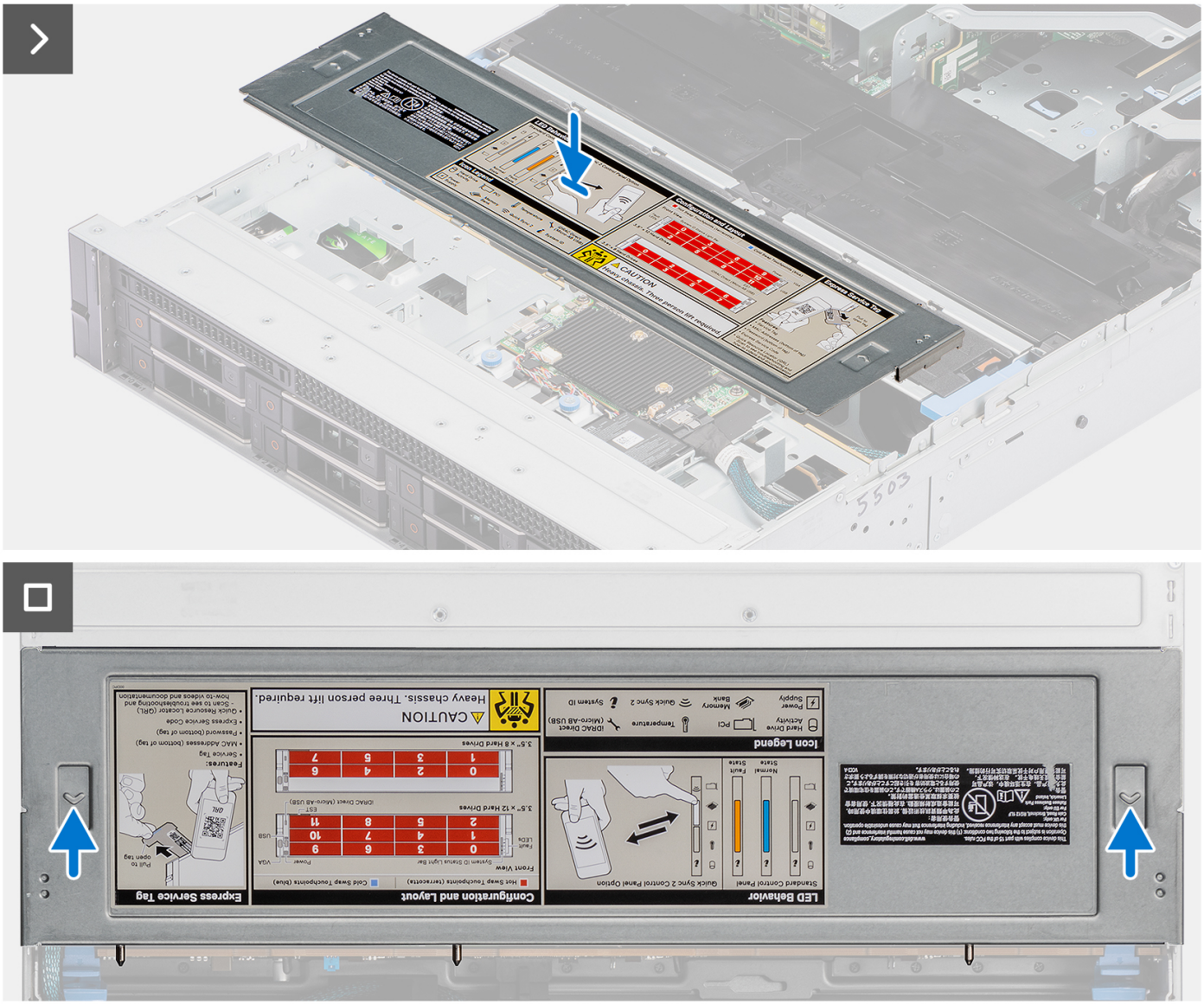
1. Slide the backplane cover in the direction of the arrows marked on the backplane cover.
2. Lift to remove the backplane cover from the computer.

Installing the backplane cover

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the backplane cover and provide a visual representation of the installation procedure.





1. Align the backplane cover with the guide slots on the computer.
2. Slide the backplane cover to the front of the system until it fits into place.

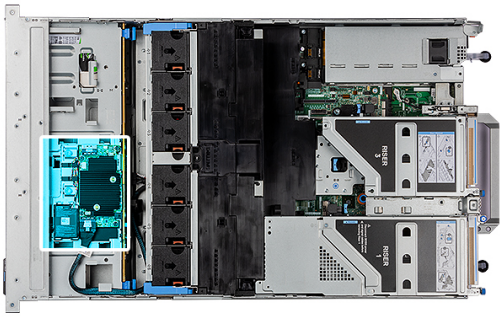
1. Install the system cover.
2. Follow the procedure in After working inside your computer.

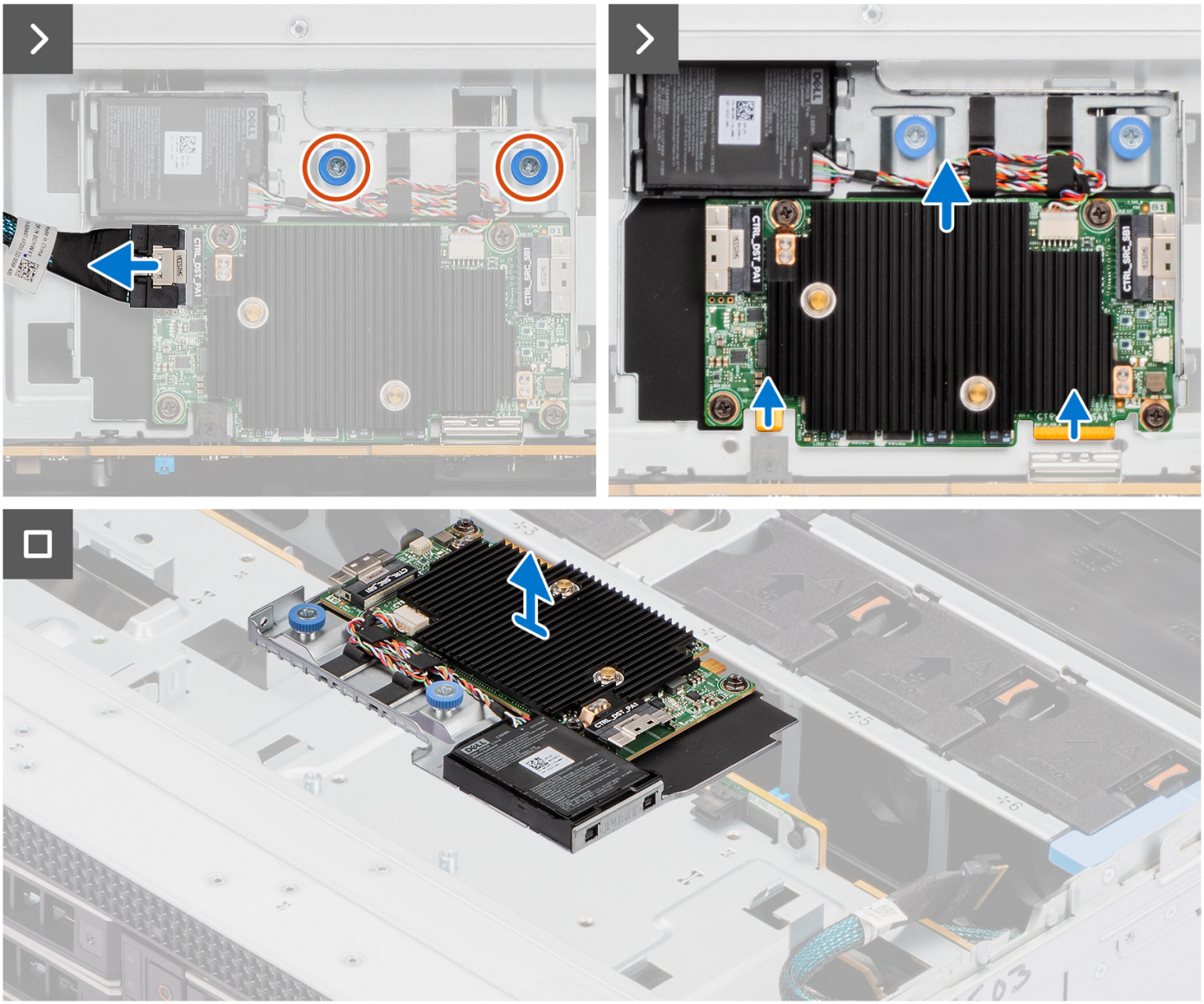
Front PowerEdge RAID Controller (PERC) module

Removing the front PERC module

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the backplane cover.

The following images indicate the location of the front PERC module and provide a visual representation of the removal procedure.



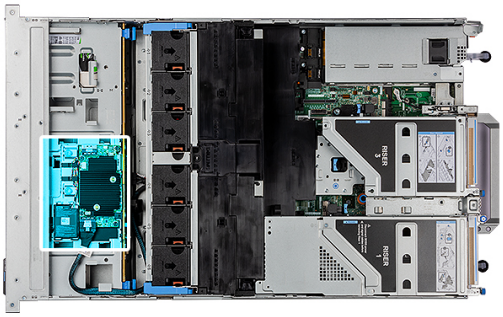


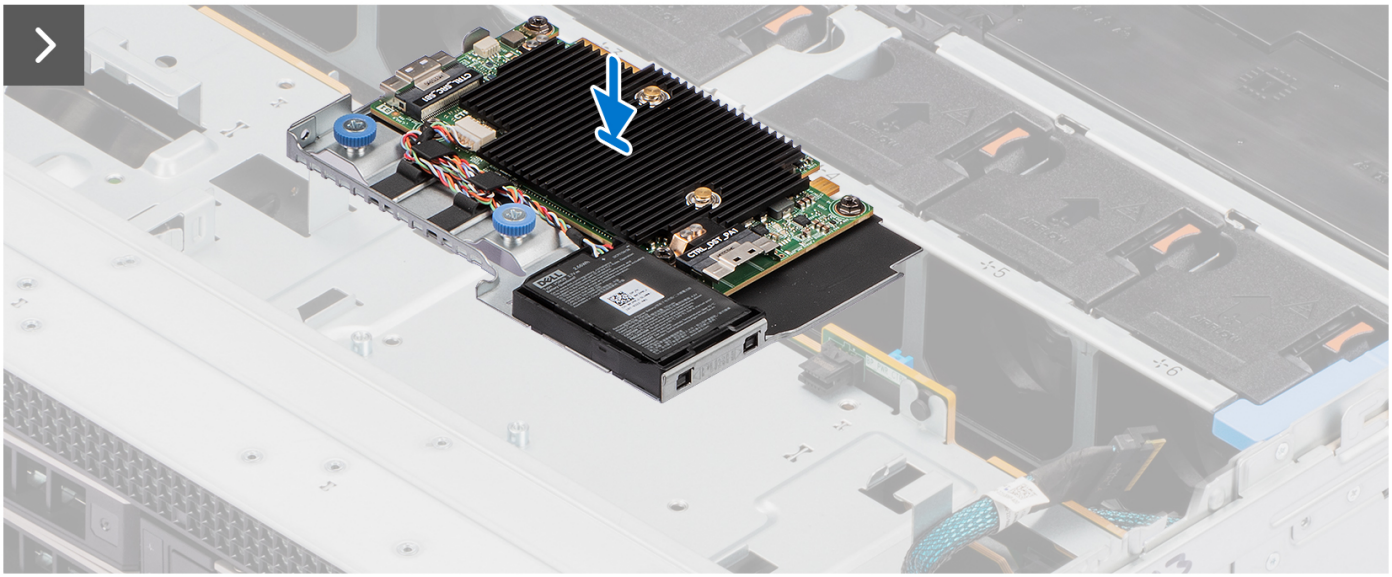
1. Press down on the latch and disconnect the cable from its connector on the front PERC module.
2. Loosen the two thumb screws to release the front PERC from the computer chassis.
3. Lift the front PERC module at an angle.
4. Remove the front PERC module out of the computer.

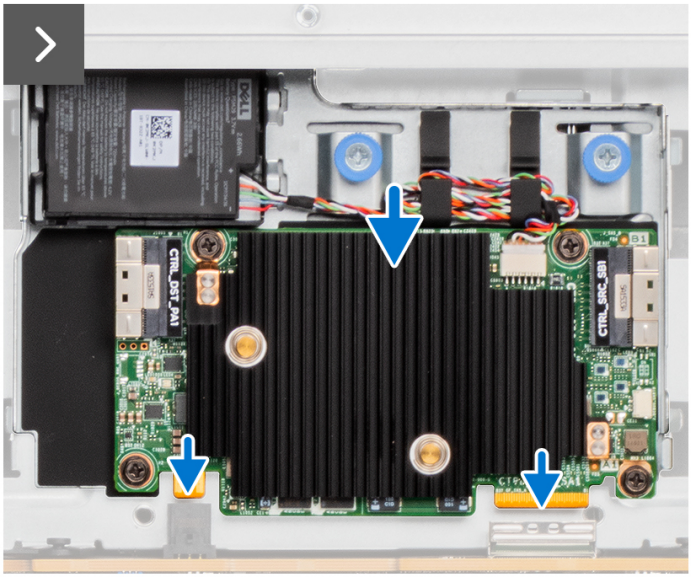
Installing the front PERC module

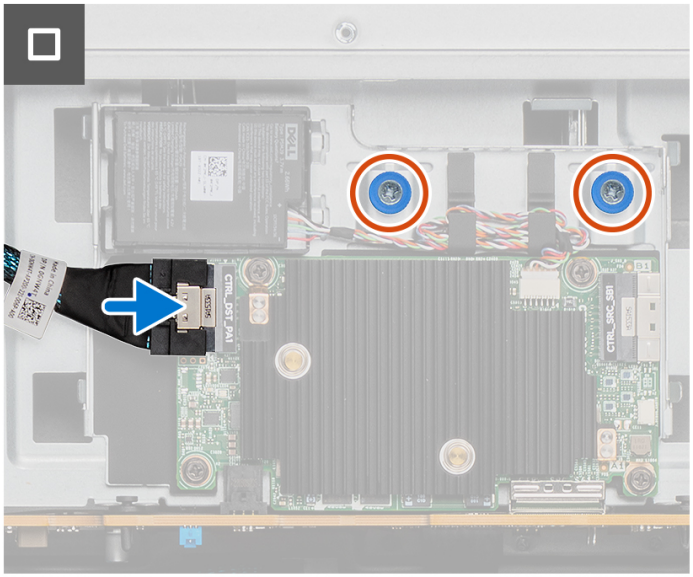
If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the front PERC module and provide a visual representation of the installation procedure.









1. Align and place the front PERC module at an angle into its slot on the computer.
2. Tighten the two thumb screws to secure the front PERC to the computer chassis.
3. Connect the cable to its connector on the front PERC module.

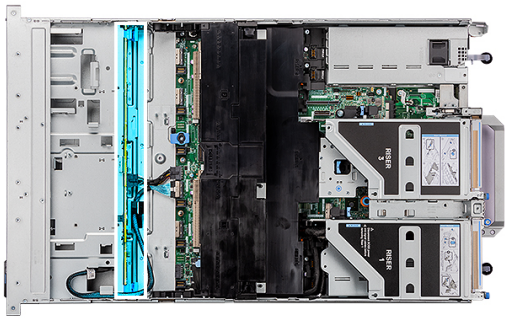
1. Install the backplane cover.
2. Install the system cover.
3. Follow the procedure in After working inside your computer.

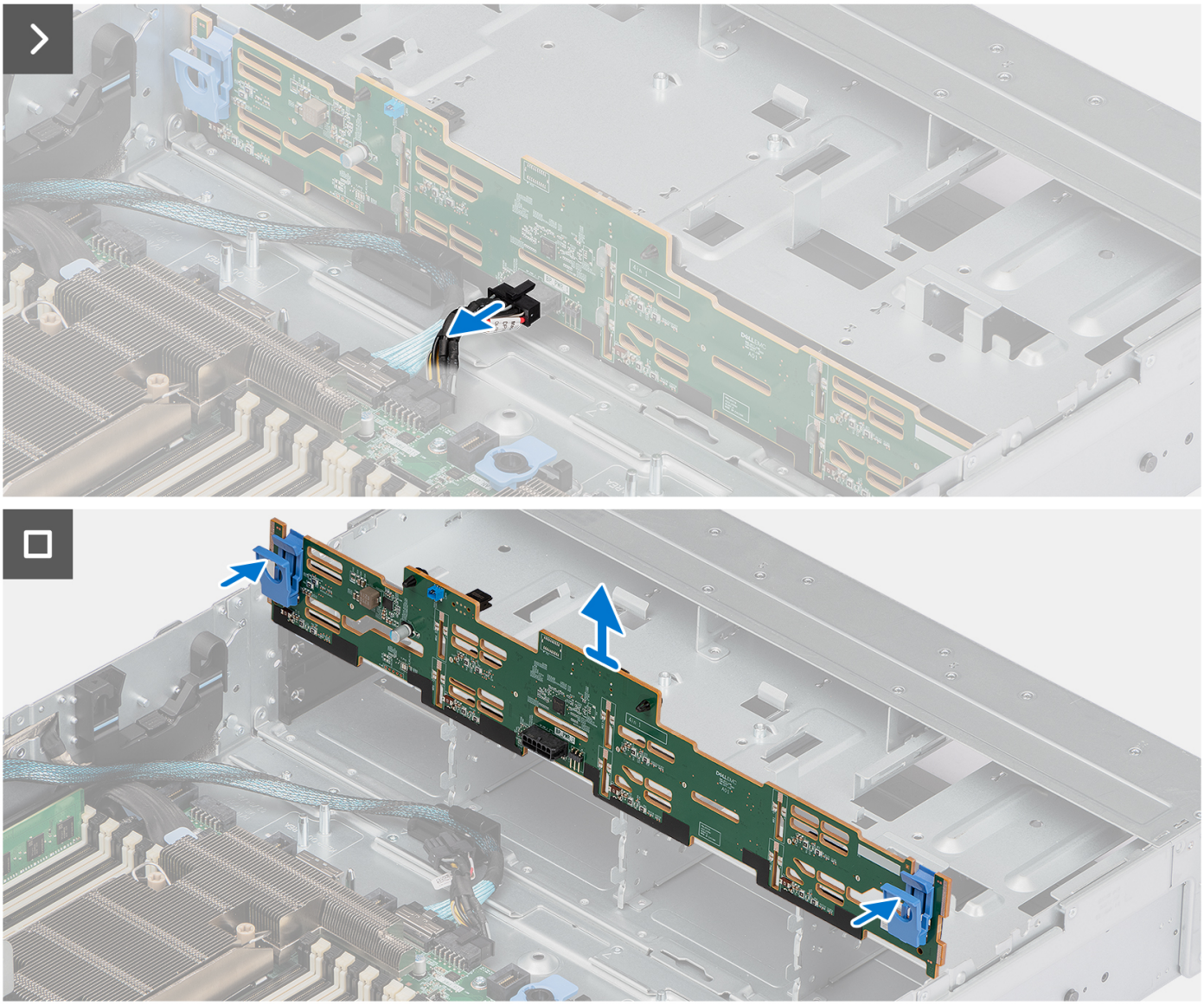
Hard drive backplane

Removing the hard drive backplane

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the backplane cover.
4. Remove the front PERC module.

The following images indicate the location of the hard drive backplane and provide a visual representation of the removal procedure.



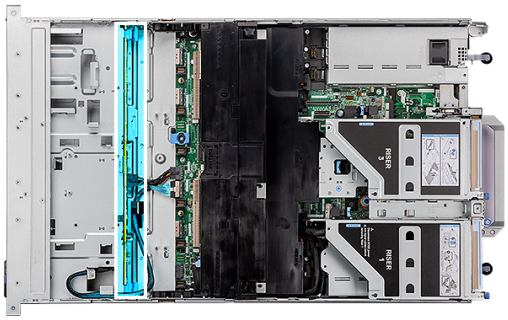


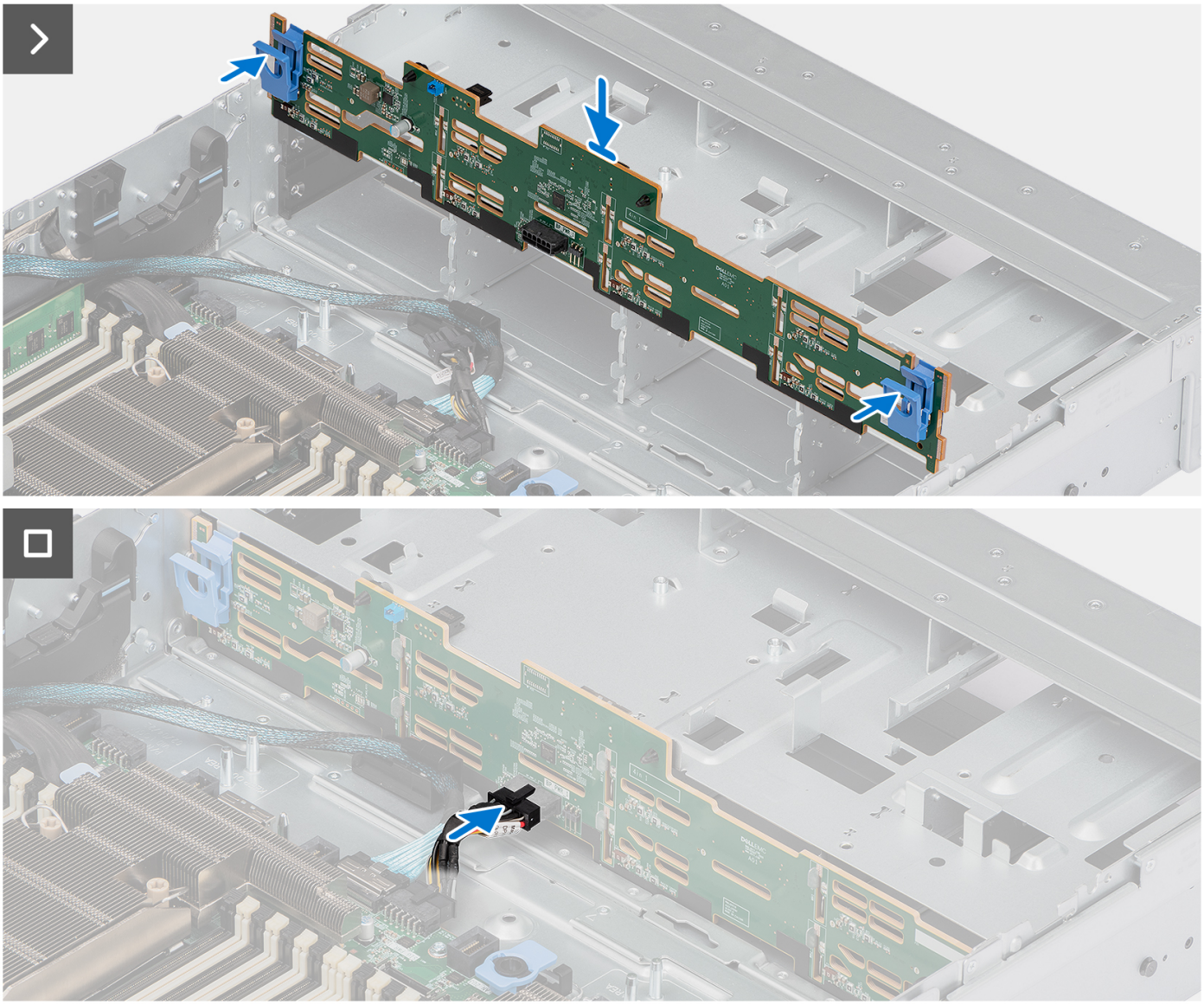
1. Disconnect the backplane power cable from its connector on the hard drive backplane.
2. Press the release tabs to disengage the hard drive backplane from the hooks on the system.
3. Lift to remove the hard drive backplane from the computer.

Installing the hard drive backplane

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the hard drive backplane and provide a visual representation of the installation procedure.





1. Align the slots on the hard drive backplane with the guides on the computer.
2. Slide the hard drive backplane into the guides and lower it until the blue release tab clicks into place.
3. Connect the backplane power cable to its connector on the hard drive backplane.

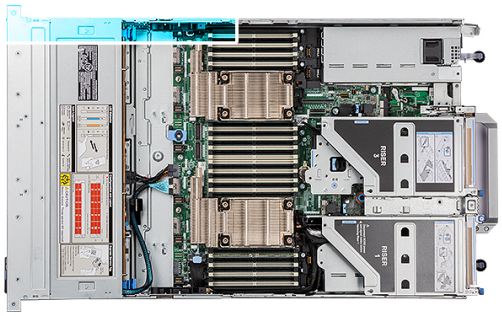
1. Install the front PERC module.
2. Install the backplane cover.
3. Install the system cover.
4. Follow the procedure in After working inside your computer.

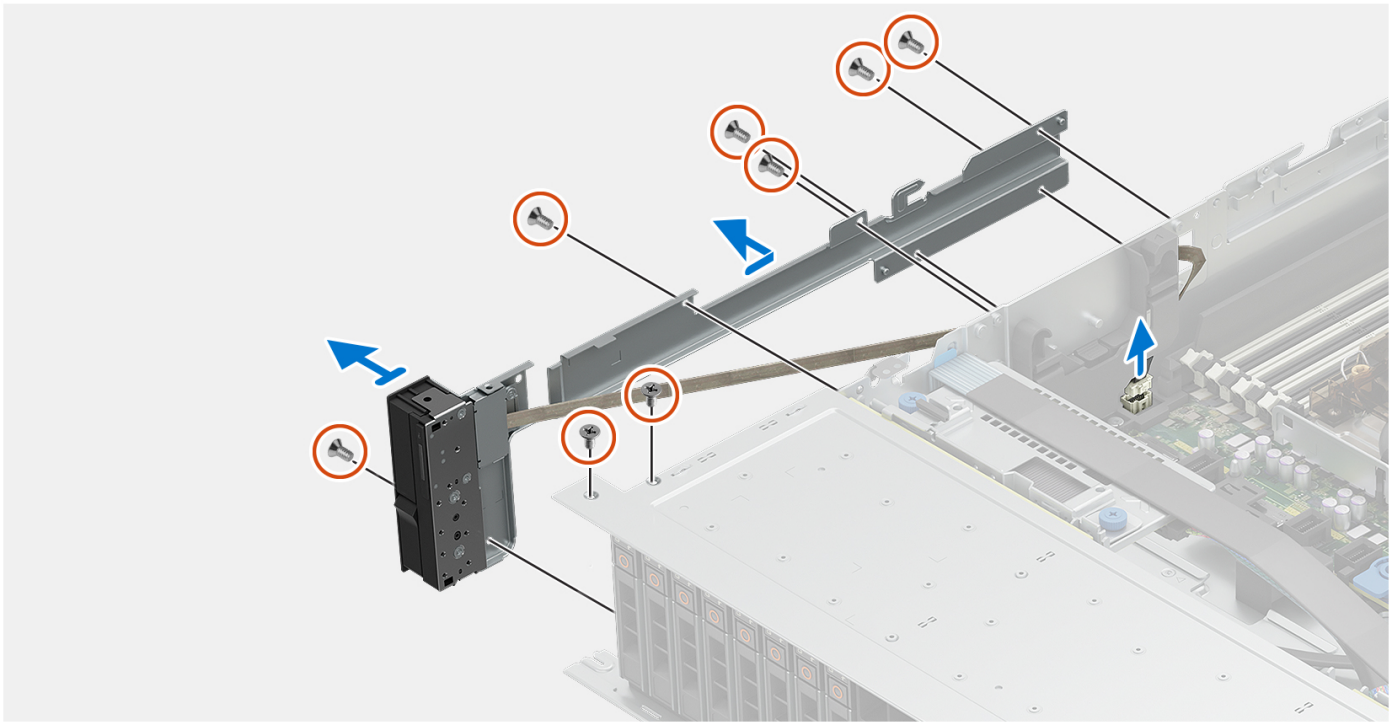
Left control panel

Removing the left control panel

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the cooling fan assembly.
4. Remove the air shroud.

The following images indicate the location of the left control panel and provide a visual representation of the removal procedure.





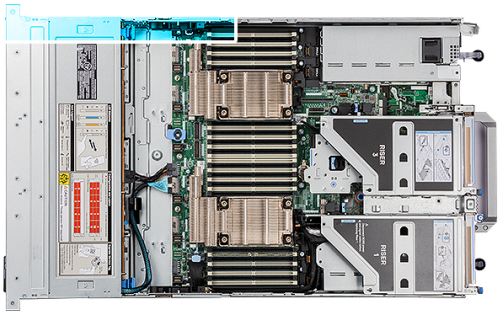
1. Disconnect the left control panel cable from its connector on the system board.
2. Remove the eight screws that secure the left control panel to the computer.
3. Remove the cable cover and the left control panel away from the computer.

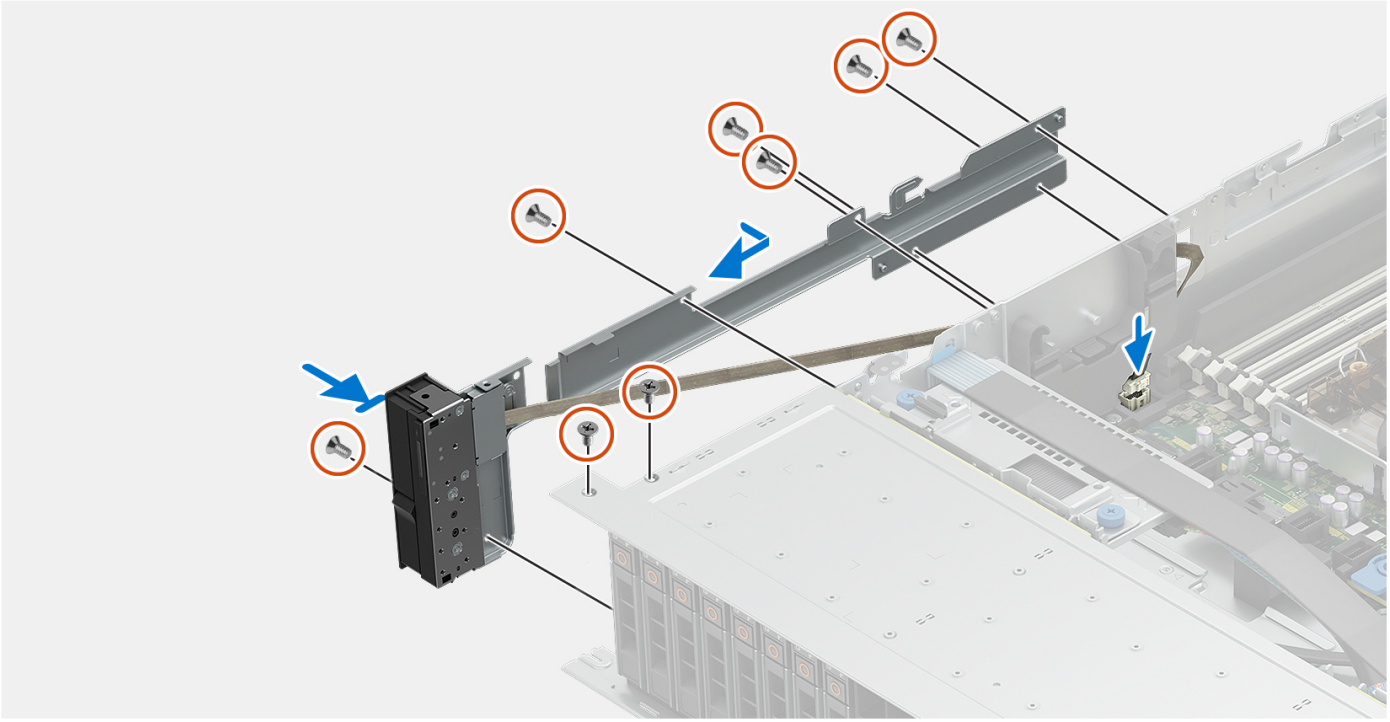
Installing the left control panel

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the left control panel and provide a visual representation of the installation procedure.

8x
M





1. Align and slide the left control panel in the slot on the computer.
2. Route the left control panel cable through the side wall of the computer.
3. Align and slide the left control panel cable cover in the slot on the system.

   NOTE: Route the cable properly to prevent the cable from being pinched or crimped.

4. Connect the left control panel cable to its connector on the system board.
5. Replace the eight screws to secure the left control panel and the cable cover to the system.

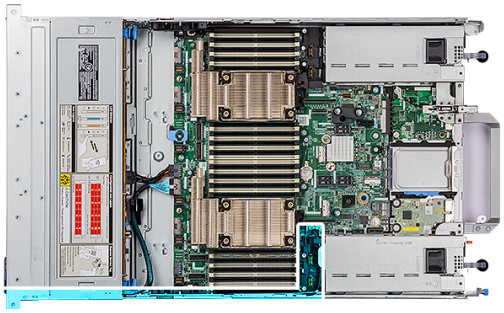
1. Install the air shroud.
2. Install the cooling fan assembly.
3. Install the system cover.
4. Follow the procedure in After working inside your computer.

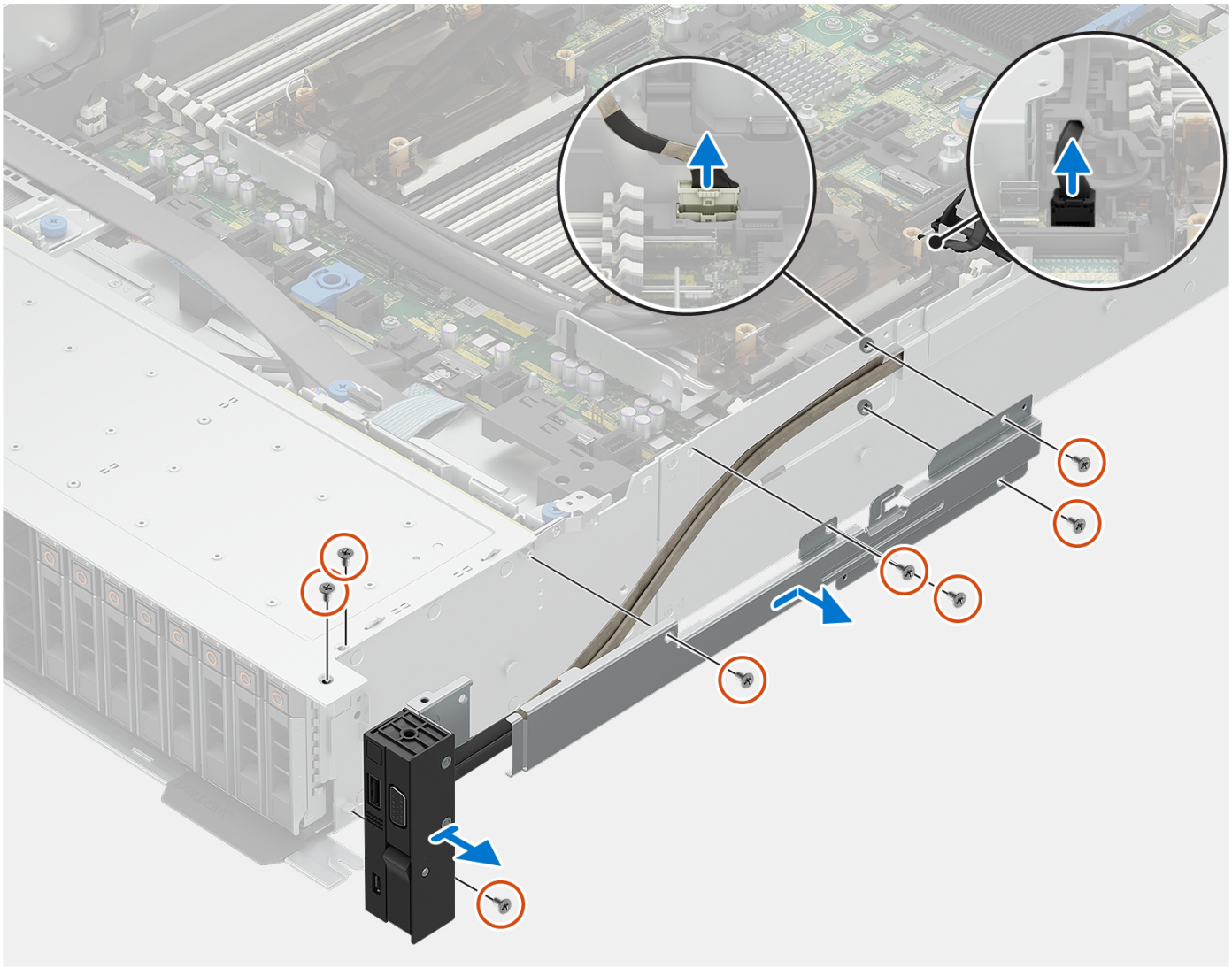
Right control panel

Removing the right control panel

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the cooling fan assembly.
4. Remove the air shroud.

The following images indicate the location of the right control panel and provide a visual representation of the removal procedure.



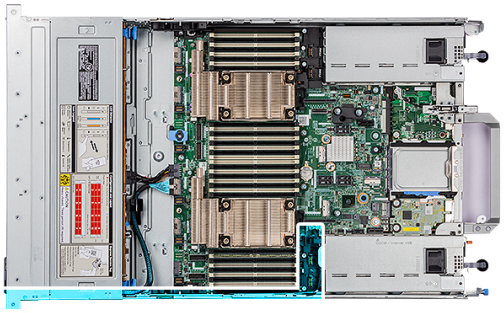


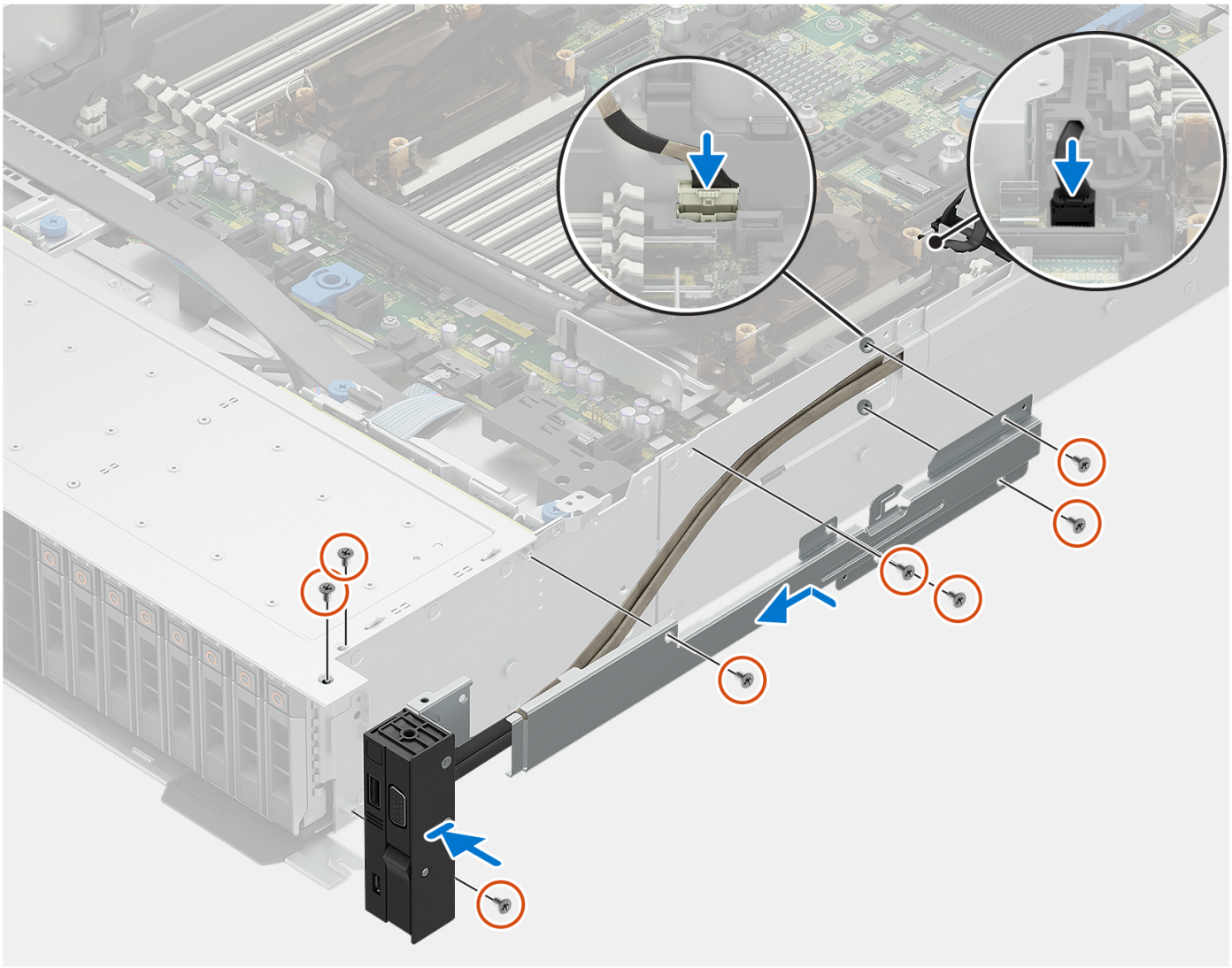
1. Disconnect the right control panel cable and VGA cable from there connectors on the system board.
2. Remove the eight screws that secure the right control panel to the computer.
3. Remove the cable cover and the right control panel away from the computer.

Installing the right control panel

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the right control panel and provide a visual representation of the installation procedure.





1. Align and slide the right control panel in the slot on the computer.
2. Route the right control panel cable through the side wall of the computer.
3. Align and slide the right control panel cable cover in the slot on the system.

   NOTE: Route the cable properly to prevent the cable from being pinched or crimped.

4. Connect the right control panel cable and VGA cable to there connectors on the system board.
5. Replace the eight screws to secure the right control panel and the cable cover to the system.

1. Install the air shroud.
2. Install the cooling fan assembly.

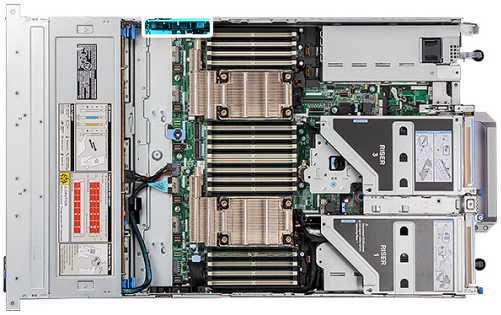
3. Install the system cover.
4. Follow the procedure in After working inside your computer.

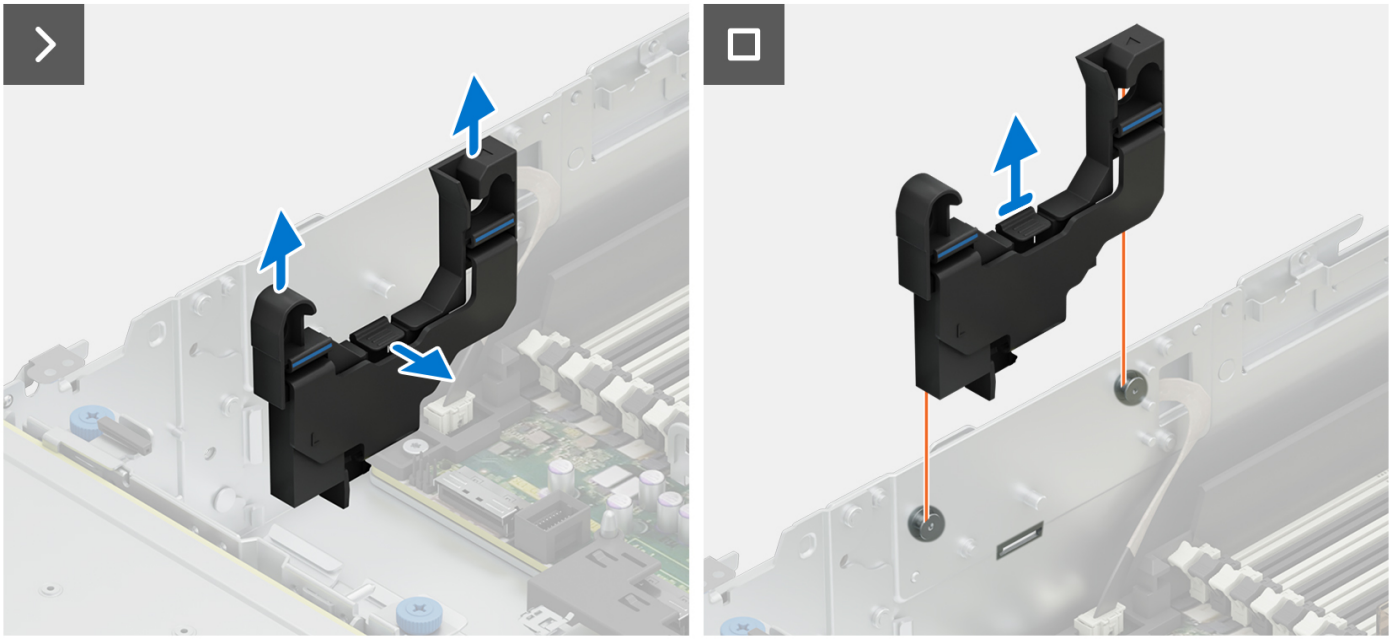
Left wall bracket

Removing the left wall bracket

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the cooling fan assembly.
4. Remove the air shroud.
5. Remove the left control panel.

The following images indicate the location of the left wall bracket and provide a visual representation of the removal procedure.



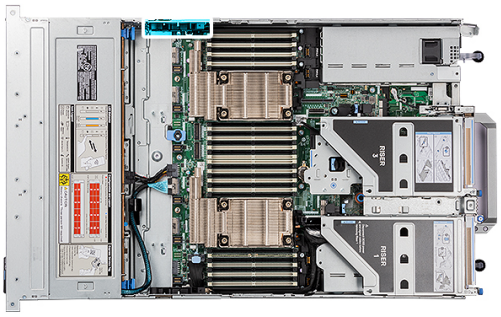


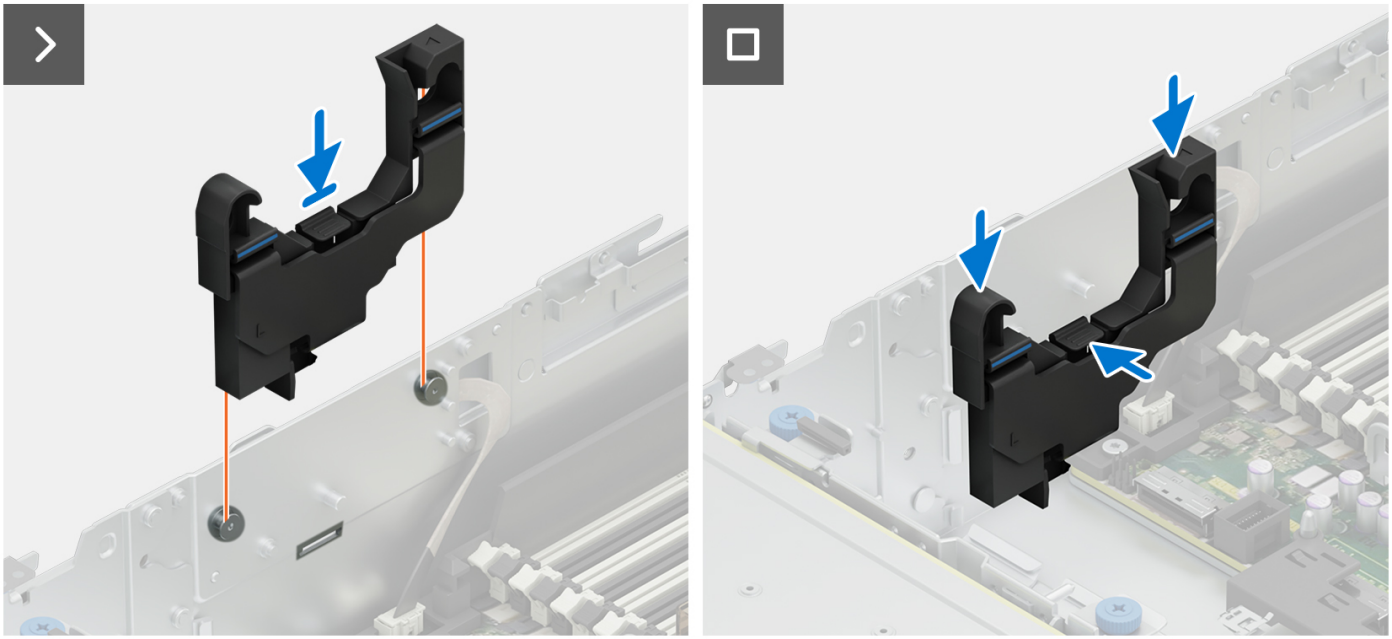
1. Press the blue side tabs to release the side wall cable holder.
2. Press the center tab to release the bracket from the chassis, and lift it away from the computer.

Installing the left wall bracket

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the left wall bracket and provide a visual representation of the installation procedure.





1. Align the guide slots on the side wall bracket with the guides on the computer and slide until the cover is seated firmly.
2. Close the side wall cable holder until the holder clicks into place.

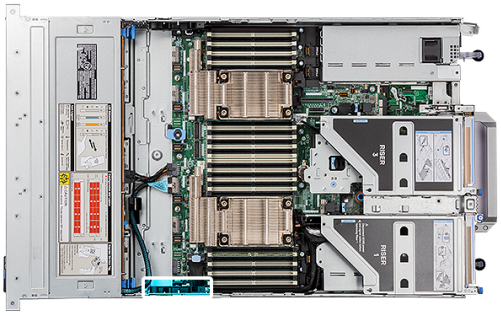
1. Install the left control panel.
2. Install the air shroud.
3. Install the cooling fan assembly.
4. Install the system cover.
5. Follow the procedure in After working inside your computer.

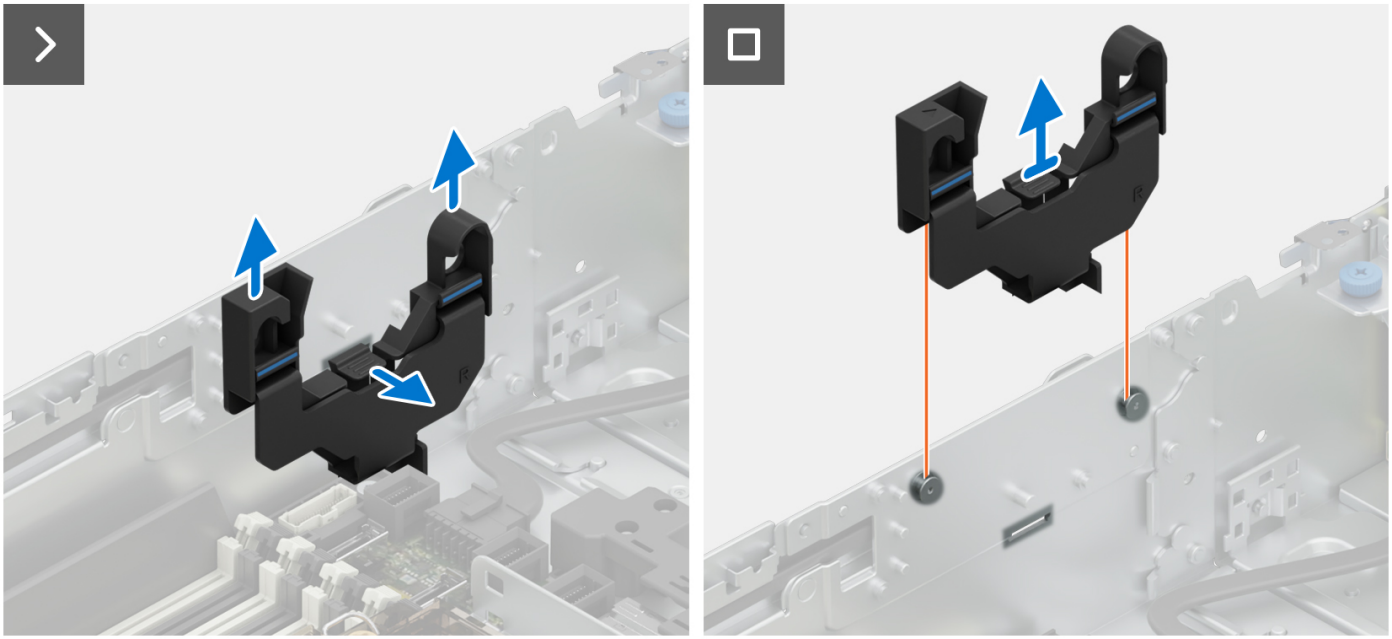
Right wall bracket

Removing the right wall bracket

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the cooling fan assembly.
4. Remove the air shroud.
5. Remove the right control panel.

The following images indicate the location of the right wall bracket and provide a visual representation of the removal procedure.



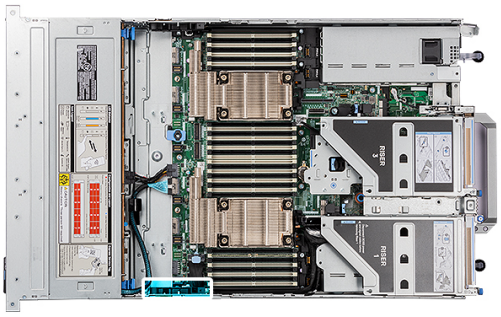


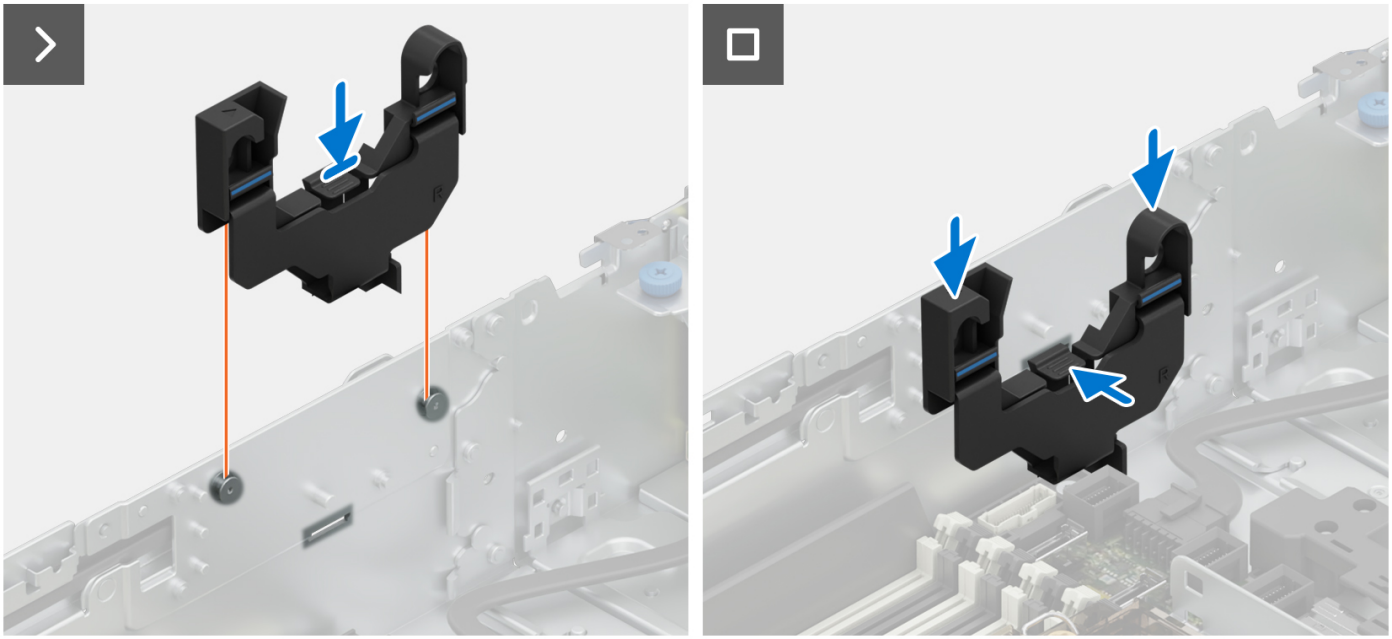
1. Press the blue side tabs to release the side wall cable holder.
2. Press the center tab to release the bracket from the chassis, and lift it away from the computer.

Installing the right wall bracket

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the right wall bracket and provide a visual representation of the installation procedure.





1. Align the guide slots on the side wall bracket with the guides on the computer and slide until the cover is seated firmly.
2. Close the side wall cable holder until the holder clicks into place.

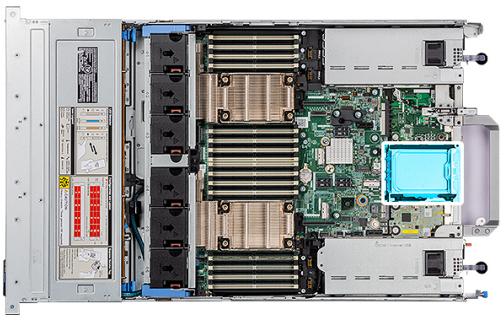
1. Install the right control panel.
2. Install the air shroud.
3. Install the cooling fan assembly.
4. Install the system cover.
5. Follow the procedure in After working inside your computer.

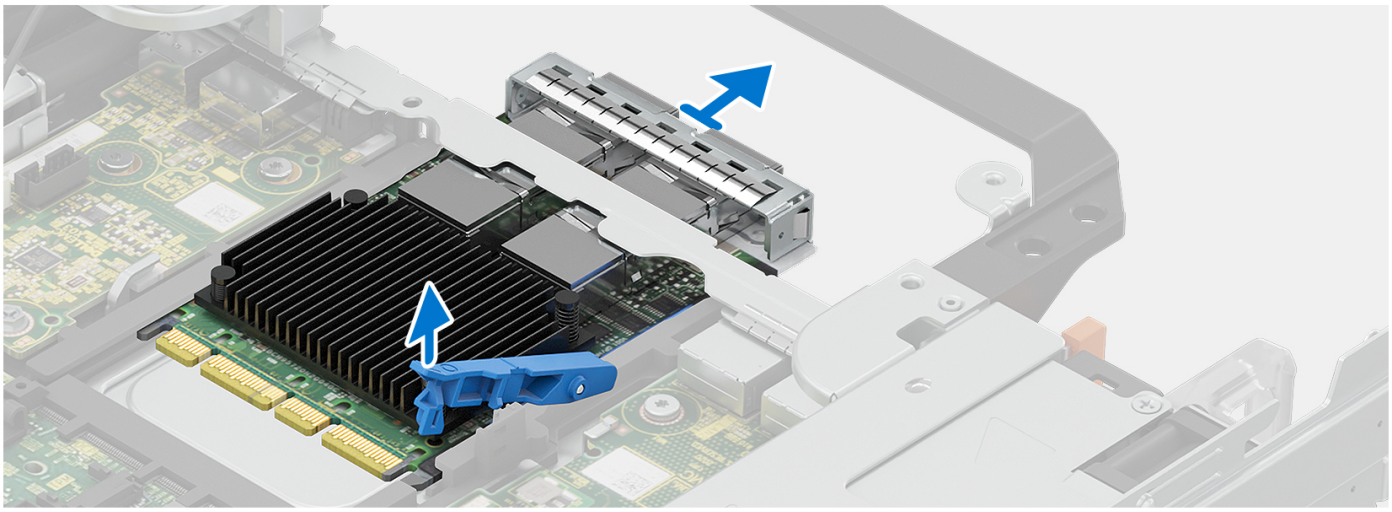
Open Compute Project (OCP) card

Removing the OCP card

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the air shroud.
4. Remove the riser card 1.
5. Remove the riser card 3.
6. Remove the riser card 2.
7. Remove the riser card 4.

The following images indicate the location of the OCP card and provide a visual representation of the removal procedure.

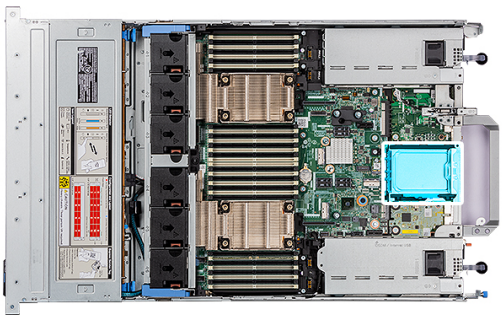


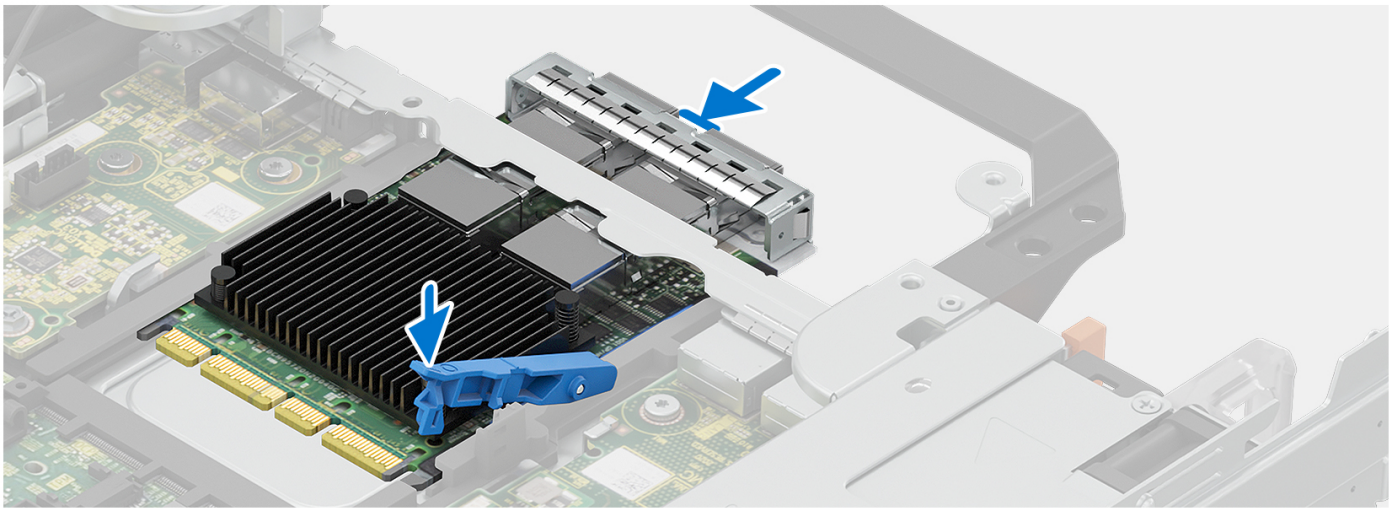


1. Open the blue latch to disengage the OCP card.
2. Push the OCP card towards the rear end of the system to disconnect from the connector on the system board.
3. Slide the OCP card out of the slot on the system.

Installing the OCP card

The following images indicate the location of the OCP card and provide a visual representation of the installation procedure.





1. Open the blue latch on the system board.
2. Slide the OCP card into the slot in the system.
3. Push until the OCP card is connected to the connector on the system board.
4. Close the blue latch to lock the OCP card to the system.

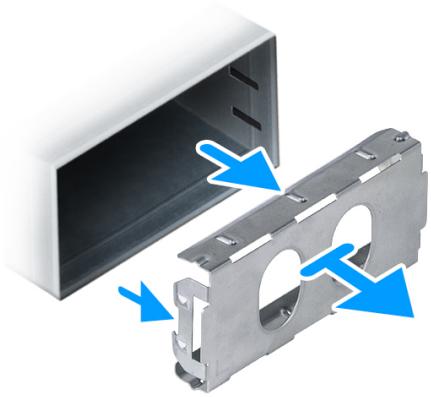
1. Install the riser card 4.
2. Install the riser card 2.
3. Install the riser card 3.
4. Install the riser card 1.
5. Install the air shroud.
6. Install the system cover.
7. Follow the procedure in After working inside your computer.

Power-supply unit

Removing the power supply unit blank

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.

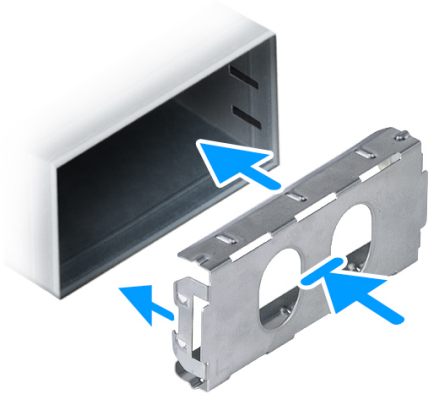
The following images indicate the location of the power supply unit blank and provide a visual representation of the removal procedure.



Pull the blank out of the system.

Installing the power supply unit blank

The following images indicate the location of the power supply unit blank and provide a visual representation of the installation procedure.



Align the PSU blank with the PSU bay and push it into the PSU bay until it clicks into place.

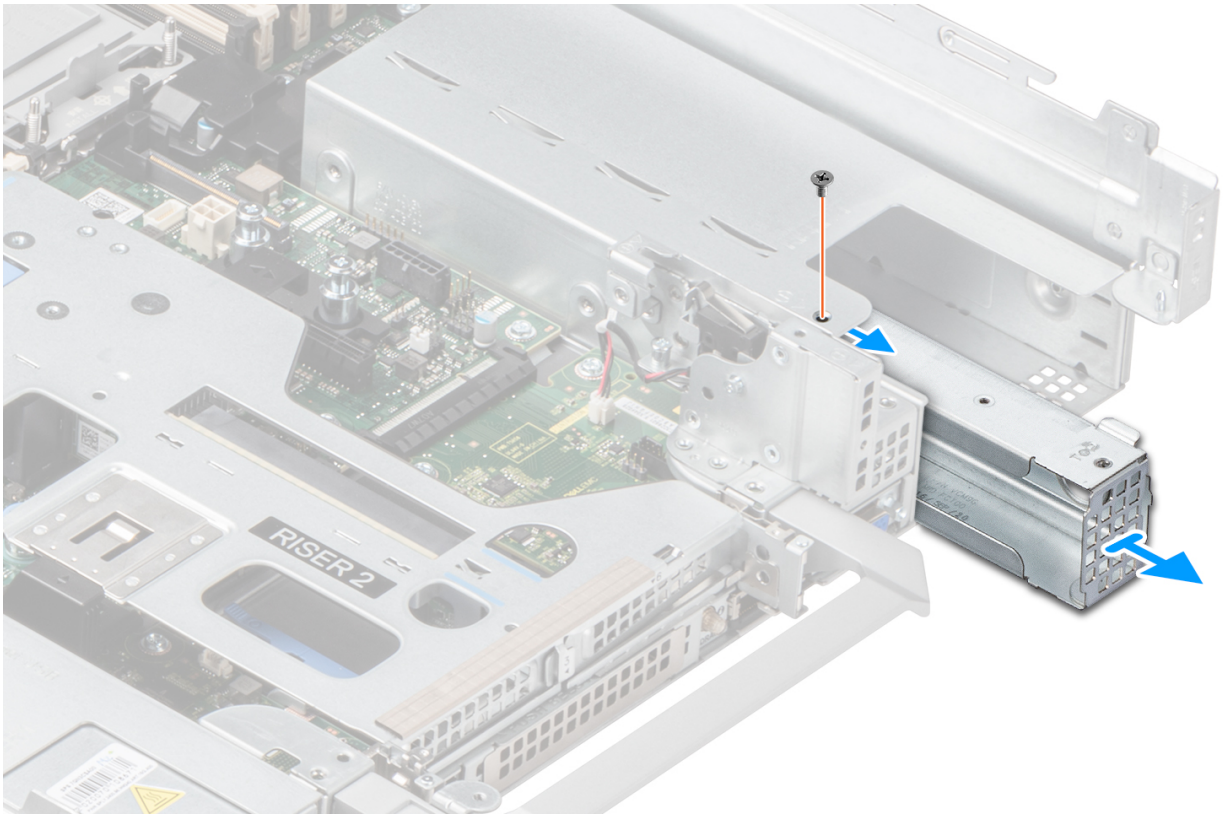
1. Install the system cover.
2. Follow the procedure in After working inside your computer.

Removing the power supply unit adapter

Remove the PSU adapter, when installing PSU with 86 mm wide form factor.

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.

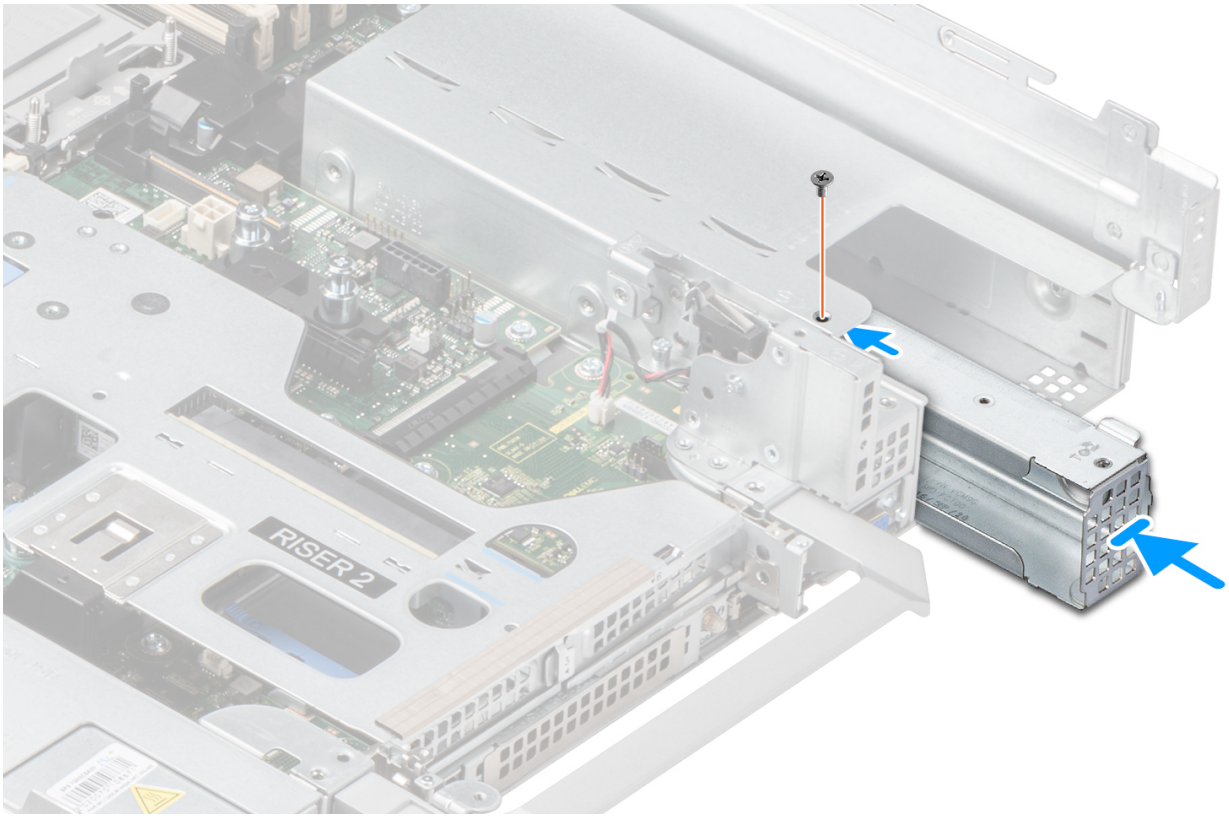
The following images indicate the location of the power supply unit adapter and provide a visual representation of the removal procedure.



Loosen the screw and remove the power supply unit adapter.

Installing the power supply unit adapter

The following images indicate the location of the power supply unit adapter and provide a visual representation of the installation procedure.



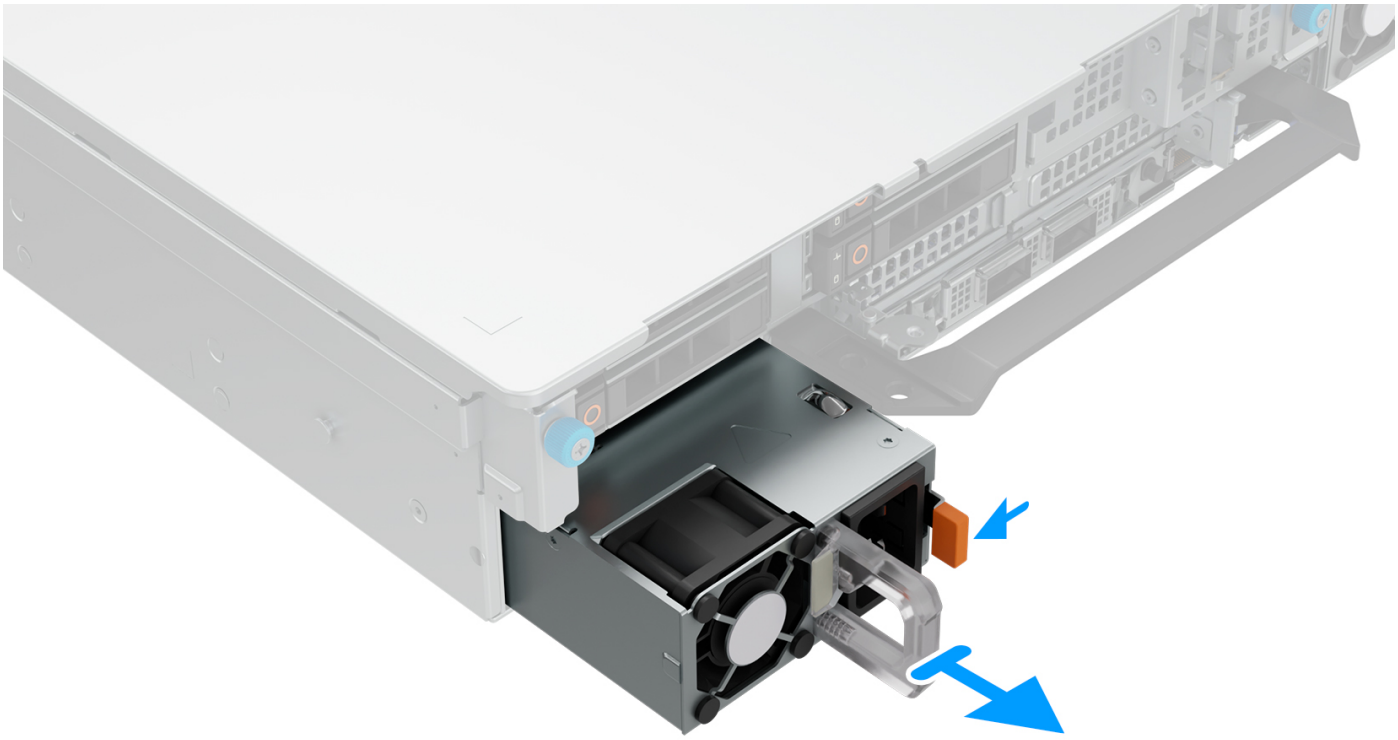
1. Align and insert the power supply unit adapter.
2. Tighten the screw to secure the power supply unit adapter.

1. Install the system cover.
2. Follow the procedure in After working inside your computer.

Removing the power supply unit

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.

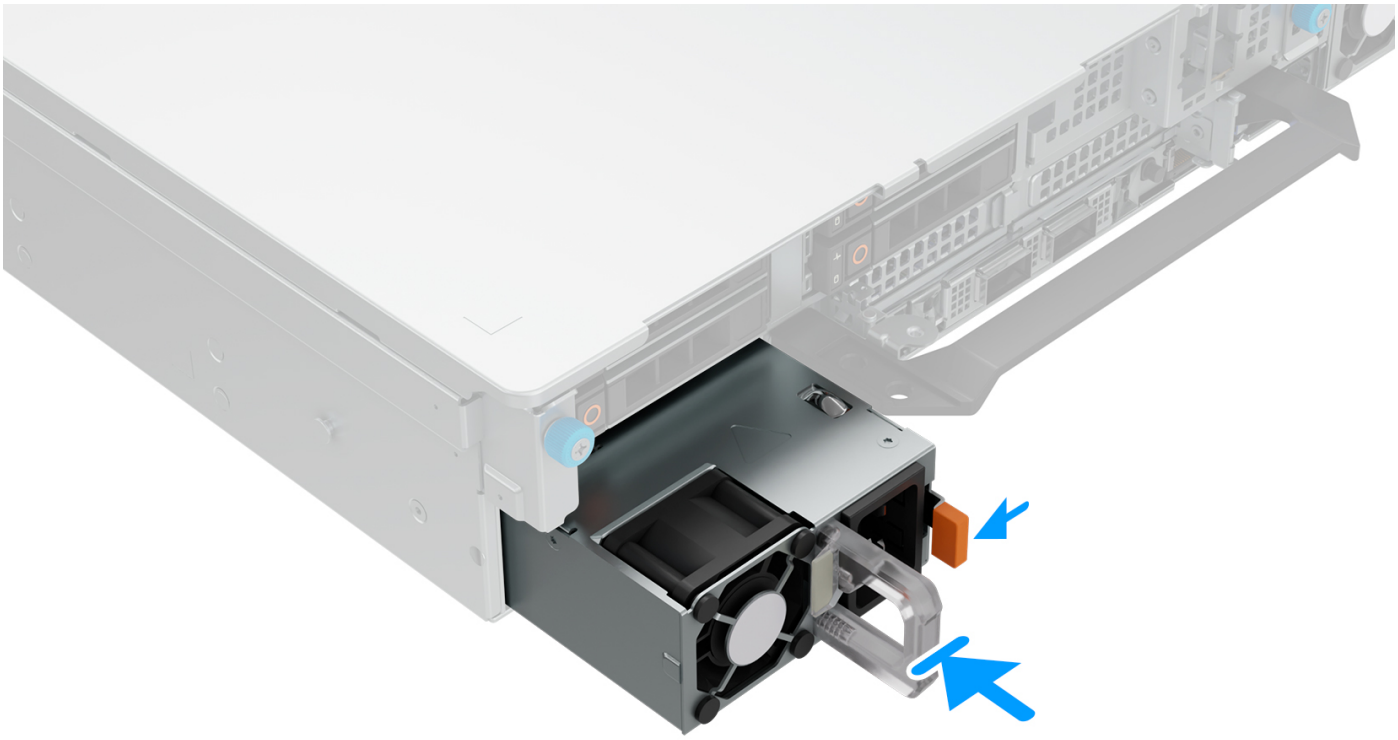
The following images indicate the location of the power supply unit and provide a visual representation of the removal procedure.



Press the release latch and hold the PSU handle to slide the PSU out of the bay.

Installing the power supply unit

The following images indicate the location of the power supply unit and provide a visual representation of the installation procedure.



Slide the PSU into the PSU bay until the release latch snaps into place.

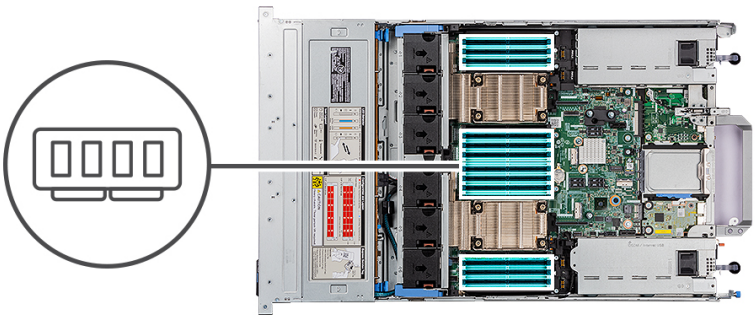
1. Install the system cover.
2. Follow the procedure in After working inside your computer.

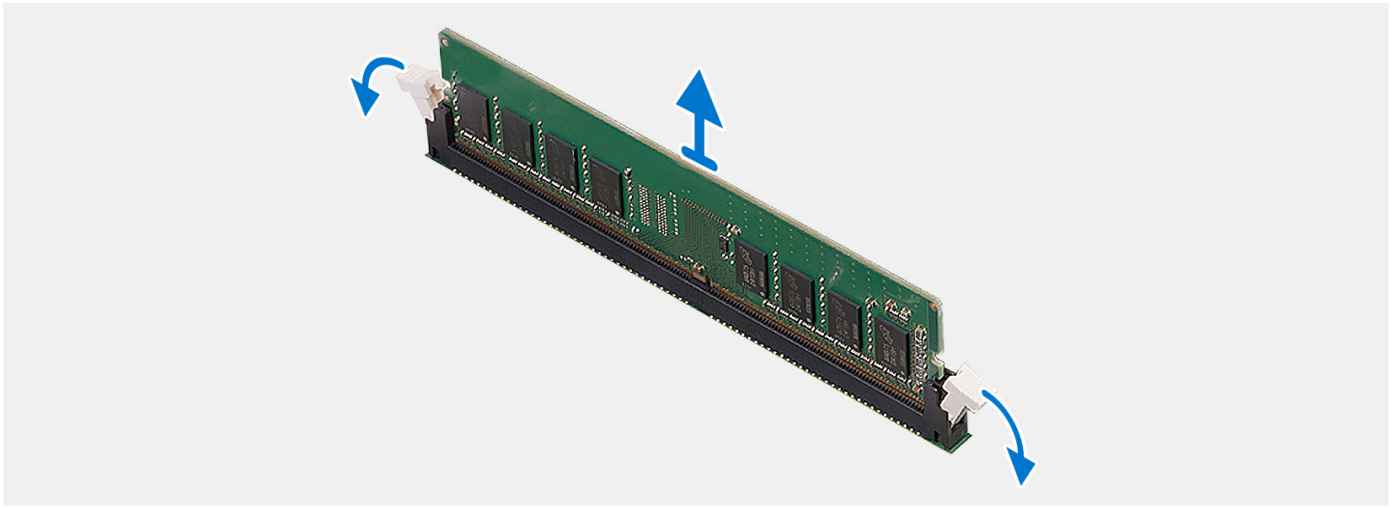
Memory modules

Removing the memory module

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the air shroud.

The following image indicates the location of the memory modules and provide a visual representation of the removal procedure.



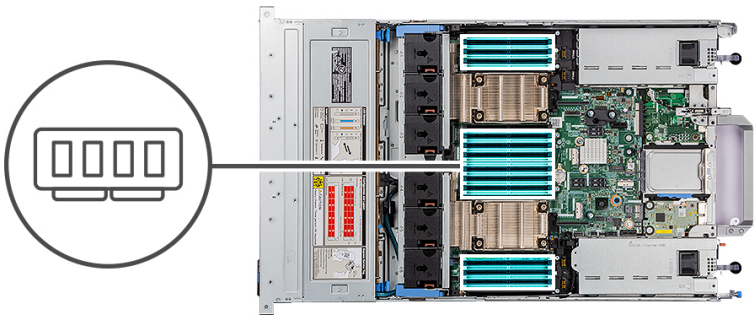


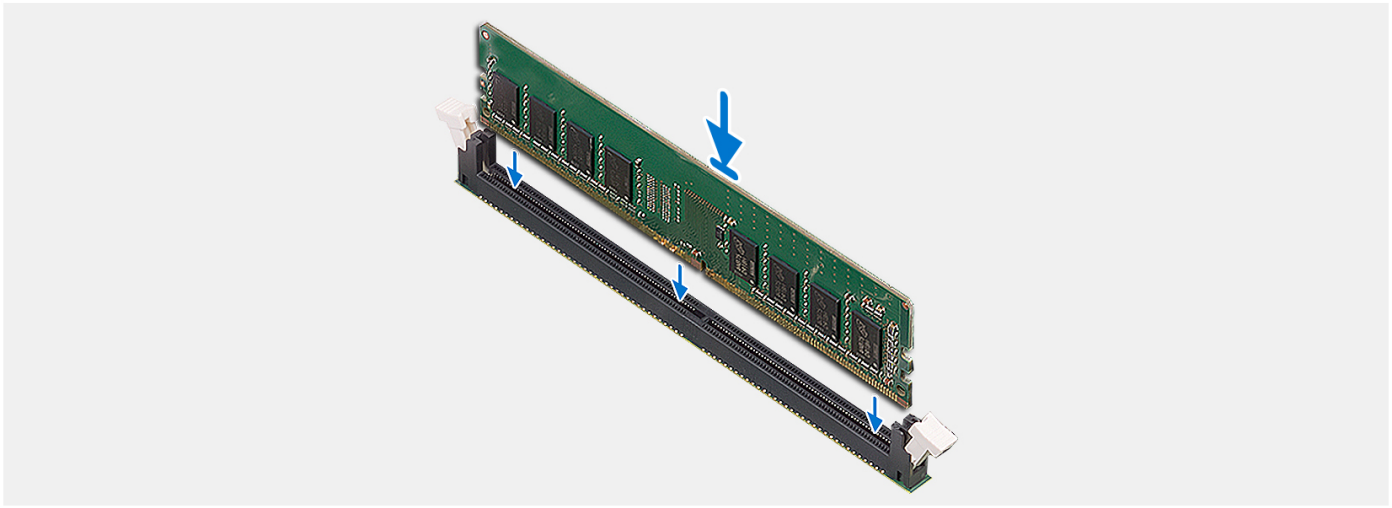
1. Pull the securing clips from both side of the memory module until the memory module pops up.
2. Lift to remove the memory module from the memory-module slot.

Installing the memory module

If you are replacing a component, remove the existing component before performing the installation procedure.

The following image indicates the location of the memory modules and provides a visual representation of the installation procedure.





1. Align the notch on the memory module with the tab on the memory-module slot.
2. Press the memory module down with your thumbs until the securing clips firmly click into place.

   NOTE: If you do not hear the click, remove the memory module and reinstall it.

NOTE: AMD graphics cards cannot tie to memory over and including 1 TB.

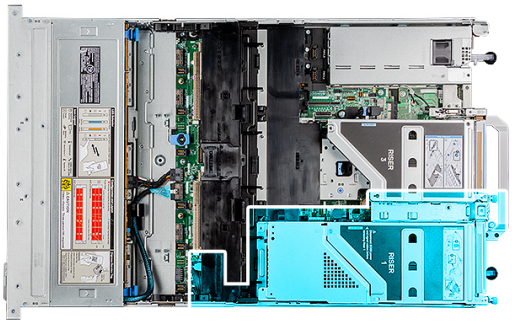
1. Install the air shroud.
2. Install the system cover.
3. Follow the procedure in After working inside your computer.

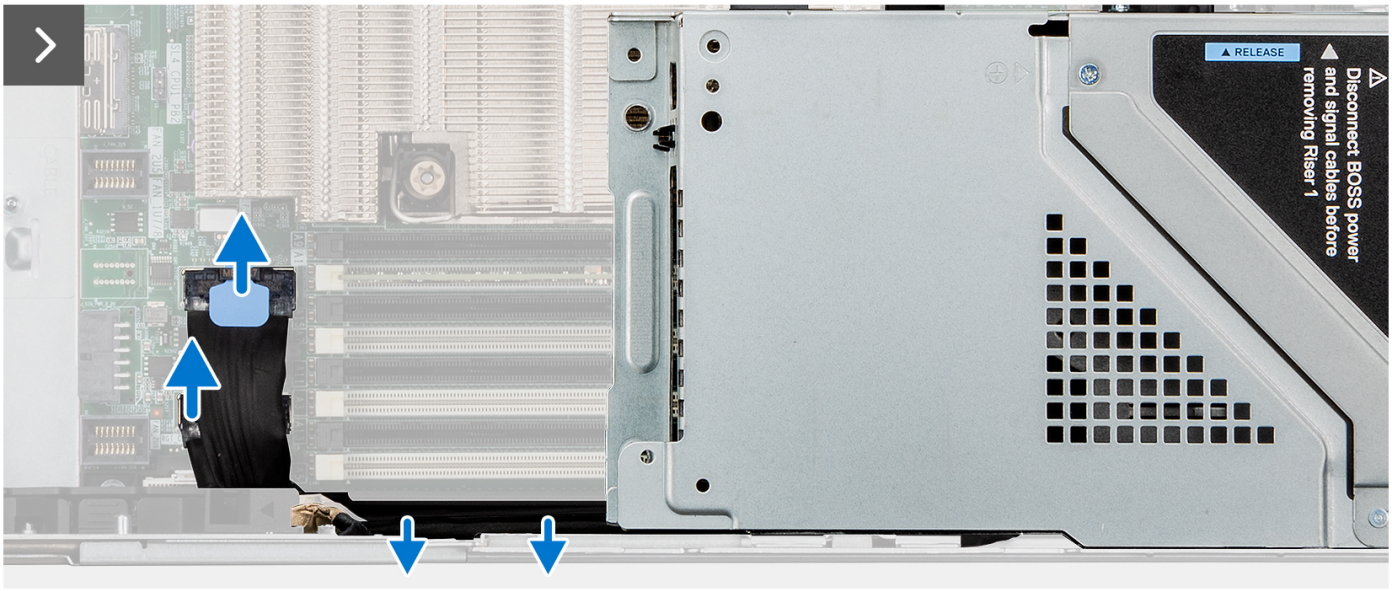
Expansion card

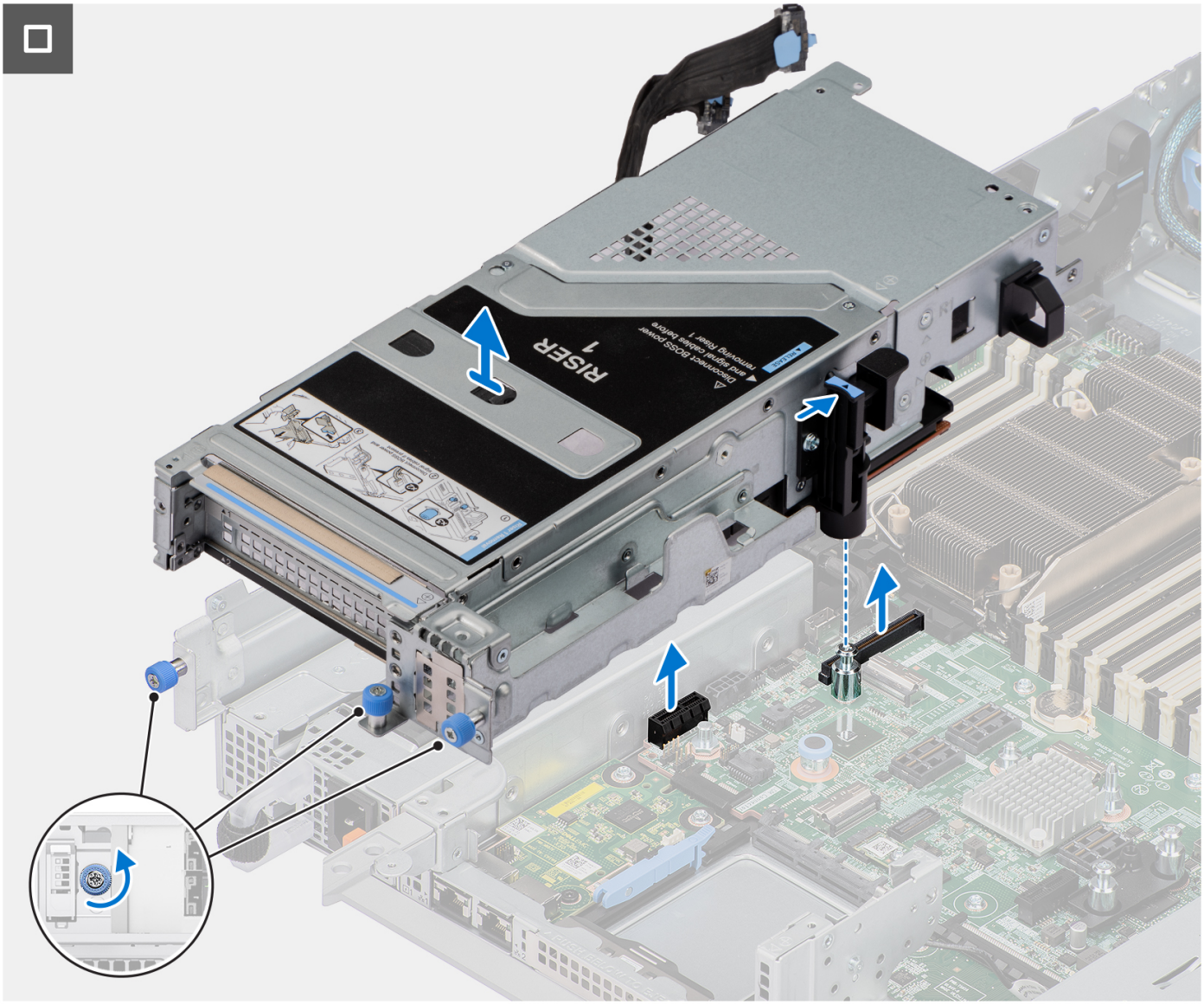
Removing the riser card 1

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the air shroud.

The following images indicate the location of the riser card 1 and provide a visual representation of the removal procedure.


RISER 3
RISER 1


RELEASE
Disconnect BOSS power and signal cables before removing Riser 1

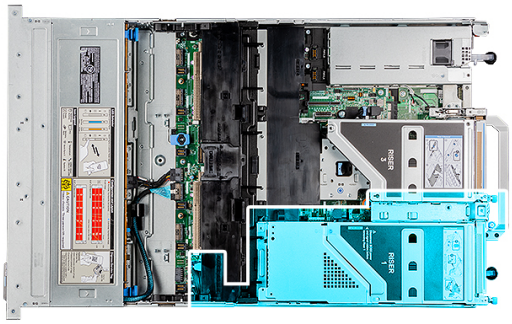


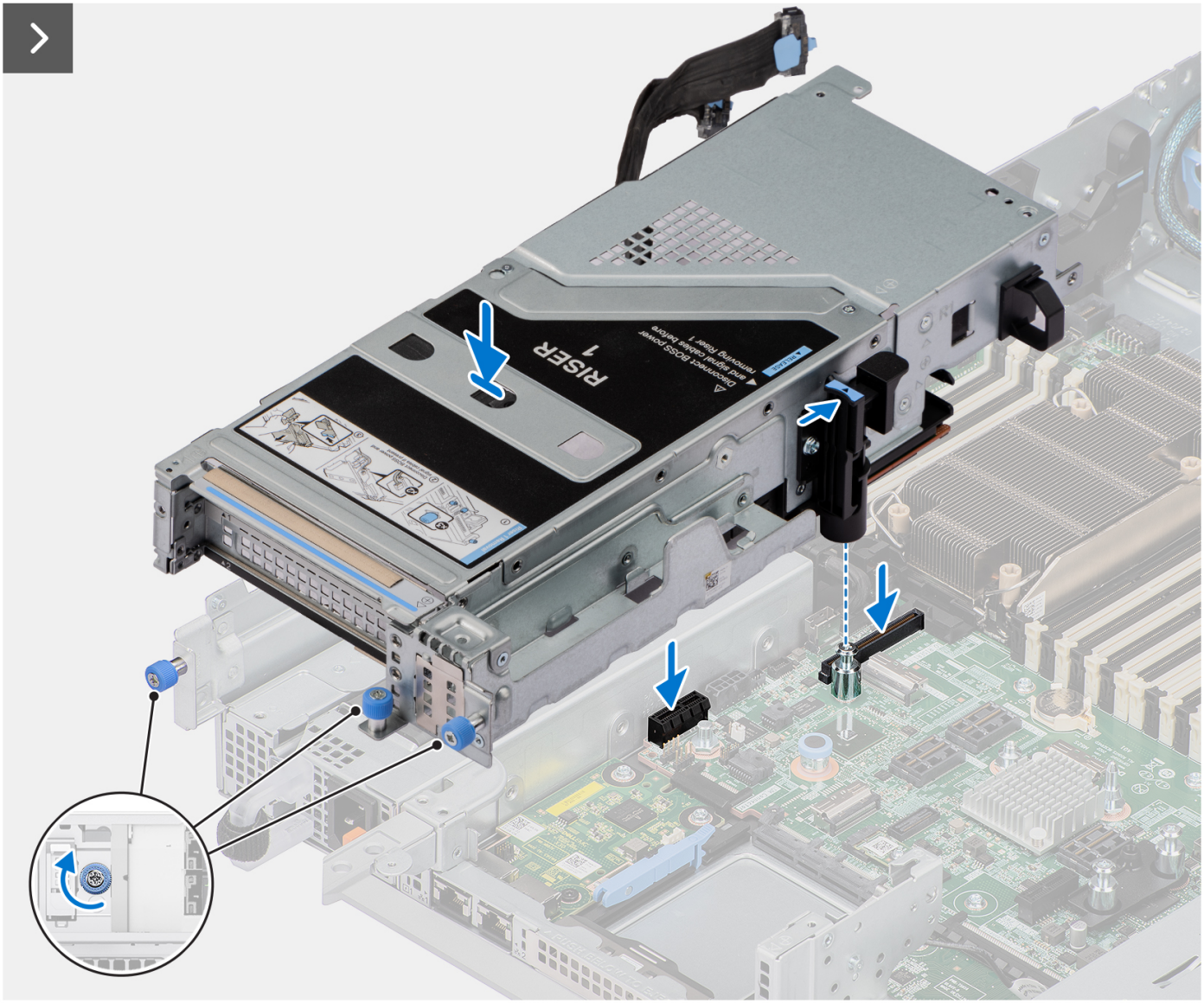
1. Hold and pull the blue strip to disconnect the riser card 1 cables from their connectors on the system board.
2. Loosen the captive screws on the riser and computer.
3. Push the release button on the riser and holding the edges lift the riser card 1 from the riser connectors on the system board.

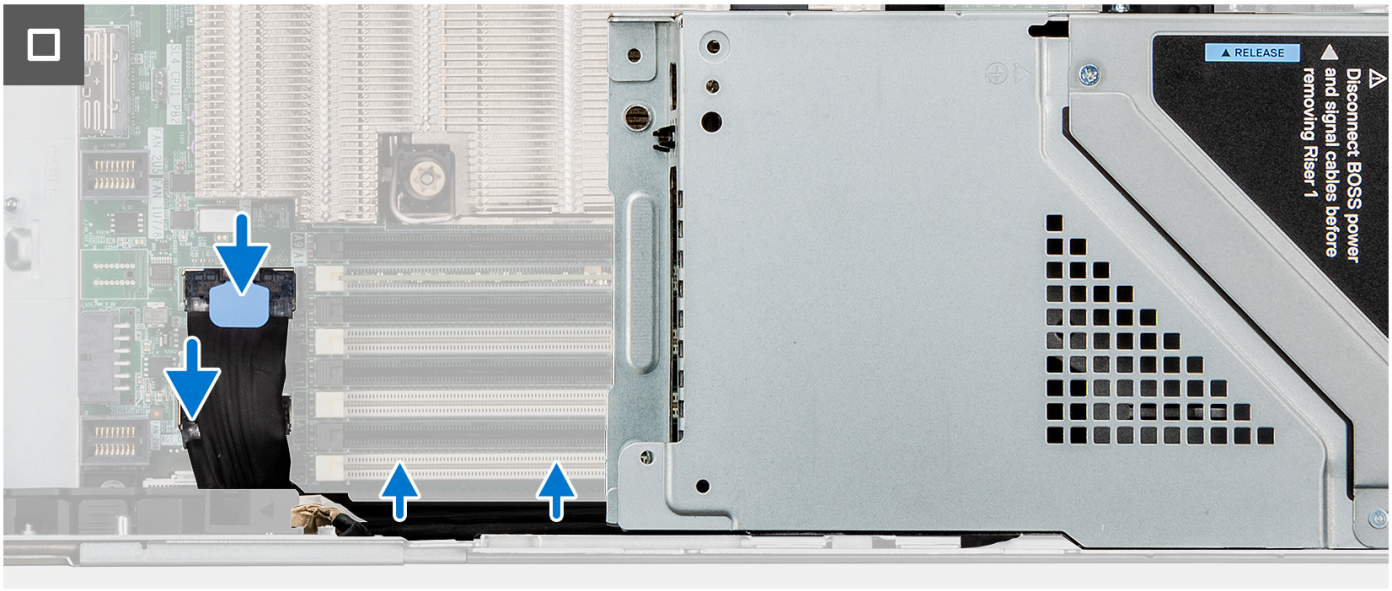
Installing the riser card 1

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the riser card 1 and provide a visual representation of the installation procedure.




RISER 1



1. Align the holes on the expansion card riser with the guides on the system board.
2. Push the release button on the riser and holding the edges lower the riser card 1 into its connector on the system board connector.
3. Tighten the captive screws on the riser to secure it to the computer.
4. Connect the riser card 1 cables to the connectors on the system board.

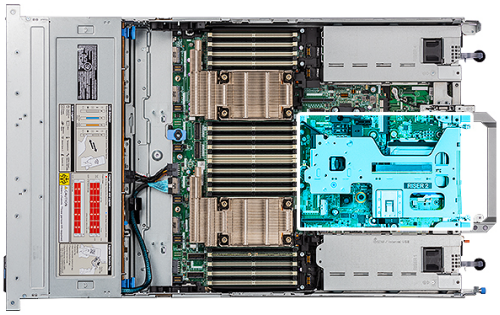
NOTE: System must not be Turned On if the Riser card 1 is not installed. When Riser card 1 is not installed, the system boots and displays as a PowerEdge system.

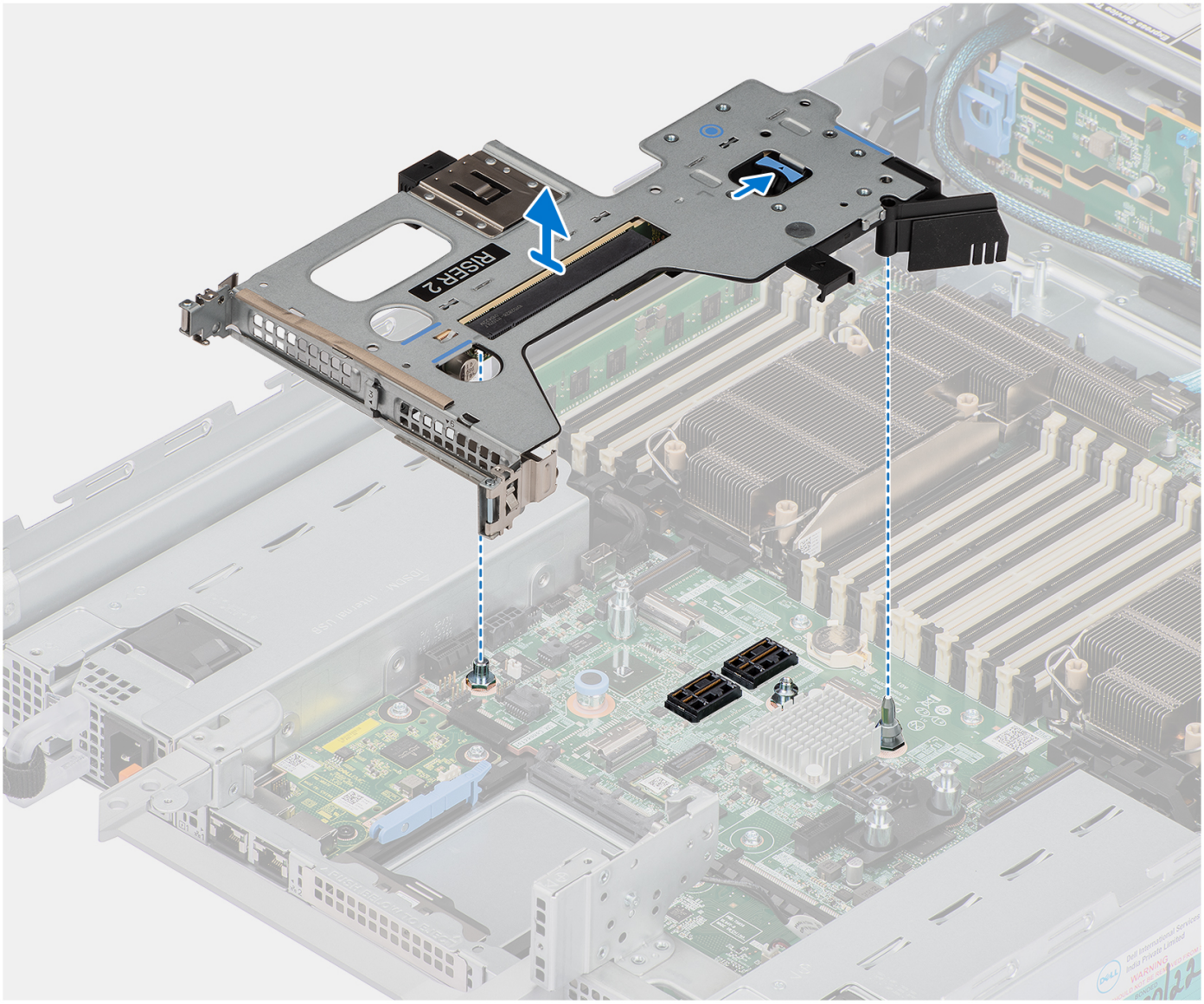
1. Install the air shroud.
2. Install the system cover.
3. Follow the procedure in After working inside your computer.

Removing the riser card 2

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the air shroud.

The following images indicate the location of the riser card 2 and provide a visual representation of the removal procedure.



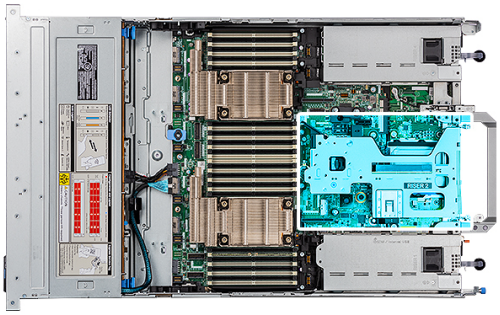


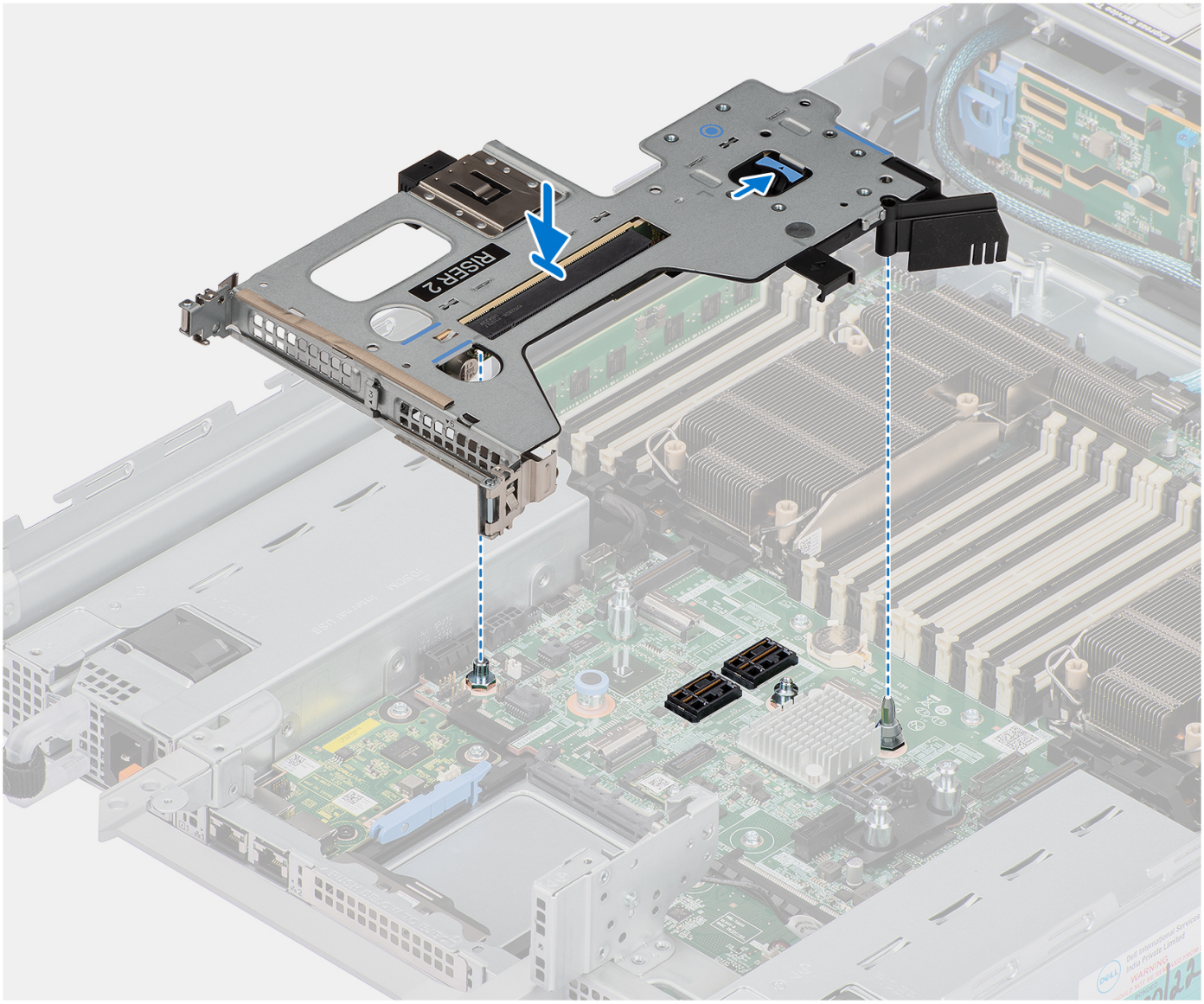
Press the blue release tab on the riser and holding the edges lift the riser card 2 from the riser connector on the system board.

Installing the riser card 2

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the riser card 2 and provide a visual representation of the installation procedure.





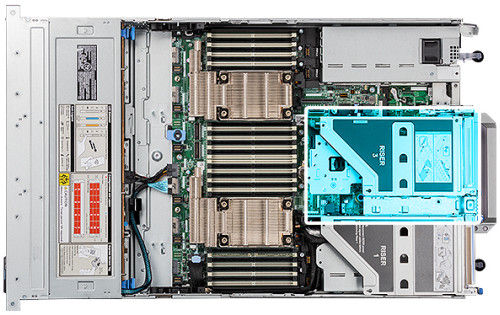
1. Align the holes on the expansion card riser with the guides on the system board.
2. Push the release button on the riser and holding the edges lower the riser card 2 into its connector on the system board connector.

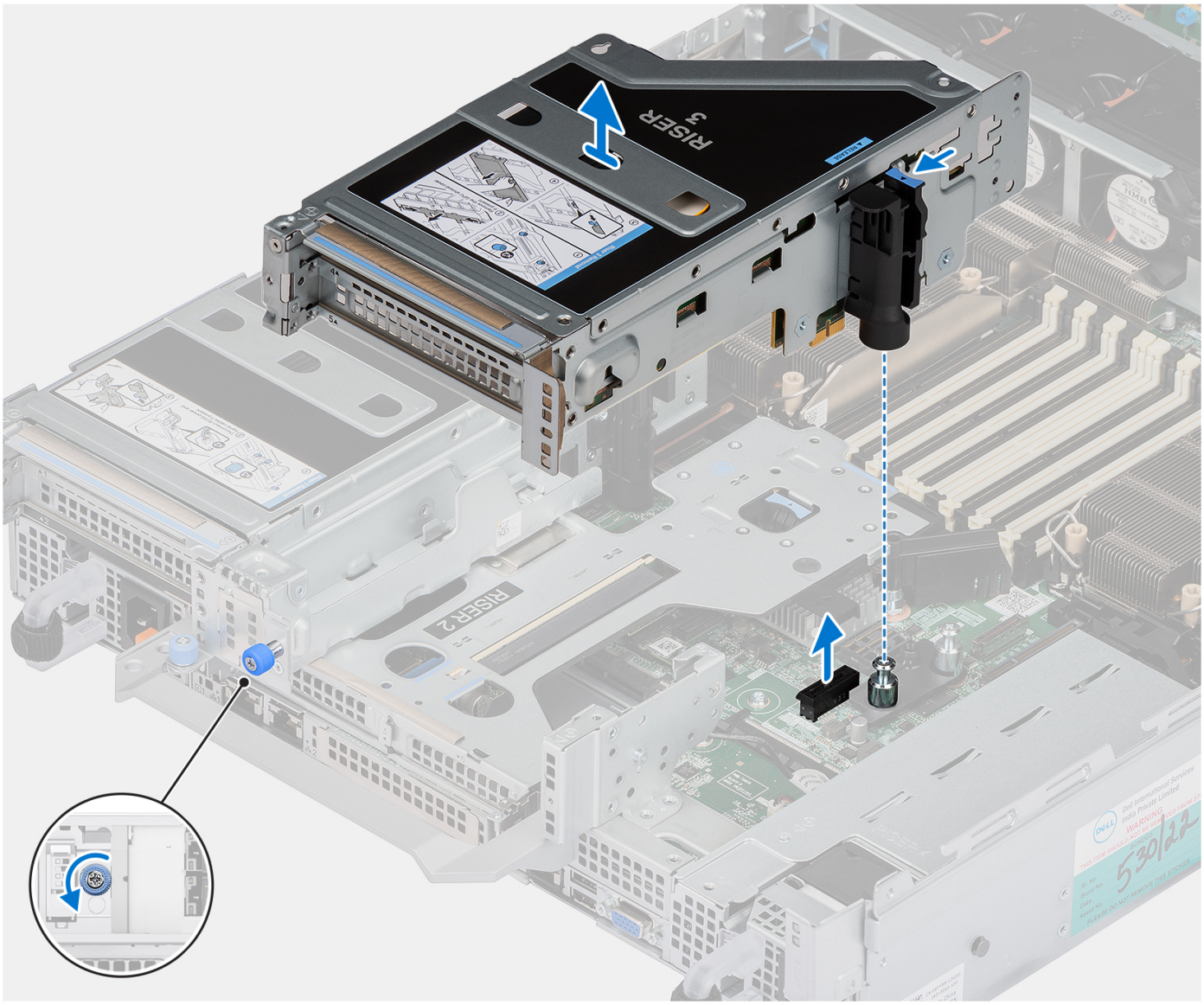
1. Install the air shroud.
2. Install the system cover.
3. Follow the procedure in After working inside your computer.

Removing the riser card 3

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the air shroud.

The following images indicate the location of the riser card 3 and provide a visual representation of the removal procedure.



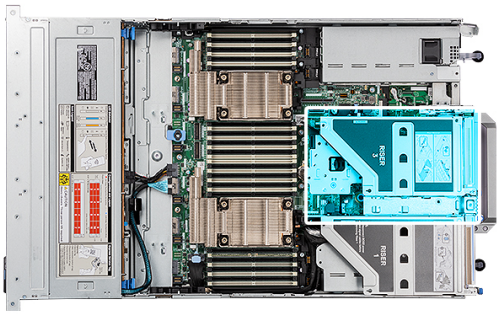


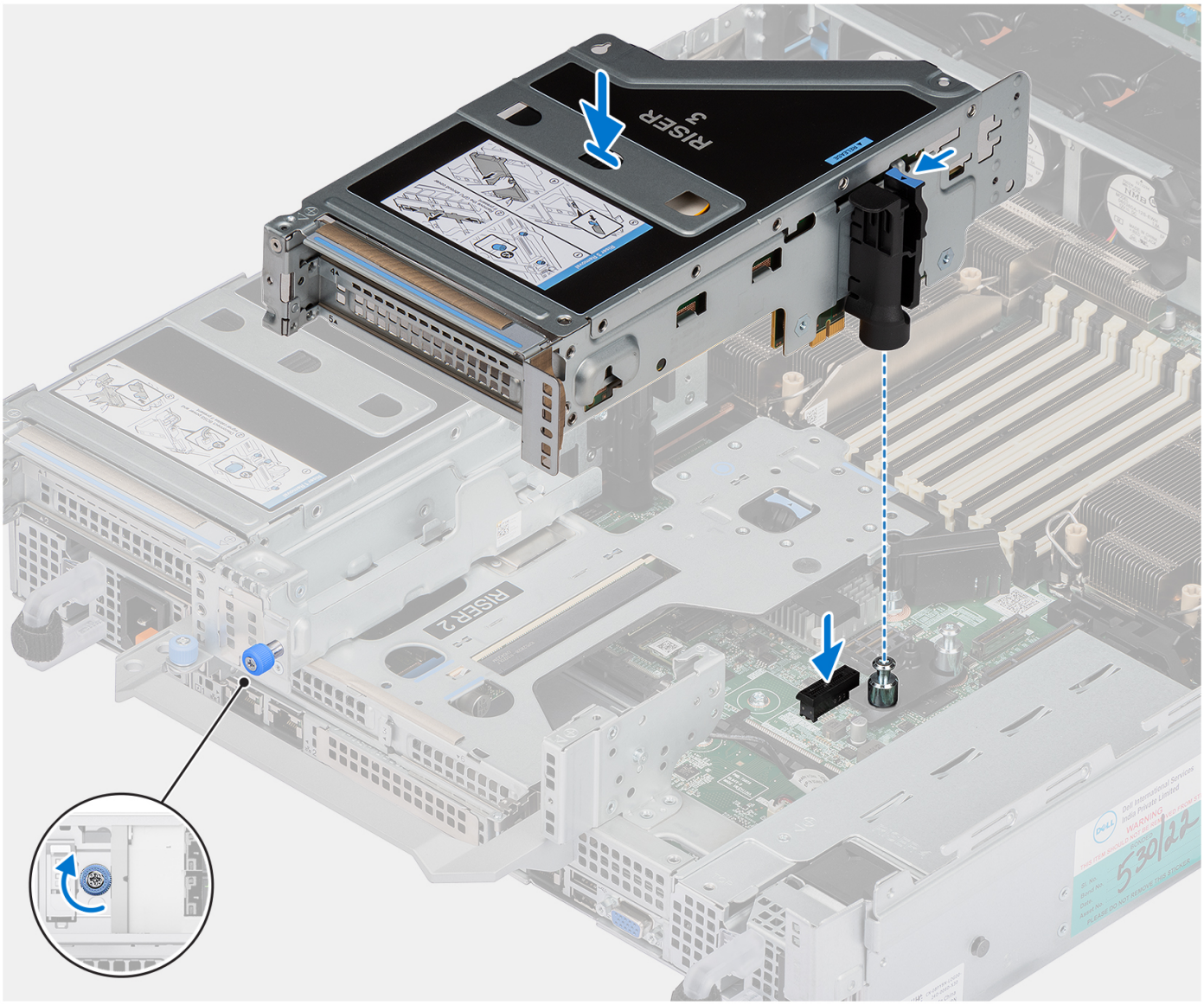
1. Loosen the captive screw that secures the riser card 3 to the computer.
2. Press the blue release tab on the riser and holding the edges lift the riser card 3 from the riser connector on the system board.

Installing the riser card 3

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the riser card 3 and provide a visual representation of the installation procedure.





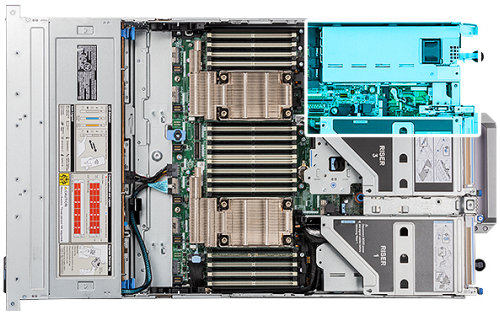
1. Align the holes on the expansion card riser with the guides on the system board.
2. Push the release button on the riser and holding the edges lower the riser card 3 into its connector on the system board connector.
3. Tighten the captive screw to secure the riser card 3 to the computer.

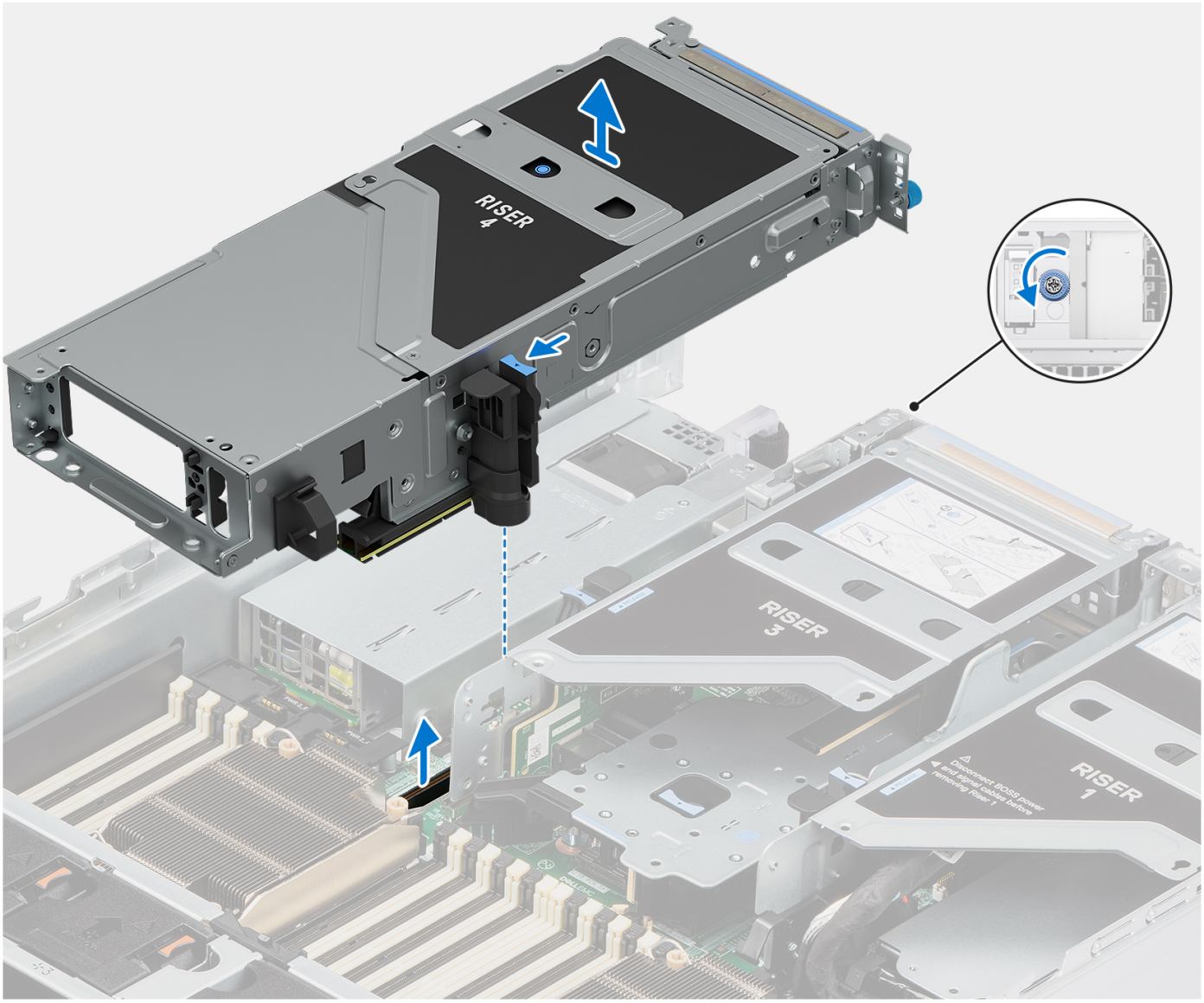
1. Install the air shroud.
2. Install the system cover.
3. Follow the procedure in After working inside your computer.

Removing the riser card 4

1. Follow the procedure in Before working inside your computer.
2. Remove the system cover.
3. Remove the air shroud.

The following images indicate the location of the riser card 4 and provide a visual representation of the removal procedure.



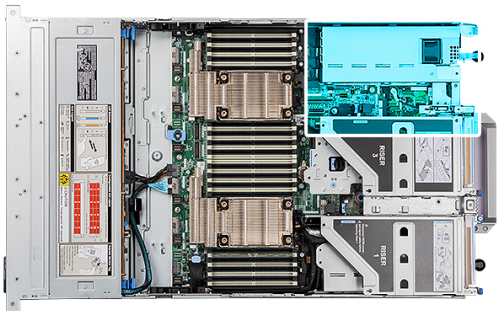


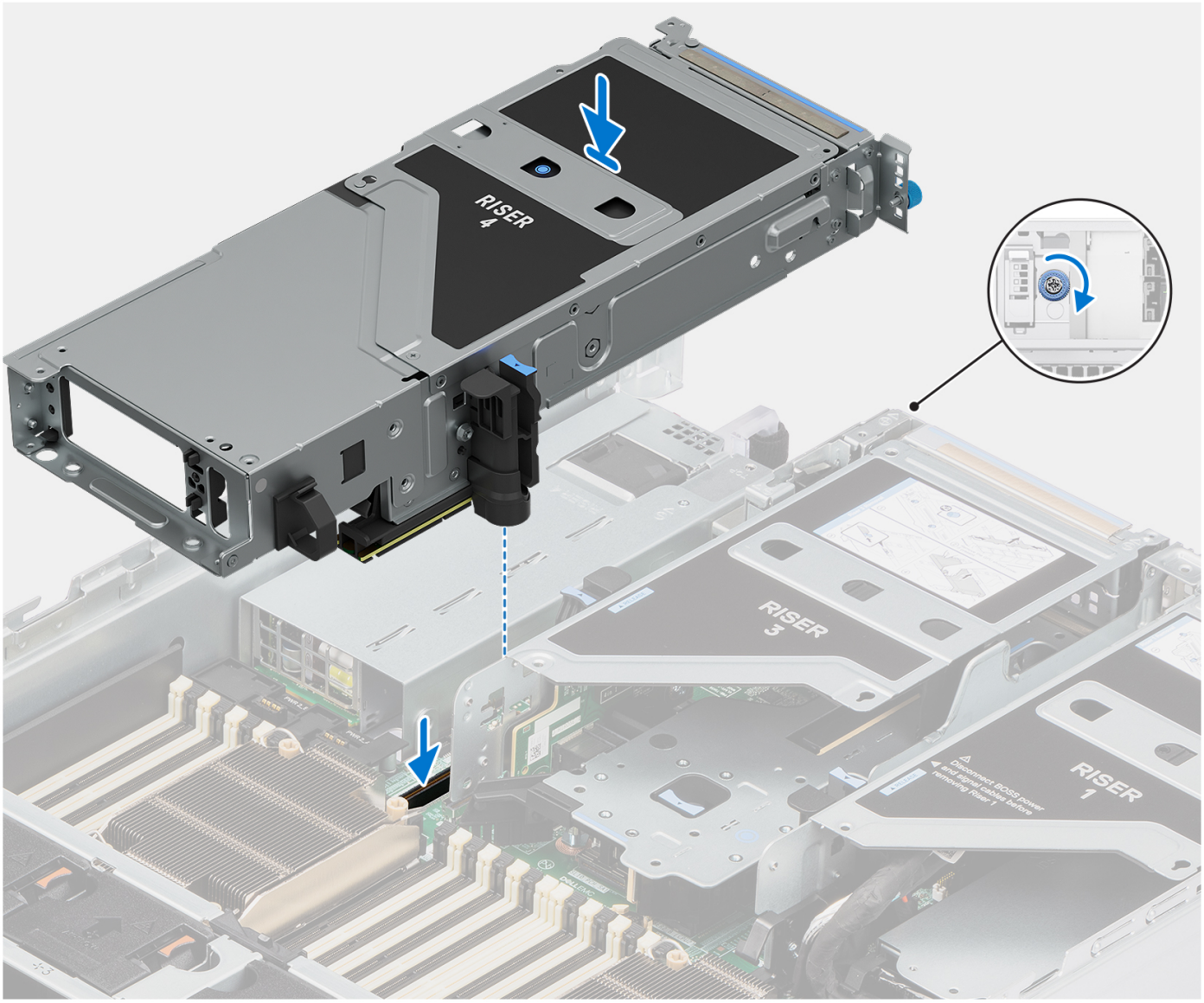
1. Loosen the captive screw that secures the riser card 4 to the computer.
2. Press the blue release tab on the riser and holding the edges lift the riser card 4 from the riser connector on the system board.

Installing the riser card 4

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the riser card 4 and provide a visual representation of the installation procedure.





1. Align the holes on the expansion card riser with the guides on the system board.
2. Push the release button on the riser and holding the edges lower the riser card 4 into its connector on the system board connector.
3. Tighten the captive screw to secure the riser card 4 to the computer.

1. Install the air shroud.
2. Install the system cover.
3. Follow the procedure in After working inside your computer.

System board

Removing the system board

1. Follow the procedure in Before working inside your computer.

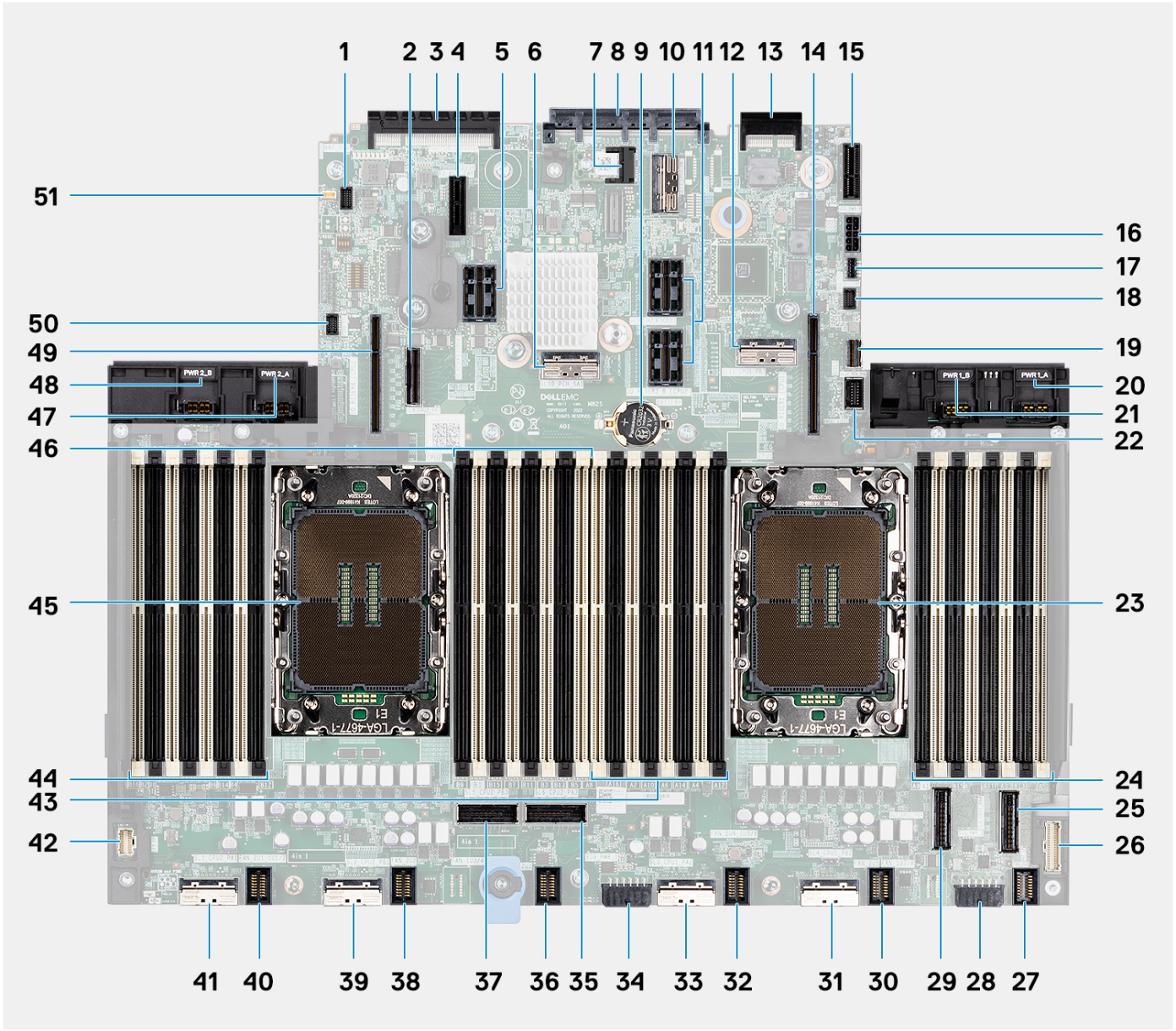
   NOTE: Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.

   NOTE: Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

   NOTE: Before disconnecting the cables from the system board, note the location of the connectors so that you can reconnect the cables correctly after you replace the system board.
2. Remove the system cover.
3. Remove the air shroud.
4. Remove the cooling fan assembly.
5. Remove the left control panel.
6. Remove the right control panel.
7. Remove the left wall bracket.
8. Remove the right wall bracket.
9. Remove the memory module.
10. Remove the riser card 1.
11. Remove the riser card 2.
12. Remove the riser card 3.
13. Remove the riser card 4.
14. Remove the processors and heat-sink module.

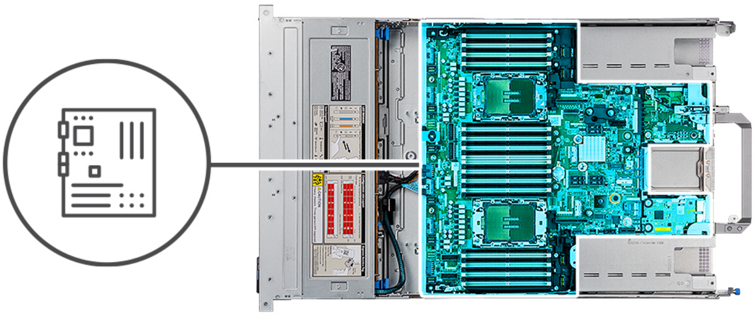
The following images indicate the location of the system board and provide a visual representation of the removal procedure.

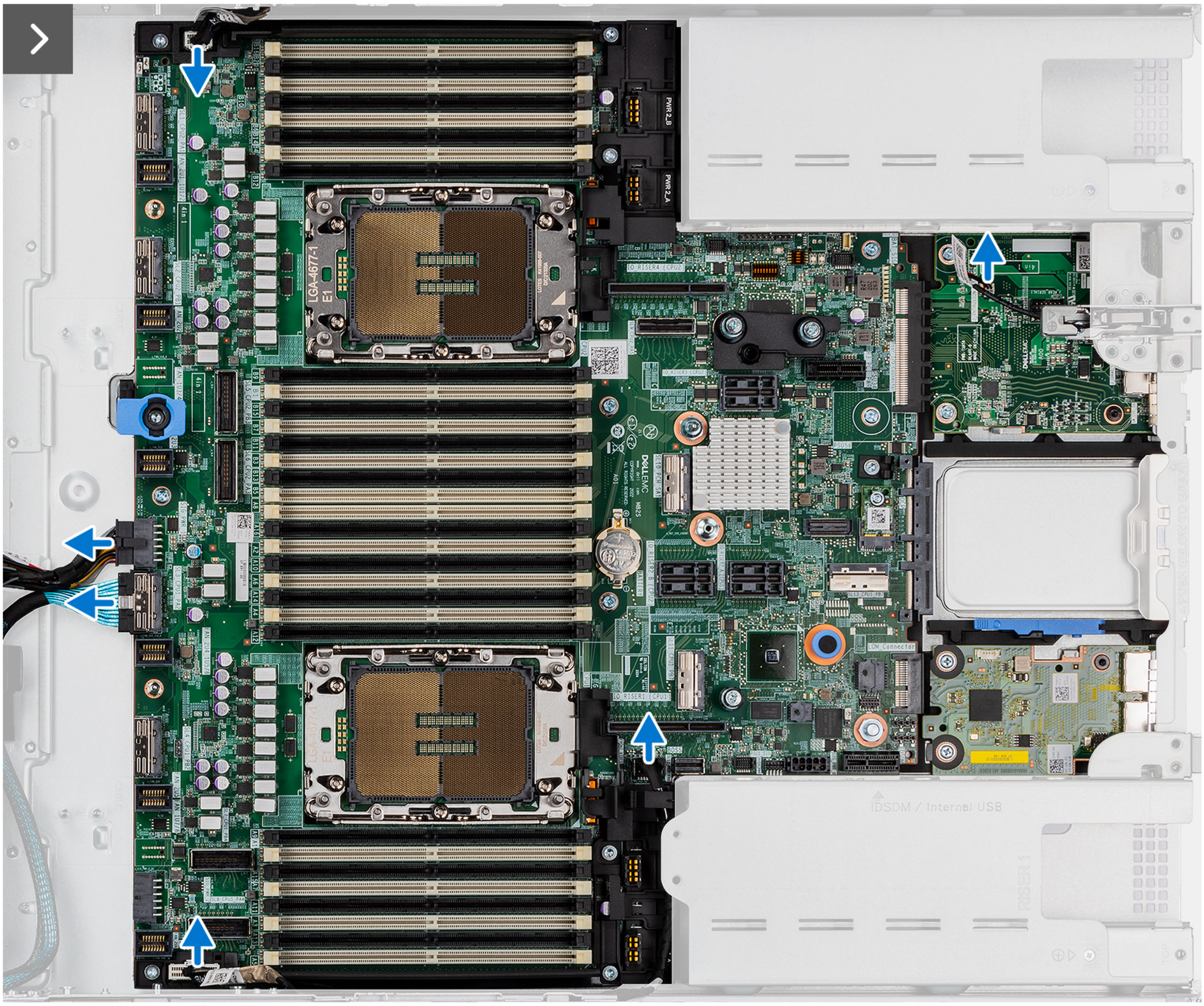
The following image indicates the connectors on your system board:

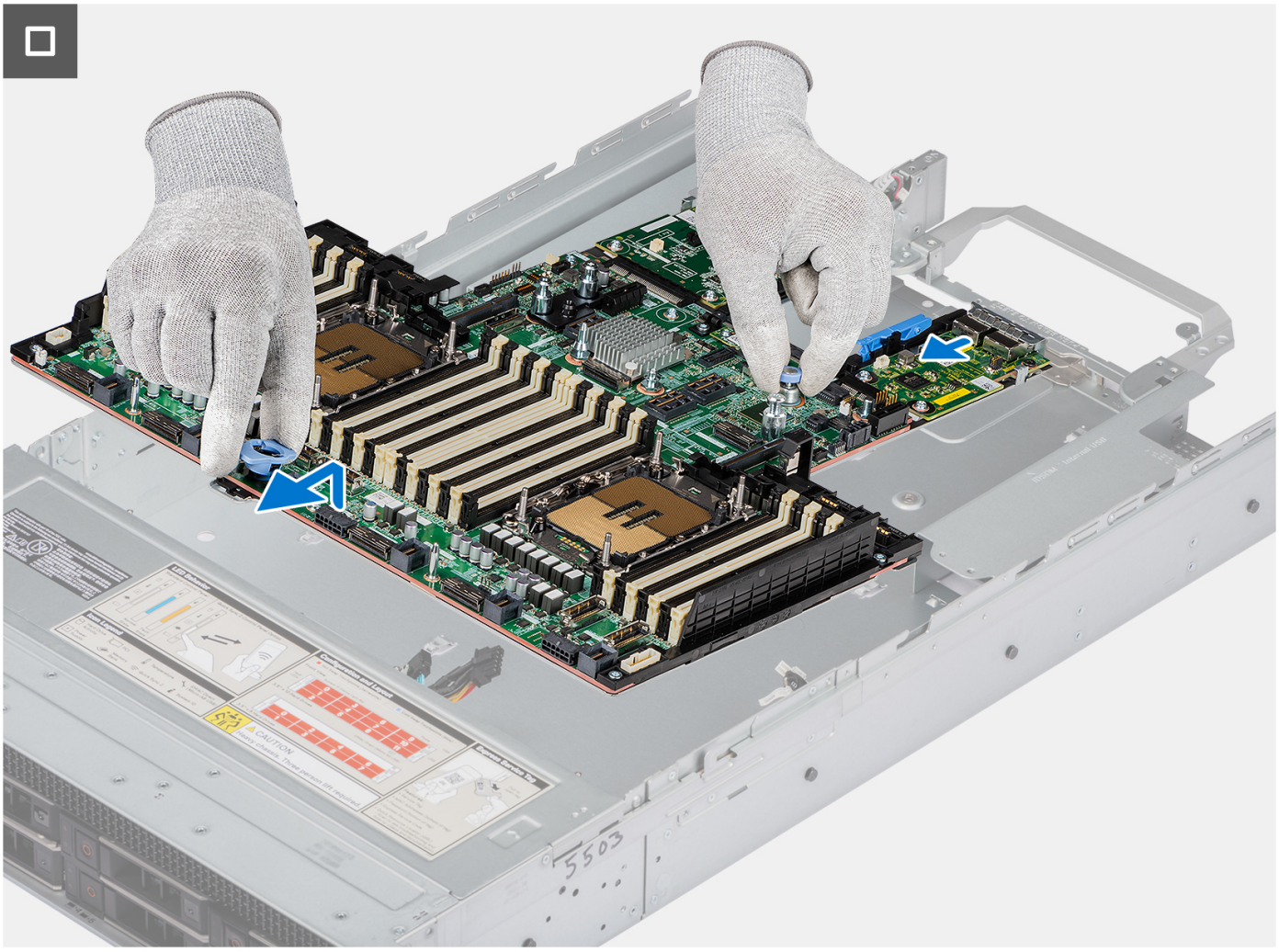


1. Battery SIG connector
2. PCIe connector 9
3. Rear I/O connector
4. Riser 3 power connector
5. Riser 3 - CPU 2 required
6. SATA connector 10
7. TPM Connector
8. OCP NIC 3.0 connector
9. Coin cell battery
10. PCIe connector 13
11. Riser 2
12. PCIe connector 11
13. LOM connector
14. Riser 1
15. iDSDM slot
16. Power connector 0
17. BOSS_PWR/ODD_PWR connector
18. PSU 1 PUCK sideband signal
19. PCIe connector 12

20. Power 1_A
21. Power 1_B
22. Front VGA connector
23. CPU 1
24. DIMMs for CPU 1
25. PCIe connector 8
26. Right control panel connector
27. Fan 6
28. Power connector 2
29. PCIe connector 7
30. Fan 5
31. PCIe connector 4
32. Fan 4
33. PCIe connector 3
34. Power connector 1
35. PCIe connector 6
36. Fan 3
37. PCIe connector 5
38. Fan 2
39. PCIe connector 2
40. Fan 1
41. PCIe connector 1
42. Left control panel connector
43. DIMMs for CPU 1
44. DIMMs for CPU 2
45. CPU 2
46. DIMMs for CPU 2
47. Power 2_A
48. Power 2_B
49. Riser 4 - CPU 2 required
50. PSU 2 PUCK sideband signal
51. P16 for CPLD RACK_MGR





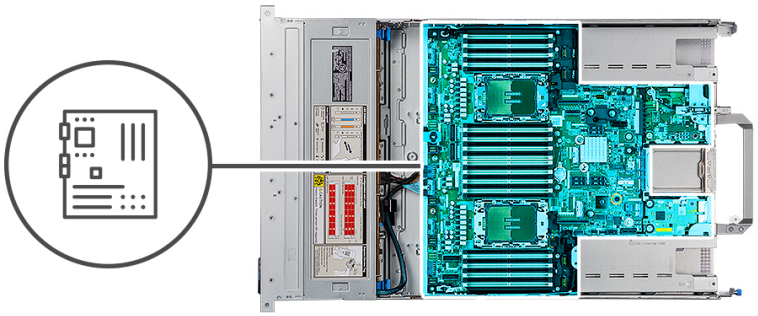


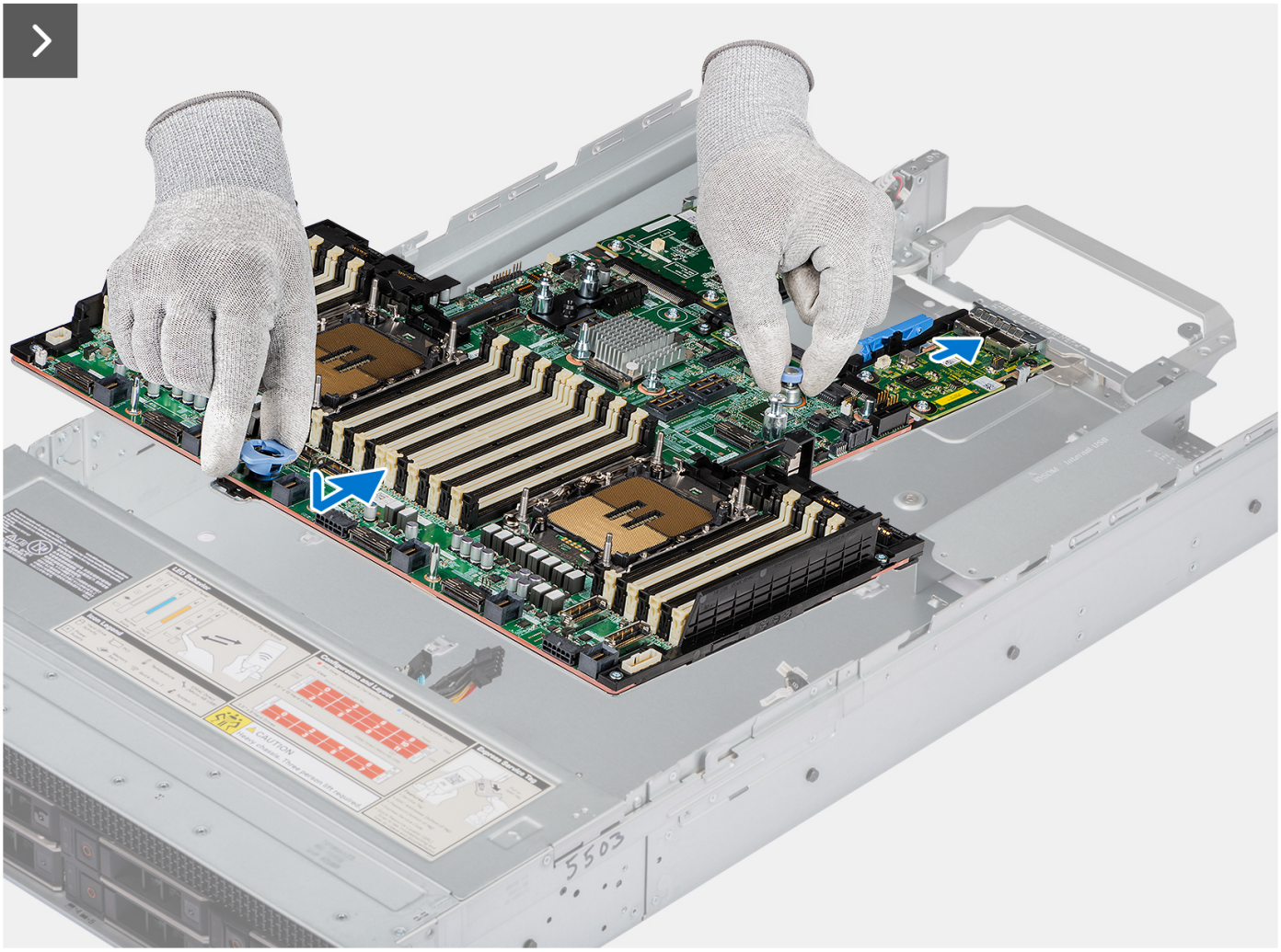
1. Disconnect all the cables from the system board and make note of all the cable connections.
2. Using the system board holder and plunger, slide the system board towards the front of the computer.
3. At a tilted angle, lift the system board out of the chassis.

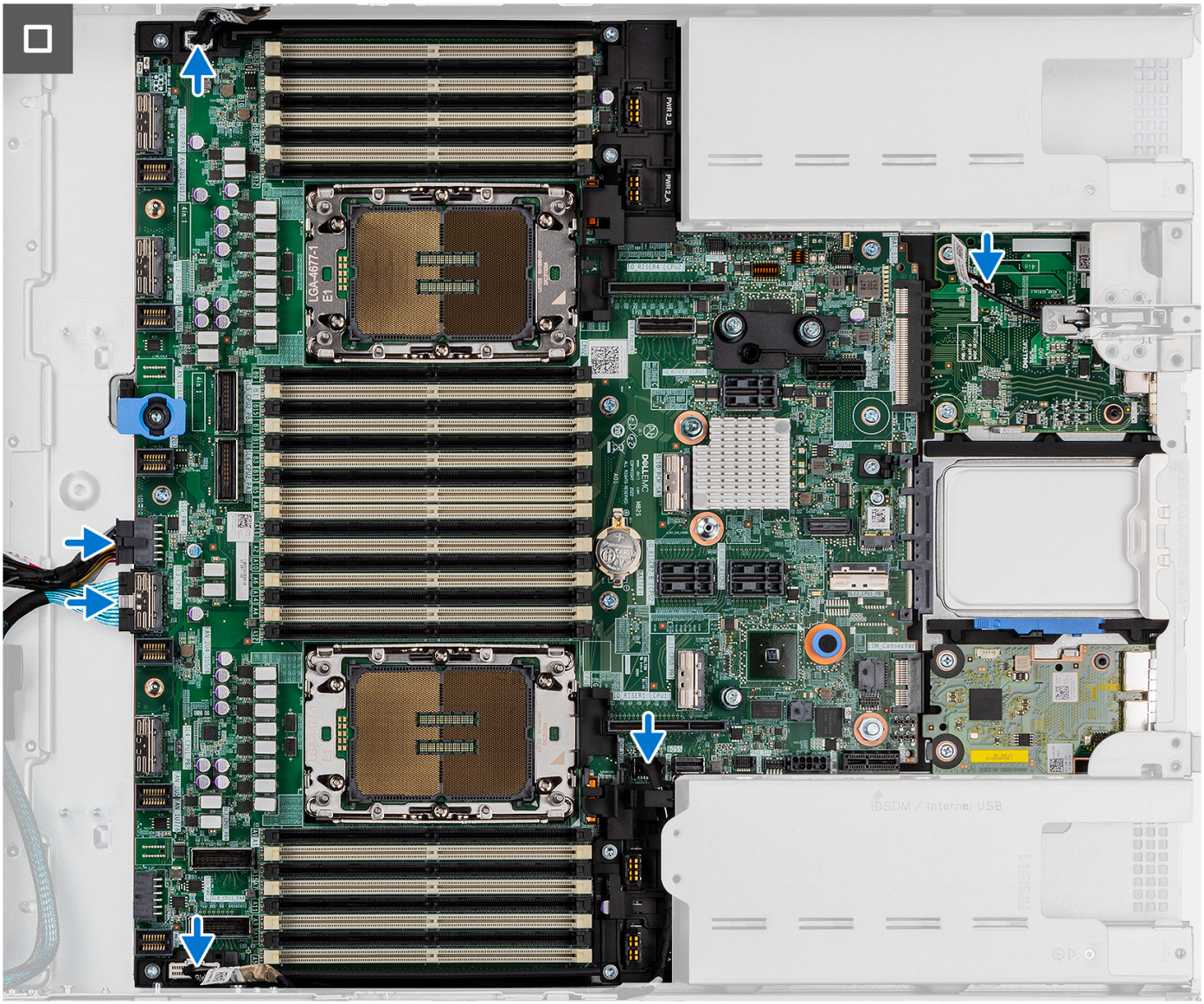
Installing the system board

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the system board and provide a visual representation of the installation procedure.







1. Hold the system board holder and plunger, lower the system board at a tilted angle into the computer.
2. Slide the system board towards the rear of the chassis until the connectors are firmly seated in the slots.
3. Connect all the cables to the systemboard.

1. Install the processors and heat-sink module.
2. Install the riser card 4.
3. Install the riser card 3.
4. Install the riser card 2.
5. Install the riser card 1.
6. Install the memory module.
7. Install the right wall bracket.
8. Install the left wall bracket.
9. Install the right control panel.
10. Install the left control panel.
11. Install the cooling fan assembly.
12. Install the air shroud.
13. Install the system cover.
14. Follow the procedure in After working inside your computer.

NOTE: Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.

NOTE: Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

Rear I/O card

Removing the Rear I/O card

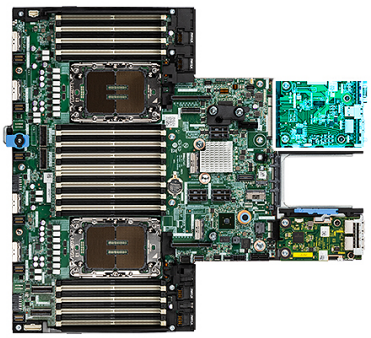
1. Follow the procedure in Before working inside your computer.

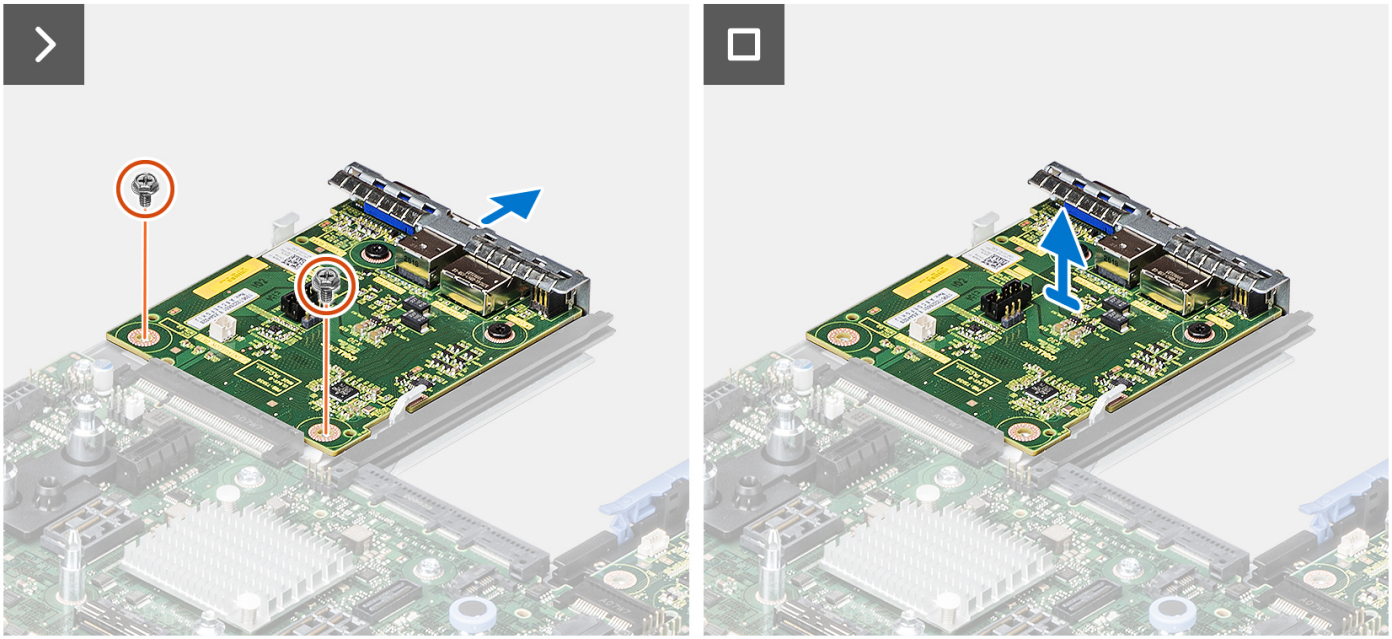
   NOTE: Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.

   NOTE: Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

   NOTE: Before disconnecting the cables from the system board, note the location of the connectors so that you can reconnect the cables correctly after you replace the system board.
2. Remove the system cover.
3. Remove the air shroud.
4. Remove the cooling fan assembly.
5. Remove the left control panel.
6. Remove the right control panel.
7. Remove the left wall bracket.
8. Remove the right wall bracket.
9. Remove the memory module.
10. Remove the riser card 1.
11. Remove the riser card 3.
12. Remove the riser card 2.
13. Remove the riser card 4.
14. Remove the processors and heat-sink module.
15. Remove the system board.

The following images indicate the location of the Rear I/O card and provide a visual representation of the removal procedure.





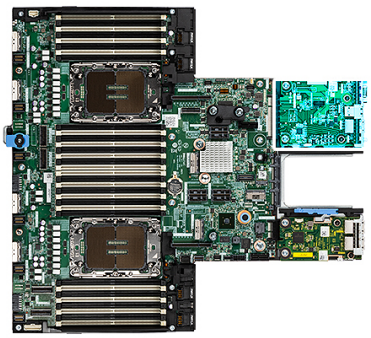
1. Remove the two (#6x32) screws that secure the Rear I/O card to the system board.
2. Holding the edges, pull the Rear I/O card to disconnect it from the connector on the system board.

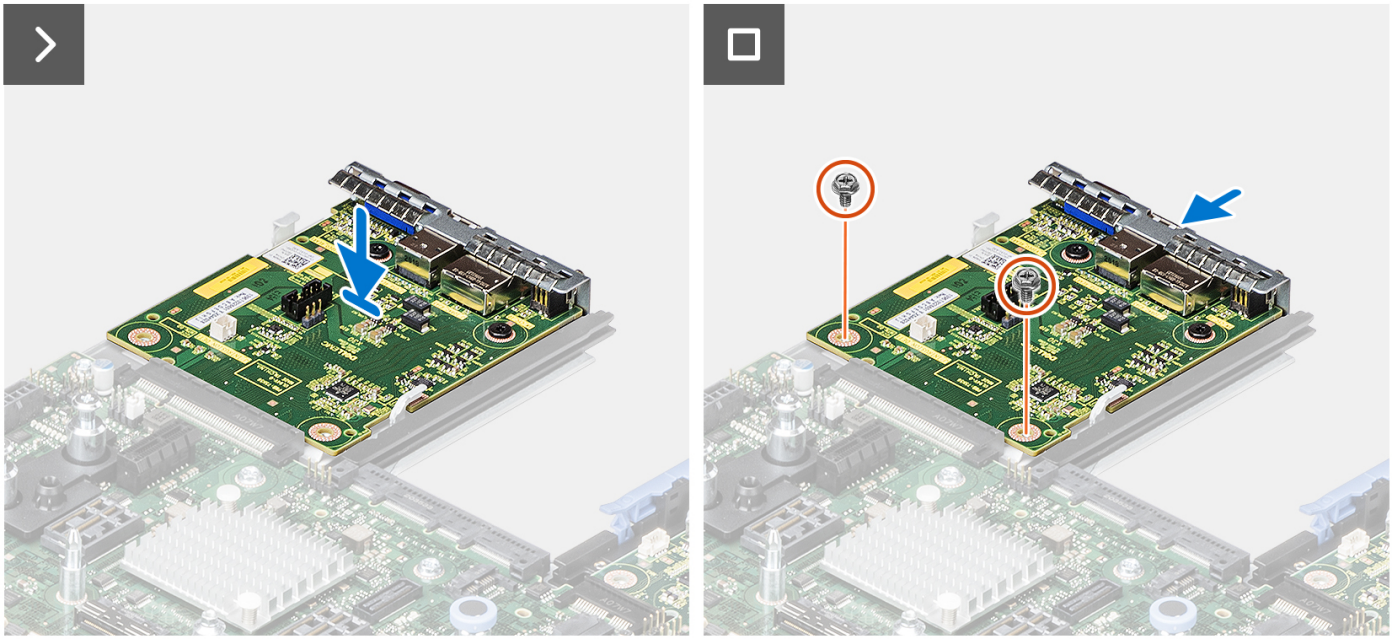
Installing the Rear I/O card

If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the Rear I/O card and provide a visual representation of the installation procedure.

2x
#6-32





1. Align the connectors and slots on the Rear I/O card on the system board.
2. Press the Rear I/O card until firmly seated on the system board connector.
3. Replace the two (#6x32) screws to secure the Rear I/O card to the system board.

1. Install the system board.
2. Install the processors and heat-sink module.
3. Install the riser card 4.
4. Install the riser card 2.
5. Install the riser card 3.
6. Install the riser card 1.
7. Install the memory module.
8. Install the right wall bracket.
9. Install the left wall bracket.
10. Install the right control panel.
11. Install the left control panel.
12. Install the cooling fan assembly.
13. Install the air shroud.
14. Install the system cover.
15. Follow the procedure in After working inside your computer.

NOTE: Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.

NOTE: Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

LAN on Motherboard (LOM) card

Removing the LOM card

1. Follow the procedure in Before working inside your computer.

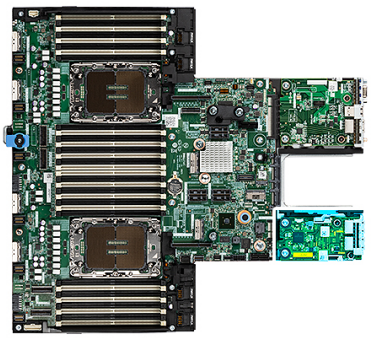
   NOTE: Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.

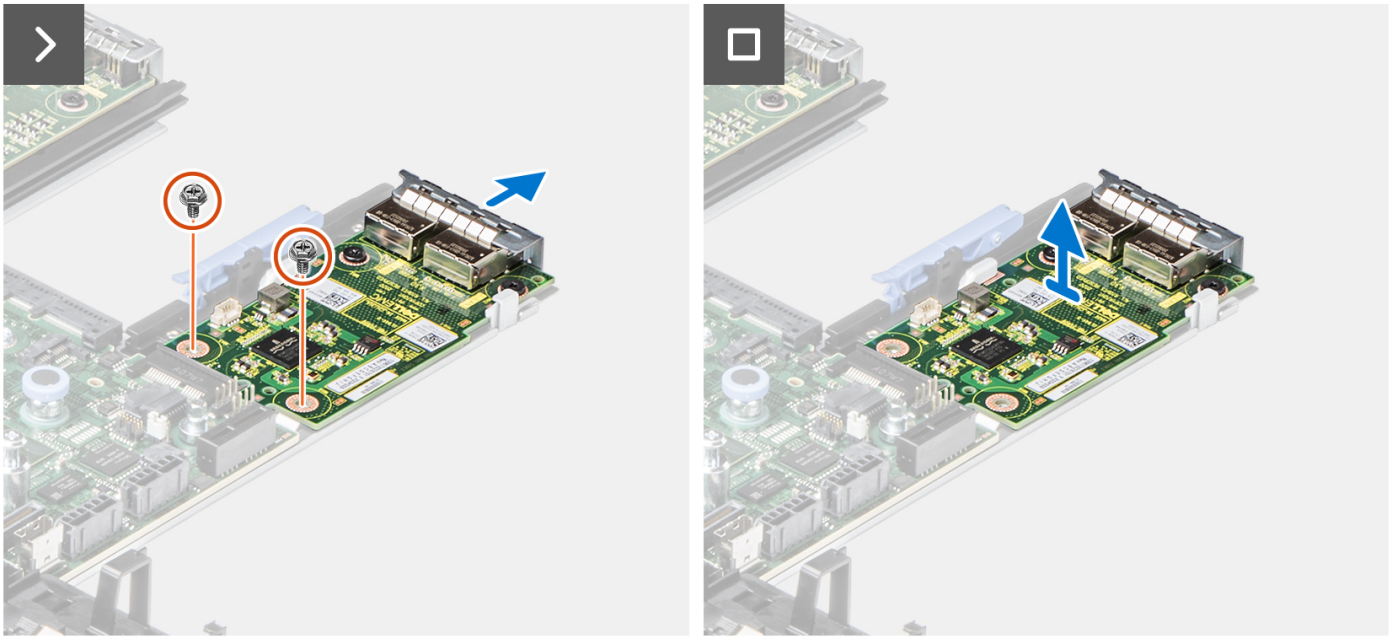
   NOTE: Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

   NOTE: Before disconnecting the cables from the system board, note the location of the connectors so that you can reconnect the cables correctly after you replace the system board.
2. Remove the system cover.
3. Remove the air shroud.
4. Remove the cooling fan assembly.
5. Remove the left control panel.
6. Remove the right control panel.
7. Remove the left wall bracket.
8. Remove the right wall bracket.
9. Remove the memory module.
10. Remove the riser card 1.
11. Remove the riser card 3.
12. Remove the riser card 2.
13. Remove the riser card 4.
14. Remove the processors and heat-sink module.
15. Remove the system board.

The following images indicate the location of the LOM card and provide a visual representation of the removal procedure.

2x
#6-32





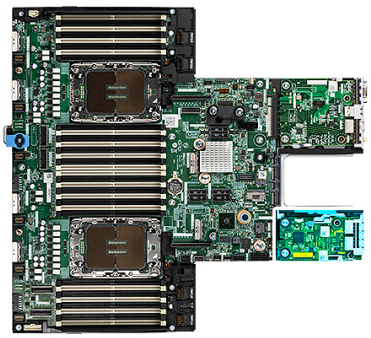
1. Remove the two (#6x32) screws that secure the LOM card to the system board.
2. Holding the edges, pull the LOM card to disconnect it from the connector on the system board.

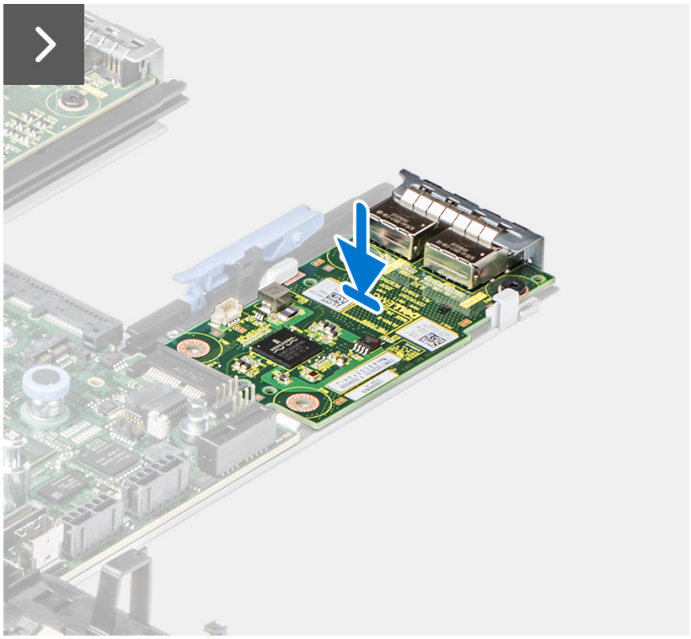
Installing the LOM card

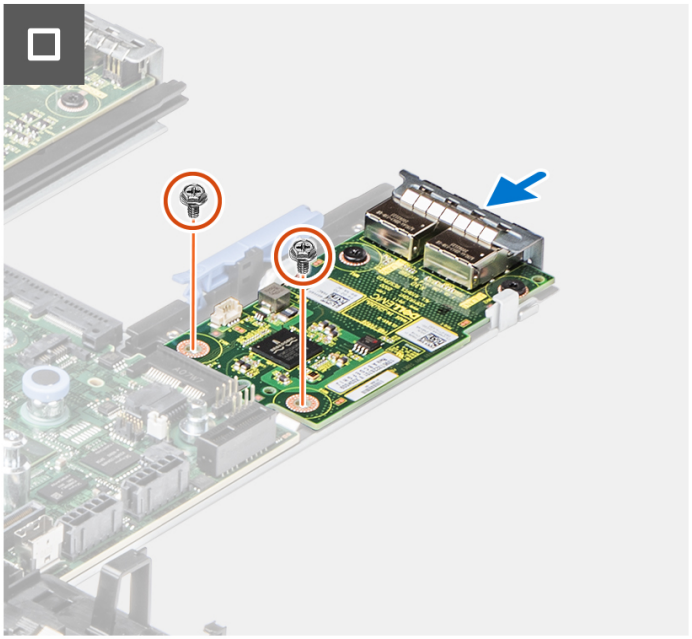
If you are replacing a component, remove the existing component before performing the installation procedure.

The following images indicate the location of the LOM card and provide a visual representation of the installation procedure.

2x
#6-32







1. Align the connectors and slots on the LOM card on the system board.
2. Press the LOM card until firmly seated on the system board connector.
3. Replace the two (#6x32) screws to secure the LOM card to the system board.

1. Install the system board.
2. Install the processors and heat-sink module.
3. Install the riser card 4.
4. Install the riser card 2.
5. Install the riser card 3.
6. Install the riser card 1.
7. Install the memory module.
8. Install the right wall bracket.
9. Install the left wall bracket.
10. Install the right control panel.
11. Install the left control panel.
12. Install the cooling fan assembly.
13. Install the air shroud.
14. Install the system cover.
15. Follow the procedure in After working inside your computer.

NOTE: Your computer's Service Tag is stored in the system board. You must enter the Service Tag in the BIOS setup program after you replace the system board.

NOTE: Replacing the system board removes any changes that you have made to the BIOS using the BIOS setup program. You must make the appropriate changes again after you replace the system board.

3

Drivers and downloads

When troubleshooting, downloading or installing drivers it is recommended that you read the Dell Knowledge Base article, Drivers and Downloads FAQs 000123347.

4

BIOS Setup

CAUTION: Unless you are an expert computer user, do not change the settings in the BIOS Setup. Certain changes can make your computer work incorrectly.

NOTE: Depending on the computer and its installed devices, the items listed in this section may or may not be displayed.

NOTE: Before you change the settings in BIOS Setup, it is recommended that you note down the original settings for future reference.

Use BIOS Setup for the following purposes:

- Get information about the hardware installed in your computer, such as the amount of RAM and the size of the hard drive.
- Change the system configuration information.
- Set or change a user-selectable option, such as the user password, type of hard drive installed, and enabling or disabling base devices.

Entering BIOS setup program

Turn on (or restart) your computer and press F2 immediately.

Navigation keys

NOTE: For most of the System Setup options, changes that you make are recorded but do not take effect until you restart the system.

Table 2. Navigation keys

Keys	Navigation
Up arrow	Moves to the previous field.
Down arrow	Moves to the next field.
Enter	Selects a value in the selected field (if applicable) or follow the link in the field.
Spacebar	Expands or collapses a drop-down list, if applicable.
Tab	Moves to the next focus area. **NOTE:** For the standard graphics browser only.
Esc	Moves to the previous page until you view the main screen. Pressing Esc in the main screen displays a message that prompts you to save any unsaved changes and restarts the system.

One time boot menu

To enter **one time boot menu**, turn on your computer, and then press F2 immediately.

NOTE: It is recommended to shutdown the computer if it is on.

The one-time boot menu displays the devices that you can boot from including the diagnostic option. The boot menu options are:

- Removable Drive (if available)
- STXXXX Drive (if available)

  NOTE: XXX denotes the SATA drive number.
- Optical Drive (if available)
- SATA Hard Drive (if available)
- Diagnostics

  NOTE: Choosing **Diagnostics**, will display the **ePSA diagnostics** screen.

The boot sequence screen also displays the option to access the System Setup screen.

System setup options

NOTE: Depending on your system and its installed devices, the items that are listed in this section may or may not appear.

Table 3. System setup options—System information menu

Overview	
Precision 7960 Rack	
Model Name	Displays the model name of the system.
BIOS Version	Displays the BIOS version number.
Management Engine Version	Displays the Management Engine version of the system.
Service Tag	Displays the Service Tag of the system.
Manufacturer	Displays the Manufacturer information of the system.
Manufacturer Contact Information	Displays the Manufacturer contact information of the system.
CPLD Version	Displays the CPLD version of the system.
UEFI Compliance Version	Displays the UEFI Compliance version of the system.

Table 4. System setup options—Memory Settings menu

Memory Settings	
Memory Size	Displays the system memory size.
Memory Type	Displays the system memory type.
Memory Speed	Displays the memory speed.
Video Memory	Displays the system video memory.
System Technology Testing	Enable or disable the System Technology Testing options. By default, the option is Disabled.
Memory Operating Mode	By default, **Optimizer Mode** is enabled.
Current State of Memory Operating Mode	Displays Optimizer Mode as default.
Node Interleaving	Enable or disable the Node Interleaving options. By default, **Fast** is enabled.
Memory Training	Enable or disable the Memory Training options. By default, the option is Disabled.
DIMM Self Healing (Post Package Repair) on	
Uncorrectable Memory Error	Enable or disable the Uncorrectable Memory Error options.

Table 4. System setup options—Memory Settings menu (continued)

Memory Settings	
	By default, the option is Enabled.
Correctable Error Logging	Enable or disable the Correctable Error Logging options. By default, the option is Disabled.
Memory Map Out	

Table 5. System setup options—Processor Settings menu

Processor Settings	
Logical Processor	Enable or disable the Logical Processor options. By default, the option is Enabled.
CPU Interconnect Speed	By default, **Maximum data rate** drop down is selected.
Virtualization Technology	Enable or disable the Virtualization Technology options. By default, the option is Enabled.
Kernel DMA Protection	Enable or disable the Kernel DMA Protection options. By default, the option is Disabled.
Directory Mode	Enable or disable the Directory Mode options. By default, the option is Enabled.
Adjacent Cache Line Prefetch	Enable or disable the Adjacent Cache Line Prefetch options. By default, the option is Enabled.
Hardware Prefetcher	Enable or disable the Hardware Prefetcher options. By default, the option is Enabled.
DCU Streamer Prefetcher	Enable or disable the DCU Streamer Prefetcher options. By default, the option is Enabled.
DCU IP Prefetcher	Enable or disable the DCU IP Prefetcher options. By default, the option is Enabled.
Sub NUMA Cluster	By default, the option is Disabled.
MADT Core Enumeration	Enable or disable the MADT Core Enumeration options. By default, the **Round Robin** is enabled.
UMA Based Clustering	Displays Quadrant as default.
UPI Prefetch	Enable or disable the UPI Prefetch options. By default, the option is Enabled.
XPT Prefetch	Enable or disable the XPT Prefetch options. By default, the option is Enabled.
LLC Prefetch	Enable or disable the LLC Prefetch options. By default, the option is Enabled.
Dead Line LLC Alloc	Enable or disable the Dead Line LLC Alloc options. By default, the option is Enabled.
Directory AtoS	Enable or disable the Directory AtoS options. By default, the option is Disabled.

Table 5. System setup options—Processor Settings menu (continued)

Processor Settings	
AVX P1	Enable or disable the AVX P1 options. By default, the **Normal** is enabled.
Dynamic SST-Performance Profile	Enable or disable the Dynamic SST-Performance Profile options. By default, the option is Disabled.
SST-Performance Profile	By default, **Operating Point 1** drop down is selected.
Intel SST-BF	By default, the option is Disabled.
Intel SST-CP	Enable or disable the Intel SST-CP options. By default, the option is Disabled.
Optimized Power Mode	Enable or disable the Optimized Power Mode options. By default, the option is Disabled.
x2APIC Mode	Enable or disable the x2APIC Mode options. By default, the option is Enabled.
AVX ICCP Pre-Grant License	Enable or disable the AVX ICCP Pre-Grant License options. By default, the option is Disabled.
Dell Controlled Turbo	This field allows control of the Dell Controlled Turbo settings.
Number of Cores per Processor	By default, **All** drop down is selected.
CPU Physical Address Limit	Enable or disable the CPU Physical Address Limit options. By default, the option is Enabled.
AMP Prefetch	Enable or disable the AMP Prefetch options. By default, the option is Disabled.
Homeless Prefetch	Enable or disable the Homeless Prefetch options. By default, the **Auto** is enabled.
Uncore Frequency RAPL	Enable or disable the Uncore Frequency RAPL options. By default, the option is Enabled.
Processor Core Speed	Displays the Processor Core Speed of the system.
Processor Bus Speed	Displays the Processor Bus Speed of the system.
Local Machine Check Exception	Enable or disable the Local Machine Check Exception options. By default, the option is Enabled.
CPU Crash Log Support	Enable or disable the CPU Crash Log Support options. By default, the option is Disabled.
Processor 1	
Family-Model-Stepping	Displays the processor Family-Model-Stepping of the system.
Brand	Displays the processor Brand of the system.
Level 2 Cache	Displays the Level 2 cache of the system.
Level 3 Cache	Displays the Level 3 cache of the system.
Number of Cores	Displays the Number of Cores of the system.
Microcode	Displays the Microcode of the system.
Processor 2	

Table 5. System setup options—Processor Settings menu (continued)

Processor Settings	
Family-Model-Stepping	Displays the processor Family-Model-Stepping of the system.
Brand	Displays the processor Brand of the system.
Level 2 Cache	Displays the Level 2 cache of the system.
Level 3 Cache	Displays the Level 3 cache of the system.
Number of Cores	Displays the Number of Cores of the system.
Microcode	Displays the Microcode of the system.

Table 6. System setup options—SATA Settings menu

SATA Settings	
Embedded SATA	Displays RAID Mode as default.
Security Freeze Lock	By default, the option is **Disabled**.
Write Cache	By default, the option is **Disabled**.
Port A	By default, the option is **Auto**
Port B	By default, the option is **Auto**
Port C	By default, the option is **Auto**
Port D	By default, the option is **Auto**
Port E	By default, the option is **Auto**
Port F	By default, the option is **Auto**
Port G	By default, the option is **Auto**
Port H	By default, the option is **Auto**

Table 7. System setup options—NVMe Settings menu

NVMe Settings	
BIOS NVMe Driver	Displays the BIOS NVMe driver. By default, the **All Drives** option is selected.
VMD Mode	Enables or disable the VMD Mode. By default, the **Enabled** option is selected.

Table 8. System setup options—Boot Settings menu

Boot Settings	
Boot Mode	Displays the type of Boot mode of the system. By default, the **UEFI** option is selected.
Boot Sequence Retry	Enables or disable the Boot Sequence Retry. By default, the **Enabled** option is selected.
Hard-Disk Failover	Enables or disable the Hard-Disk Failover . By default, the **Disabled** option is selected.
Generic USB Boot	Enables or disable the Generic USB Boot. By default, the **Disabled** option is selected.
Hard-disk Drive Placeholder	Enables or disable the Hard-disk Drive Placeholder . By default, the **Disabled** option is selected.

Table 8. System setup options—Boot Settings menu (continued)

Boot Settings	
Clean all SysPrep variables and order	Displays the Clean all SysPrep variables and order of the system. By default, the **None** option is selected.
UEFI Boot Settings	Select this menu to configure the Boot Sequence and enable or disable individual boot options.

Table 9. System setup options—Network Settings menu

Network Settings	
UEFI PXE Settings	
Number of PXE Devices	By default, **4** drop down is selected.
PXE Device 1	Enables or disable the PXE Device 1. By default, the **Enabled** option is selected.
PXE Device 2	Enables or disable the PXE Device 2. By default, the **Disabled** option is selected.
PXE Device 3	Enables or disable the PXE Device 3. By default, the **Disabled** option is selected.
PXE Device 4	Enables or disable the PXE Device 4. By default, the **Disabled** option is selected.
PXE Device 1 Settings	This field controls the configuration for PXE device 1.
PXE Device 2 Settings	This field controls the configuration for PXE device 2.
PXE Device 3 Settings	This field controls the configuration for PXE device 3.
PXE Device 4 Settings	This field controls the configuration for PXE device 4.
UEFI HTTP Settings	
HTTP Device 1	Enables or disable the HTTP Device 1. By default, the **Disabled** option is selected.
HTTP Device 2	Enables or disable the HTTP Device 2. By default, the **Disabled** option is selected.
HTTP Device 3	Enables or disable the HTTP Device 3. By default, the **Disabled** option is selected.
HTTP Device 4	Enables or disable the HTTP Device 4. By default, the **Disabled** option is selected.
HTTP Device 1 Settings	This field controls the configuration for HTTP device 1.
HTTP Device 2 Settings	This field controls the configuration for HTTP device 2.
HTTP Device 3 Settings	This field controls the configuration for HTTP device 3.
HTTP Device 4 Settings	This field controls the configuration for HTTP device 4.
UEFI ISCSI Settings	
ISCSI Initiator Name	By default, this is blank.
ISCSI Device 1	Enables or disable the ISCSI Device 1. By default, the **Disabled** option is selected.
ISCSI Device 1 Settings	This field controls the configuration for ISCSI device 1.

Table 9. System setup options—Network Settings menu (continued)

Network Settings	
UEFI NVMe-oF Settings	
NVMe-oF	Enables or disable NVMe-oF. By default, the **Disabled** option is selected.
NVMe-oF Host NQN	By default, this is blank.
NVMe-oF Host Id	By default, this is blank.
Host Security Key Path	By default, this is blank.
NVMe-oF SubSystem Settings	This field controls the configuration for ISCSI device 1.

Table 10. System setup options—Integrated Devices menu

Integrated Devices Settings	
User Accessible USB Ports	By default, **All Port On** drop down is selected.
iDRAC Direct USB Ports	On or Off the iDRAC Direct USB Ports. By default, the **On** option is selected.
I/OAT DMA Engine	Enables or disable the I/OAT DMA Engine. By default, the **Disabled** option is selected.
Embedded Video Controller	Enables or disable the Embedded Video Controller. By default, the **Enabled** option is selected.
I/O Snoop HoldOff Response	By default, **2K Cycles** drop down is selected.
Current State of Embedded Video Controller	By default, the option is Enabled.
SR-IOV Global Enable	Enables or disable the SR-IOV Global Enable. By default, the **Disabled** option is selected.
OS Watchdog Timer	Enables or disable the OS Watchdog Timer. By default, the **Disabled** option is selected.
Empty Slot Unhide	Enables or disable the Empty Slot Unhide. By default, the **Disabled** option is selected.
PCIe BUS Allocation	By default, the **Default** drop down is selected.
PCIe Resizable BAR	Enables or disable the PCIe Resizable BAR. By default, the **Disabled** option is selected.
Slot Disablement	Controls the configuration of PCIe cards that are installed in the specified slot. Only slots that are present on the system will be available for control.
Slot Bifurcation	Allows slot bifurcation of the system.

Table 11. System setup options—Serial Communication menu

Serial Communication Settings	
Serial Communication	By default, **Off** drop down is selected.
Serial Port Address	Allows selection of Serial Port Address. By default, the **COM1** option is selected.

Table 11. System setup options—Serial Communication menu (continued)

Serial Communication Settings	
External Serial Connector	By default, **Serial Device 1** drop down is selected.
Failsafe Baud Rate	By default, **115200** drop down is selected.
Remote Terminal Type	Allows selection of Remote Terminal Type. By default, the **VT100/VT220** option is selected.
Redirection After Boot	Enables or disable the Redirection After Boot. By default, the **Enabled** option is selected.

Table 12. System setup options—System Profile Settings menu

System Profile Settings	
System Profile	By default, **Performance Per Watt (DAPC)** drop down is selected.
CPU Power Management	By default, the option is System DBPM (DAPC).
Memory Frequency	By default, **Maximum Performance** drop down is selected.
Turbo Boost	By default, the option is Enabled.
Energy Efficient Turbo	By default, the option is Enabled.
C1E	By default, the option is Enabled.
C-States	By default, the option is Enabled.
Memory Patrol Scrub	By default, the option is Standard.
Memory Refresh Rate	By default, the option is 1x.
Uncore Frequency	By default, the option is Dynamic.
Energy Efficient Policy	By default, the option is Balanced Performance.
Monitor/Mwait	By default, the option is Enabled.
Workload Profile	By default, **Not Configured** drop down is selected.
CPU Interconnect Bus Link Power Management	By default, the option is Enabled.
PCI ASPM L1 Link Power Management	By default, the option is Enabled.

Table 13. System setup options—System Security menu

System Security Settings	
CPU AES-Ni	By default, the option is Enabled.
System Password	Set, change, or delete the System password.
Setup Password	Set, change, or delete the Setup password.
Password Status	Unlock or lock the Password Status. By default, the **Unlocked** option is selected.
Bootmanager Password	Allow selection for Bootmanager password. By default, **Always** option is selected.

Table 13. System setup options—System Security menu (continued)

System Security Settings	
TPM Security	Allow selection for TPM security. By default, **On** option is selected.
- TPM Information	By default, the option is Type: 2.0 NTC.
- TPM Firmware	By default, the option is 7.2.2.0.
- TPM Hierarchy	Allow selection of TPM hierarchy. By default, the **Enabled** option is selected.
TPM Advanced Settings	
Intel(R) TXT	Allows selection of Intel(R) TXT. By default, the **Off** option is selected.
Memory Encryption	Allows selection of Memory Encryption. By default, the **Disabled** option is selected.
TME Encryption Bypass	Enables or disable the TME Encryption Bypass. By default, the **Disabled** option is selected.
Intel(R) SGX	By default, the option is Off.
Power Button	Enables or disable the Power button. By default, the **Enabled** option is selected.
AC Power Recovery	Allows selection of AC Power Recovery. By default, the **Last** option is selected.
AC Power Recovery Delay	Allows selection of AC Power Recovery. By default, the **Immediate** option is selected.
User Defined Delay (120 s to 600 s)	By default, **120** is added.
UEFI Variable Access	Allows selection of UEFI Variable Access. By default, the **Standard** option is selected.
In-Band Manageability Interface	Enables or disable the In-Band Manageability Interface. By default, the **Enabled** option is selected.
SMM Security Mitigation	Enables or disable the SMM Security Mitigation. By default, the **Disabled** option is selected.
SECURE BOOT	
Secure Boot	Enables or disable the Secure Boot. By default, the **Disabled** option is selected.
Secure Boot Policy	Allows selection of Secure Boot Policy. By default, the **Standard** option is selected.
Secure Boot Mode	Allows selection of Secure Boot Mode. By default, the **Deployed Mode** option is selected.
Secure Boot Policy Summary	View the list of certificates and hashes that Secure Boot users to authenticate images.

Table 13. System setup options—System Security menu (continued)

System Security Settings	
Secure Boot Custom Policy Settings	View the list of Custom Policy Settings.

Table 14. System setup options—Redundant OS Control menu

Redundant OS Control Settings	
Redundant OS Location	By default, the option is None.
Redundant OS State	By default, the option is Visible.
Redundant OS Boot	By default, the option is Disabled.

Table 15. System setup options—Miscellaneous Settings menu

Miscellaneous Settings	
System Time	Displays the Time of the system.
System Date	Displays the Date of the system.
Time Zone	Displays the Local Time of the system. By default, **LOCAL, Local Time** drop down is selected.
Daylight Savings Time	Enables or disable the Daylight Savings Time. By default, the **Disabled** option is selected.
Asset Tag	Create a system Asset Tag.
Keyboard NumLock	Allows selection of Keyboard NumLock. By default, the **On** option is selected.
F1/F2 Prompt on Error	Enables or disable the F1/F2 Prompt. By default, the **Enabled** option is selected.
Load Legacy Video Option ROM	Enables or disable the Load Legacy Video Option ROM. By default, the **Disabled** option is selected.
Dell Wyse P25/P45 BIOS Access	Enables or disable the Dell Wyse P25/P45 BIOS Access. By default, the **Enabled** option is selected.
Power Cycle Request	Allows selection of Power Cycle Request. By default, the **None** option is selected.

Updating the BIOS

Updating the BIOS in Windows

CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress, and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information about this subject, search in the Knowledge Base Resource at www.dell.com/support.

BIOS update using IDRAC, see the knowledge base article 000134013.

1. Go to www.dell.com/support.
2. Click **Product support**. In the **Search support** box, enter the Service Tag of your computer, and then click **Search**.

NOTE: If you do not have the Service Tag, use the SupportAssist feature to automatically identify your computer. You can also use the product ID or manually browse for your computer model.

3. Click **Drivers & Downloads**. Expand **Find drivers**.
4. Select the operating system installed on your computer.
5. In the **Category** drop-down list, select **BIOS**.
6. Select the latest version of BIOS, and click **Download** to download the BIOS file for your computer.
7. After the download is complete, browse the folder where you saved the BIOS update file.
8. Double-click the BIOS update file icon and follow the on-screen instructions.
   For more information, search in the Knowledge Base Resource at www.dell.com/support.

Updating the BIOS in Windows and Linux

To update the system BIOS on a computer that is installed with Windows and Linux, see the knowledge base article 000130467 at www.dell.com/support.

Updating the BIOS using the USB drive in Windows

CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the system it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress, and the system will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information about this subject, search in the Knowledge Base Resource at www.dell.com/support.

1. Follow the procedure from step 1 to step 6 in Updating the BIOS in Windows to download the latest BIOS setup program file.
2. Create a bootable USB drive. For more information, search in the Knowledge Base Resource at www.dell.com/support.
3. Copy the BIOS setup program file to the bootable USB drive.
4. Connect the bootable USB drive to the computer that needs the BIOS update.
5. Restart the computer and press **F11** for Boot Manager.
6. Select **System Utilities** > **BIOS Update File Explorer** > **USB disk**.

   NOTE: USB disk must be FAT32 format, and BIOS Secure Boot setting must be disabled.

7. Follow the on-screen instructions to complete the BIOS update.

Updating the BIOS from the F12 One-Time boot menu

Update your computer BIOS using the BIOS update.exe file that is copied to a FAT32 USB drive and booting from the F12 One-Time boot menu.

CAUTION: If BitLocker is not suspended before updating the BIOS, the next time you reboot the computer it will not recognize the BitLocker key. You will then be prompted to enter the recovery key to progress and the computer will ask for this on each reboot. If the recovery key is not known this can result in data loss or an unnecessary operating system re-install. For more information on this subject, search in the Knowledge Base Resource at www.dell.com/support.

BIOS Update

You can run the BIOS update file from Windows using a bootable USB drive or you can also update the BIOS from the F12 One-Time boot menu on the computer.

Most of the Dell computers built after 2012 have this capability, and you can confirm by booting your computer to the F12 One-Time Boot Menu to see if BIOS FLASH UPDATE is listed as a boot option for your computer. If the option is listed, then the BIOS supports this BIOS update option.

NOTE: Only computers with BIOS Flash Update option in the F12 One-Time boot menu can use this function.

Updating from the One-Time boot menu

To update your BIOS from the F12 One-Time boot menu, you need the following:

- USB drive formatted to the FAT32 file system (key does not have to be bootable)
- BIOS executable file that you downloaded from the Dell Support website and copied to the root of the USB drive
- AC power adapter that is connected to the computer
- Functional computer battery to flash the BIOS

Perform the following steps to perform the BIOS update flash process from the F12 menu:

CAUTION: Do not turn off the computer during the BIOS update process. The computer may not boot if you turn off your computer.

1. From a turn off state, insert the USB drive where you copied the flash into a USB port of the computer.
2. Turn on the computer and press F12 to access the One-Time Boot Menu, select BIOS Update using the mouse or arrow keys then press Enter.
   The flash BIOS menu is displayed.
3. Click **Flash from file**.
4. Select external USB device.
5. Select the file and double-click the flash target file, and then click **Submit**.
6. Click **Update BIOS**. The computer restarts to flash the BIOS.
7. The computer will restart after the BIOS update is completed.

System and setup password

Table 16. System and setup password

Password type	Description
System password	Password that you must enter to log in to your system.
Setup password	Password that you must enter to access and make changes to the BIOS settings of your computer.

You can create a system password and a setup password to secure your computer.

CAUTION: The password features provide a basic level of security for the data on your computer.

CAUTION: Anyone can access the data that is stored on your computer if it is not locked and left unattended.

NOTE: System and setup password feature is disabled.

Assigning a System Setup password

You can assign a new **System or Admin Password** only when the status is in **Not Set**.

To enter BIOS System Setup, press F2 immediately after a power-on or reboot.

1. In the **System BIOS** or **System Setup** screen, select **Security** and press Enter.
   The **Security** screen is visible.
2. Select **System/Admin Password** and create a password in the **Enter the new password** field.
   Use the following guidelines to assign the system password:
   - A password can have up to 32 characters.
   - At least one special character: ! " # $ % & ' ( ) * + , - . / : ; < = > ? @ [\ ] ^ _ ` { | }
   - Numbers 0 through 9.
   - Upper case letters from A to Z.
   - Lower case letters from a to z.
3. Type the system password that you entered earlier in the **Confirm new password** field and click **OK**.
4. Press Esc and save the changes as prompted by the pop-up message.
5. Press Y to save the changes.
   The computer restarts.

Deleting or changing an existing system setup password

Ensure that the **Password Status** is Unlocked (in the System Setup) before attempting to delete or change the existing System and/or Setup password. You cannot delete or change an existing System or Setup password, if the **Password Status** is Locked.

To enter the System Setup, press F12 immediately after a power-on or reboot.

1. In the **System BIOS** or **System Setup** screen, select **System Security** and press Enter.
   The **System Security** screen is displayed.
2. In the **System Security** screen, verify that **Password Status** is **Unlocked**.
3. Select **System Password**, update, or delete the existing system password, and press Enter or Tab.
4. Select **Setup Password**, update, or delete the existing setup password, and press Enter or Tab.

   NOTE: If you change the System and/or Setup password, reenter the new password when prompted. If you delete the System and/or Setup password, confirm the deletion when prompted.

5. Press Esc and a message prompts you to save the changes.
6. Press Y to save the changes and exit from System Setup.
   The computer restarts.

Clearing CMOS settings

CAUTION: Clearing CMOS settings will reset the BIOS settings on your computer.

1. Remove the system cover.
2. Disconnect the battery cable from the system board.
3. Remove the coin-cell battery.
4. Wait for one minute.
5. Replace the coin-cell battery.
6. Connect the battery cable to the system board.
7. Replace the system cover.

Clearing BIOS (System Setup) and System passwords

To clear the system or BIOS passwords, contact Dell technical support as described at www.dell.com/contactdell.

NOTE: For information on how to reset Windows or application passwords, refer to the documentation accompanying Windows or your application.

5

Troubleshooting

Dell SupportAssist Pre-boot System Performance Check diagnostics

SupportAssist diagnostics (also known as system diagnostics) performs a complete check of your hardware. The Dell SupportAssist Pre-boot System Performance Check diagnostics is embedded with the BIOS and is launched by the BIOS internally. The embedded system diagnostics provides a set of options for particular devices or device groups allowing you to:

- Run tests automatically or in an interactive mode
- Repeat tests
- Display or save test results
- Run thorough tests to introduce additional test options to provide extra information about the failed device(s)
- View status messages that inform you if tests are completed successfully
- View error messages that inform you of problems encountered during testing

NOTE: Some tests for specific devices require user interaction. Always ensure that you are present at the computer terminal when the diagnostic tests are performed.

For more information, see the knowledge base article 000180971.

Running the SupportAssist Pre-Boot System Performance Check

1. Turn on your computer.
2. As the computer boots, press the F12 key as the Dell logo appears.
3. On the boot menu screen, select the **Diagnostics** option.
4. Click the arrow at the bottom left corner.
   Diagnostics front page is displayed.
5. Click the arrow in the lower-right corner to go to the page listing.
   The items detected are listed.
6. To run a diagnostic test on a specific device, press Esc and click **Yes** to stop the diagnostic test.
7. Select the device from the left pane and click **Run Tests**.
8. If there are any issues, error codes are displayed.
   Note the error code and validation number and contact Dell.

Power-Supply Unit Built-in Self-Test

Built-in Self-Test (BIST) helps determine if the power-supply unit is working. To run self-test diagnostics on the power-supply unit of a desktop or all-in-one computer, search in the Knowledge Base Resource at www.dell.com/support.

System-diagnostic lights

This section lists the system-diagnostic lights of your Precision 7960 Rack.

Table 17. System-diagnostic lights

Blinking pattern							Problem description	Suggested resolution
LED6	**LED5**	**LED4**	**LED3**	**LED2**	**LED1**	**LED0**		
White	White	White	White	Blue	White	White	idrac initialization	More than 20 minutes in this state. 1. Change PSU 2. Replace the system board
White	White	White	Blue	White	White	White	System in Standby Mode(S5).	1. Press Power button 2. After pressing power button, if system doesn't power on. 3. Replace the system board
White	White	Blue	White	White	White	Blue	PCH doesn't send power on signal.	Replace the system board.
Blue	Blue	Blue	Blue	Blue	Blue	Blue	System Power On	No problem with the system
White	White	White	White	White	White	White	CPLD crush	Replace the system board.
White	White	White	White	White	White	White	CPLD doesn't have V_3P3_SW power.	Replace the system board.
Blue	Blue	Blue	White	White	White	White	CPU1 power fail	Replace the system board.
White	White	White	Blue	White	Blue	Blue	CPU1 power fail	Replace the system board.
Blue	Blue	Blue	White	White	White	Blue	CPU1 power fail	Replace the system board.

Table 17. System-diagnostic lights (continued)

Blinking pattern							Problem description	Suggested resolution
LED6	LED5	LED4	LED3	LED2	LED1	LED0		
Blue	Blue	Blue	White	White	Blue	White	CPU1 power fail	Replace the system board.
Blue	Blue	Blue	White	White	Blue	Blue	CPU1 power fail	Replace the system board.
Blue	Blue	Blue	White	Blue	White	White	CPU1 power fail	Replace the system board.
Blue	Blue	Blue	White	Blue	White	Blue	CPU1 power fail	Replace the system board.
Blue	Blue	Blue	Blue	White	Blue	White	CPU2 power fail	Replace the system board.
Blue	Blue	Blue	Blue	White	Blue	Blue	CPU2 power fail	Replace the system board.
Blue	Blue	Blue	Blue	Blue	White	White	CPU2 power fail	Replace the system board.
White	White	Blue	Blue	White	Blue	White	CPU2 power fail	Replace the system board.
Blue	Blue	Blue	Blue	Blue	White	Blue	CPU2 power fail	Replace the system board.
Blue	Blue	Blue	Blue	Blue	Blue	White	CPU2 power fail	Replace the system board.
Blue	Blue	Blue	Blue	Blue	Blue	Blue	CPU2 power fail	Replace the system board.
White	Blue	Blue	Blue	Blue	White	Blue	Backplane power fail	1. Replace the system board 2. Change Backplane power cable 3. Change Backplane
White	Blue	Blue	Blue	Blue	Blue	White	Backplane power fail	1. Replace the system board 2. Change Backplan

Table 17. System-diagnostic lights (continued)

Blinking pattern							Problem description	Suggested resolution
LED6	LED5	LED4	LED3	LED2	LED1	LED0		
								e power cable 3. Change Backplane
White	Blue	Blue	Blue	Blue	Blue	Blue	Backplane power fail	1. Replace the system board 2. Change Backplane power cable 3. Change Backplane
Blue	White	Blue	White	White	White	Blue	System board power fail	Replace the system board.
Blue	White	Blue	White	Blue	Blue	White	System board power fail	Replace the system board.
Blue	White	Blue	Blue	White	Blue	Blue	System board power fail	Replace the system board.
Blue	White	Blue	Blue	Blue	White	White	System board power fail	Replace the system board.
Blue	White	Blue	Blue	Blue	White	Blue	OCP board power fail	1. Replace the system board 2. Change OCP card
Blue	Blue	White	Blue	Blue	White	White	CPU1 Memory power fail	1. Replace the system board 2. Change Memory
Blue	Blue	White	Blue	Blue	White	Blue	CPU1 Memory power fail	1. Replace the system board 2. Change Memory
Blue	Blue	White	Blue	Blue	Blue	White	CPU1 Memory power fail	1. Replace the system board 2. Change Memory

Table 17. System-diagnostic lights (continued)

Blinking pattern							Problem description	Suggested resolution
LED6	LED5	LED4	LED3	LED2	LED1	LED0		
Blue	Blue	White	Blue	Blue	Blue	Blue	CPU1 Memory power fail	1. Replace the system board 2. Change Memory
Blue	Blue	Blue	White	Blue	Blue	White	CPU2 Memory power fail	1. Replace the system board 2. Change Memory
Blue	Blue	Blue	White	Blue	Blue	Blue	CPU2 Memory power fail	1. Replace the system board 2. Change Memory
Blue	Blue	Blue	Blue	White	White	White	CPU2 Memory power fail	1. Replace the system board 2. Change Memory
Blue	Blue	Blue	Blue	White	White	Blue	CPU2 Memory power fail	1. Replace the system board 2. Change Memory
White	Blue	White	White	White	White	White	GPU power cable fail	1. Replace the system board 2. Change GPU power cable

Recovering the operating system

When your computer is unable to boot to the operating system even after repeated attempts, it automatically starts Dell SupportAssist OS Recovery.

Dell SupportAssist OS Recovery is a standalone tool that is preinstalled in all Dell computers installed with Windows operating system. It consists of tools to diagnose and troubleshoot issues that may occur before your computer boots to the operating system. It enables you to diagnose hardware issues, repair your computer, back up your files, or restore your computer to its factory state.

You can also download it from the Dell Support website to troubleshoot and fix your computer when it fails to boot into their primary operating system due to software or hardware failures.

For more information about the Dell SupportAssist OS Recovery, see *Dell SupportAssist OS Recovery User's Guide* at www.dell.com/serviceabilitytools. Click **SupportAssist** and then, click **SupportAssist OS Recovery**.

Real Time Clock—RTC reset

The Real Time Clock (RTC) reset function allows you or the service technician to recover the recently launched model Dell Latitude and Precision systems from **No POST/No Boot/No Power** situations. You can initiate the RTC reset on the system from a power-off state only if it is connected to AC power. Press and hold the power button for 25 seconds. The system RTC reset occurs after you release the power button.

NOTE: If AC power is disconnected from the system during the process or the power button is held longer than 40 seconds, the RTC reset process gets aborted.

The RTC reset will reset the BIOS to Defaults, un-provision Intel vPro and reset the system date and time. The following items are unaffected by the RTC reset:

- Service Tag
- Asset Tag
- Ownership Tag
- Admin Password
- System Password
- HDD Password
- Key Databases
- System Logs

NOTE: The IT administrator's vPro account and password on the system will be un-provisioned. The system needs to go through the setup and configuration process again to reconnect it to the vPro server.

The below items may or may not reset based on your custom BIOS setting selections:

- Boot List
- Enable Legacy Option ROMs
- Secure Boot Enable
- Allow BIOS Downgrade

Backup media and recovery options

It is recommended to create a recovery drive to troubleshoot and fix problems that may occur with Windows. Dell proposes multiple options for recovering Windows operating system on your Dell PC. For more information. see Dell Windows Backup Media and Recovery Options.

6

Getting help and contacting Dell

Self-help resources

You can get information and help on Dell products and services using these self-help resources:

Table 18. Self-help resources

Self-help resources	Resource location
Information about Dell products and services	www.dell.com
Tips	
Contact Support	In Windows search, type `Contact Support`, and press Enter.
Online help for operating system	www.dell.com/support/windows www.dell.com/support/linux
Access top solutions, diagnostics, drivers and downloads, and learn more about your computer through videos, manuals and documents.	Your Dell computer is uniquely identified by a Service Tag or Express Service Code. To view relevant support resources for your Dell computer, enter the Service Tag or Express Service Code at www.dell.com/support. For more information on how to find the Service Tag for your computer, see Locate the Service Tag on your computer.
Dell knowledge base articles for a variety of computer concerns	1. Go to www.dell.com/support. 2. On the menu bar at the top of the Support page, select **Support** > **Knowledge Base**. 3. In the Search field on the Knowledge Base page, type the keyword, topic, or model number, and then click or tap the search icon to view the related articles.

Contacting Dell

To contact Dell for sales, technical support, or customer service issues, see www.dell.com/contactdell.

NOTE: Availability varies by country/region and product, and some services may not be available in your country/region.

NOTE: If you do not have an active Internet connection, you can find contact information about your purchase invoice, packing slip, bill, or Dell product catalog.