Lenovo

ThinkSystem SD650 V2/SD650-N V2 Neptune® DWC Trays and DW612 Neptune® DWC Enclosure Setup Guide

Machine Type: 7D1M , 7D1N and 7D1L

Note

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

The server is intended for use in a system/rack always installed on the load side of Power Distribution Unit (PDU) or Uninterruptible Power Supply (UPS) supplying a maximum 20 A branch circuit protection. The overall system/rack connection to mains power is to be a Pluggable Type B connector.

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

Eleventh edition (January 2025)

Contents

Chapter 1. Introduction

The ThinkSystem SD650 V2/SD650-N V2 Neptune® DWC Trays and DW612 Neptune® DWC Enclosure is a 6U solution designed for high-volume network transaction processing. This solution includes a single enclosure that can contain up to six SD650 V2/SD650-N V2 trays, which are designed to deliver a dense, scalable platform for distributed enterprise and hyperconverged solutions.

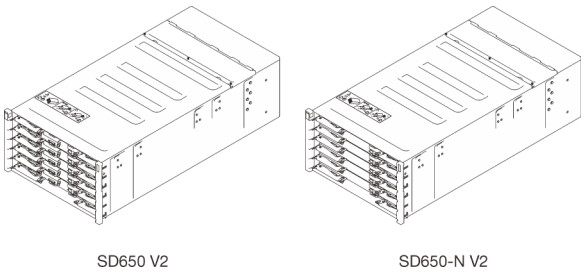


Figure 1. Enclosure with six SD650 V2/SD650-N V2 trays installed

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

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

Solution package contents

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

The solution package includes the following items:

Note: Some of the items listed are available on select models only.

- DWC tray
- Enclosure
- Rail installation kit (optional). Detailed instructions for installing the rail installation kit are provided in the package with the rail installation kit.
- Material box, including items such as power cords, rack installation template, and accessory kit.

Features

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

Your solution implements the following features and technologies:

- **Features on Demand**

  If a Features on Demand feature is integrated in the solution or in an optional device that is installed in the solution, you can purchase an activation key to activate the feature. For information about Features on Demand, see:

  https://fod.lenovo.com/lkms

- **Lenovo XClarity Controller (XCC)**

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

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

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

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

- **UEFI-compliant server firmware**

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

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

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

- **Active Memory**

  The Active Memory feature improves the reliability of memory through memory mirroring. Memory mirroring mode replicates and stores data on two pairs of DIMMs within two channels simultaneously. If a failure occurs, the memory controller switches from the primary pair of memory DIMMs to the backup pair of DIMMs.

- **Large system-memory capacity**

  The solution supports up to maximum of 2,048 GB system memory. The solution supports synchronous dynamic random-access memory (SDRAM) registered dual inline memory modules (DIMMs) with error correcting code (ECC). For more information about the specific types and maximum amount of memory, see “Specifications” on page 3.

- **Integrated network support**

  The tray comes with an integrated 1-port Gigabit Ethernet controller with RJ-45 connector and 1-port 25Gb Ethernet controller with SFP28 connector, which support connection to a 1000 Mbps network.

- **Integrated Trusted Platform Module (TPM)**

  This integrated security chip performs cryptographic functions and stores private and public secure keys. It provides the hardware support for the Trusted Computing Group (TCG) specification. You can download the software to support the TCG specification.

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

  Note: For customers in Chinese Mainland, a Lenovo-qualified TPM 2.0 adapter or a Trusted Cryptographic Module (TCM) adapter (sometimes called a daughter card) may be pre-installed.

- **Large data-storage capacity**

  The simple-swap solution models support the following drives:

  – Supports up to two 2.5-inch 7mm simple-swap Serial ATA (SATA)/Non-Volatile Memory express (NVMe) solid-state drives per node.

  - Supports up to one 2.5-inch 15mm simple-swap Serial ATA (SATA)/Non-Volatile Memory express (NVMe) solid-state drive per node.
- **Light path diagnostics**

  Light path diagnostics provides LEDs to help you diagnose problems. For more information about the light path diagnostics, see Light path diagnostics panel and Light path diagnostics LEDs.
- **Mobile access to Lenovo Service Information website**

  The solution provides a QR code on the system service label, which is on the cover of the solution, that you can scan using a QR code reader and scanner with a mobile device to get quick access to the Lenovo Service Information website. The Lenovo Service Information website provides additional information for parts installation, replacement videos, and error codes for solution support.
- **Active Energy Manager**

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

  The solution supports a maximum of six 1800-watt or 2400-watt hot-swap power supplies.
  - SD650 V2 tray supports 1800-watt or 2400-watt hot-swap power supplies.
  - SD650-N V2 tray supports only 2400-watt hot-swap power supplies.

  Note: Do not mix 1800-watt and 2400-watt power supplies in the same unit of solution.
- **ThinkSystem RAID support**

  The ThinkSystem RAID provides software RAID supports for RAID level 0 and 1, while integrated on-board hardware RAID supports for RAID level 1.

Specifications

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

Enclosure Specifications

A summary of the features and specifications of the enclosure.

Note: One DW612 Enclosure could contain six SD650 V2/SD650-N V2 trays.

Attention: Environment quality must be maintain over the lifetime of the system to receive warranty and support on affecting components. For water quality requirement, see Lenovo Neptune Direct Water-Cooling Standards.

Table 1. Enclosure specifications

Specification	Description
Dimension	6U enclosure • Height: 263.3 mm (10.37 inches) • Depth: 930.6 mm (36.64 inches) • Width: 447 mm (17.6 inches) • Weight: – Empty enclosure (with midplane and cables): approximately 23.6 kg (52.04 lbs) – Fully configured (stand-alone): – Enclosure with six SD650 V2 trays: approximately 156.54 kg (345.17 lbs) – Enclosure with six SD650-N V2 trays: approximately 168.94 kg (372.51 lbs)
Power supply	**SD650 V2 tray:** Supports six hot-swap ac power supplies (conditionally upgradable to nine with ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply, see "PSU configuration" on page 104). • Input voltage: 200-240 Vac • Wattage: – 1800W – 2400W **SD650-N V2 tray:** Supports six hot-swap ac power supplies (conditionally upgradable to nine power supplies, see "PSU configuration" on page 104). • Input voltage: 200-240 Vac • Wattage: 2400W **Note:** SD650-N V2 tray supports ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply Delta only. All the installed power supply units must be ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply Delta. **CAUTION:** **Power supplies and redundant power supplies in the enclosure must be with the same brand, power rating, wattage or efficiency level.**
System Management Module 2 (SMM2)	Hot-swappable See https://pubs.lenovo.com/mgt_tools_smm2/ for more details about SMM2.

Table 1. Enclosure specifications (continued)

Specification	Description
Acoustical noise emissions	• SD650 V2 sound power level (LWAd): – Idle: 6.5 Bel – Operation: 7.6 Bel • SD650-N V2 sound power level (LWAd): – Idle: 7.0 Bel – Operation: 9.5 Bel **Notes:** • These levels were measured in controlled acoustical environments according to procedures specified by ISO 7779, and are reported in accordance with ISO 9296. • The declared acoustic noise levels are based on specified configurations, and may change depending on configuration/condition changes. • The declared acoustic noise levels may increase greatly if high-power components are installed, such as high-power NICs and high-power M.2.
Heat output	Approximate heat output: • SD650 V2 – Minimum configuration (with one minimal configuration tray): 4003.5 BTU per hour (1275 watts) – Maximum configuration (with six maximal configuration trays): 23480.92 BTU per hour (7478 watts) • SD650-N V2 – Minimum configuration (with one minimal configuration tray): 7790.34 BTU per hour (2481 watts) – Maximum configuration (with six maximal configuration trays): 44986.78 BTU per hour (14327 watts)
Electrical input	• Sine-wave input (50-60 Hz) required • Input voltage range: – Minimum: 200 Vac – Maximum: 240 Vac

Table 1. Enclosure specifications (continued)

Specification	Description
Water requirement	**Attention:** The water required to initially fill the system side cooling loop must be reasonably clean, bacteria-free water (<100 CFU/ml) such as de-mineralized water, reverse osmosis water, de-ionized water, or distilled water. The water must be filtered with an in-line 50 micron filter (approximately 288 mesh). The water must be treated with anti-biological and anti-corrosion measures. Environment quality must be maintain over the lifetime of the system to receive warranty and support on affecting components. For more information please see Lenovo Neptune Direct Water-Cooling Standards. • Water Temperature: – SD650 V2 tray: ASHRAE class W4: 2°C - 50°C (35.6°F - 122°F) with the following exceptions: – With processors of 205W or higher: 2°C - 45°C (35.6°F - 113°F) – With M.2 drives: 2°C - 45°C (35.6°F - 113°F) – With Intel® Xeon® Platinum 8368Q processor: 2°C - 35°C (35.6°F - 95°F) – SD650-N V2 tray: ASHRAE class W4: 2°C - 45°C (35.6°F - 113°F) – For 80 GB NVIDIA HGX™ A100 4-GPU: ASHRAE class W3: 2°C - 40°C (35.6°F - 104°F) – With Intel® Xeon® Platinum 8368Q processor: 2°C - 35°C (35.6°F - 95°F) • Maximum pressure: 4.4 bars • Minimum water flow rate: – SD650 V2 tray: 6.0 liters per minute per enclosure, assuming 1.0 lpm per compute tray with 6 trays per enclosure (1 tray consists of 2 compute nodes) – For processors below 205W: 6.0 liters per minute per enclosure, assuming 1.0 lpm per compute tray with 6 trays per enclosure – For processors above 205W: 7.5 liters per minute per enclosure, assuming 1.25 lpm per compute tray with 6 trays per enclosure – SD650-N V2 tray with 40/80 GB NVIDIA HGX™ A100 4-GPU: 21.0 liters per minute per enclosure, assuming 3.5 lpm per compute tray with 6 trays per enclosure (1 tray consists of 1 compute node and 1 GPU node)

Table 1. Enclosure specifications (continued)

Specification	Description
Environment	**Attention:** Environment quality must be maintain over the lifetime of the system to receive warranty and support on affecting components. For water quality requirement, see Lenovo Neptune Direct Water-Cooling Standards. The SD650 V2 tray, the SD650-N V2 tray and DW612 Enclosure are supported in the following environment: • Air temperature requirements: – Operating: ASHRAE class A2: 10°C - 35°C (50°F - 95°F); when the altitude exceeds 900 m (2953 ft), the maximum ambient temperature value decreases by 1°C (1.8°F) with every 300 m (984 ft) of altitude increase. – Powered off: 5°C - 45°C (41°F - 113°F) – Shipping/storage: -40°C - 60°C (-40°F - 140°F) To use the 240 GB M.2 drive, the following conditions must be met: – If inlet water temperature is 45°C, then the ambient air temperature cannot exceed 27°C. – If inlet water temperature is 30°C, then the ambient air temperature cannot exceed 35°C. • Relative humidity (non-condensing): – Operating: ASHRAE Class A2: 8% - 80%, maximum dew point : 21°C (70°F) – Shipment/storage: 8% - 90% • Maximum altitude: 3048 m (10 000 ft) • Particulate contamination: Airborne particulates and reactive gases acting alone or in combination with other environmental factors such as humidity or temperature might pose a risk to the solution. For information about the limits for particulates and gases, see *Particulate contamination* . **Note:** The solution is designed for standard data center environment and recommended to be placed in industrial data center.

Tray specifications

A summary of the features and specifications of the tray.

Tray specifications

Note: The SD650 V2 tray contains two compute nodes while the SD650-N V2 tray contains one compute node and one GPU node.

Table 2. Tray specifications

Specification	Description
Dimension	Tray • Height: 41.0 mm (1.61 inches) • Depth: 693.2 mm (27.29 inches) • Width: 437.5 mm (17.22 inches) • Weight estimation: – SD650 V2 tray: 20.67 kg (45.58 lbs) – SD650-N V2 tray: 22.05kg (48.62 lbs)
Operating systems	Supported and certified operating systems include: • Microsoft Windows Server • VMware ESXi • Red Hat Enterprise Linux • SUSE Linux Enterprise Server References: • Complete list of available operating systems: https://lenovopress.lenovo.com/osig. • OS deployment instructions: “Deploy the operating system” on page 105.

Node specifications

A summary of the features and specifications of the compute node and the GPU node.

Compute node specifications

Note: The SD650 V2 tray contains two compute nodes while the SD650-N V2 tray contains one compute node and one GPU node.

Table 3. Compute node specifications

Specification	Description
Processor (depending on the model)	• Supports two 3rd Gen Intel® Xeon® Scalable processors per node. **Notes:** 1. Use the Setup utility to determine the type and speed of the processors in the node. 2. For a list of supported processors, see https://serverproven.lenovo.com/. 3. If the Intel® Xeon® Platinum 8368Q processor is installed, the supported water temperature is 2°C - 35°C (35.6°F - 95°F).
Memory	See "Memory module installation rules and order" on page 53 for detailed information about memory configuration and setup. • Slots: 16 DIMM slots per node • Type: – PC4-25600 (dual-rank), 3200 MT/s, error correcting code (ECC), double-data-rate 4 (DDR4) registered DIMM (RDIMM) • Supports (depending on the model): – SD650 V2 compute node: – 2Rx4 32 GB and 64 GB size RDIMMs – 2Rx8 16 GB size RDIMMs – SD650-N V2 compute node: – 2Rx4 32 GB and 64 GB size RDIMMs • Minimum: – SD650 V2 compute node: 256 GB per node – SD650-N V2 compute node: 512 GB per node • Maximum: 2048 GB per node **Important:** The tray only supports fully populated processor and memory configuration (2 processors and 16 DIMMs).
Drive bays	• Supports up to two 2.5-inch 7mm simple-swap Serial ATA (SATA)/Non-Volatile Memory express (NVMe) solid-state drives per node. • Supports up to one 2.5-inch 15mm simple-swap Serial ATA (SATA)/Non-Volatile Memory express (NVMe) solid-state drive per node. **Attention:** As a general consideration, do not mix standard 512-byte and advanced 4-KB format drives in the same RAID array because it might lead to potential performance issues.
M.2 drive/backplane	ThinkSystem M.2 backplane supports up to two identical M.2 drives. Supports 2 different physical sizes of M.2 drives: • 42 mm (2242) • 80 mm (2280)
RAID	• Software RAID level 0 and 1 for SATA storage • Integrated on-board Hardware RAID level 1 • Intel VROC NVMe RAID Premium level 0 and 1
Expansion slots	Supports up to two Half-Height Half-Length x16 Gen 4 PCIe slots.

Table 3. Compute node specifications (continued)

Specification	Description
Video controller (integrated into Lenovo XClarity Controller)	• ASPEED • SVGA compatible video controller • Avocent Digital Video Compression • Video memory is not expandable **Note:** Maximum video resolution is 1920 x 1200 at 60 Hz.
Input/Output (I/O) features	• Front operator panel • KVM breakout cable connector • External LCD diagnostics handset connector • One 1 Gb RJ45 Ethernet port with share-NIC feature for Lenovo XClarity Controller access • One 25 Gb SFP28 Ethernet port with share-NIC feature for Lenovo XClarity Controller access
Minimum configuration for debugging	• One DW612 Enclosure • One SD650 V2 tray (contains two nodes) • Two processors on a specific node • 16 DIMMs on a specific node • Six CFF v4 power supplies (any type) • One disk (any type) (If OS is needed for debugging)

GPU node specifications

Note: The SD650-N V2 tray contains one compute node and one GPU node.

Table 4. GPU node specifications

Specification	Description
GPU	• NVIDIA HGX A100 four GPU board • NVIDIA HGX A800 four GPU board
Expansion slots	Supports one Half-Height Half-Length x16 Gen 4 PCIe slot.
Minimum configuration for debugging	• One DW612 Enclosure • One SD650-N V2 tray • Two processors on a right node • 16 DIMMs on a right node • Six units of ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply Delta • One disk (any type) (If OS is needed for debugging)

Management options

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

Overview

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

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

Functions

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

Notes:

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

Chapter 2. Solution components

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

Identifying your component

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

The enclosure machine type, model number and serial number are on the enclosure label that can be found on the front of the enclosure, as shown in the following illustration.

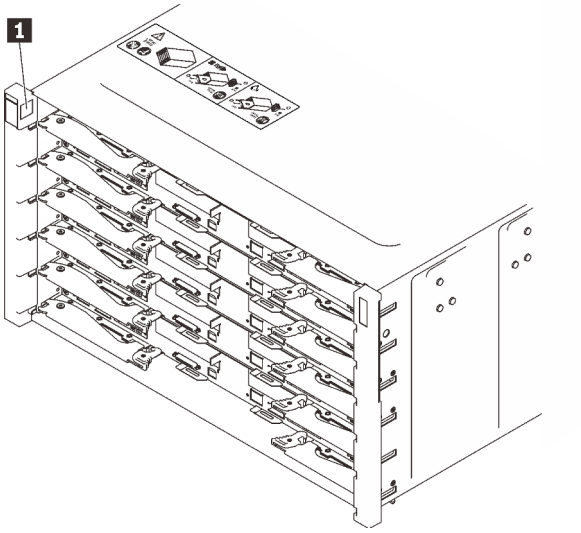


Figure 2. Enclosure label on the front of the enclosure

Table 5. Enclosure label on the front of the enclosure

1 Enclosure label

The tray model number can be found on the front of the tray, as shown in the following illustration.

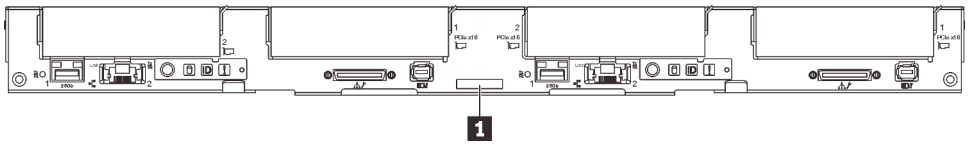


Figure 3. SD650 V2 tray model number

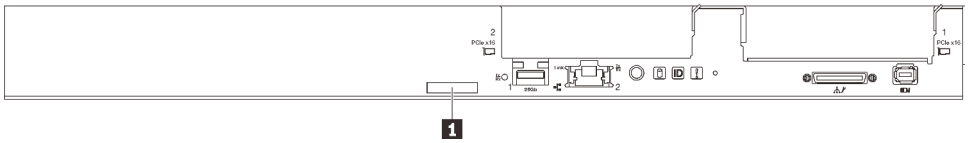


Figure 4. SD650-N V2 tray model number

Table 6. Tray model number

1 Tray model number

QR code

In addition, the system Service Label is located on the inside surface of the tray cover, provides a quick response (QR) code for mobile access to service information. You can scan the QR code with a mobile device using a QR code reader application and get quick access to the Service Information web page. The Service Information web page provides additional information for parts installation and replacement videos, and error codes for solution support.

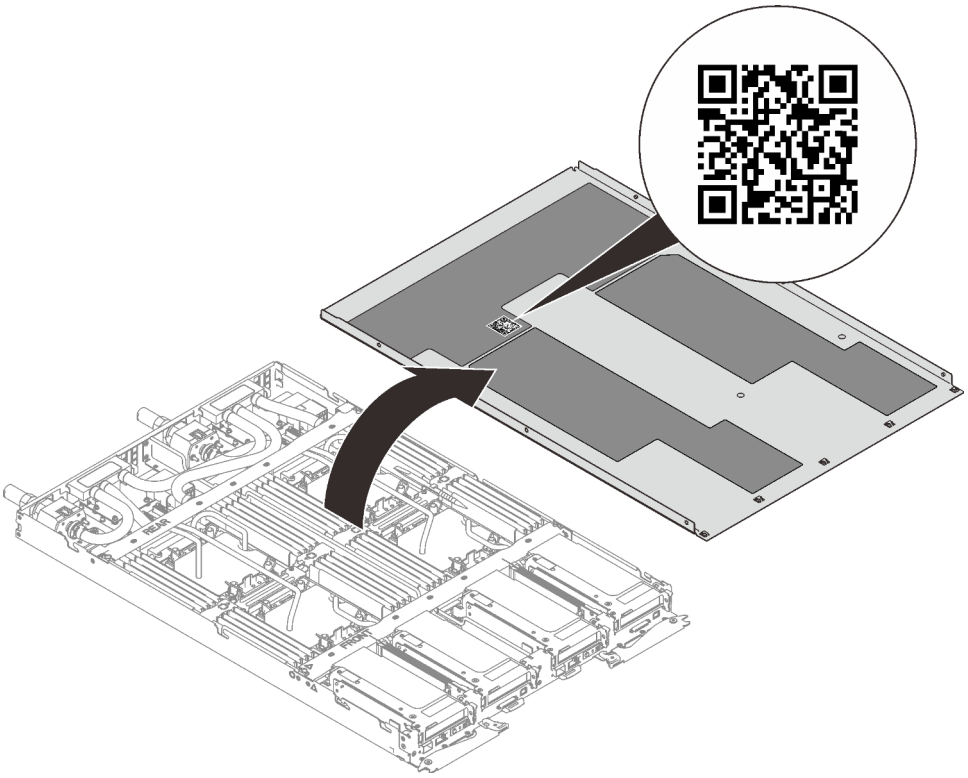


Figure 5. Service Label and QR code

Network access tag

The Lenovo XClarity Controller network access information for both nodes can be found on the pull out information tag located at the front of the tray. You can use the information on the pull out tag to access the XCC MAC address and LLA for each node. The left node information is on the left side and the right node information is on the right side. You can also use the information tag for your own node labeling information such as the hostname, the system name and the inventory bar code.

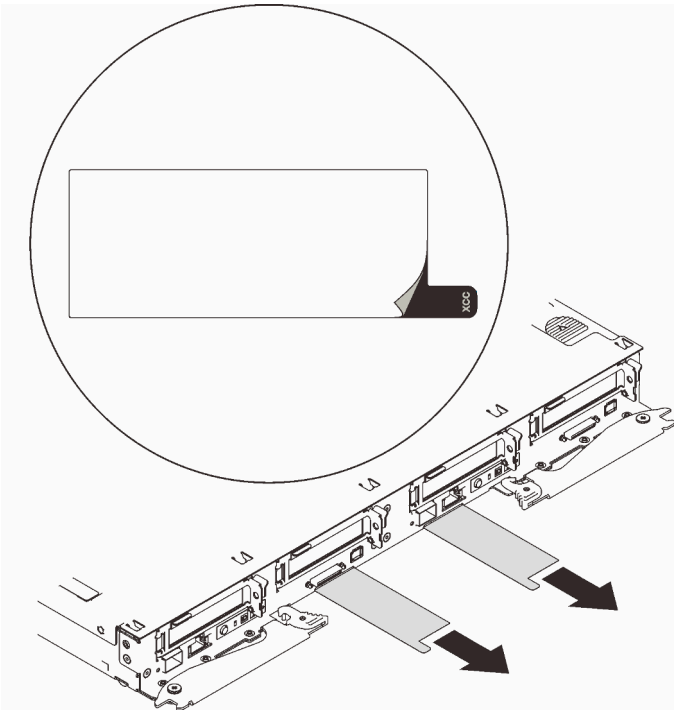


Figure 6. Network access information on the pull out tag

Front view

The following illustration shows the controls, LEDs, and connectors on the front of the solution.

Enclosure

Note: The illustrations in this document might differ slightly from your hardware.

The enclosure supports up to six trays.

The following illustration shows six trays installed in the enclosure.

The slot numbers are indicated on both sides of the enclosure.

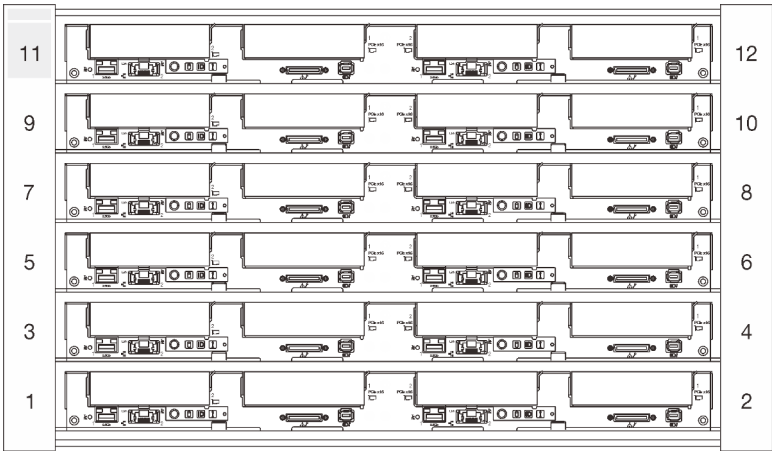


Figure 7. Enclosure with six SD650 V2 trays

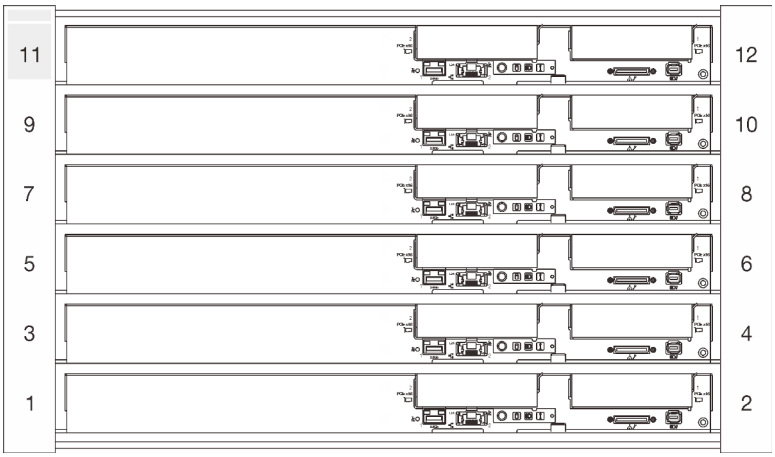


Figure 8. Enclosure with six SD650-N V2 trays

SD650 V2 tray

The following illustrations show the controls, LEDs, and connectors on the front of each tray.

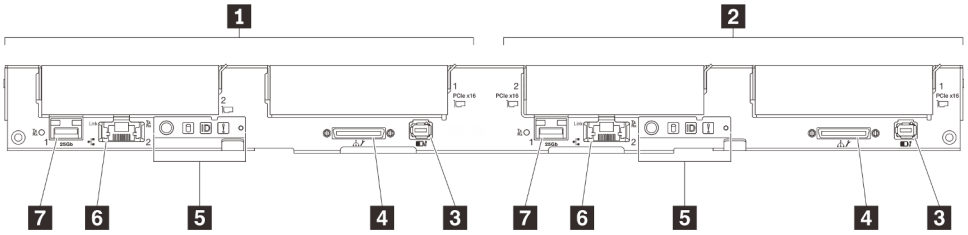


Figure 9. SD650 V2 tray

Table 7. SD650 V2 Tray indicators, controls, and connectors

1 Left node (odd bay numbers)	5 Front operator panel
2 Right node (even bay numbers)	6 1 Gb RJ45 Ethernet port with share-NIC feature for Lenovo XClarity Controller
3 External LCD diagnostics handset connector	7 25 Gb SFP28 Ethernet port with share-NIC feature for Lenovo XClarity Controller
4 USB 3.0 Console Breakout Cable	

SD650-N V2 tray

The following illustrations show the controls, LEDs, and connectors on the front of each tray.

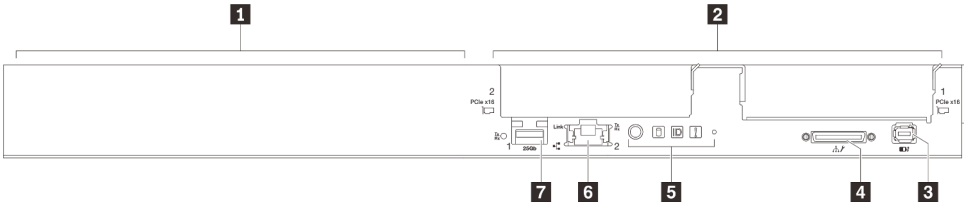


Figure 10. SD650-N V2 tray

Table 8. SD650-N V2 Tray indicators, controls, and connectors

1 GPU node/Left node (odd bay numbers)	5 Front operator panel
2 Compute node/Right node (even bay numbers)	6 1 Gb RJ45 Ethernet port with share-NIC feature for Lenovo XClarity Controller
3 External LCD diagnostics handset connector	7 25 Gb SFP28 Ethernet port with share-NIC feature for Lenovo XClarity Controller
4 USB 3.0 Console Breakout Cable	

Front LEDs

The following illustration shows LEDs on the front of the solution. By viewing the status of LEDs, you can often identify the source of the error.

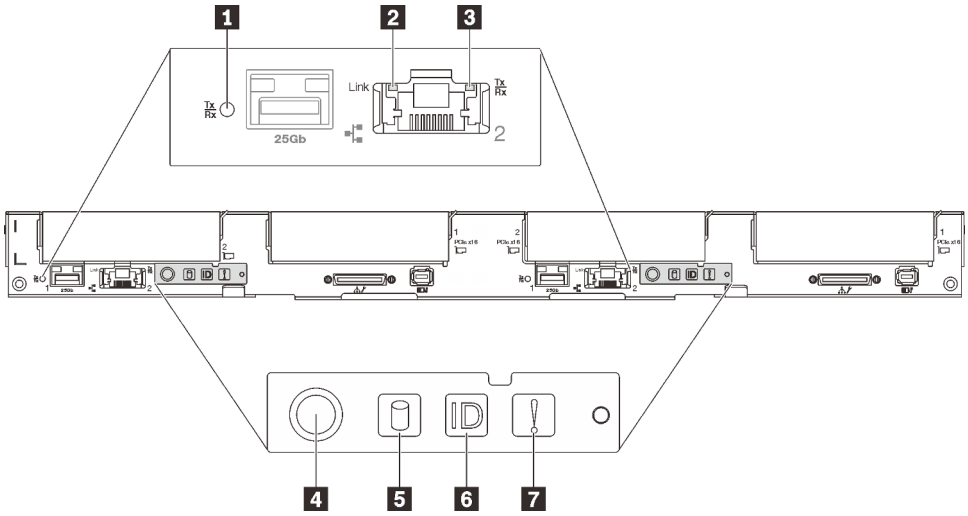


Figure 11. Front LEDs

Table 9. Front LEDs

1 25 Gb Ethernet port link and activity LED (green)	5 Drive activity LED (green)
2 1 Gb Ethernet port link LED (green)	6 Identification LED (blue)
3 1 Gb Ethernet port activity LED (green)	7 System-error LED (yellow)
4 Node power LED (green)	

1 25 Gb Ethernet port link and activity LED (green): Use this green LED to distinguish the network status.

Off: The network is disconnected.

Blinking: The network is accessing.

On: The network is established.

2 1 Gb Ethernet port link LED (green): Use this green LED to distinguish the network status.

Off: The network link is disconnected.

On: The network link is established.

3 1 Gb Ethernet port activity LED (green): Use this green LED to distinguish the network status.

Off: The node is disconnected from a LAN.

Blinking: The network is connected and active.

4 Node power LED (green): Press this button to turn the node on and off manually. The states of the power LED are as follows:

Off: Power is not present or the power supply, or the LED itself has failed.

Flashing rapidly (4 times per second): The node is turned off and is not ready to be turned on. The power button is disabled. This will last approximately 5 to 10 seconds.

Flashing slowly (once per second): The node is turned off and is ready to be turned on. You can press the power button to turn on the node.

On: The node is turned on.

5 Drive activity LED (green): If the LED is lit, it indicates that the drive is powered, but not actively reading or writing data. If the LED is flashing, the drive is being accessed.

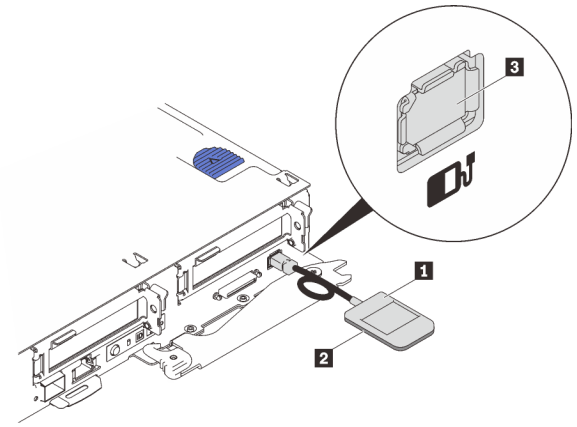
6 Identification LED (blue): Use this blue LED to visually locate the node among other nodes. This LED is also used as a presence detection button. You can use Lenovo XClarity Administrator to light this LED remotely.

7 System-error LED (yellow): When this yellow LED is lit, it indicates that a system error has occurred.

External LCD diagnostics handset

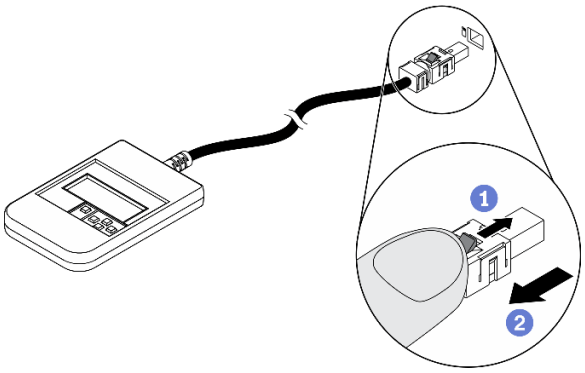
The external LCD diagnostics handset is an external device that is connected to the server with a cable, and it allows quick access to system information such as errors, system status, firmware, network, and health information.

Location of the external LCD diagnostics handset

Location	Callouts
The external LCD diagnostics handset is connected to the server with an external cable. 	1 External LCD diagnostics handset
	2 Magnetic bottom With this component, the diagnostic handset can be attached to the top or side of the rack with hands spared for service tasks.
	3 External diagnostics connector This connector is located on the front of the server, and is used to connect an external LCD diagnostics handset.

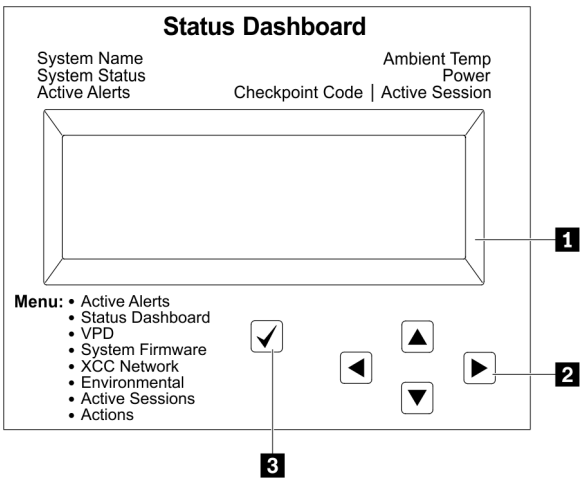
Note: When unplugging the external handset, see the following instructions: ❶ Press the plastic clip on the plug forward.

❷ Hold the clip and remove the cable from the connector.



Display panel overview

The diagnostics device consists of an LCD display and 5 navigation buttons.

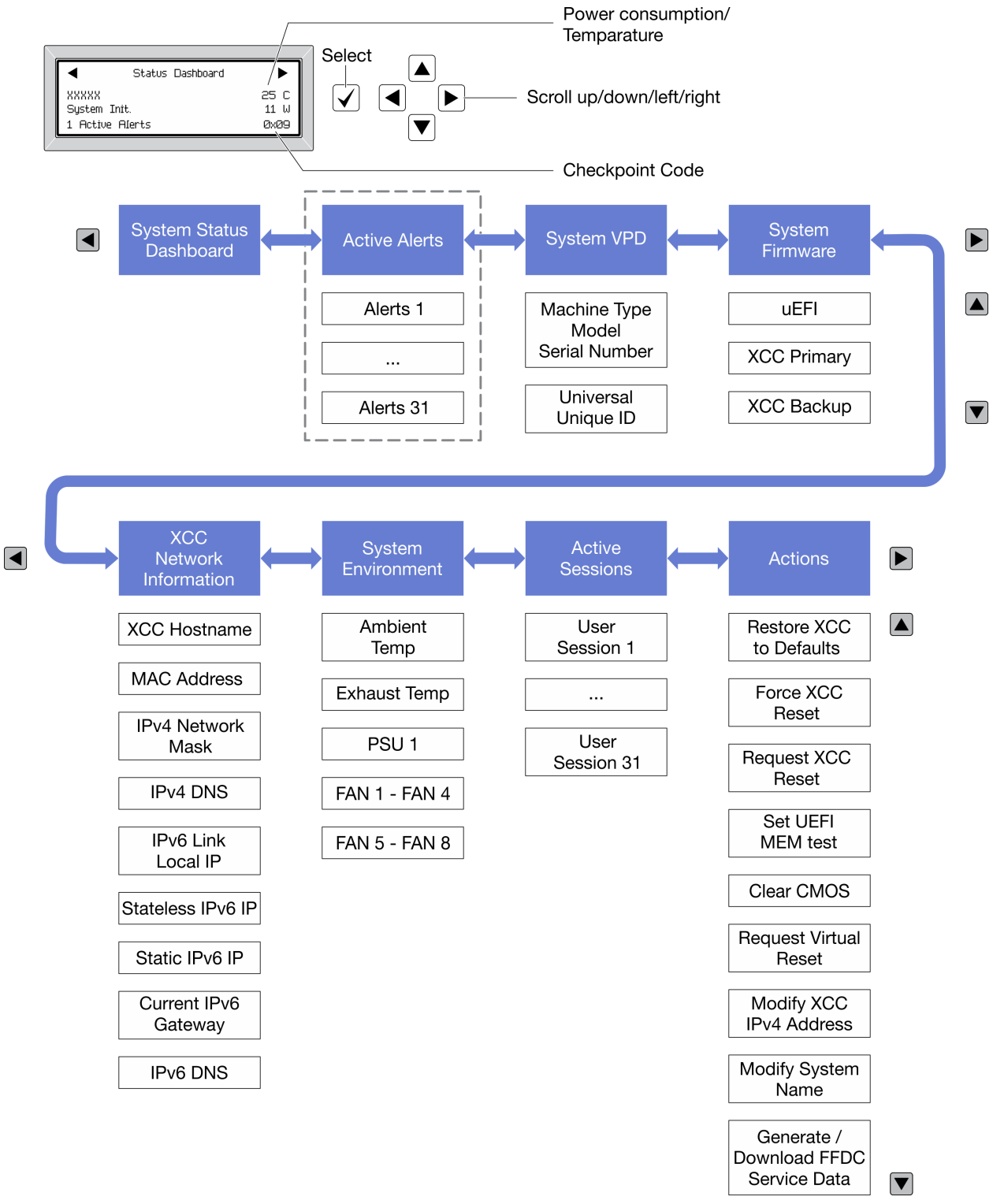


1 LCD display
2 Scroll buttons (up/down/left/right) Press the scroll buttons to locate and select system information.
3 Select button Press the select button to select from the options in the menu.

Option flow diagram

The external LCD diagnostics handset displays various system information. Navigate through the options with the scroll keys.

Depending on the model, the options and entries on the LCD display might be different.

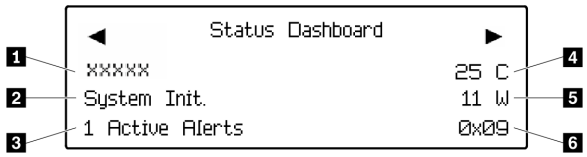


Full menu list

Following is the list of available options. Switch between an option and the subordinate information entries with the select button, and switch among options or information entries with the scroll buttons.

Depending on the model, the options and entries on the LCD display might be different.

Home Menu (System Status Dashboard)

Home Menu	Example
1 System name 2 System status 3 Active alert quantity 4 Temperature 5 Power consumption 6 Checkpoint code	

Active Alerts

Sub Menu	Example
Home screen: Active error quantity **Note:** The “Active Alerts” menu displays only the quantity of active errors. If no errors occur, the “Active Alerts” menu will not be available during navigation.	1 Active Alerts
Details screen: • Error message ID (Type: Error/Warning/Information) • Occurrence time • Possible sources of the error	Active Alerts: 1 Press ▼ to view alert details FQXSPPU009N(Error) 04/07/2020 02:37:39 PM CPU 1 Status: Configuration Error

System VPD Information

Sub Menu	Example
• Machine type and serial number • Universal Unique ID (UUID)	Machine Type: xxxx Serial Num: xxxxxx Universal Unique ID: xxxxxxxxxxxxxxxxxxxxxxxxxxxx

System Firmware

Sub Menu	Example
UEFI • Firmware level (status) • Build ID • Version number • Release date	UEFI (Inactive) Build: D0E101P Version: 1.00 Date: 2019-12-26
XCC Primary • Firmware level (status) • Build ID • Version number • Release date	XCC Primary (Active) Build: DVI399T Version: 4.07 Date: 2020-04-07
XCC Backup • Firmware level (status) • Build ID • Version number • Release date	XCC Backup (Active) Build: D8BT05I Version: 1.00 Date: 2019-12-30

XCC Network Information

Sub Menu	Example
• XCC hostname • MAC address • IPv4 Network Mask • IPv4 DNS • IPv6 Link Local IP • Stateless IPv6 IP • Static IPv6 IP • Current IPv6 Gateway • IPv6 DNS **Note:** Only the MAC address that is currently in use is displayed (extension or shared).	XCC Network Information XCC Hostname: XCC-xxxx-SN MAC Address: xx:xx:xx:xx:xx:xx IPv4 IP: xx.xx.xx.xx IPv4 Network Mask: x.x.x.x IPv4 Default Gateway: x.x.x.x

System Environmental Information

Sub Menu	Example
• Ambient temperature • Exhaust temperature • PSU status • Spinning speed of fans by RPM	Ambient Temp: 24 C Exhaust Temp: 30 C PSU1: Vin= 213 w Inlet= 26 C FAN1 Front: 21000 RPM FAN2 Front: 21000 RPM FAN3 Front: 21000 RPM FAN4 Front: 21000 RPM

Active Sessions

Sub Menu	Example
Quantity of active sessions	Active User Sessions: 1

Actions

Sub Menu	Example
Several quick actions are available: • Restore XCC to Defaults • Force XCC Reset • Request XCC Reset • Set UEFI Memory Test • Clear CMOS • Request Virtual Reseat • Modify XCC Static IPv4 Address/Net mask/Gateway • Modify System Name • Generate/Download FFDC Service Data	Request XCC Reset? This will request the BMC to reboot itself. Hold √ for 3 seconds

Rear view

The following illustration shows the components on the rear of the enclosure.

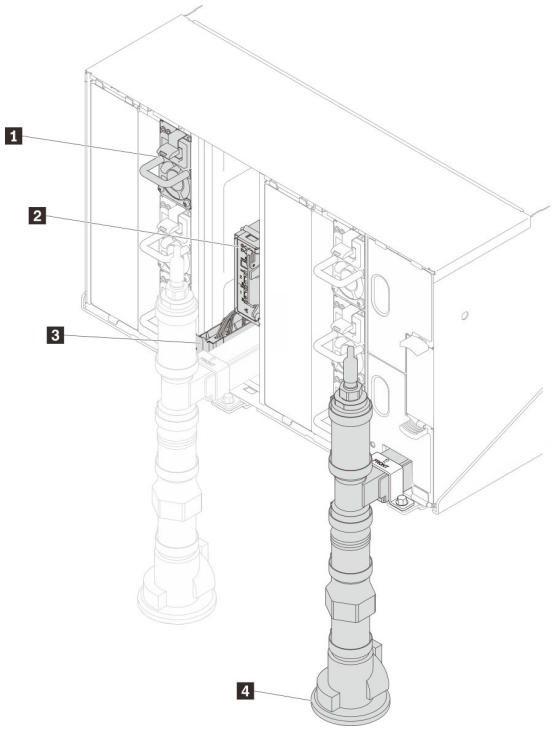


Figure 12. Rear view

Table 10. Rear view

1 Power supply	3 Drip sensor assembly
2 System Management Module 2	4 Manifold

System Management Module 2 (SMM 2)

The following illustration shows the connectors and LEDs on the SMM2 module.

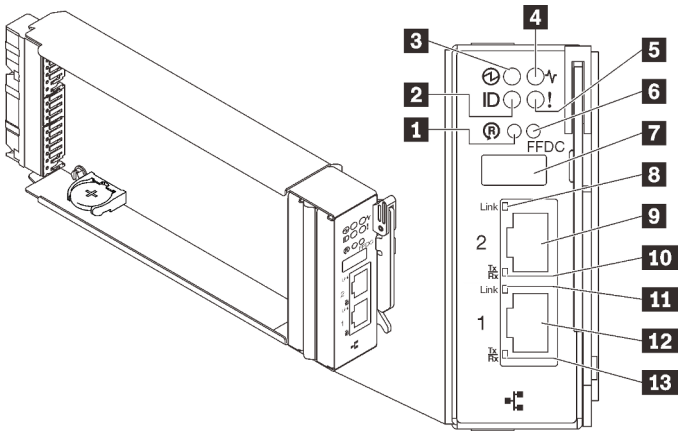


Figure 13. SMM2 connectors and LEDs

Table 11. SMM2 connectors and LEDs

1 Reset button hole	8 Ethernet port 2 link (RJ-45) LED (green)
2 Identification LED (blue)	9 Ethernet port 2
3 Power LED (green)	10 Ethernet port 2 activity (RJ-45) LED (green)
4 Status LED (green)	11 Ethernet port 1 link (RJ-45) LED (green)
5 Check log LED (yellow)	12 Ethernet port 1
6 USB port service mode button (FFDC dump)	13 Ethernet port 1 activity (RJ-45) LED (green)
7 USB 2.0 connector	

1 **Reset button**: Press the button for 1 to 4 seconds, SMM2 reboots. Press over 4 seconds, SMM2 reboots and loads to the default settings.

2 **Identification LED**: When this LED is lit (blue), it indicates the enclosure location in a rack.

3 **Power-on LED**: When this LED is lit (green), it indicates that the SMM2 has power.

4 **Status LED**: This LED (green) indicates the operating status of the SMM2.

- **Continuously on**: The SMM2 has encountered one or more problems.
- **Off**: When the enclosure power is on, it indicates the SMM2 has encountered one or more problems.
- **Flashing**: The SMM2 is working.
  - During the pre-boot process, the LED flashes rapidly.
    - Ten times per second: The SMM2 hardware is working and the firmware is ready to initialize.
    - Two times per second: The firmware is initializing.
  - When the pre-boot process is completed and the SMM2 is working correctly, the LED flashes at a slower speed (about once every two seconds).

5 **Check log LED**: When this LED is lit (yellow), it indicates that a system error has occurred. Check the SMM2 event log for additional information.

6 **USB port service mode button (FFDC dump)**: Press this button to collect FFDC logs after inserting the USB storage device to the USB 2.0 connector.

7 **USB 2.0 connector**: Insert the USB storage device to this connector and then press the **USB port service mode button** to collect FFDC logs.

8 **Ethernet port 2 link (RJ-45) LED**: When this LED is lit (green), it indicates that there is an active connection through the remote management and console (Ethernet) port 2 to the management network.

9 **Ethernet port 2**: Use this connector to access SMM2 management.

10 **Ethernet port 2 activity (RJ-45) LED**: When this LED is flashing (green), it indicates that there is an activity through the remote management and console (Ethernet) port 2 over the management network.

11 **Ethernet port 1 link (RJ-45) LED**: When this LED is lit (green), it indicates that there is an active connection through the remote management and console (Ethernet) port 1 to the management network.

12 **Ethernet port 1**: Use this connector to access SMM2 management.

13 **Ethernet port 1 activity (RJ-45) LED**: When this LED is flashing (green), it indicates that there is an activity through the remote management and console (Ethernet) port 1 over the management network.

Power supplies

The ThinkSystem DW612 Neptune® DWC Enclosure Type 7D1L supports nine autoranging power supplies.

The power supplies get electrical power from a 200 - 240 V ac power source and convert the ac input into 12 V outputs. The power supplies are capable of autoranging within the input voltage range. There is one common power domain for the enclosure that distributes power to each of the DWC tray and modules through the system midplane.

AC redundancy is achieved by distributing the ac power cord connections between independent ac circuits.

Each power supply has internal fans and a controller. The power supply controller can be powered by any installed power supply that is providing power through the midplane.

Attention: The power supplies contain internal cooling fans. Do not obstruct the fan exhaust vents.

You have to install all of the six power supplies regardless of the type of power supply, the enclosure power load, or selected enclosure power policy.

The ThinkSystem DW612 Neptune® DWC Enclosure Type 7D1L does not support mixing of low input voltage power supplies with high input voltage power supplies. For example, if you install a power supply with an input voltage of 100 - 127 V ac in a enclosure that is powered by 200 - 240 V ac power supplies, the 100 - 127 V power supply will not power on. The same restriction applies to a enclosure that is powered by 100 - 127 V ac power supplies. If you install a 200 - 240 V ac power supply in a enclosure that is powered by 100 - 127 V ac power supplies, the 200 - 240 V ac power supply will not power on.

The following illustration shows the power supply:

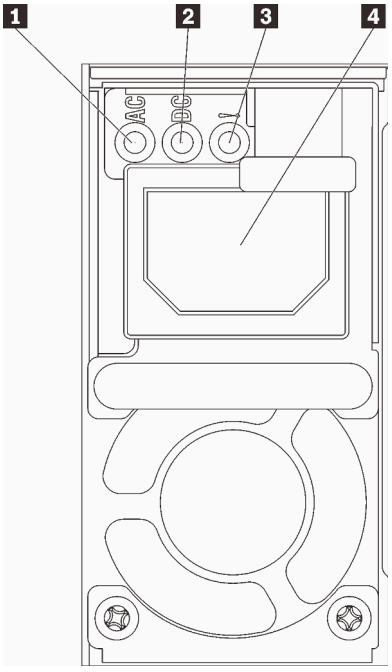


Figure 14. Power supply LEDs and connectors

1 Input (AC) power LED (green)	3 Power supply error LED (yellow)
2 Output (DC) power LED (green)	4 Power cord connector

There are three LEDs on each power supply:

1 AC power LED (green): When this LED is lit (green), it indicates that ac power is being supplied to the power supply.

2 DC power LED (green): When this LED is lit (green), it indicates that dc power is being supplied from the power supply to the enclosure midplane.

3 Power supply error LED (yellow): When this LED is lit (yellow), it indicates that there is a fault with the power supply.

Note: Before unplugging the ac power cord from the power supply, or removing the power supply from the enclosure, verify that the capacity of the remaining power supplies are sufficient to meet the minimum power requirements for all components in the enclosure.

System board layout

The illustrations in this section provide information about the connectors and switches that are available on the node system board.

System-board internal connectors

The following illustration shows the internal connectors on the system board.

Note: The SD650 V2 tray contains two compute nodes while the SD650-N V2 tray contains one compute node and one GPU node.

Compute node

The following illustration shows the internal connectors on the system board of the compute node.

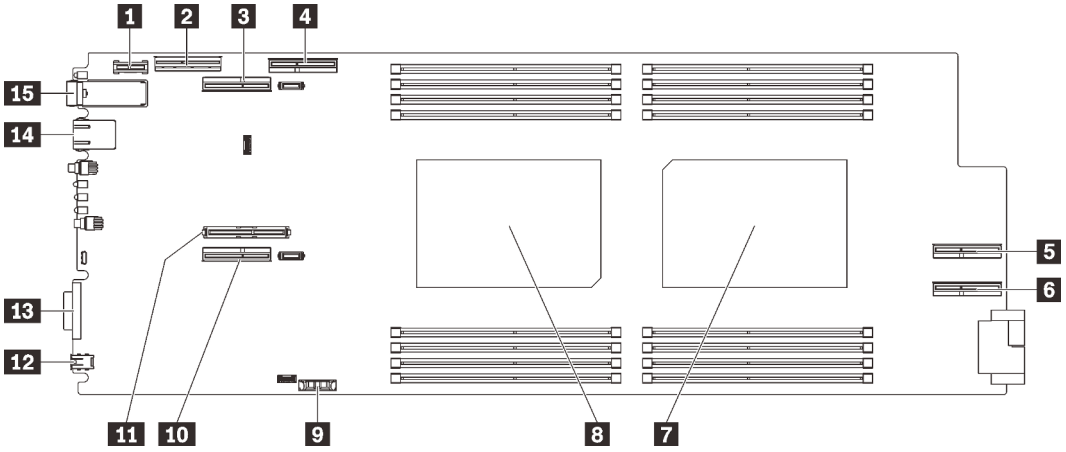


Figure 15. Internal connectors on the system board of the compute node

Table 12. Internal connectors on the system board of the compute node

1 Trusted cryptographic module (TCM) connector	9 CMOS battery (CR2032) connector
2 NVMe/SATA connector	10 PCIe 1 (riser 1) connector
3 PCIe 2 (riser 2) connector (shared with GPU)	11 M.2 connector
4 PCIe 3 connector (for GPU)	12 External LCD diagnostics handset connector
5 PCIe 4 connector (for GPU)	13 KVM connector

Table 12. Internal connectors on the system board of the compute node (continued)

6 PCIe 5 connector (for GPU)	14 1 Gb Ethernet connector
7 Processor 2 connector	15 25 Gb Ethernet connector
8 Processor 1 connector	

The following illustration shows the location of the DIMM connectors on the system board of the compute node.

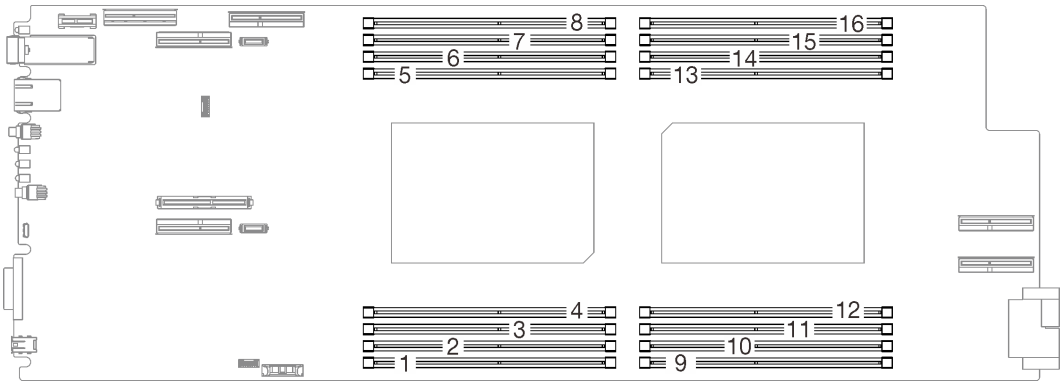


Figure 16. The location of the DIMM connectors on the system board of the compute node

GPU node

The following illustration shows the internal connectors on the system board of the GPU node.

Note: The SD650-N V2 tray contains one compute node and one GPU node.

The following illustration shows the location of the GPU connector and GPU numbering.

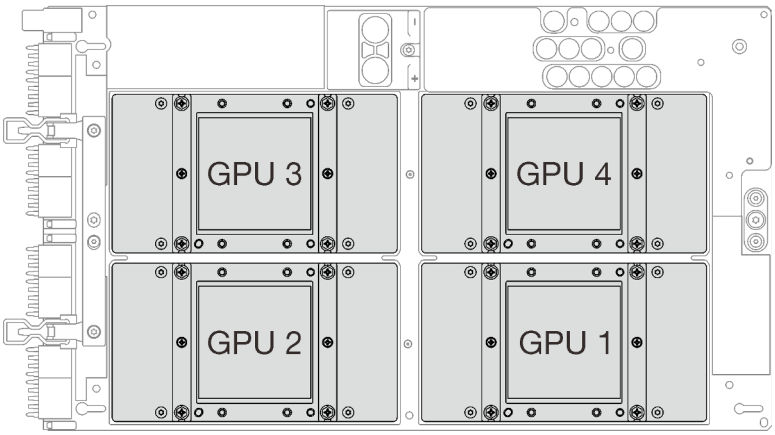


Figure 17. GPU connector and numbering

System-board switches

The following illustration shows the location and description of the switches.

Important:

1. Before you change any switch settings or move any jumpers, turn off the solution; then, disconnect all power cords and external cables. Review the information in https://pubs.lenovo.com/safety_documentation/, “Installation Guidelines” on page 50, “Handling static-sensitive devices” on page 53, and “Power off nodes” on page 95.
2. If there is a clear protective sticker on the switch blocks, you must remove and discard it to access the switches.
3. Any system-board switch or jumper block that is not shown in the illustrations in this document are reserved.

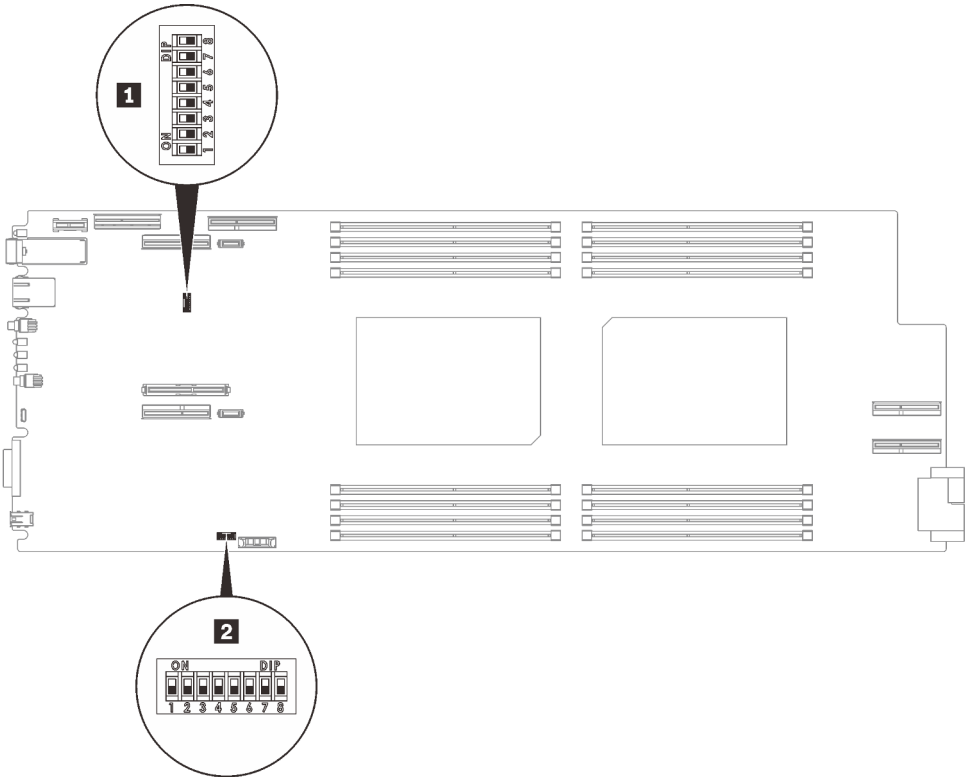


Figure 18. Location of the switches on the system board

Table 13. Switch definition

Switch name	Switch number	Switch name	Usage description	
			On	Off
1 SW2	3	Machine Engine (ME) firmware security override	ME update by jumper.	Normal (default)
	4	Password override	Overrides the power-on password.	Normal (default)
	5	Low security	Enable low security	Normal (default)
2 SW3	3	Clear CMOS	Clear CMOS data	Normal (default)
	5	Serial select	Sends the XCC to the serial port	Send the serial input output (SIO) to the front serial port (default) .

PCIe slot numbering

Use this information to identify slot numbering for SD650 V2 and SD650-N V2 trays.

SD650 V2 tray

Note: The SD650 V2 tray contains two compute nodes.

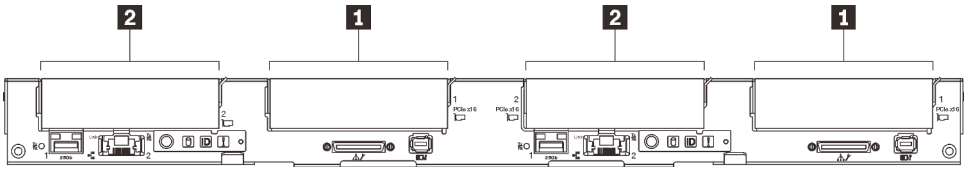


Figure 19. PCIe slot numbering - SD650 V2 tray

1 PCIe slot 1	2 PCIe slot 2

SD650-N V2 tray

Note: The SD650-N V2 tray contains one compute node and one GPU node.

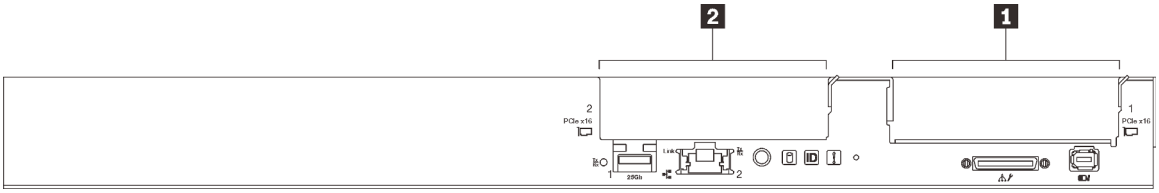


Figure 20. PCIe slot numbering - SD650-N V2 tray

1 PCIe slot 1	2 PCIe slot 2

Use the following mapping table to identify the slot numbering for GPUs.

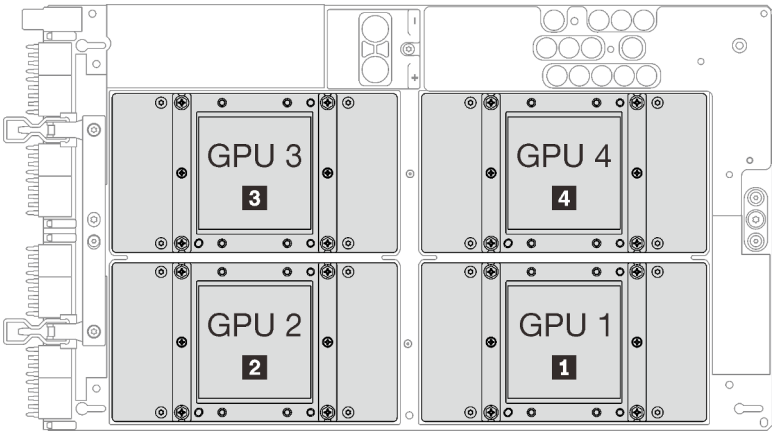


Figure 21. GPU numbering - SD650-N V2 tray

1 PCIe slot 2	3 PCIe slot 4
2 PCIe slot 3	4 PCIe slot 5

Internal cable routing

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

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

SD650 V2 tray

Use this information to route the cables for SD650 V2 trays.

ConnectX-6 Shared I/O adapter

ConnectX-6 Shared I/O adapters comes in two types:

Table 14.

Configuration	NVMe/SATA drive	M.2 backplane
Configuration 1: Shared I/O A	√	√
Configuration 2: Shared I/O B	X	√

Refer to corresponding table to route the cables for ConnectX-6 Shared I/O adapters.

- **Shared I/O A**

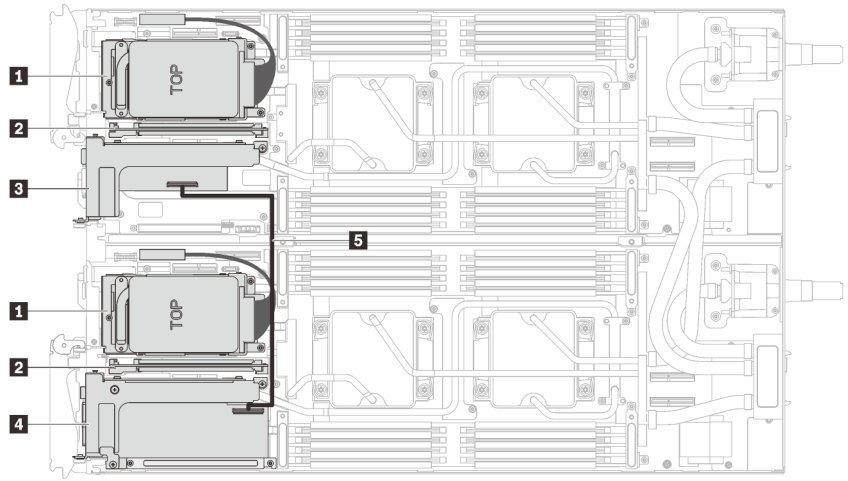


Figure 22. Cable routing - Shared I/O A (with NVMe/SATA drives and M.2 backplane)

1 NVMe/SATA drives	4 Main adapter
2 M.2 backplane	5 350mm IPEX cable
3 Auxiliary adapter	

- **Shared I/O B**

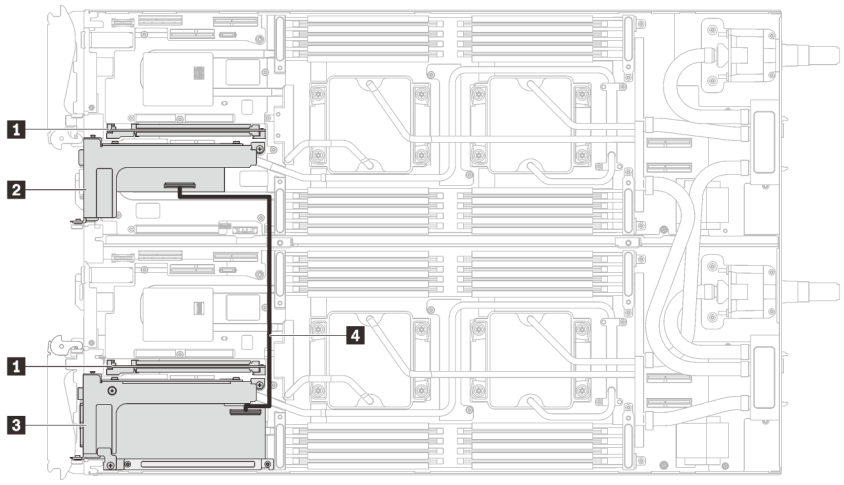


Figure 23. Cable routing - Share I/O B (with M.2 backplane)

1 M.2 backplane	3 Main adapter
2 Auxiliary adapter	4 350mm IPEX cable

SD650-N V2 tray

Use this information to route the cables for SD650-N V2 trays.

Cable installation order

Use this information to route the cables for SD650-N V2 trays.

GPU power cable installation

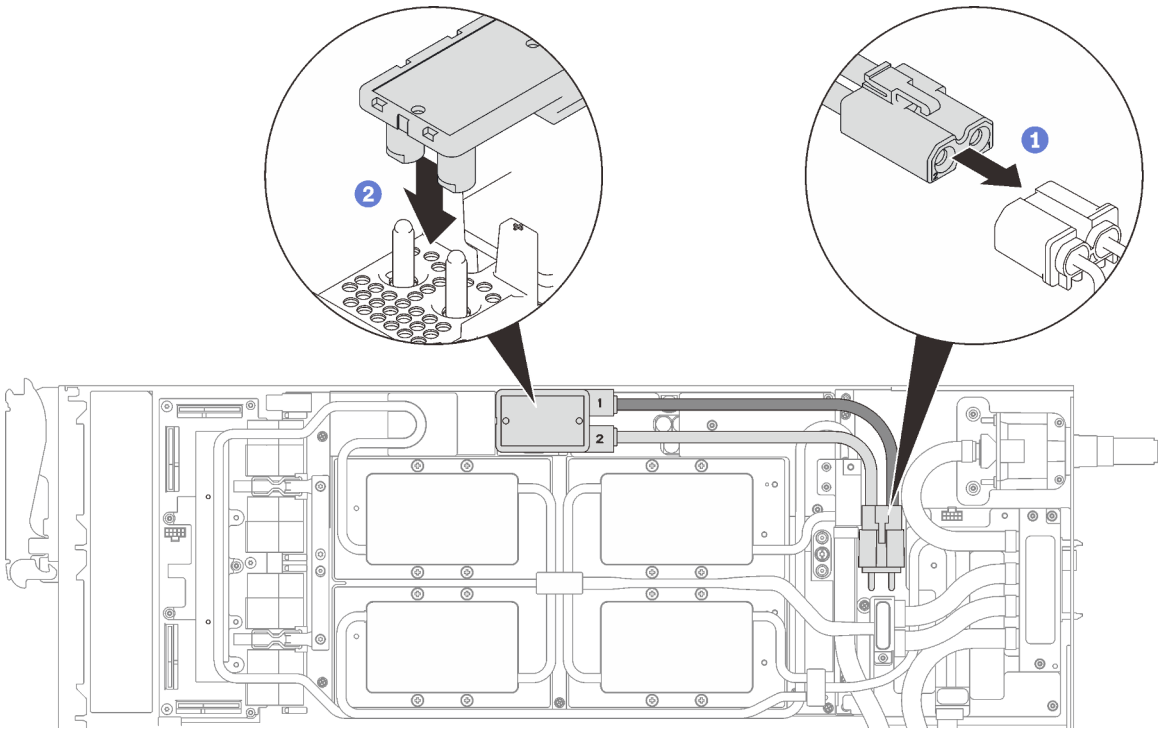
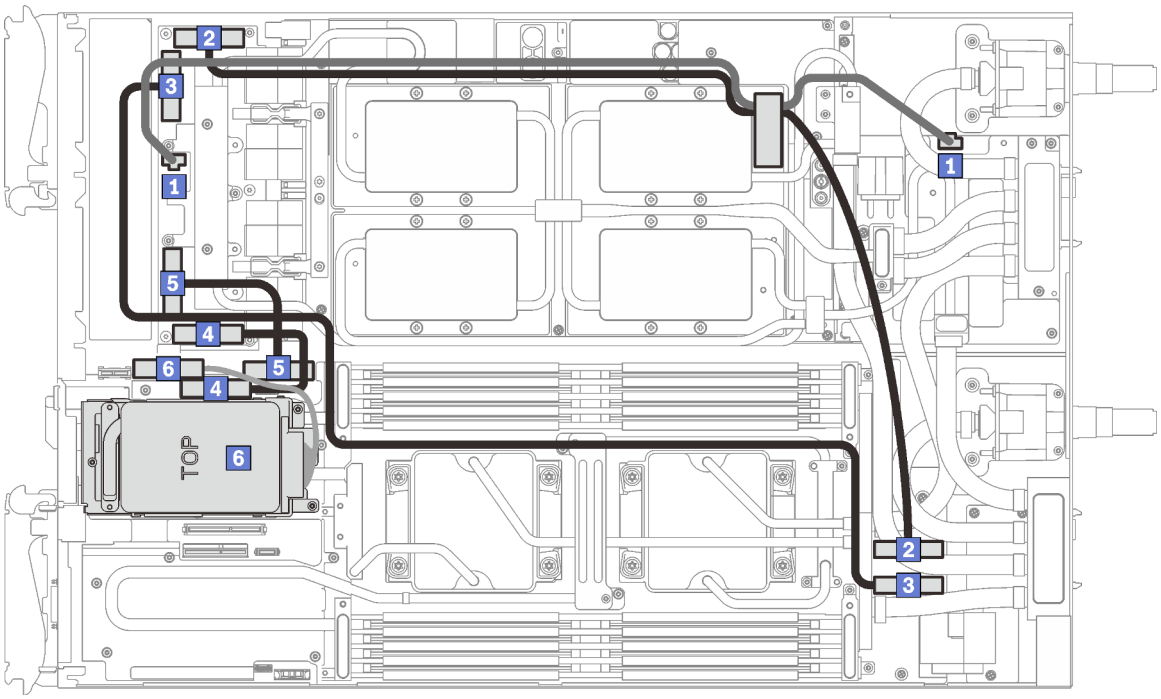


Figure 24. GPU power cable installation

One-PCIe adapter configuration

Important: Connect cables according to the following order.



1 Retimer board power cable	4 PCIe slot 2 MCIO cable
2 PCIe slot 4 MCIO cable	5 PCIe slot 3 MCIO cable
3 PCIe slot 5 MCIO cable	6 Drive SATA/NVMe cable

Figure 25. SD650-N V2 tray cable routing - One-PCIe adapter configuration

Two-PCIe adapter configuration

Important: Connect cables according to the following order.

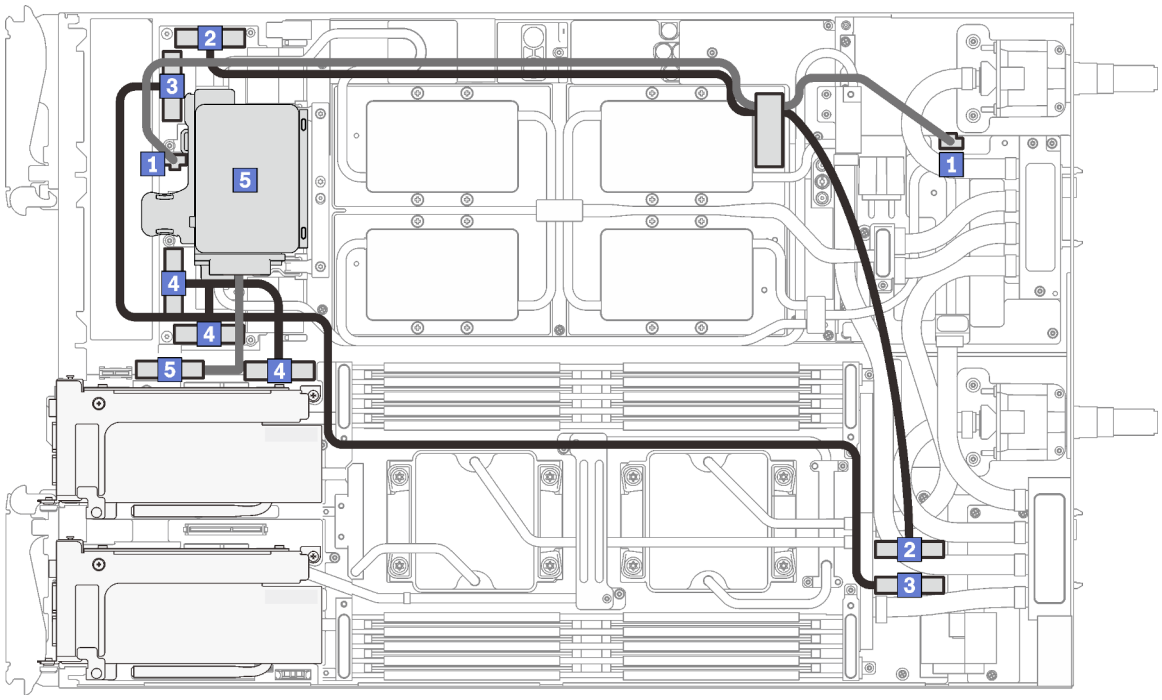


Figure 26. SD650-N V2 tray cable routing - Two-PCIe adapter configuration

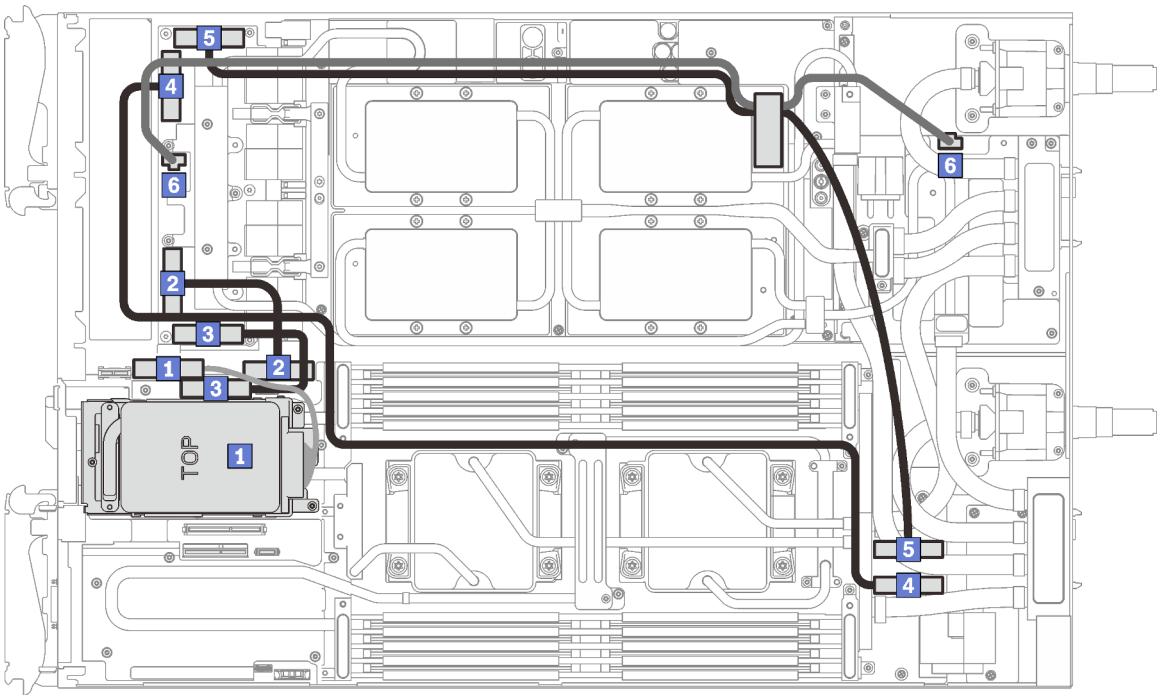
1 Retimer board power cable	4 PCIe slot 3 MCIO Y-cable
2 PCIe slot 4 MCIO cable	5 Drive SATA/NVMe cable
3 PCIe slot 5 MCIO cable	

Cable removal order

Use this information to disconnect the cables from SD650-N V2 trays.

One-PCIe adapter configuration

Important: Disconnect cables according to the following order.



1 Drive SATA/NVMe cable	4 PCIe slot 5 MCIO cable
2 PCIe slot 3 MCIO cable	5 PCIe slot 4 MCIO cable
3 PCIe slot 2 MCIO cable	6 Retimer board power cable

Figure 27. SD650-N V2 tray cable removal - One-PCIe adapter configuration

Two-PCIe adapter configuration

Important: Disconnect cables according to the following order.

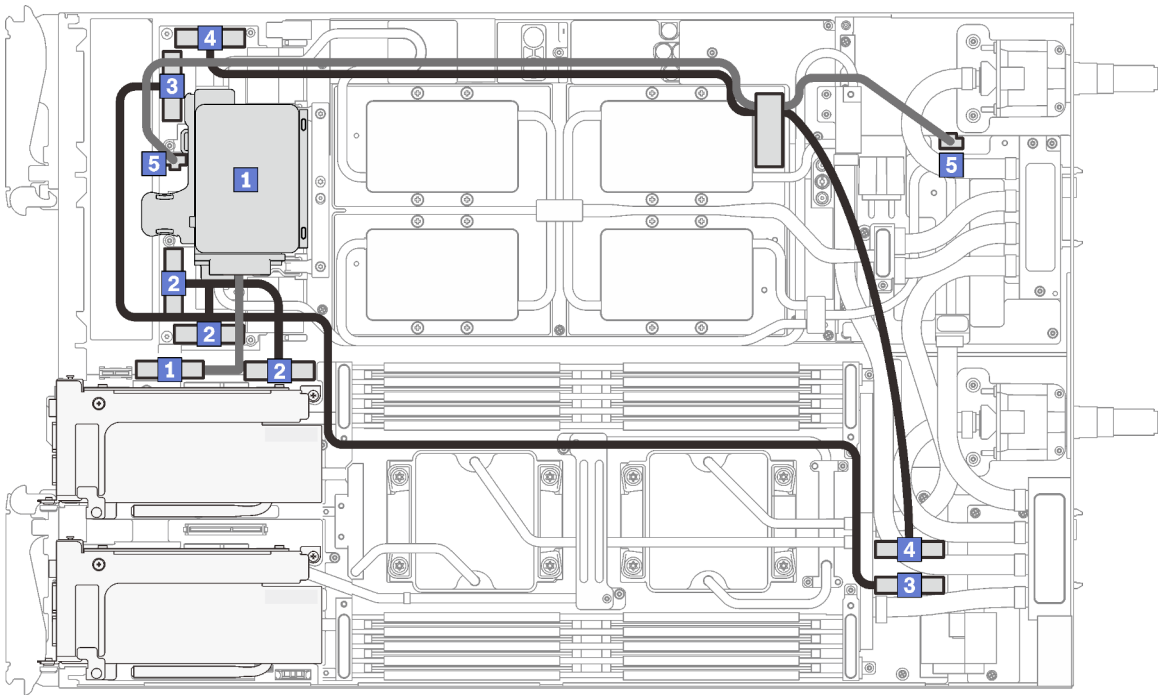


Figure 28. SD650-N V2 tray cable removal - Two-PCIe adapter configuration

1 Drive SATA/NVMe cable	4 PCIe slot 4 MCIO cable
2 PCIe slot 3 MCIO Y-cable	5 Retimer board power cable
3 PCIe slot 5 MCIO cable	

GPU power cable removal

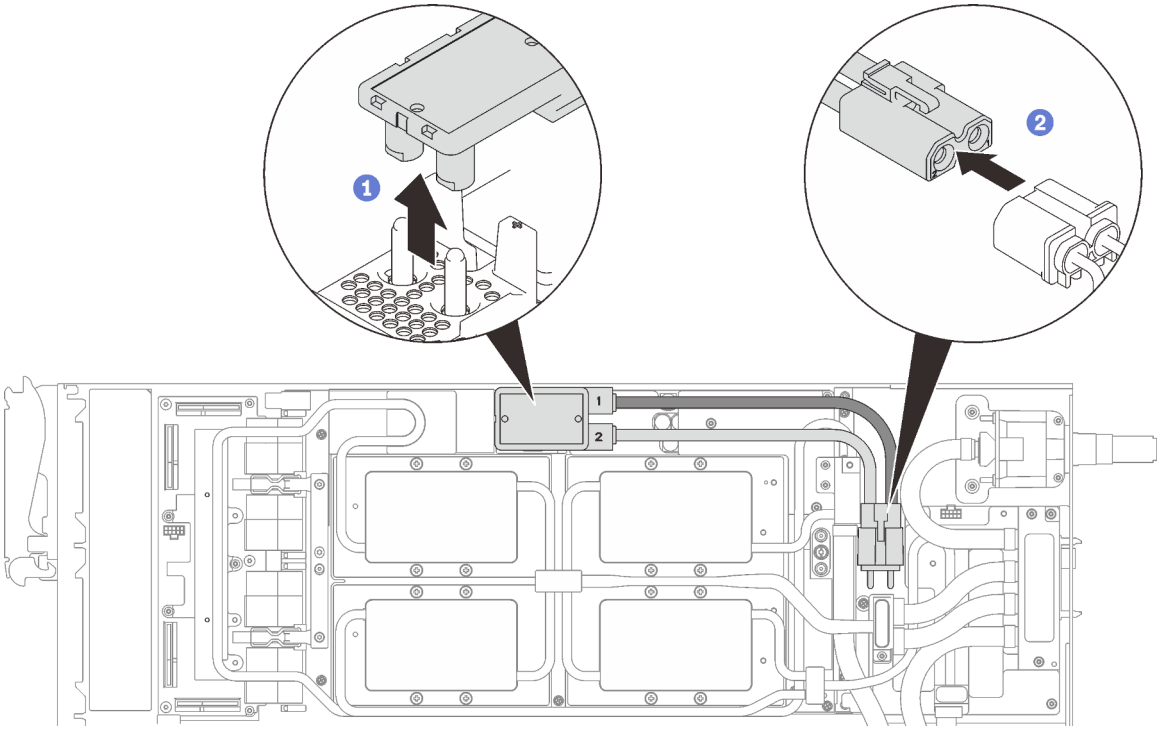


Figure 29. GPU power cable removal

Parts listing

Identify each of the components that are available for your solution with the parts listing.

For more information about ordering the parts:

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

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

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

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

Enclosure components

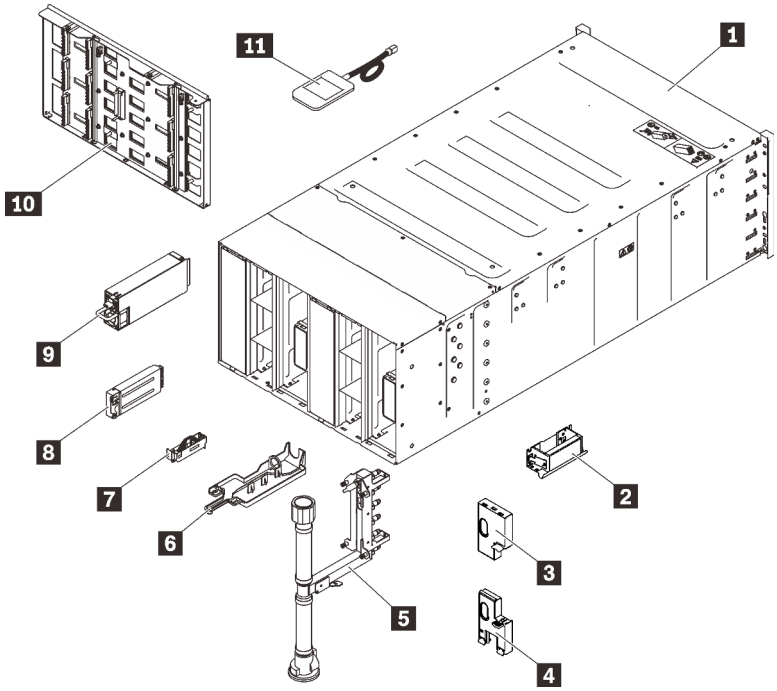


Figure 30. Enclosure components

Table 15. Parts list

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 31 “Enclosure components” on page 42: **https://datacentersupport.lenovo.com/products/servers/thinksystem/da240-enclosure/7d1j/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
1	6U enclosure assembly			√	
2	Lift handle			√	
3	Upper EMC shield			√	
4	Lower EMC shield			√	
5	Manifold assembly			√	
6	Drip sensor tray			√	
7	Drip sensor assembly			√	
8	System Management Module 2			√	
9	Power supply	√			

Table 15. Parts list (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 31 "Enclosure components" on page 42: **https://datacentersupport.lenovo.com/products/servers/thinksystem/da240-enclosure/7d1j/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
10	Midplane			√	
11	External LCD diagnostics handset	√			

SD650 V2 components

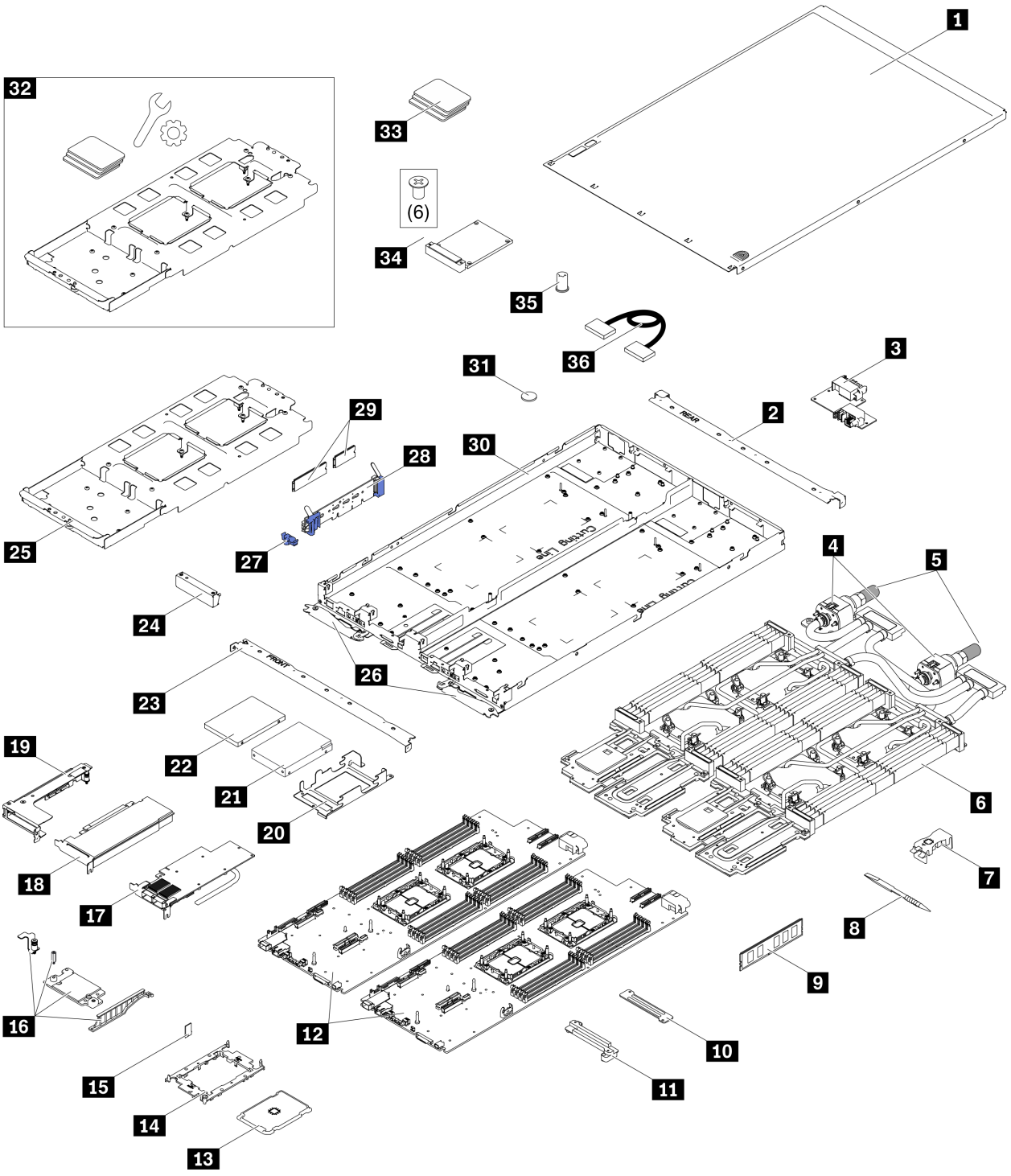


Figure 31. SD650 V2 components

Table 16. Parts list

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 32 "SD650 V2 components" on page 45: **http://datacentersupport.lenovo.com/products/servers/thinksystem/sd630v2/7d1k/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
1	Tray cover			√	
2	Rear cross brace			√	
3	Power distribution board			√	
4	Quick connects			√	
5	Quick connect plug covers			√	
6	Water loop			√	
7	DIMM comb			√	
8	DIMM tool			√	
9	DIMM			√	
10	DIMM VR clamp plate			√	
11	DIMM VR cold plate			√	
12	System board			√	
13	Processor			√	
14	Processor retainer			√	
15	Trusted Cryptographic Module (TCM)			√	
16	ConnectX-6 kit			√	
17	ConnectX-6 adapter			√	
18	Adapter			√	
19	PCIe riser cage			√	
20	Drive cage			√	
21	2.5-inch drive (15mm)			√	
22	2.5-inch drive (7mm)			√	
23	Front cross brace			√	
24	Blank bezel filler	√			
25	Water loop carrier			√	
26	SD650 V2 cam handles			√	
27	M.2 retainer clip			√	
28	M.2 backplane			√	

Table 16. Parts list (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 32 "SD650 V2 components" on page 45: **http://datacentersupport.lenovo.com/products/servers/thinksystem/sd630v2/7d1k/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
29	M.2 drive (42 mm and 80 mm)			√	
30	SD650 V2 tray			√	
31	CMOS battery (CR2032)				√
32	DWC waterloop service kit			√	
33	SD650-N V2/ SD650-V2 Neptune® DWC gap pad and putty kit			√	
34	Upper drive conduction plate assembly			√	
35	Heat sink peek nut			√	
36	Cable			√	

SD650-N V2 components

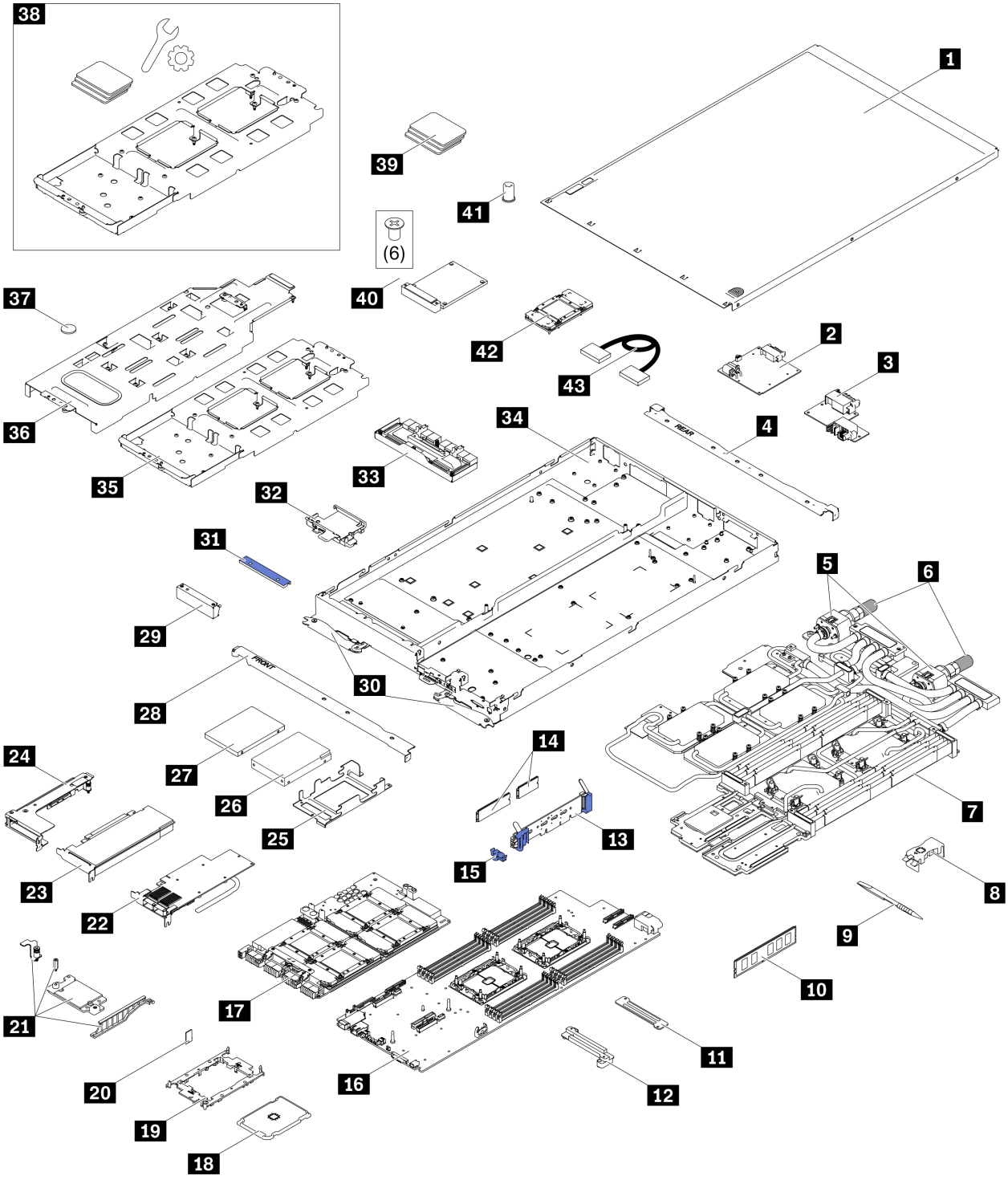


Figure 32. SD650-N V2 components

Table 17. Parts listing

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 31 "SD650-N V2 components" on page 42: **http://datacentersupport.lenovo.com/products/servers/thinksystem/sd650-n-v2/7d1n/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
1	Tray cover			√	
2	GPU Power distribution board			√	
3	Power distribution board			√	
4	Rear cross brace			√	
5	Quick connects			√	
6	Quick connect plug covers			√	
7	Water loop			√	
8	DIMM comb			√	
9	DIMM tool			√	
10	DIMM			√	
11	DIMM VR clamp plate			√	
12	DIMM VR cold plate			√	
13	M.2 backplane			√	
14	M.2 drive (42 mm and 80 mm)			√	
15	M.2 retainer clip			√	
16	System board			√	
17	GPU board			√	
18	Processor			√	
19	Processor retainer			√	
20	Trusted Cryptographic Module (TCM)			√	
21	ConnectX-6 kit			√	
22	ConnectX-6 adapter			√	
23	Adapter			√	
24	PCIe riser cage			√	
25	Drive cage (for compute node)			√	
26	2.5-inch drive (15mm)			√	
27	2.5-inch drive (7mm)			√	
28	Front cross brace			√	

Table 17. Parts listing (continued)

Index	Description	Tier 1 CRU	Tier 2 CRU	FRU	Consumable and Structural part
For more information about ordering the parts shown in Figure 31 "SD650-N V2 components" on page 42: **http://datacentersupport.lenovo.com/products/servers/thinksystem/sd650-n-v2/7d1n/parts** **It is highly recommended that you check the power summary data for your server using Lenovo Capacity Planner before purchasing any new parts.**					
29	Blank bezel filler	√			
30	SD650-N V2 tray cam handles			√	
31	Retimer clamp plate **Note:** The retimer clamp plate is available only if no drive is installed in the GPU node.			√	
32	Drive cage (for GPU node) **Note:** The drive cage is available only if the drive is installed in the GPU node.			√	
33	Retimer board			√	
34	SD650-N V2 tray			√	
35	Compute node water loop carrier			√	
36	GPU node water loop carrier			√	
37	CMOS battery (CR2032)				√
38	Neptune® DWC Waterloop service kit			√	
39	SD650-N V2/ SD650-V2 Neptune® DWC gap pad and putty kit			√	
40	Upper drive conduction plate assembly			√	
41	Heat sink peek nut			√	
42	GPU			√	
43	Cable			√	

Power cords

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

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

1. Go to:

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

2. Click **Preconfigured Model** or **Configure to order**.
3. Enter the machine type and model for your server to display the configurator page.
4. Click **Power → Power Cables** to see all line cords.

Notes:

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

Chapter 3. Solution hardware setup

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

Solution setup checklist

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

The solution setup procedure varies depending on the configuration of the solution when it was delivered. In some cases, the solution is fully configured and you just need to connect the solution to the network and an ac power source, and then you can power on the solution. In other cases, the solution needs to have hardware options installed, requires hardware and firmware configuration, and requires an operating system to be installed.

The following steps describe the general procedure for setting up a solution:

1. Unpack the solution package. See “Solution package contents” on page 1.
2. Set up the solution hardware.
   a. Install any required hardware or solution options. See the related topics in “Install solution hardware options” on page 55.
   b. If necessary, install the solution into a standard rack cabinet by using the rail kit shipped with the solution. See the *Rack Installation Instructions* that comes with optional rail kit.
   c. Connect the Ethernet cables and power cords to the solution. See “Rear view” on page 25 to locate the connectors. See “Cable the enclosure” on page 94 for cabling best practices.
   d. Power on the solution. See “Power on nodes” on page 95.

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

      “Opening and Using the XClarity Controller Web Interface” section in the XCC documentation version compatible with your server at https://pubs.lenovo.com/lxcc-overview/.
   e. Validate that the solution hardware was set up successfully.
3. Configure the system.
   a. Connect the Lenovo XClarity Controller to the management network. See “Set the network connection for the Lenovo XClarity Controller” on page 97.
   b. Update the firmware for the solution, if necessary. See “Update the firmware” on page 98.
   c. Configure the firmware for the solution. See “Configure the firmware” on page 102.

      The following information is available for RAID configuration:

      - https://lenovopress.com/lp0578-lenovo-raid-introduction
      - https://lenovopress.com/lp0579-lenovo-raid-management-tools-and-resources
   d. Install the operating system. See “Deploy the operating system” on page 105.
   e. Back up the solution configuration. See “Back up the server configuration” on page 106.
   f. Install the applications and programs for which the solution is intended to be used.

Installation Guidelines

Use the installation guidelines to install components in your solution.

Before installing optional devices, read the following notices carefully:

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

- Read the safety information and guidelines to ensure your safety at work:
  - A complete list of safety information for all products is available at:

    https://pubs.lenovo.com/safety_documentation/
  - The following guidelines are available as well: "Handling static-sensitive devices" on page 53 and "Working inside the solution with the power on" on page 52.
- Make sure the components you are installing are supported by your server. For a list of supported optional components for the server, see https://serverproven.lenovo.com/.
- When you install a new server, download and apply the latest firmware. This will help ensure that any known issues are addressed, and that your server is ready to work with optimal performance. Go to ThinkSystem SD650 V2/SD650-N V2 Neptune® DWC Trays and DW612 Neptune® DWC Enclosure Drivers and Software to download firmware updates for your server.

  Important: Some cluster solutions require specific code levels or coordinated code updates. If the component is part of a cluster solution, verify the latest Best Recipe code level menu for cluster supported firmware and driver before you update the code.
- It is good practice to make sure that the server is working correctly before you install an optional component.
- Keep the working area clean, and place removed components on a flat and smooth surface that does not shake or tilt.
- Do not attempt to lift an object that might be too heavy for you. If you have to lift a heavy object, read the following precautions carefully:
  - Make sure that you can stand steadily without slipping.
  - Distribute the weight of the object equally between your feet.
  - Use a slow lifting force. Never move suddenly or twist when you lift a heavy object.
  - To avoid straining the muscles in your back, lift by standing or by pushing up with your leg muscles.
- Make sure that you have an adequate number of properly grounded electrical outlets for the server, monitor, and other devices.
- Back up all important data before you make changes related to the disk drives.
- Have a small flat-blade screwdriver, a small Phillips screwdriver, and a T8 torx screwdriver available.
- To view the error LEDs on the system board and internal components, leave the power on.
- You do not have to turn off the server to remove or install hot-swap power supplies, hot-swap fans, or hot-plug USB devices. However, you must turn off the server before you perform any steps that involve removing or installing adapter cables, and you must disconnect the power source from the server before you perform any steps that involve removing or installing a riser card.
- Blue on a component indicates touch points, where you can grip to remove a component from or install it in the server, open or close a latch, and so on.
- Terra-cotta on a component or a terra-cotta label on or near a component indicates that the component can be hot-swapped if the server and operating system support hot-swap capability, which means that

you can remove or install the component while the server is still running. (Terra-cotta can also indicate touch points on hot-swap components.) See the instructions for removing or installing a specific hot-swap component for any additional procedures that you might have to perform before you remove or install the component.

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

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

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

Safety inspection checklist

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

Notes:

- The product is not suitable for use at visual display workplaces according to §2 of the Workplace Regulations.
- The complete process of setup must be done in the server room.

CAUTION:
S041

CAUTION:

- **This equipment must be installed or serviced by trained personnel, as defined by the NEC, IEC 62368-1 and IEC 60950-1, the standard for Safety of Electronic Equipment within the Field of Audio/ Video, Information Technology and Communication Technology.**
- **Access to the equipment is by the use of a tool, lock and key, or other means of security, and is controlled by the authority responsible for the location.**

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

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

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

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

     a. Go to:

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

b. Click **Preconfigured Model** or **Configure to order**.
c. Enter the machine type and model for your server to display the configurator page.
d. Click **Power → Power Cables** to see all line cords.

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

3. Check for any obvious non-Lenovo alterations. Use good judgment as to the safety of any non-Lenovo alterations.
4. Check inside the solution for any obvious unsafe conditions, such as metal filings, contamination, water or other liquid, or signs of fire or smoke damage.
5. Check for worn, frayed, or pinched cables.
6. Make sure that the power-supply cover fasteners (screws or rivets) have not been removed or tampered with.
7. The design of the electrical distribution system must take into consideration the total grounding leakage current from all power supplies in the enclosure.

   "CAUTION": High touch current. Connect to earth before connecting to supply.

System reliability guidelines

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

Make sure the following requirements are met:

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

Working inside the solution with the power on

Guidelines to work inside the solution with the power on.

Attention: The solution might stop and data loss might occur when internal solution components are exposed to static electricity. To avoid this potential problem, always use an electrostatic-discharge wrist strap or other grounding systems when working inside the solution with the power on.

- Avoid loose-fitting clothing, particularly around your forearms. Button or roll up long sleeves before working inside the solution.
- Prevent your necktie, scarf, badge rope, or hair from dangling into the solution.
- Remove jewelry, such as bracelets, necklaces, rings, cuff links, and wrist watches.

- Remove items from your shirt pocket, such as pens and pencils, in case they fall into the solution as you lean over it.
- Avoid dropping any metallic objects, such as paper clips, hairpins, and screws, into the server.

Handling static-sensitive devices

Use this information to handle static-sensitive devices.

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

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

Memory module installation rules and order

The following notes describe the types of DIMMs that the node supports and other information that you must consider when you install DIMMs.

- Confirm that the node supports the DIMM that you are installing (see https://serverproven.lenovo.com/).
- DIMM fillers must be installed in unused slots for proper cooling.
- When you install or remove DIMMs, the node configuration information changes. When you restart the node, the system displays a message that indicates that the memory configuration has changed. You can use the Setup utility to view the node configuration information, see ThinkSystem SD650 V2/SD650-N V2 Neptune® DWC Trays and DW612 Neptune® DWC Enclosure *Setup Guide* for more information.
- Install higher capacity (ranked) DIMMs first, following the population sequence for the memory mode being used.
- The tray only supports fully populated processor and memory configuration (2 processors and 16 DIMMs).
- The tray supports only industry-standard double-data-rate 4 (DDR4), 3200 MT/s, PC4-25600 (single-rank or dual-rank), unbuffered or synchronous dynamic random-access memory (SDRAM) dual inline memory modules (DIMMs) with error correcting code (ECC).
- The maximum operating speed of the node is determined by the slowest DIMM in the node.
- You can use compatible DIMMs from various manufacturers in the same pair.
- The specifications of a DDR4 DIMM are on a label on the DIMM, in the following format.
- *gggGBpheRxff* PC4-*wwwwaa-mccd-bb*

where:

- *gggGB* is the total capacity, in gigabytes, for primary bus (ECC not counted) 4GB, 8GB, 16GB, etc. (no space between digits and units)
- *pheR* is the number of package ranks of memory installed and number of logical ranks per package rank
  - p =
    - 1 = 1 package rank of SDRAMs installed
    - 2 = 2 package ranks of SDRAMs installed
    - 3 = 3 package ranks of SDRAMs installed
    - 4 = 4 package ranks of SDRAMs installed
  - he = blank for monolithic DRAMs, else for modules using stacked DRAM:
    - h = DRAM package type
      - D = multi-load DRAM stacking (DDP)
      - Q = multi-load DRAM stacking (QDP)
      - S = single load DRAM stacking (3DS)
    - e = blank for SDP, DDP and QDP, else modules using 3DS stacks, logical ranks per package rank
      - 2 = 2 logical ranks in each package rank
      - 4 = 4 logical ranks in each package rank
      - 8 = 8 logical ranks in each package rank
  - R = rank(s)
  - xff = Device organization (data bit width) of SDRAMs used on this assembly
    - x4 = x4 organization (4 DQ lines per SDRAM)
    - x8 = x8 organization
    - x16 = x16 organization
- *wwwww* is the DIMM bandwidth, in MBps: 2133, 2400, 2666, 2933, 3200
- *aa* is the SDRAM speed grade
- *m* is the DIMM type
  - E = Unbuffered DIMM (UDIMM), x64 primary + 8 bit ECC module data bus
  - L = Load Reduced DIMM (LRDIMM), x64 primary + 8 bit ECC module data bus
  - R = Registered DIMM (RDIMM), x64 primary + 8 bit ECC module data bus
  - U = Unbuffered DIMM (UDIMM) with no ECC (x64-bit primary data bus)
- *cc* is the reference design file used for this design
- *d* is the revision number of the reference design used
- *bb* is the JEDEC SPD Revision Encoding and Additions level used on this DIMM

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

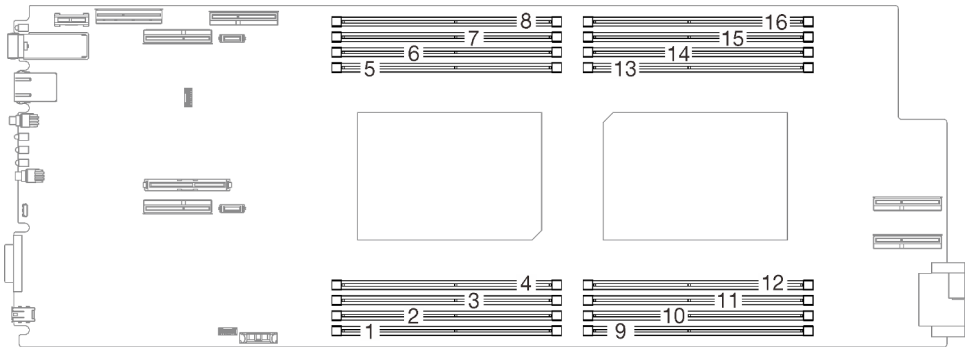


Figure 33. The location of the DIMM connectors on the system board

DRAM Installation order

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

The following memory configurations are available:
- Independent memory mode
- Memory mirroring
- Memory rank sparing

For information about memory modes, see "Memory configuration" on page 103

DRAM DIMM installation order

The tray only supports fully populated processor and memory configuration (2 processors and 16 DIMMs).

Notes:

- Sub NUMA Clustering 2 (SNC2) is supported and can be enabled in UEFI.
- Software Guard Extensions (SGX) is supported. See "Enable Software Guard Extensions (SGX)" on page 103 to enable this feature.

Install solution hardware options

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

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

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

- Make sure the components you are installing are supported by your server. For a list of supported optional components for the server, see https://serverproven.lenovo.com/.
- Always download and apply the latest firmware. This will help ensure that any known issues are addressed, and that your server is ready to work with optimal performance. Go to ThinkSystem SD650 V2/ SD650-N V2 Neptune® DWC Trays and DW612 Neptune® DWC Enclosure Drivers and Software to download firmware updates for your server.
- It is good practice to make sure that the server is working correctly before you install an optional component.

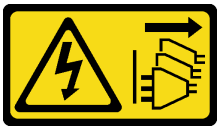
- Follow the installation procedures in this section and use appropriate tools. Incorrectly installed components can cause system failure from damaged pins, damaged connectors, loose cabling, or loose components.

Remove a DWC tray from the enclosure

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

About this task

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

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

Attention:

- Read the following sections to ensure that you work safely.
  - "Installation Guidelines" on page 50
  - "Solution setup checklist" on page 49
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Rotate the front cam handles as shown in the illustration. The DWC tray moves out of the tray bay approximately 0.6 cm (0.25 inch).

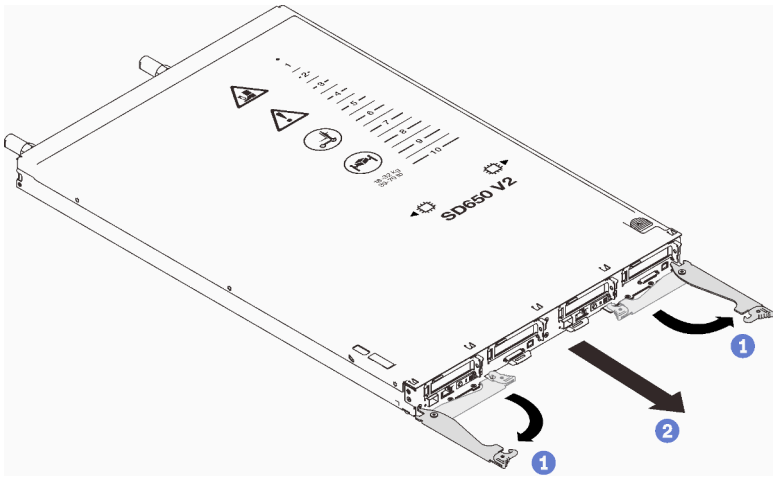


Figure 34. DWC tray removal

Attention:

- To maintain proper system cooling, do not operate the ThinkSystem DW612 Neptune® DWC Enclosure Type 7D1L without a DWC tray or tray bay filler installed in each tray bay.
- When you remove the DWC tray, note the tray bay number. Reinstalling a DWC tray into a different tray bay from the one it was removed from can have unintended consequences. Some configuration information and update options are established according to tray bay number. If you reinstall the DWC tray into a different tray bay, you might have to reconfigure the DWC tray.

Step 2. Pull the DWC tray out of the DW612 Enclosure until you see the warning icon in the right side of the cover; then, adjust hands and grip tray (~49lb) at sides to carefully pull out of enclosure.

Step 3. Once the DWC tray has been serviced, place the tray back into the original position as soon as possible.

After you finish

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

Demo video

Watch the procedure on YouTube

Remove the tray cover

Use this information to remove the tray cover.

About this task

S014

CAUTION:

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

S033

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

Attention:

- Read the following sections to ensure that you work safely.
  - "Installation Guidelines" on page 50
  - "Solution setup checklist" on page 49
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Press on the release latch and the push point at the same time and slide the cover toward the rear of the DWC tray.

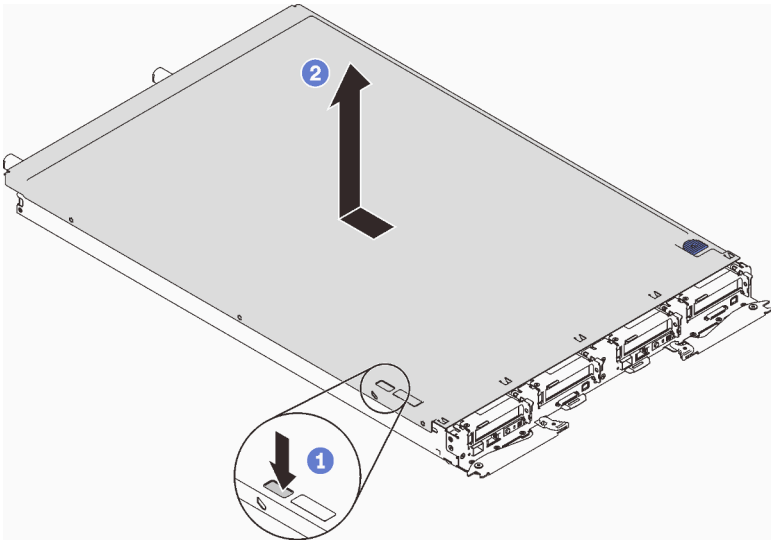


Figure 35. Tray cover removal

Step 2. Lift the cover off the DWC tray and set it aside.

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

After you finish

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

Demo video

Watch the procedure on YouTube

Remove a memory module

Use this information to remove a memory module.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 50
  - “Solution setup checklist” on page 49
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.
- Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for “Handling static-sensitive devices” on page 53:
  - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
  - Never hold two or more memory modules together so that they touch. Do not stack memory modules directly on top of each other during storage.
  - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory-module connector housing.
  - Handle memory modules with care: never bend, twist, or drop a memory module.

Procedure

Step 1. Carefully use the memory module tool to press the retaining clips outward on each end of the memory module connector.

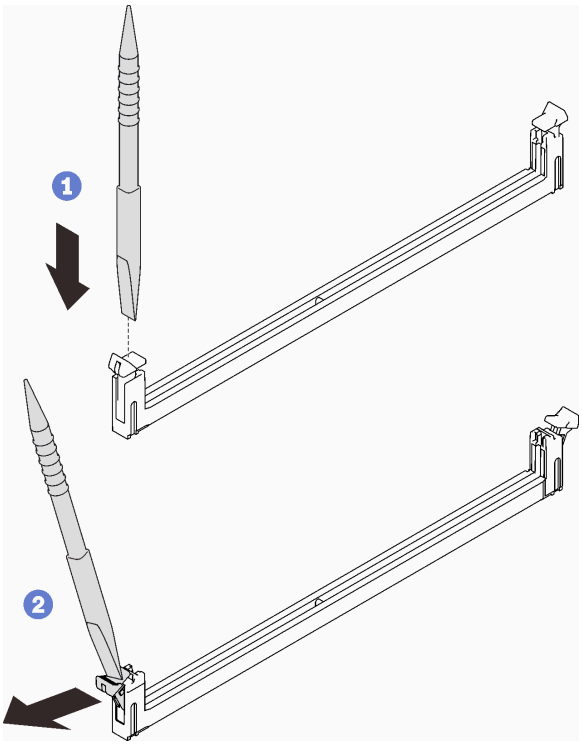


Figure 36. Memory module removal

Attention: To avoid breaking the retaining clips or damaging the memory module connectors, open and close the clips gently.

Step 2. Carefully remove the memory module.

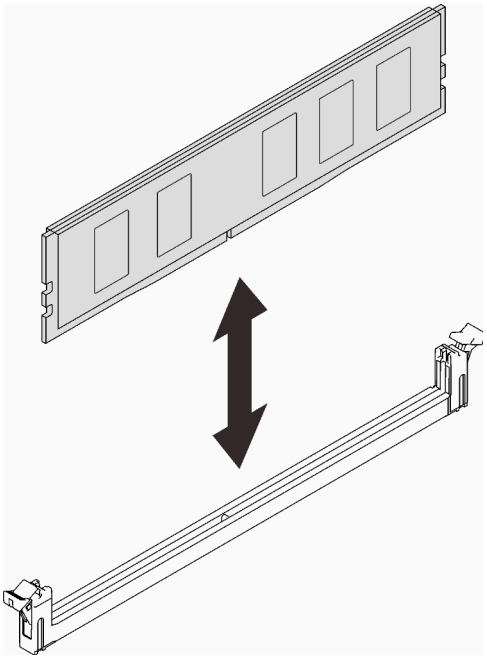


Figure 37. Memory module removal

After you finish

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

Demo video

Watch the procedure on YouTube

Remove a drive cage assembly

Use this information to remove a drive cage assembly.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 50
  - “Solution setup checklist” on page 49
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Disconnect the drive cable.

Step 2. Remove the 3 screws and remove the drive assembly out of the node.

- One-drive cage assembly

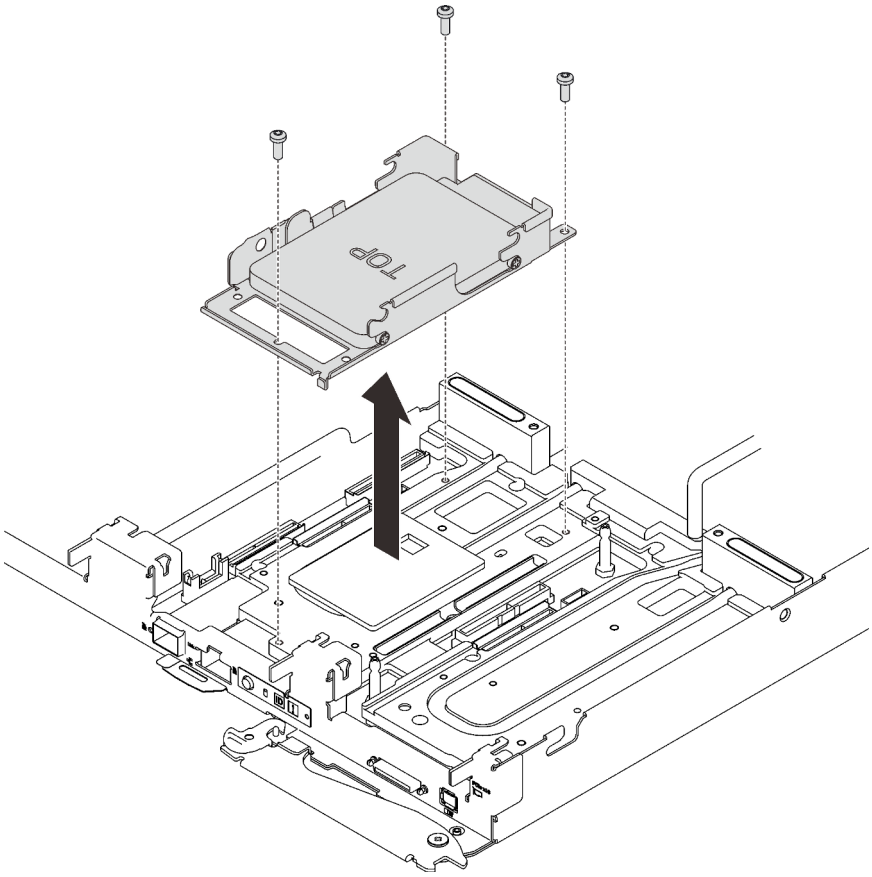


Figure 38. One-drive cage assembly removal

- Two-drive cage assembly

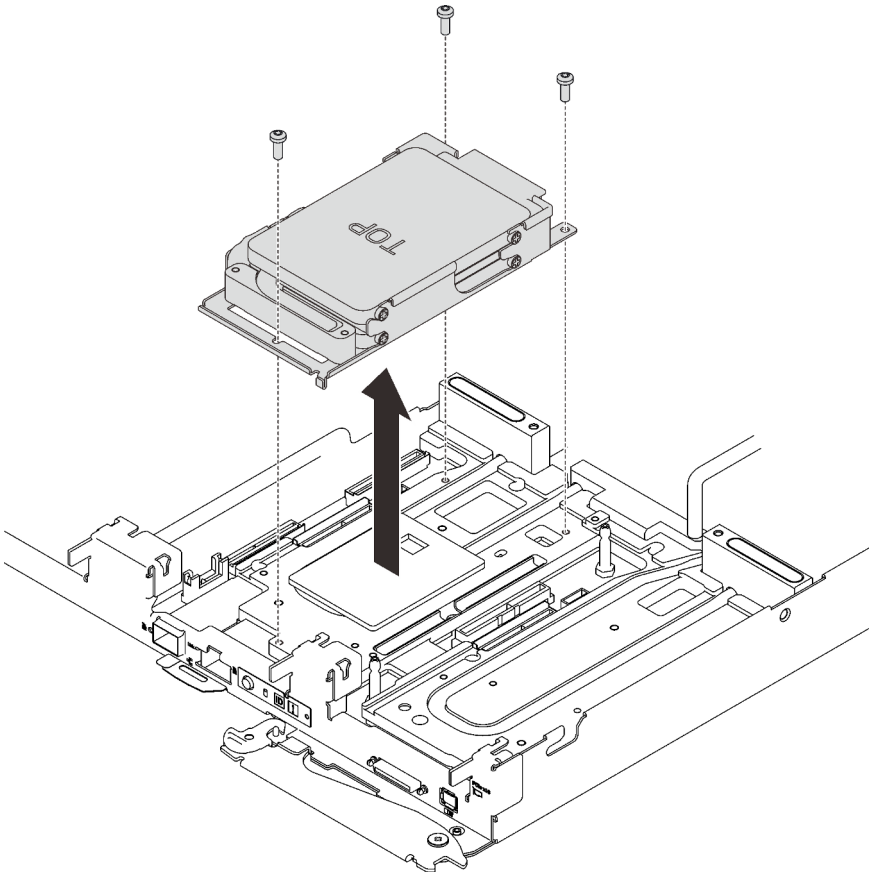


Figure 39. Two-drive cage assembly removal

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

Demo video

Watch the procedure on YouTube

Remove a drive from a compute node

Use this information to remove a drive from a compute node.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - "Installation Guidelines" on page 50
  - "Solution setup checklist" on page 49
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. There are different procedures for removing one and two drives, follow the steps according to your configuration.

For removing one drive only, complete the following steps.

1. Remove the drive.
   a. ❶ Pull the release latch.
   b. ❷ Slide the drive out of the drive cage.
   c. ❸ Disconnect the cable connector.

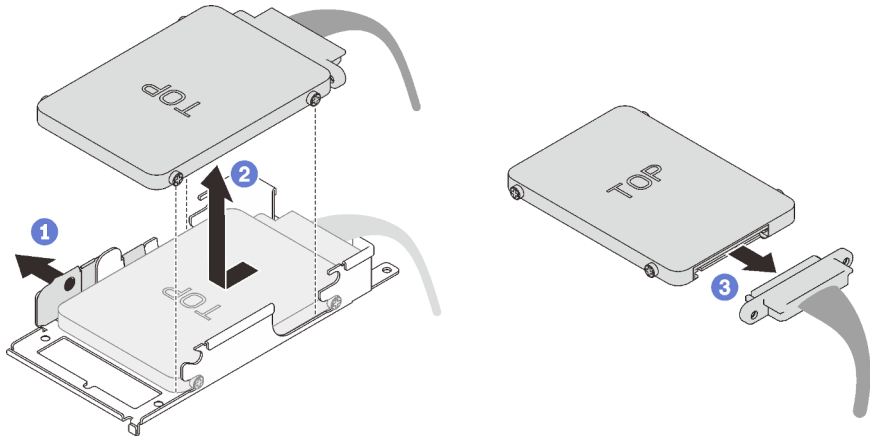


Figure 40. Drive removal

For removing two drives, complete the following steps.

1. Remove the upper drive.
   a. ❶ Remove the two screws.
   b. ❷ Pull the release latch.
   c. ❸ Slide the drive out of the drive cage.
   d. ❹ Remove the four screws; then, remove the conduction plate.

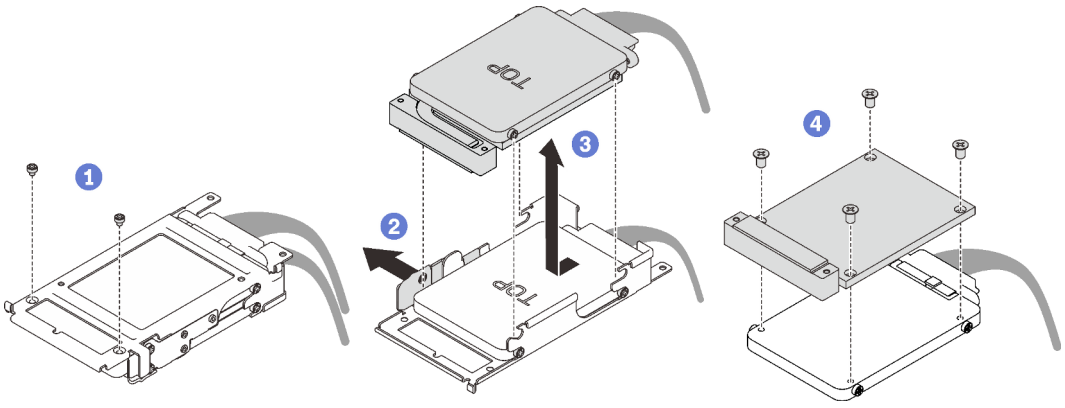


Figure 41. Upper drive removal

2. Remove the lower drive.
   a. ❶ Pull the release latch.
   b. ❷ Slide the drive out of the drive cage.
   c. ❸ Disconnect the cable connector.

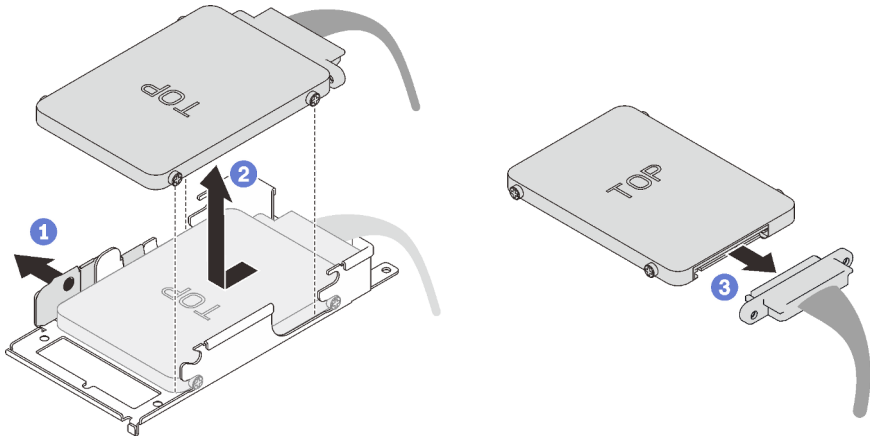


Figure 42. Lower drive removal

After you finish

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

Demo video

Watch the procedure on YouTube

Remove the drive from the GPU node

Use this information to remove the drive from the GPU node.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 50
  - “Solution setup checklist” on page 49
- Turn off the corresponding DWC tray that you are going to perform the task on.

  Note: If Shared I/O adapters are installed, power off the auxiliary node (node 1/3/5/7/9/11) first, and then power off the primary node (node 2/4/6/8/10/12).
- Disconnect all external cables from the enclosure.

  Note: Use extra forces to disconnect QSFP cables if they are connected to the solution.

Procedure

Step 1. Remove the drive.
   a. ❶ Disconnect the power cable.

b. ❷ Hold the release tab and push it to release the drive.

c. ❸ Remove the drive out of the drive cage.

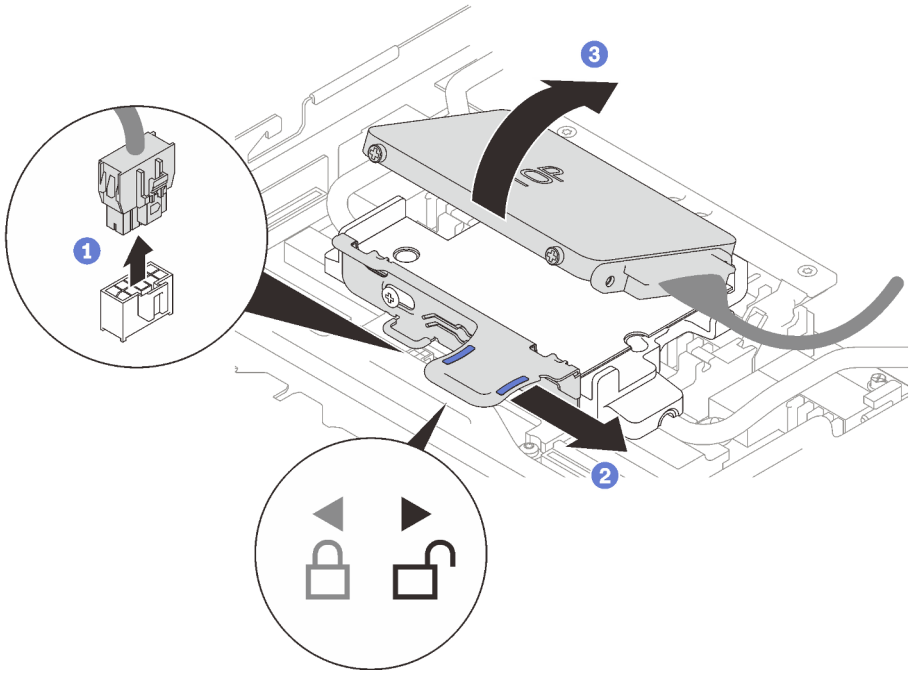


Figure 43. Drive removal

Step 2. Remove the two screws to remove the drive cage.

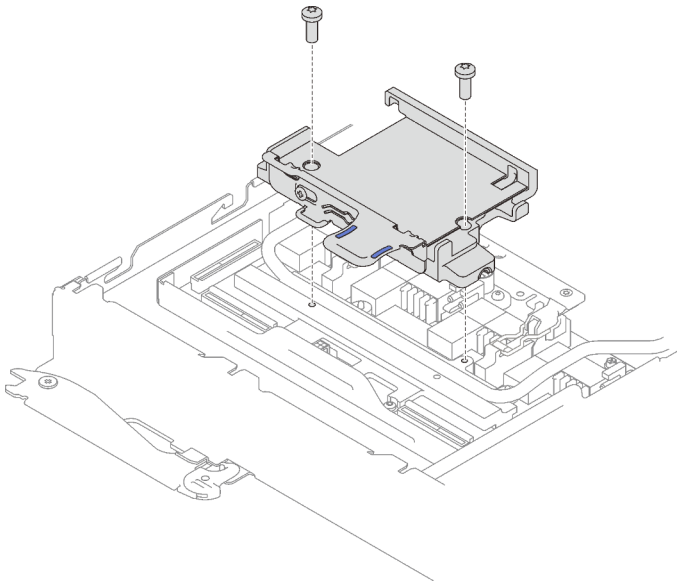


Figure 44. Drive cage removal

After you finish

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

Demo video

Watch the procedure on YouTube

Install a memory module

Use this information to install a memory module.

About this task

See “Memory module installation rules and order” on page 53 for detailed information about memory configuration and setup.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 50
  - “Solution setup checklist” on page 49
- Memory modules are sensitive to static discharge and require special handling. In addition to the standard guidelines for “Handling static-sensitive devices” on page 53:
  - Always wear an electrostatic-discharge strap when removing or installing memory modules. Electrostatic-discharge gloves can also be used.
  - Never hold two or more memory modules together so that they touch. Do not stack memory modules directly on top of each other during storage.
  - Never touch the gold memory module connector contacts or allow these contacts to touch the outside of the memory-module connector housing.
  - Handle memory modules with care: never bend, twist, or drop a memory module.
  - Do not use any metal tools (such as jigs or clamps) to handle the memory modules, because the rigid metals may damage the memory modules.
  - Do not insert memory modules while holding packages or passive components, which can cause package cracks or detachment of passive components by the high insertion force.
  - DIMM fillers must be installed in unused slots for proper cooling.

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

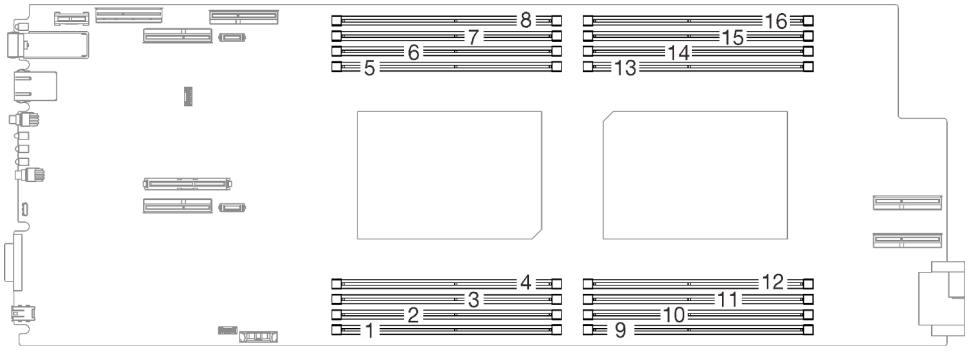


Figure 45. The location of the memory module connectors on the system board

You can find the memory module tool attached to the DIMM comb.

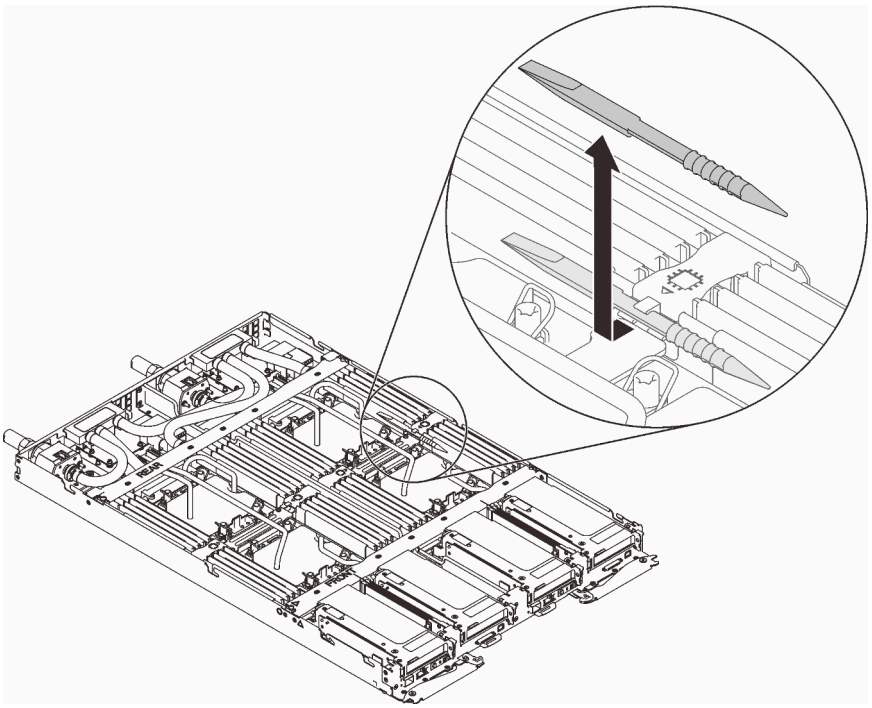


Figure 46. Memory module tool

Procedure

Step 1. Carefully use the memory module tool to press down the retaining clips on each end of the memory module connector.

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

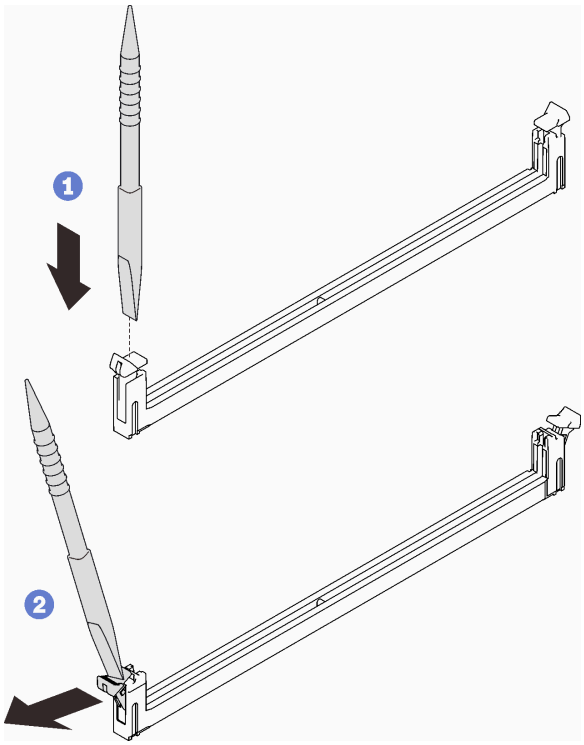


Figure 47. Memory module removal

Attention:

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

Step 2. Touch the static-protective package that contains the memory module to any unpainted metal surface on the outside of the node. Then, remove the memory module from the package.

Step 3. Align the memory module with the slot, and gently place the memory module on the slot with both hands.

Step 4. Firmly press both ends of the memory module straight down into the slot until the retaining clips snap into the locked position.

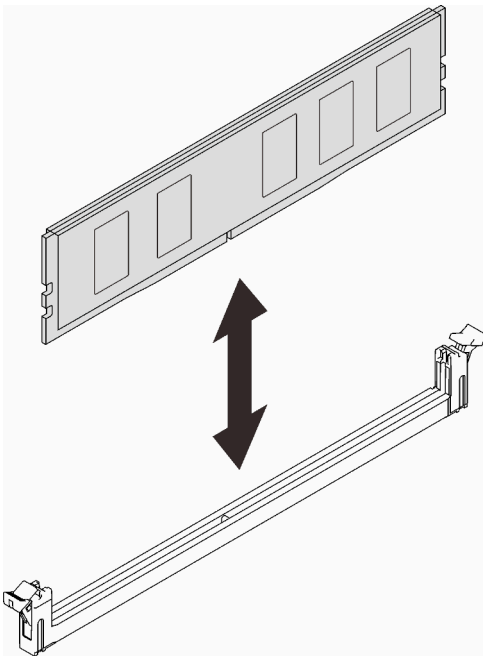


Figure 48. memory module installation

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

Install a drive in a compute node

Use this information to install a drive in a compute node.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 50
  - “Solution setup checklist” on page 49

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Procedure

Step 1. **For installing one drive only, complete the following steps.**

1. Connect the cable to the drive; then, slide the drive into drive cage and make sure the drive is inserted into the place.

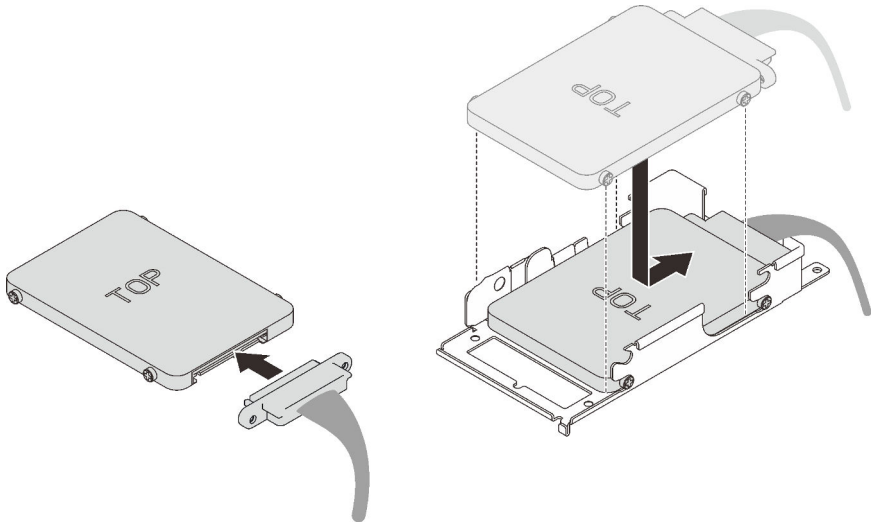


Figure 49. Drive installation

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

1. Install the lower drive.
   a. Connect the cable to the drive.
   b. Slide the lower drive into drive cage and make sure the lower drive is inserted into the place.

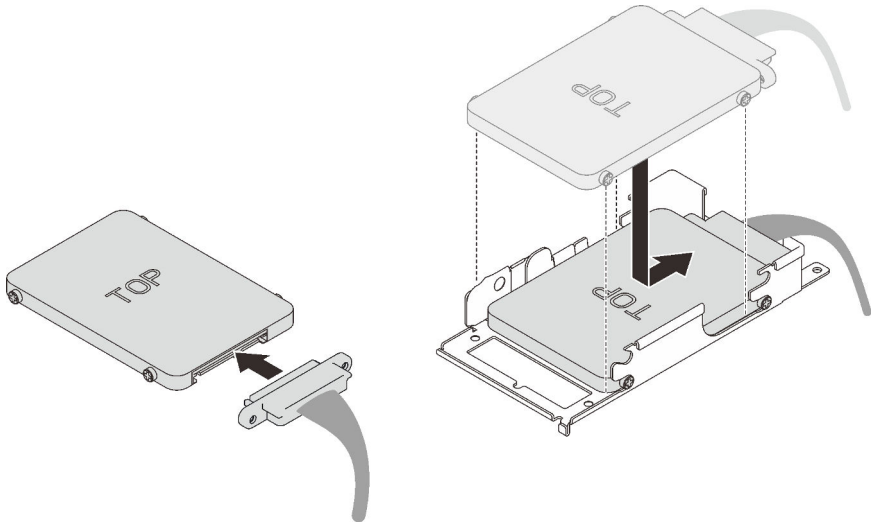


Figure 50. Lower drive installation

2. Install the upper drive.
   a. ❶ Align the conduction plate with the rear side of the upper drive; then, fasten the four screws.
   b. ❷ Slide the upper drive into drive cage and make sure the upper drive is inserted into the place.
   c. ❸ Flip over the drive assembly cage and fasten the two screws.

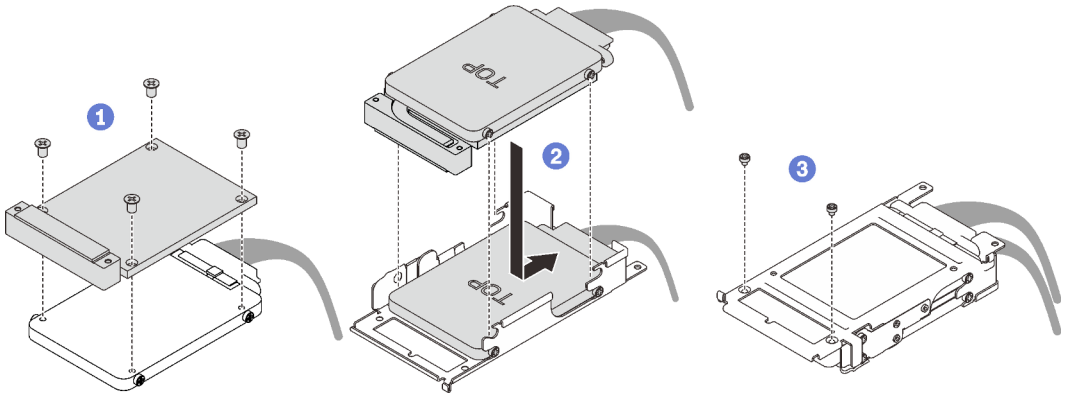


Figure 51. Upper drive installation

After you finish

1. Reinstall the drive cage (see “Install a drive cage assembly” on page 74).
2. Reinstall the tray cover (see “Install the tray cover” on page 78).
3. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 80).

   Note: For safety, use the lift tool to install the tray into the rack.
4. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
5. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Install the drive in the GPU node

Use this information to install the drive in the GPU node.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 50
  - “Solution setup checklist” on page 49

Note: Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Procedure

Step 1. Install the two screws to secure the drive cage.

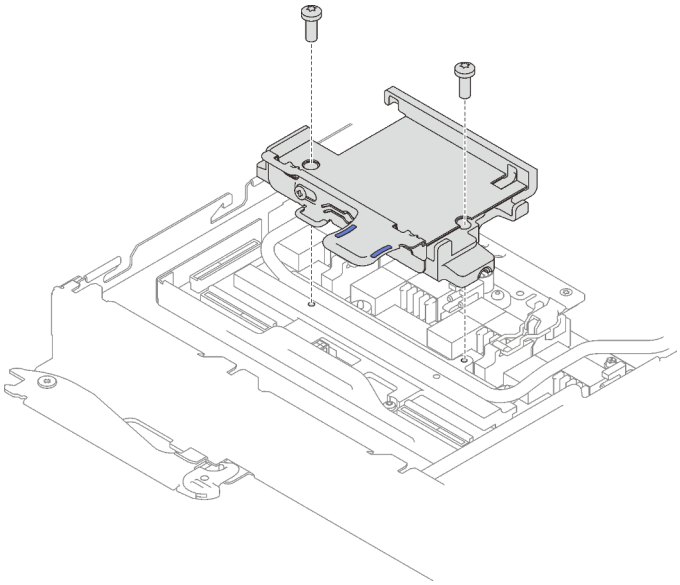


Figure 52. Drive cage installation

Step 2. Install the drive.

a. ❶ Hold the release tab and push it to the right to ensure the drive cage is released.

b. ❷ Align the drive with the two slots; then, push it into the cage to ensure it is firmly seated.

c. ❸ Hold the release tab and push it to the left to secure the drive.

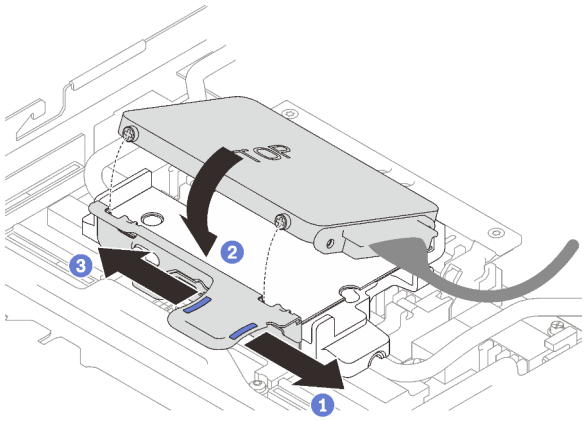


Figure 53. Drive cage installation

Step 3. Connect the cable.

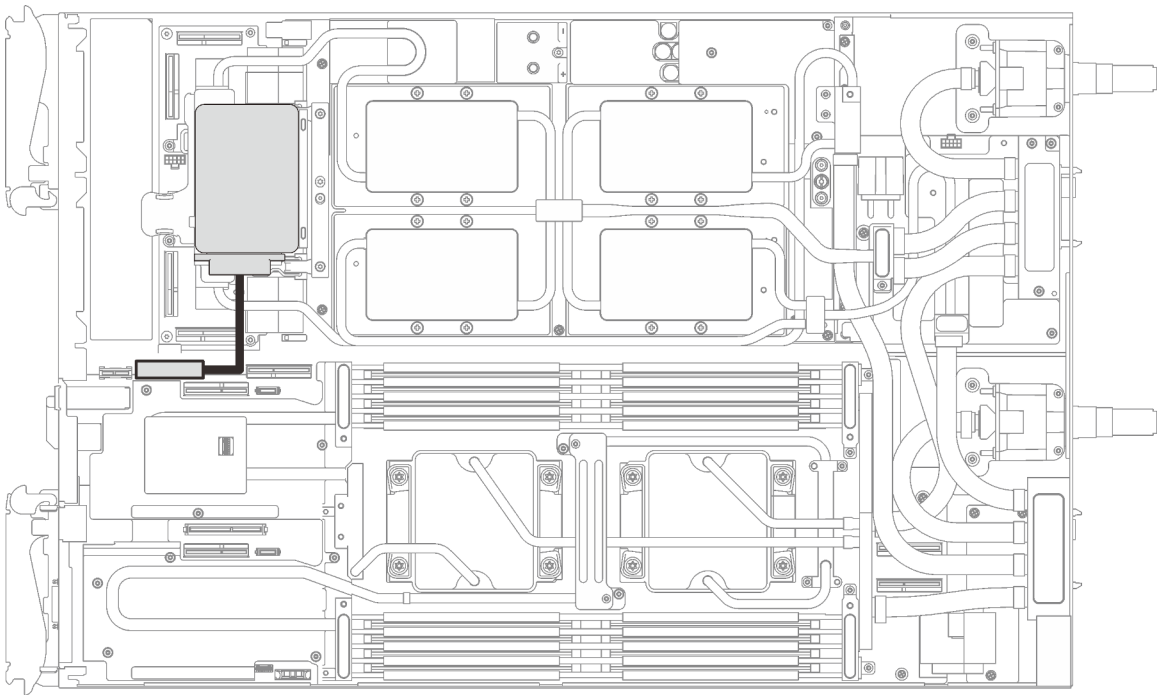


Figure 54. Cable routing

After you finish

1. Reinstall the tray cover (see “Install the tray cover” on page 78).
2. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 80).

   Note: For safety, use the lift tool to install the tray into the rack.
3. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
4. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Install a drive cage assembly

Use this information to install a drive cage assembly.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 50
  - “Solution setup checklist” on page 49

- Ensure the drives are installed correctly into the drive cage assembly (see “Install a drive in a compute node” on page 70).

Notes:

- Ensure you have “SD650 V2 or SD650-N V2 Neptune® DWC Waterloop Service Kit “ in hand to install components.

Procedure

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

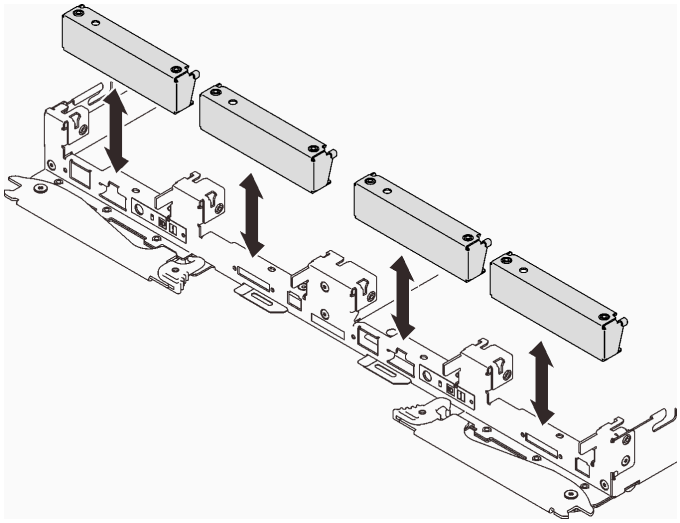


Figure 55. Blank bezel filler removal

Step 2. Connect the cable connector to the system board and route the cable as the following illustration.

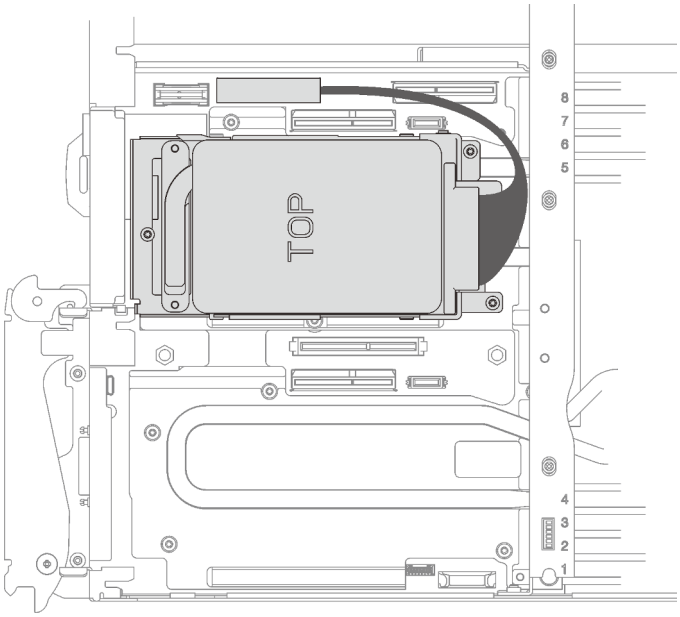


Figure 56. Drive assembly installation

Step 3. If the gap pad located on the reverse side of the drive cage is damaged or missing, replace it with the new one.

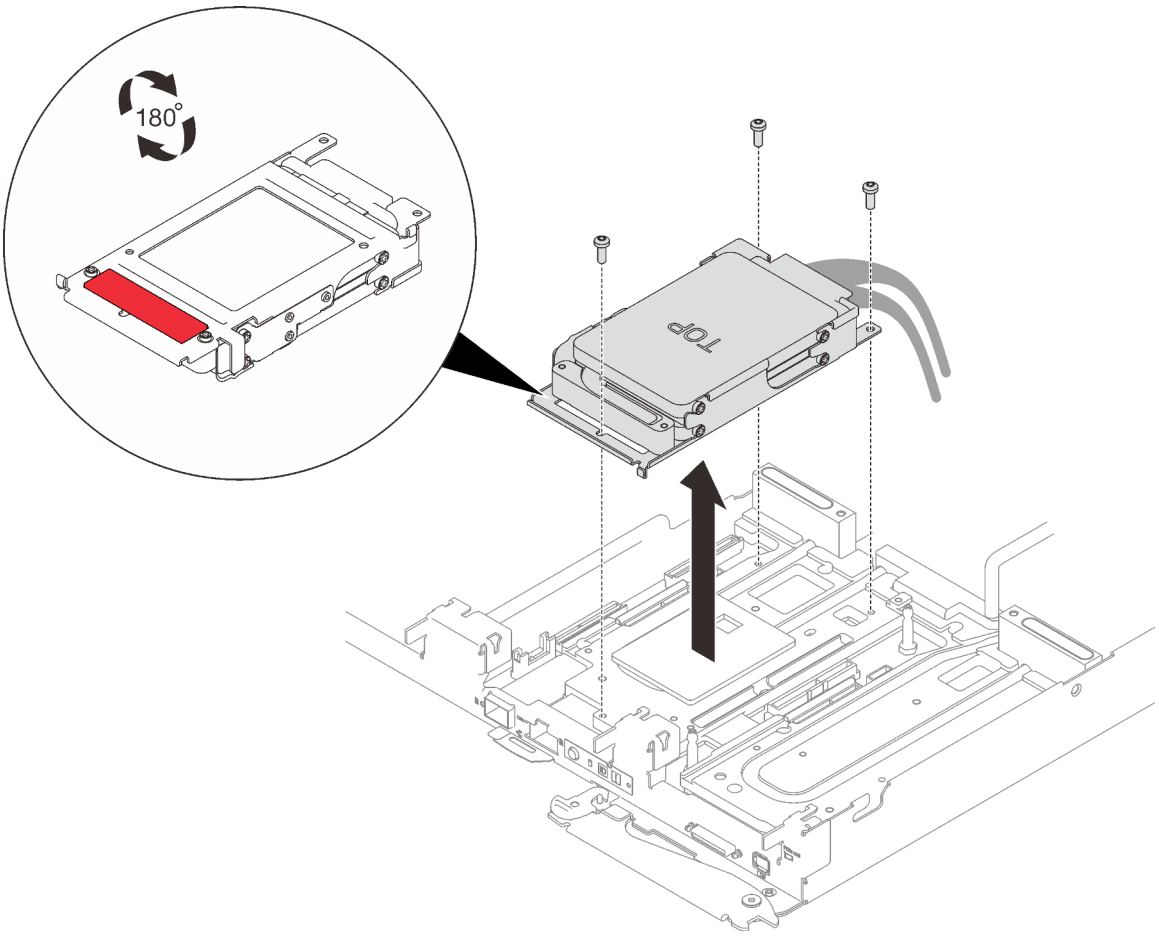


Figure 57. Gap pad

Step 4. Install the drive cage assembly and fasten the three screws.

- One-drive cage assembly

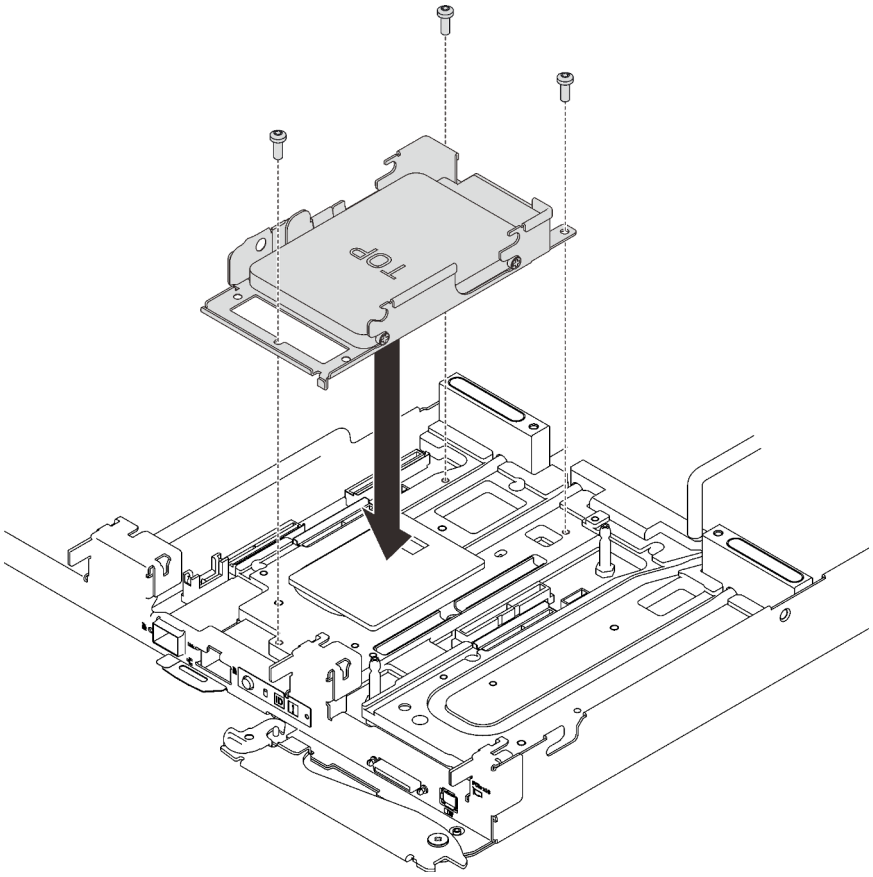


Figure 58. One-drive cage assembly installation

- Two-drive cage assembly

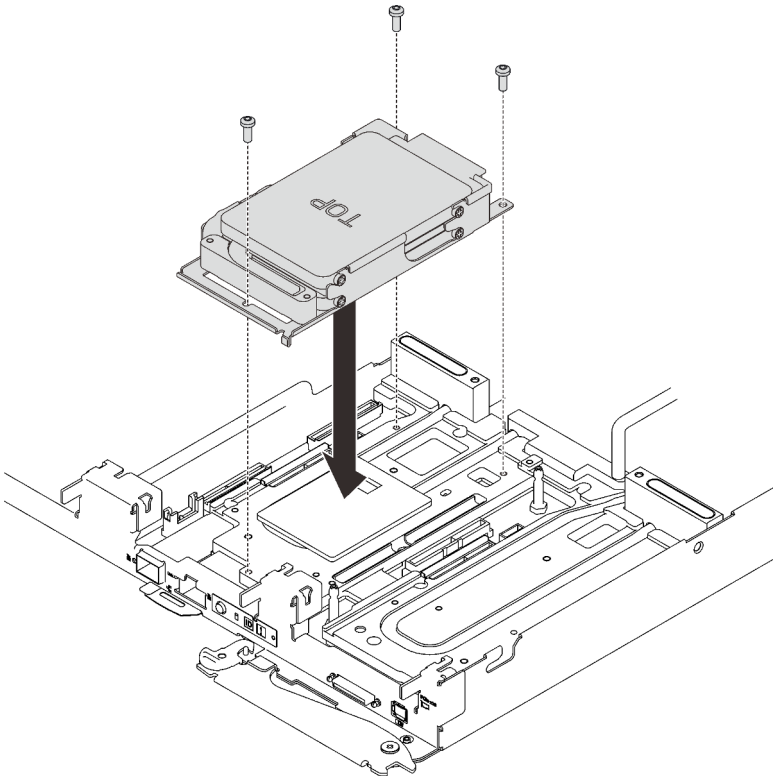


Figure 59. Two-drive cage assembly installation

After you finish

1. Reinstall the tray cover (see “Install the tray cover” on page 78).
2. Reinstall the tray (see “Install a DWC tray in the enclosure” on page 80).

   Note: For safety, use the lift tool to install the tray into the rack.
3. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.
4. Check the power LED on each node to make sure it changes from fast blink to slow blink to indicate all nodes are ready to be powered on.

Demo video

Watch the procedure on YouTube

Install the tray cover

Use this information to install the tray cover.

About this task

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 50

– “Solution setup checklist” on page 49

Procedure

Step 1. Slide the node out of the enclosure (see “Remove a DWC tray from the enclosure” on page 56).

Step 2. Position the cover on top of the tray.

Step 3. Slide the cover toward the front of the tray.

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

Step 4. Make sure that the cover correctly engages all the insert tabs on the tray.

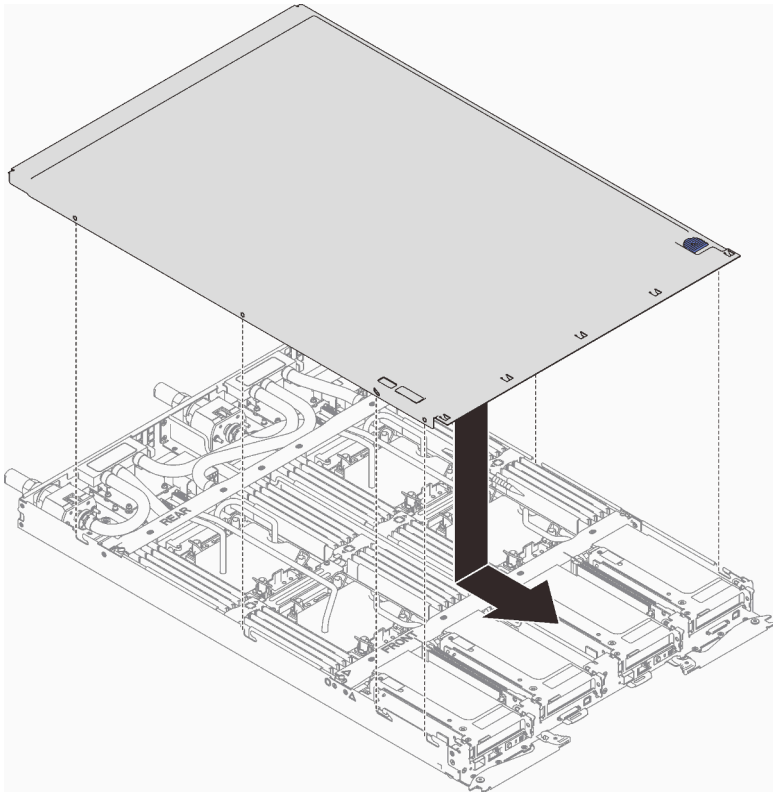


Figure 60. Tray cover installation

After you finish

1. Reinstall the tray into the enclosure (see “Install a DWC tray in the enclosure” on page 80).

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

2. Connect all required external cables to the enclosure.

   Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.

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

Demo video

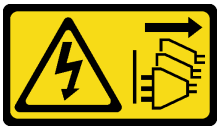
Watch the procedure on YouTube

Install a DWC tray in the enclosure

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

About this task

S002



CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 50
  - “Solution setup checklist” on page 49
- For your safety, use the lift tool to install the tray into the rack.

Procedure

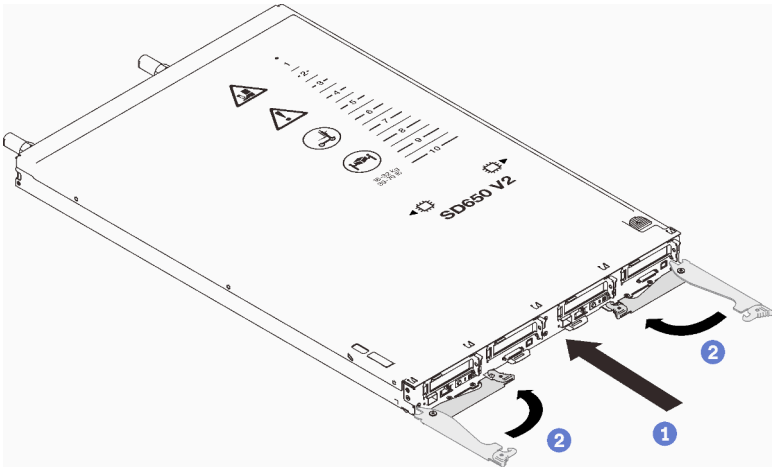


Figure 61. DWC tray installation

Step 1. Select the tray bay.

Attention:

- To maintain proper system cooling, do not operate the ThinkSystem DW612 Neptune® DWC Enclosure Type 7D1L without a DWC tray or tray bay filler installed in each tray bay.

- If you are reinstalling a DWC tray that you removed, you must install it in the same tray bay from which you removed it. Some DWC tray configuration information and update options are established according to tray bay number. Reinstalling a DWC tray into a different tray bay can have unintended consequences. If you reinstall the DWC tray into a different tray bay, you might have to reconfigure the DWC nodes in the tray.

Step 2. Make sure that the front cam handles on the DWC tray are in the open position.

Step 3. Insert the DWC tray into the tray bay until it stops.

Step 4. Rotate the front cam handles on the front of the DWC tray to the closed position to secure the tray in the enclosure.

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

Step 5. Connect all required external cables to the enclosure.

Note: Use extra forces to connect QSFP cables to the enclosure if Mellanox ConnectX-6 adapters are installed.

Step 6. Press the power buttons to turn on both nodes in the DWC tray.

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

Step 8. If you have other trays to install, do so now.

If this is the initial installation of the DWC tray in the enclosure, you must configure the DWC tray through the Setup utility and install the DWC tray operating system.

If you have changed the configuration of the DWC tray or if you are installing a different DWC tray from the one that you removed, you must configure the DWC tray through the Setup utility, and you might have to install the DWC tray operating system.

Demo video

Watch the procedure on YouTube

Install the enclosure in a rack

To install the enclosure in a rack, follow the instructions that are provided below.

About this task

S002

CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 50
  - “Solution setup checklist” on page 49
- Three trained technicians are needed to complete the enclosure installation/removal task.
  - Two technicians hold front and rear handles at both sides of the enclosure.
  - One technician protects cables from damage.
- To install the rails into a rack, follow the instructions that are provided in the *Rail installation Guide*.
- Ensure four handles are attached to the enclosure when moving the enclosure.

  Note: Make sure all handle posts are secured before lifting.

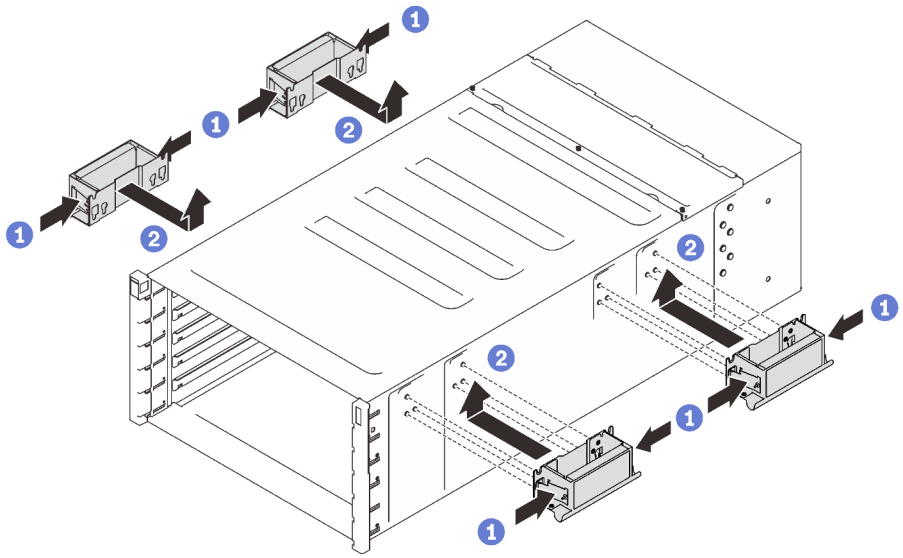


Figure 62. Attaching four handles

After rails are installed successfully, complete the following steps to install the enclosure in a rack.

Procedure

Step 1. Carefully put the enclosure into the rack and slide the enclosure until rear handles are near front rack rails; then, remove rear handles at both sides.

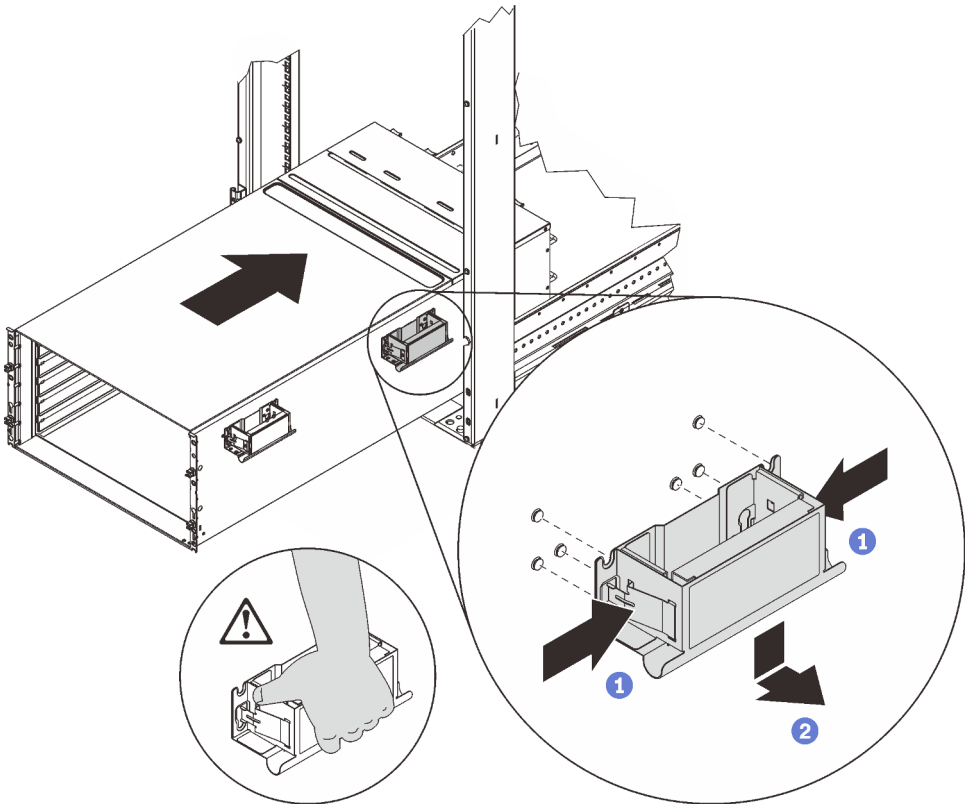


Figure 63. Rear handle removal

Step 2. Slide the enclosure farther into the rack until front handles are near front rack rails; then, remove front handles at both sides.

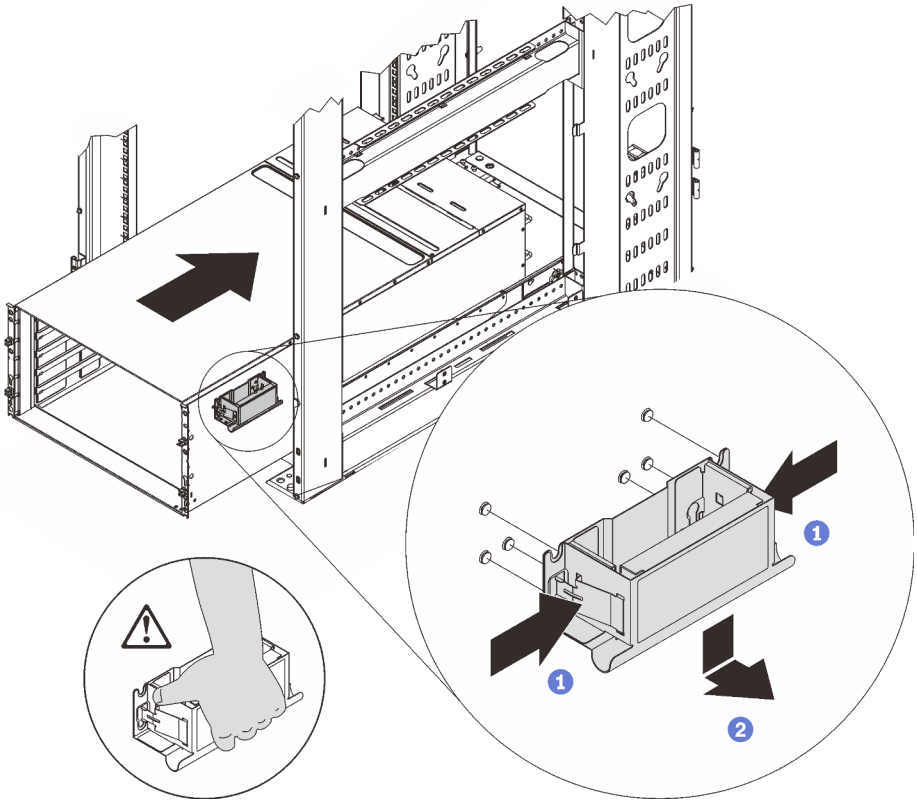


Figure 64. Front handle removal

Step 3. Side the enclosure all the way back to the rack.

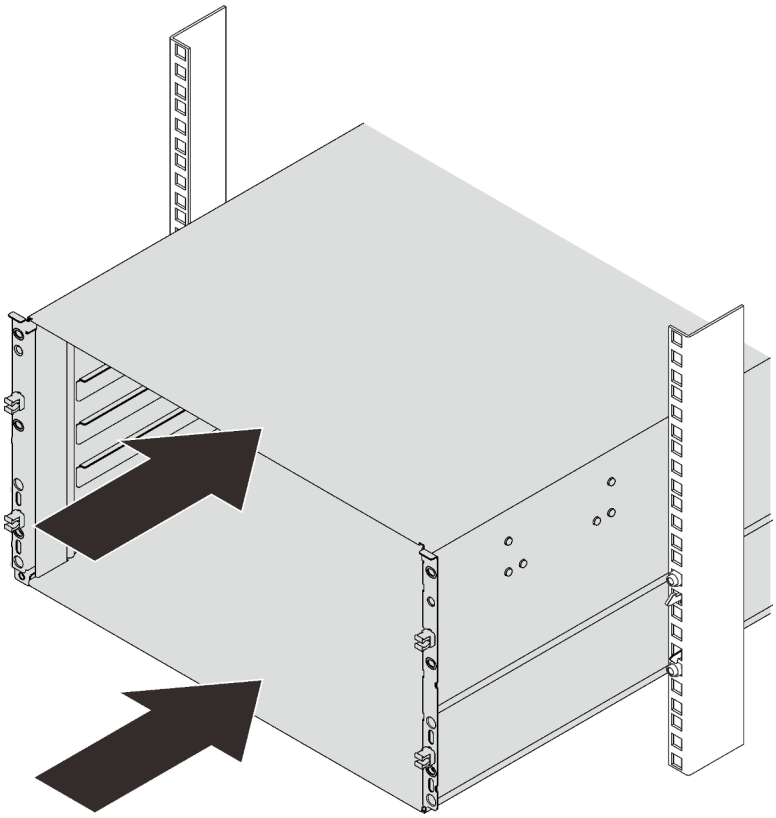


Figure 65. Sliding the rack

Step 4. Secure the enclosure to the rack with six screws; then, reinstall the EIA covers.

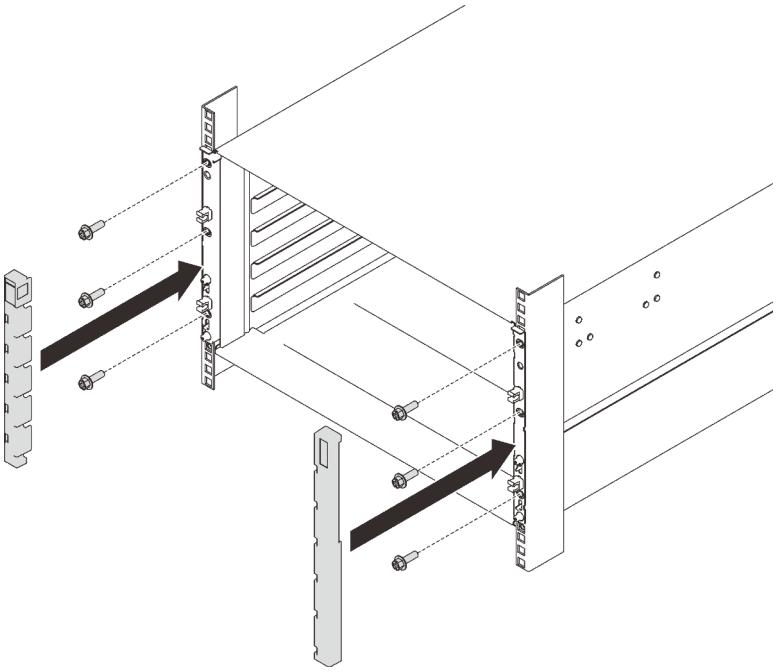


Figure 66. EIA cover installation

Step 5. Secure the two support brackets on the rear enclosure with eight screws.

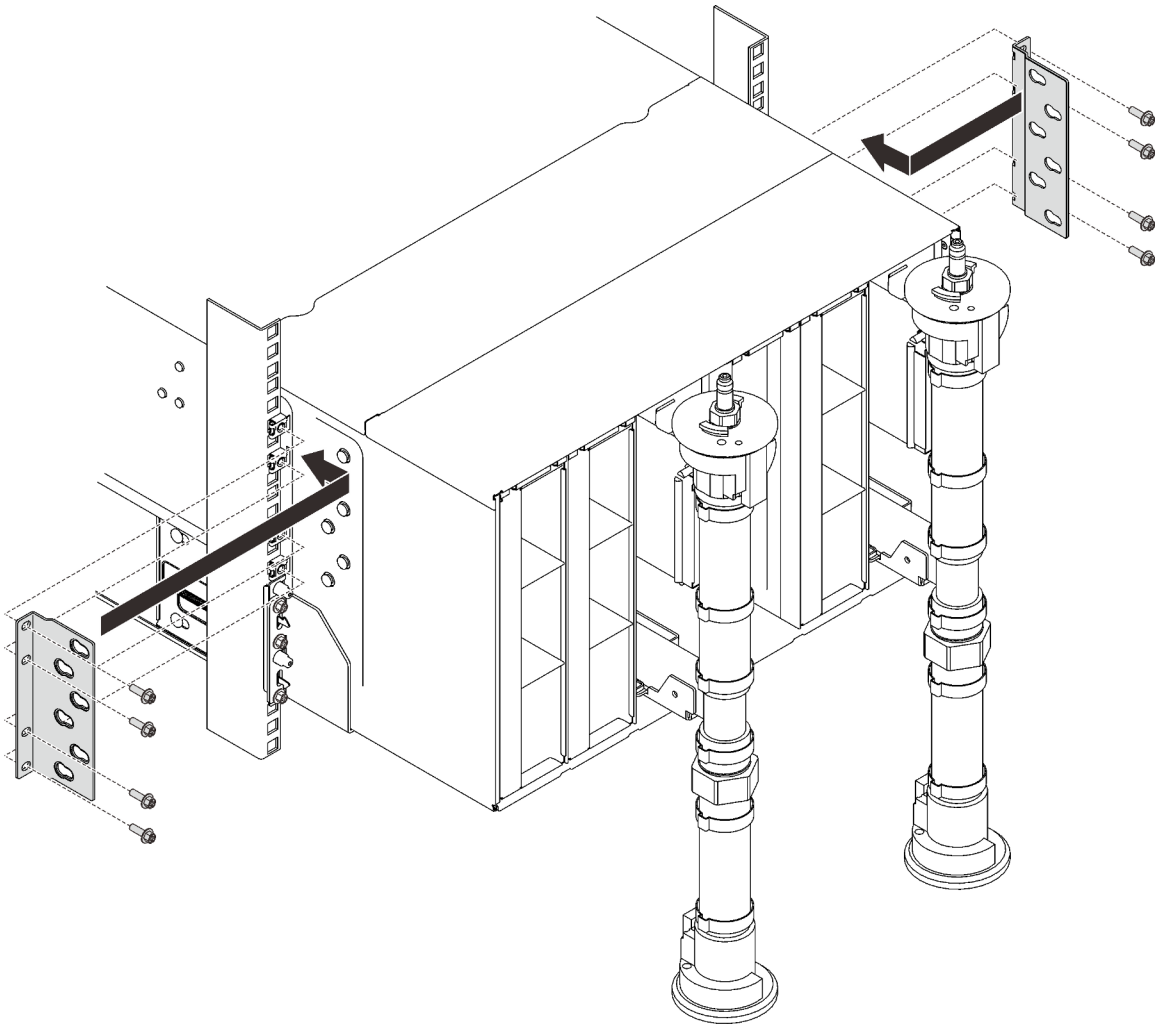


Figure 67. Support bracket installation

Step 6. Reinstall eight screws (using the screwdriver contained in the manifold repair kit) to secure two manifolds.

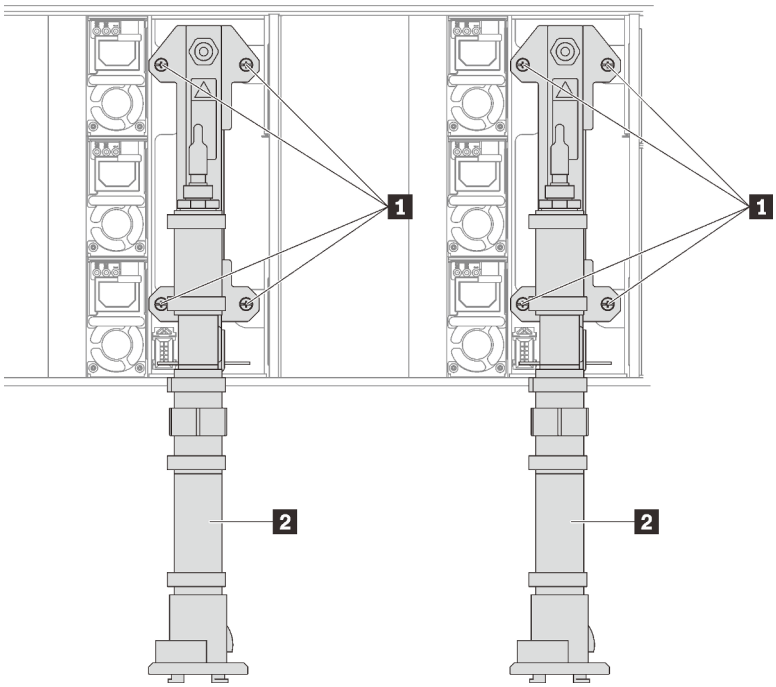


Figure 68. Manifold screw locations

After you finish

1. Reinstall all power supplies back to the enclosure.

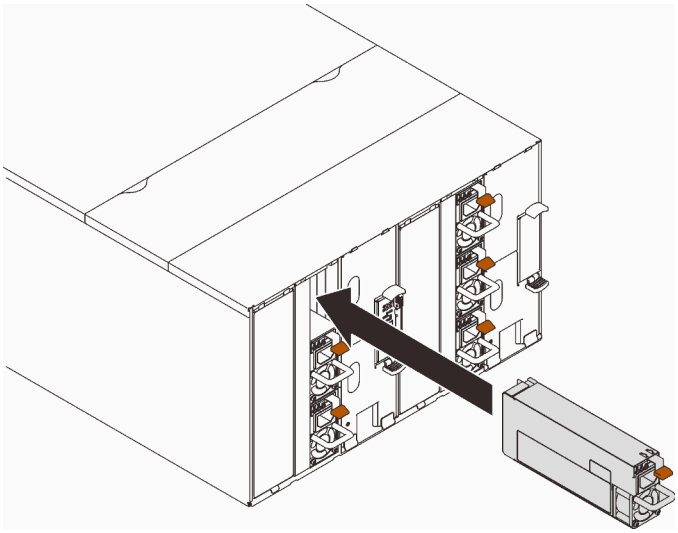


Figure 69. Power supply installation

2. Reinstall the blank filler.

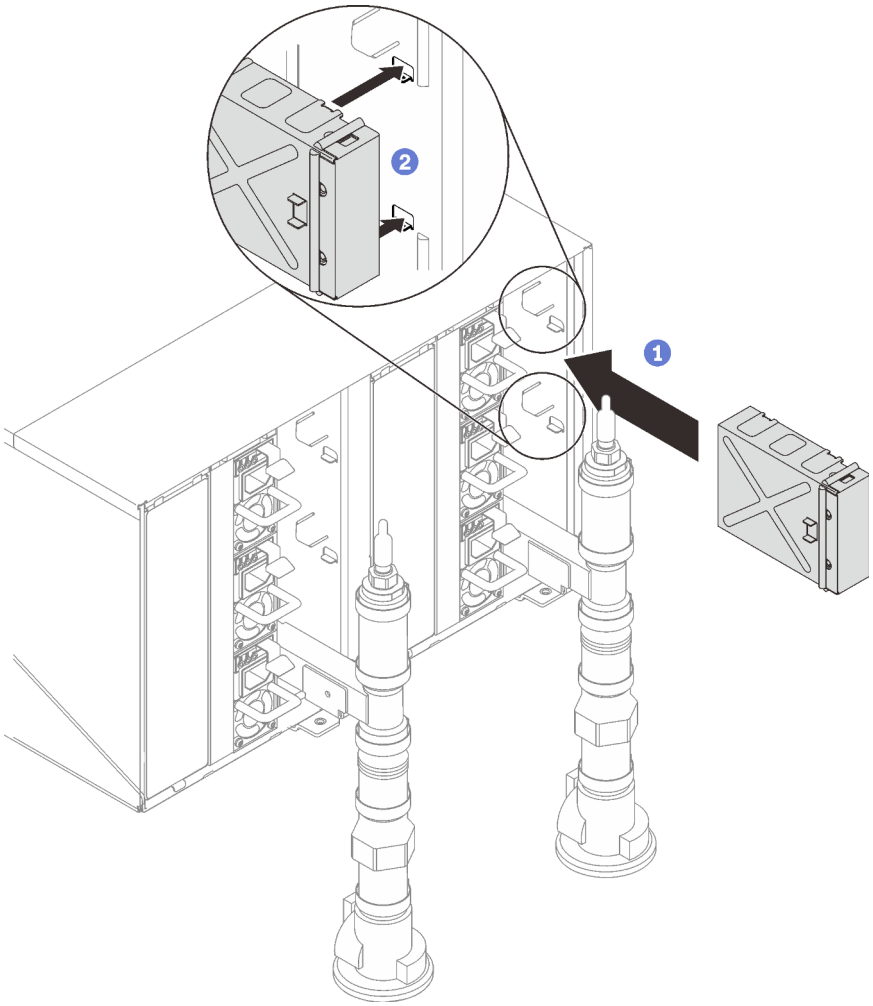


Figure 70. Blank filler installation

3. Reinstall the SMM2 support bracket and the SMM2.

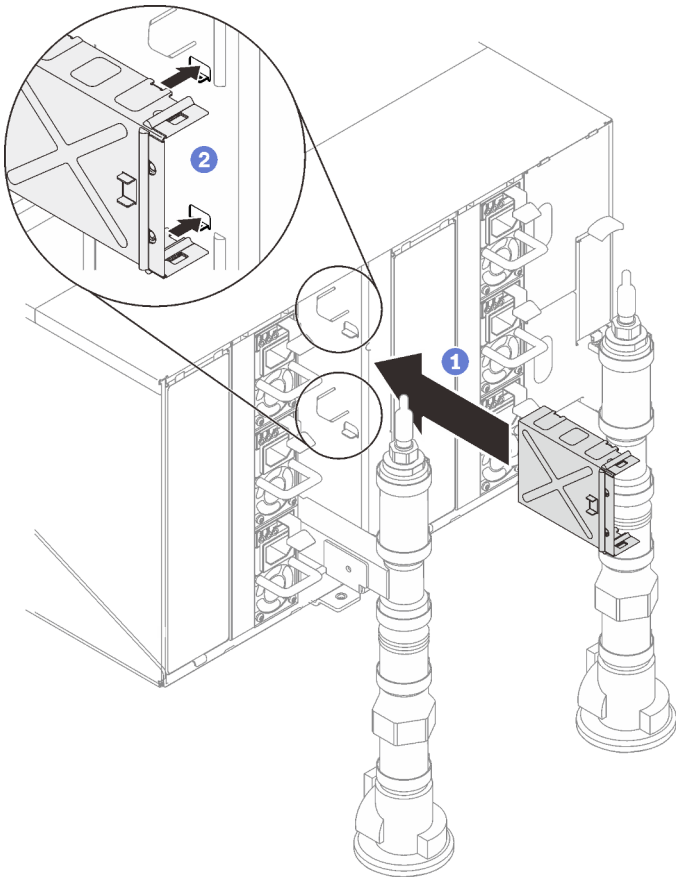


Figure 71. SMM2 support bracket installation

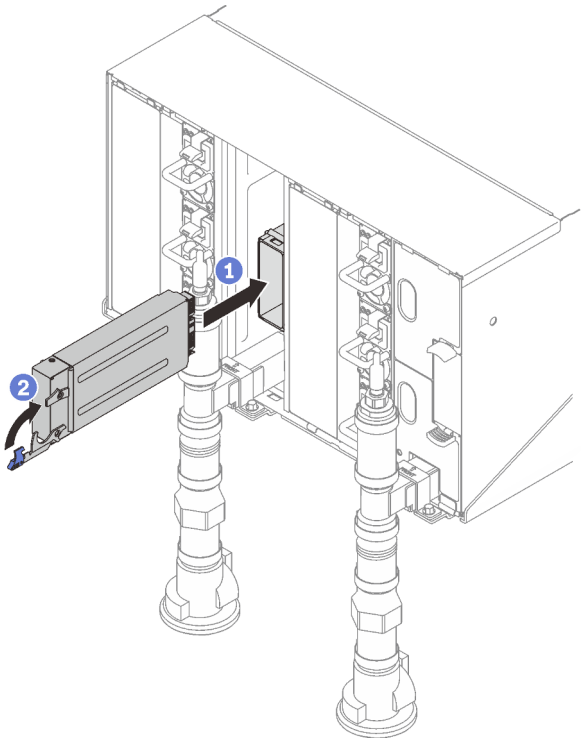


Figure 72. SMM2 installation

Reinstall manifold retention brackets that are retaining the manifolds (top enclosure position only).

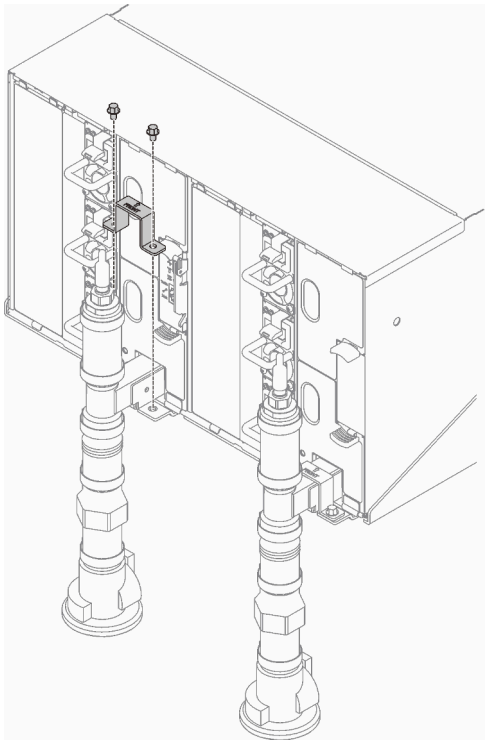


Figure 73. Retention bracket installation

Align the drip sensor assembly with the enclosure and slide it into place.

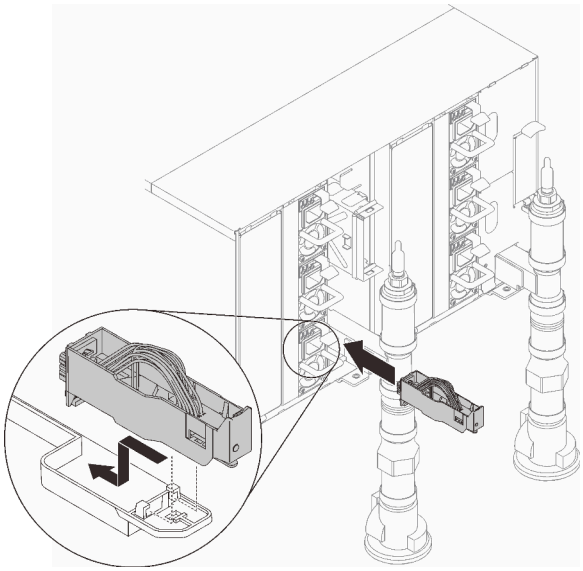


Figure 74. Drip sensor assembly installation

4. Reinstall all EMC shields.

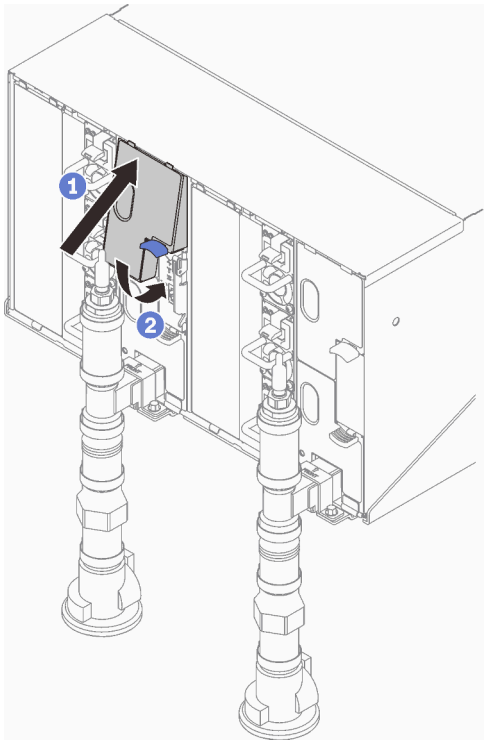


Figure 75. EMC shields installation

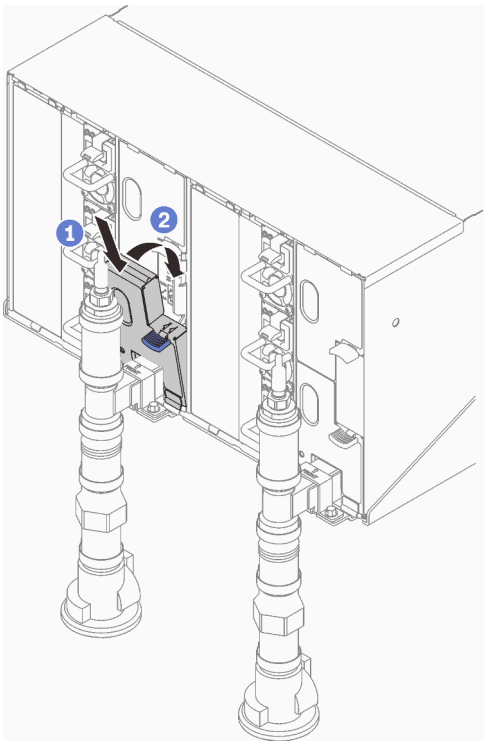


Figure 76. EMC shields installation

5. Install the tray (see "Install a DWC tray in the enclosure" on page 80).

   Note: For safety, use the lift tool to install the tray into the rack.
6. Install any other required components.
7. Connect all required cables.
8. Connect the enclosure to power.
9. Write down new enclosure midplane serial number (for example: Y030UN34B063) and UUID (for example: 2E2B686CC6B311E2907C6EAE8B16A49E).
10. Update the solution firmware to the latest level.
11. Log in to the web interface.
12. Go to **System Information** section, click on the **Midplane VPD** tab.
13. Update the new enclosure midplane serial number and UUID onto the fan and power controller.
14. Close the release handles on the tray in order to seat the nodes in the enclosure midplane connectors.
15. Restart any nodes that you shut down. See the documentation that comes with the compute node for detailed instructions.
16. The fan and power controller is powered-on automatically.

Install a hot-swap power supply

Use this information to install a hot-swap power supply.

About this task

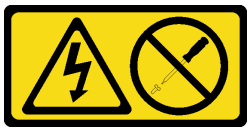
S001

DANGER

Electrical current from power, telephone, and communication cables is hazardous.
To avoid a shock hazard:

- **Connect all power cords to a properly wired and grounded electrical outlet/source.**
- **Connect any equipment that will be attached to this product to properly wired outlets/sources.**
- **When possible, use one hand only to connect or disconnect signal cables.**
- **Never turn on any equipment when there is evidence of fire, water, or structural damage.**
- **The device might have more than one power cord, to remove all electrical current from the device, ensure that all power cords are disconnected from the power source.**

S035



CAUTION:
Never remove the cover on a power supply or any part that has this label attached. Hazardous voltage, current, and energy levels are present inside any component that has this label attached. There are no serviceable parts inside these components. If you suspect a problem with one of these parts, contact a service technician.

CAUTION:

High touch current. Connect to earth before connecting to supply.

Attention:

- Read the following sections to ensure that you work safely.
  - “Installation Guidelines” on page 50
  - “Solution setup checklist” on page 49
- The following notes describe the type of power supply that the enclosure supports and other information that you must consider when you install a power supply:
  - Make sure you follow the guidelines in “PSU configuration” on page 104.
  - For redundancy support, you must install an additional hot-swap power supply, if one is not installed in your model.
  - Make sure that the devices that you are installing are supported. For a list of supported optional devices for the enclosure, see https://serverproven.lenovo.com/.

- SD650-N V2 tray supports ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply Delta only. All the installed power supply units must be ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply Delta.

Procedure

Step 1. Slide the hot-swap power supply into the bay until the release latch clicks into place.

Important: During normal operation, each power-supply bay must contain either a power supply or power-supply filler panel for proper cooling.

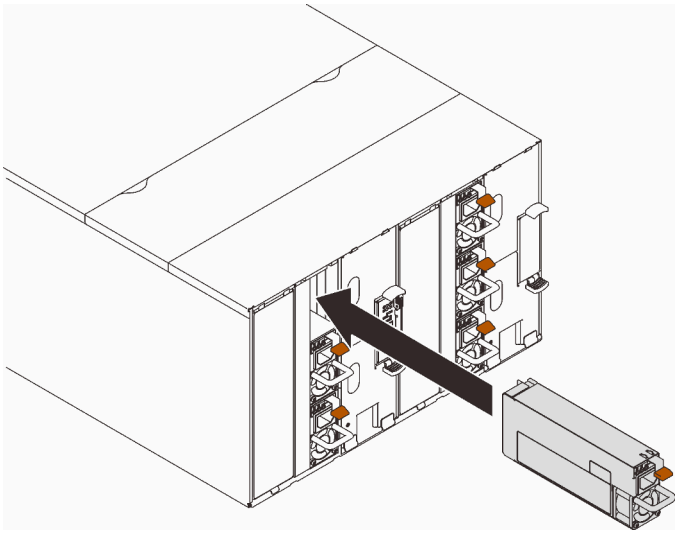


Figure 77. Hot-swap power supply installation

Step 2. Connect one end of the power cord for the new power supply into the ac connector on the back of the power supply; then, connect the other end of the power cord into a properly grounded electrical outlet.

Step 3. If the node is turned off, turn on the node.

Step 4. Make sure that the ac power LED on the power supply is lit, indicating that the power supply is operating correctly. If the solution is turned on, make sure that the dc power LED on the power supply is lit also.

After you finish

1. Reconnect the power cords and any cables that you removed.
2. Turn on all compute nodes.

Demo video

Watch the procedure on YouTube

Cable the enclosure

Attach all external cables to the solution. Typically, you will need to connect the solution to a power source, to the data network, and to storage. In addition, you will need to connect the solution to the management network.

Connect the enclosure to power.

Connect the enclosure to the network.

Connect the enclosure to any external storage devices.

Power on nodes

When a tray is plugged into the enclosure, each node performs a short self-test (power LED flashes quickly - 4 times per second). Once the self test is completed successfully, the node enters a standby state (power LED flashes slowly - once per a second).

S002

CAUTION:
The power-control button on the device and the power switch on the power supply do not turn off the electrical current supplied to the device. The device also might have more than one power cord. To remove all electrical current from the device, ensure that all power cords are disconnected from the power source.

Each node can be turned-on (power LED on) in any of the following ways:

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

For information about powering off nodes, see “Power off nodes” on page 95.

Power off nodes

Each node remains in a standby state when it is connected to a power source, allowing the Lenovo XClarity Controller to respond to remote power-on requests.

To remove all power from the nodes (power status LED off), remove the tray from the enclosure.

Note: This removes power immediately from both nodes.

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

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

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

When in a standby state, the solution can respond to remote power-on requests sent to the Lenovo XClarity Controller. For information about powering on the solution, see “Power on nodes” on page 95.

Chapter 4. System configuration

Complete these procedures to configure your system.

The minimum supported configurations for this solution are as follows:

- With SD650 V2 tray:
  - One DW612 Enclosure
  - One SD650 V2 tray (contains two nodes)
  - Two processors on a specific node
  - 16 DIMMs on a specific node
  - Six CFF v4 power supplies (any type)
  - One disk (any type) (If OS is needed for debugging)
- With SD650-N V2 tray:
  - One DW612 Enclosure
  - One SD650-N V2 tray
  - Two processors on a right node
  - 16 DIMMs on a right node
  - Six units of ThinkSystem 2400W (230V) v4 Platinum hot-swap power supply Delta
  - One disk (any type) (If OS is needed for debugging)

Set the network connection for the Lenovo XClarity Controller

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

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

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

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

  1. Start the server.
  2. Press the key specified in the on-screen instructions to display the Lenovo XClarity Provisioning Manager interface. (For more information, see the “Startup” section in the LXPM documentation compatible with your server at https://pubs.lenovo.com/lxpm-overview/.)
  3. Go to **LXPM → UEFI Setup → BMC Settings** to specify how the Lenovo XClarity Controller will connect to the network.
     - If you choose a static IP connection, make sure that you specify an IPv4 or IPv6 address that is available on the network.
     - If you choose a DHCP connection, make sure that the MAC address for the server has been configured in the DHCP server.
  4. Click **OK** to apply the setting and wait for two to three minutes.
  5. Use an IPv4 or IPv6 address to connect Lenovo XClarity Controller.

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

- If no monitor attached to the server, you can set the network connection through the SMM2 interface. Connect an Ethernet cable from your laptop to the Ethernet port on the SMM2, which is located at the rear of the server.

  Note: Make sure that you modify the IP settings on the laptop so that it is on the same network as the server default settings.

  To access the SMM2 interface, the SMM2 network must be enabled. For more information about accessing the SMM2, see: the *SMM2 User's Guide*

  The default IPv4 address and the IPv6 Link Local Address (LLA) is provided on the Lenovo XClarity Controller Network Access label that is affixed to the Pull Out Information Tab.

- If you are using the Lenovo XClarity Administrator Mobile app from a mobile device, you can connect to the Lenovo XClarity Controller through the Lenovo XClarity Controller micro-USB connector on the front of the server. For the location of the Lenovo XClarity Controller USB connector, see "Front view" on page 17.

  To connect using the Lenovo XClarity Administrator Mobile app:

  1. Connect the USB cable of your mobile device to the Lenovo XClarity Administrator USB connector on the front panel.
  2. On your mobile device, enable USB tethering.
  3. On your mobile device, launch the Lenovo XClarity Administrator mobile app.
  4. If automatic discovery is disabled, click **Discovery** on the USB Discovery page to connect to the Lenovo XClarity Controller.

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

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

Update the firmware

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

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

- Best practices related to updating firmware is available at the following site:
  - http://lenovopress.com/LP0656
- The latest firmware can be found at the following site:
  - http://datacentersupport.lenovo.com/products/servers/system-x/system-x3850-x6/6241/downloads
- You can subscribe to product notification to stay up to date on firmware updates:
  - https://datacentersupport.lenovo.com/tw/en/solutions/ht509500

UpdateXpress System Packs (UXSPs)

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

Update method terminology

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

Firmware updating tools

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

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

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

Notes:

1. For I/O firmware updates.
2. For BMC and UEFI firmware updates.

- **Lenovo XClarity Provisioning Manager**

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

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

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

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

- **Lenovo XClarity Controller**

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

  Notes:

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

    For additional information about configuring Ethernet over USB, see:

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

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

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

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

- **Lenovo XClarity Essentials OneCLI**

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

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

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

- **Lenovo XClarity Essentials UpdateXpress**

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

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

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

- **Lenovo XClarity Essentials Bootable Media Creator**

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

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

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

- **Lenovo XClarity Administrator**

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

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

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

- **Lenovo XClarity Integrator offerings**

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

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

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

Configure the firmware

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

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

- **Lenovo XClarity Provisioning Manager**

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

  Notes: The Lenovo XClarity Provisioning Manager provides a Graphical User Interface to configure a server. The text-based interface to system configuration (the Setup Utility) is also available. From Lenovo XClarity Provisioning Manager, you can choose to restart the server and access the text-based interface. In addition, you can choose to make the text-based interface the default interface that is displayed when you start LXPM. To do this, go to **Lenovo XClarity Provisioning Manager → UEFI Setup → System Settings → <F1>Start Control → Text Setup**. To start the server with Graphic User Interface, select **Auto** or **Tool Suite**.

  See the following documentations for more information:

  - *Lenovo XClarity Provisioning Manager User Guide*
    - Search for the LXPM documentation version compatible with your server at https://pubs.lenovo.com/lxpm-overview/
  - *UEFI User Guide*
    - https://pubs.lenovo.com/uefi-overview/
- **Lenovo XClarity Essentials OneCLI**

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

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

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

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

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

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

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

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

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

Memory configuration

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

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

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

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

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

For specific information about the required installation order of memory modules in your solution based on the system configuration and memory mode that you are implementing, see the *ThinkSystem SD650 V2/ SD650-N V2 Neptune® DWC Trays and DW612 Neptune® DWC Enclosure Memory Population Reference*.

Enable Software Guard Extensions (SGX)

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

Complete the following steps to enable SGX.

Step 1. Make sure you follow the memory module population sequence for SGX configurations in "Memory module installation rules and order" on page 53. (DIMM configuration must be at least 8 DIMMs per socket to support SGX).

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

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

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

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

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

RAID configuration

Using a Redundant Array of Independent Disks (RAID) to store data remains one of the most common and cost-efficient methods to increase server's storage performance, availability, and capacity.

RAID increases performance by allowing multiple drives to process I/O requests simultaneously. RAID can also prevent data loss in case of a drive failure by reconstructing (or rebuilding) the missing data from the failed drive using the data from the remaining drives.

RAID array (also known as RAID drive group) is a group of multiple physical drives that uses a certain common method to distribute data across the drives. A virtual drive (also known as virtual disk or logical

drive) is a partition in the drive group that is made up of contiguous data segments on the drives. Virtual drive is presented up to the host operating system as a physical disk that can be partitioned to create OS logical drives or volumes.

An introduction to RAID is available at the following Lenovo Press website:

https://lenovopress.com/lp0578-lenovo-raid-introduction

Detailed information about RAID management tools and resources is available at the following Lenovo Press website:

https://lenovopress.com/lp0579-lenovo-raid-management-tools-and-resources

Notes:

- Before setting up RAID for NVMe drives, follow the below steps to enable VROC:
  1. Restart the system. Before the operating system starts up, press **F1** to enter the Setup Utility.
  2. Go to **System settings → Devices and I/O Ports → Intel VMD** and enable the option.
  3. Save the changes and reboot the system.
- VROC Intel-SSD-Only supports RAID levels 0, 1, 5, and 10 with Intel NVMe drives.
- VROC Premium requires an activation key and supports RAID levels 0, 1, 5, and 10 with non-Intel NVMe drives. For more information about acquiring and installing the activation key, see https://fod.lenovo.com/lkms

PSU configuration

Refer to the following section for more information on the PSU configurations.

- "PSU support matrix" on page 104
- "Upgrading to nine PSU configuration" on page 105

PSU support matrix

When building a DW612 Enclosure solution, it is required to validate the power requirements for your configuration using the latest version of the Power Configurator to ensure that the number of power supplies selected are adequate for supporting your chassis configuration. The Power Configurator tool can be found at https://datacentersupport.lenovo.com/solutions/lnvo-lcp.

CAUTION:
Failure to validate the configuration with the Power Configurator tool could result in system errors, failure to power on, or microprocessor throttling, and limiting system's ability to leverage all the microprocessor performance.

Note: The tables below are based on nodes with all DIMM slots, PCIe slots, and hard disk drives populated.

Table 18. SD650 V2 trays with DW612 enclosure

	Six power supply configuration		Nine power supply configuration[2]
PSU Capacity	1800W	2400W	
Power Policy	N+1 with OVS[1], N=5 Non-redundant, N=6		N+1 redundant without OVS[1], N=8

Table 18. SD650 V2 trays with DW612 enclosure (continued)

	Six power supply configuration		Nine power supply configuration[2]
CPU with TDP smaller or equal to 205W	Fully populated	Fully populated	Fully populated
CPU with TDP greater than 205W	Up to 5 trays	Fully populated	Fully populated

Table 19. SD650-N V2 trays with DW612 enclosure

	Six power supply configuration	Nine power supply configuration
PSU Capacity	2400W	
Power Policy	N+1 with OVS[1], N=5 Non-redundant, N=6	N+1 redundant without OVS[1], N=8
400W GPUs	Fully populated[3]	Fully populated
500W GPUs	Partially populated[4]	Fully populated

Notes:

1. OVS (Oversubscription) of the power system allows for more efficient use of the available system power.
2. When fully populated with SD650 V2 trays, only six power supplies are needed to provide N+1 redundancy.
3. Follow the best practices in https://support.lenovo.com/solutions/HT512757 to ensure peak performance through optimal settings. Some versions of High Performance Linpack may cause the system or GPUs to throttle when best practices are not followed.
4. The number of trays supported depends on the power capacity of the enclosure. Use Lenovo Capacity Planner (LCP) to estimate the power capacity of the enclosure, see https://datacentersupport.lenovo.com/solutions/lnvo-lcp.

Upgrading to nine PSU configuration

If the enclosure comes with six power supply units along with three fillers for reserved power supply bays, the SMM2 could be upgraded to allow the enclosure to support nine power supply units.

See the instructions in https://datacentersupport.lenovo.com/solutions/ht512577.

Deploy the operating system

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

Available operating systems

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

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

Tool-based deployment

- **Multi-server**

Available tools:

- Lenovo XClarity Administrator

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

- Lenovo XClarity Essentials OneCLI

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

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

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

- **Single-server**

  Available tools:

  - Lenovo XClarity Provisioning Manager

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

  - Lenovo XClarity Essentials OneCLI

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

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

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

Manual deployment

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

1. Go to https://datacentersupport.lenovo.com/solutions/server-os.
2. Select an operating system from the navigation pane and click **Resources**.
3. Locate the "OS Install Guides" area and click the installation instructions. Then, follow the instructions to complete the operation system deployment task.

Back up the server configuration

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

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

- **Management processor**

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

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

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

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

- **Operating system**

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

Chapter 5. Resolving installation issues

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

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

Server does not power on

Complete the following steps until the problem is resolved:

Note: The power button will not function until approximately five to ten seconds after the server has been connected to power to allow the BMC to complete initialization.

1. Make sure that the power button is working correctly:
   a. Disconnect the server power cords.
   b. Reconnect the power cords.
   c. (Trained technician only) Reseat the operator information panel cable, and then repeat steps 1a and 1b.
      - (Trained technician only) If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
      - If the server does not start, bypass the power button by using the force power-on jumper. If the server starts, reseat the operator information panel. If the problem remains, replace the operator information panel.
2. Make sure that the reset button is working correctly:
   a. Disconnect the server power cords.
   b. Reconnect the power cords.
   c. (Trained technician only) Reseat the operator information panel cable, and then repeat steps 2a and 2b.
      - (Trained technician only) If the server starts, replace the operator information panel.
      - If the server does not start, go to step 3.
3. Make sure that both power supplies installed in the server are of the same type. Mixing different power supplies in the server will cause a system error (the system-error LED on the front panel turns on).
4. Make sure that:
   - The power cords are correctly connected to the server and to a working electrical outlet.
   - The type of memory that is installed is correct and the installation rules are met.
   - The DIMMs are fully seated with lock latches fully closed.
   - The LEDs on the power supply do not indicate a problem.
   - The processors are installed in the correct sequence.

5. Reseat the following components:
   a. Operator information panel connector
   b. Power supplies
6. Replace the following components and restart the server each time:
   a. Operator information panel connector
   b. Power supplies
7. If you just installed an optional device, remove it, and restart the server. If the server now starts, you might have installed more devices than the power supply supports.
8. Implement the minimum configuration (one processor and one DIMM) to check whether any specific components lock the power permission.
9. Collect the failure information by capturing the system logs and provide it to Lenovo support.
10. Check power supply LEDs.

The solution immediately displays the POST Event Viewer when it is turned on

Complete the following steps until the problem is solved.

1. Correct any errors that are indicated by the light path diagnostics LEDs.
2. Make sure that the solution supports all the processors and that the processors match in speed and cache size.

   You can view processor details from system setup.

   To determine if the processor is supported for the solution, see https://serverproven.lenovo.com/.
3. (Trained technician only) Make sure that processor 1 is seated correctly
4. (Trained technician only) Remove processor 2 and restart the solution.
5. Replace the following components one at a time, in the order shown, restarting the solution each time:
   a. (Trained technician only) Processor
   b. (Trained technician only) System board

Embedded hypervisor is not in the boot list

Complete the following steps until the problem is resolved:

1. Make sure that the optional embedded hypervisor flash device is selected on the boot manager `<F12> Select Boot Device` at startup.
2. See the documentation that comes with the optional embedded hypervisor flash device to validate that the device is configured correctly.
3. Make sure that other software works on the server.

Server cannot recognize a hard drive

Complete the following steps until the problem is solved.

1. Verify that the drive is supported for the server. See https://serverproven.lenovo.com/ for a list of supported hard drives.
2. Make sure that the drive is seated in the drive bay properly and that there is no physical damage to the drive connectors.
3. Run the diagnostics tests for the SAS/SATA adapter and hard disk drives. When you start a solution and press the key according to the on-screen instructions, the LXPM interface is displayed by default. (For more information, see the “Startup” section in the LXPM documentation compatible with your solution at https://pubs.lenovo.com/lxpm-overview/.) You can perform hard drive diagnostics from this interface. From the Diagnostic page, click **Run Diagnostic → HDD test/Disk Drive Test**.

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

Based on those tests:

- If the adapter passes the test but the drives are not recognized, replace the backplane signal cable and run the tests again.
- Replace the backplane.
- If the adapter fails the test, disconnect the backplane signal cable from the adapter and run the tests again.
- If the adapter fails the test, replace the adapter.

Displayed system memory is less than installed physical memory

Complete the following steps until the problem is resolved:

Note: Each time you install or remove a DIMM, you must disconnect the server from the power source; then, wait 10 seconds before restarting the server.

1. Make sure that:
   - No error LEDs are lit on the operator information panel.
   - No DIMM error LEDs are lit on the system board.
   - Memory mirrored channel does not account for the discrepancy.
   - The memory modules are seated correctly and followed the system memory installation rules.
   - You have installed the correct type of memory.
   - If you changed the memory, you updated the memory configuration in the Setup utility.
   - Check that all banks of memory are enabled in the UEFI setup. The server might have automatically disabled a memory bank when it detected a problem, or a memory bank might have been manually disabled by a previous user.
   - There is no memory mismatch when the server is at the minimum memory configuration.
2. Reseat the DIMMs, and then restart the server.
3. Check the POST error log:
   - If a DIMM was disabled by a systems-management interrupt (SMI), move the DIMM to a different slot and run the UEFI setup utility to confirm if the DIMM is enabled, if the DIMM is still disabled then replace the DIMM.
   - If a DIMM was disabled by the user or by POST, move the DIMM to a different slot and run the UEFI setup utility to confirm if the DIMM is enabled, if the DIMM is still disabled then replace the DIMM.
4. Reverse the DIMMs between the channels (of the same processor), and then restart the server. If the problem is related to a DIMM, replace the failing DIMM.
5. Re-enable all DIMMs using the Setup utility, and then restart the server.
6. (Trained technician only) Install the failing DIMM into a DIMM connector for processor 2 (if installed) to verify that the problem is not the processor or the DIMM connector.
7. (Trained technician only) Replace the system board.

A Lenovo optional device that was just installed does not work

1. Make sure that:
   - The device is supported for the server (see https://serverproven.lenovo.com/).
   - You followed the installation instructions that came with the device and the device is installed correctly.
   - You have not loosened any other installed devices or cables.

- You updated the configuration information in the Setup utility. Whenever memory or any other device is changed, you must update the configuration.

2. Reseat the device that you have just installed.
3. Replace the device that you have just installed.

Voltage planar fault is displayed in the event log

Complete the following steps until the problem is solved.

1. Revert the system to the minimum configuration. See “Specifications” on page 3 for the minimally required number of processors and DIMMs.
2. Restart the system.
   - If the system restarts, add each of the items that you removed one at a time, restarting the system each time, until the error occurs. Replace the item for which the error occurs.
   - If the system does not restart, replace the system board.

Appendix A. Getting help and technical assistance

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

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

http://datacentersupport.lenovo.com

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

Before you call

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

Attempt to resolve the problem yourself

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

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

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

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

Gathering information needed to call Support

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

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

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

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

Collecting service data

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

Service data can be collected through the following tools:

- **Lenovo XClarity Provisioning Manager**

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

- **Lenovo XClarity Controller**

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

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

- **Lenovo XClarity Administrator**

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

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

- **Lenovo XClarity Essentials OneCLI**

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

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

Contacting Support

You can contact Support to obtain help for your issue.

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

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