# Mona 2U GPU Server
# User Manual

*Powered by Intel Processors*

## Applicable Model

| Model | Maintenance | Cooling |
|---|---|---|
| BRB-MA1-204SR-R0XX | Rear access | Air cooling |



## Environmental Protection

Please dispose of product packaging by recycling at a local recycling center for a greener planet.

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| | |
|---|---|
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# Preface

## Abstract

This white paper describes the Mona 1.4SR Intel-based server's appearance, features, performance parameters, and software and hardware compatibility, providing in- depth information of Mona 1.4SR.

## Intended Audience

This white paper is intended for:

- 2CRSi pre-sales engineers
- Pre-sales engineers of channel partners
- Enterprise pre-sales engineers

## Symbol Conventions

The symbols that may be found in this document are defined as follows.

| Symbol | Description |
|---|---|
| DANGER | A potential for serious injury, or even death if not properly handled |
| WARNING | A potential for minor or moderate injury if not properly handled |
| CAUTION | A potential loss of data or damage to equipment if not properly handled |
| IMPORTANT | Operations or information that requires special attention to ensure successful installation or configuration |
| NOTE | Supplementary description of document information |

## Revision History

| Version | Date | Description of Changes |
|---|---|---|
| V0.9 | 2023/03/09 | Initial release |
| V2 | 2023/09/15 | Technical validation |
| V2.1 | 2024/03/08 | Technical update |

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# 1. Product Overview

The 2CRSi Mona 1.4SR Intel-based system is a high-end 2-socket rack server that features the 4th Gen Intel Xeon Scalable processors. It is specially designed for high-end IT applications such as cloud computing, big data, data mining and deep learning. The product maintains the consistent high quality and superior reliability of 2CRSi servers, and brings innovation and breakthroughs in computing performance, scalability, configuration elasticity, and intelligent management.

Hence it is well suited for a wide range of applications and can be widely used in various sectors.

**8X 2.5-INCH DRIVE CONFIGURATION**

# 2. Features

## 2.1 Scalability and Performance

- Features the 4th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids), with up to 64 cores per CPU, a maximum TDP of 350 W, a max Turbo frequency of 4.5 GHz, an L3 cache of 2 MB per core, and up to 4 UPI links per CPU at up to 20 GT/s, delivering unrivaled processing performance.
    - With the processor cache hierarchy optimization, a larger L2 cache of private 1 MB per core is provided, so that memory data can be put and processed directly in L2 cache, improving the memory access performance and reducing the demand on L3 cache capacity.
    - Supports Intel Turbo Boost Technology 2.0 and automatically scales CPU speeds up to the max Turbo frequency at peak workloads, allowing processor cores to exceed the thermal design power (TDP) for a limited time.
    - Supports Intel Hyper-Threading Technology, allowing up to 2 threads to run on each core to improve the performance of multi-threaded applications.
    - Supports Intel Virtualization Technology that provides hardware assist to the virtualization software, allowing the operating system to better use hardware to handle virtualized workloads.
    - Supports Intel Advanced Vector Extensions 512 (Intel AVX-512), significantly accelerating the workloads that are strongly floating-point compute intensive.
    - Supports Intel DL Boost (VNNI) instructions, improving the performance for deep learning applications.
- Supports up to 32 DIMMs and multiple DIMM types.
    - Up to 32 DDR5 ECC DIMMs (4,800 MT/s, RDIMMs), delivering superior speed, high availability, and a memory capacity up to 4 TB.
    - Up to 16 Intel Optane Persistent Memory 300 Series (PMem for short), which must be used with DDR5 DIMMs. A single PMem supports a capacity of up to 512 GB and a bandwidth of 4,800 MHz, ensuring memory data persistence in case of power failure without compromising memory capacity and bandwidth.
- Flexible drive configurations, providing elastic and scalable storage solutions to meet different capacity and upgrade requirements.
- Delivers all-SSD configuration, bringing higher I/O performance over all-HDD configuration or HDD-SSD mixing configuration.
- Offers 24 Gbps serial attached SCSI (SAS), quadrupling the data transfer rate of internal storage of 6 Gbps SAS solution and maximizing the performance of storage I/O-intensive applications.

- With Intel integrated I/O technology, the processors integrate the PCIe 5.0 controller to reduce I/O latency and enhance overall system performance.
- Up to 2 FHHL PCIe cards, further improving the I/O performance.
- Up to 4 dual-slot GPUs.

## 2.2 Availability and Serviceability

- Supports hot-swap SAS/SATA/NVMe drives and RAID controller cards with RAID levels 0/1/1E/10/5/50/6/60 (with SAS/SATA drives), RAID cache and data protection enabled by the super-capacitor in case of power failures. Supported RAID levels vary with RAID controller cards.
- Based on humanization design, the server allows tool-less maintenance. The modular structural parts enable quick removal/installation, greatly reducing O&M time.
- 2CRSi's unique intelligent control technology combined with the cutting-edge air-cooling technology creates an optimum operating environment to ensure stable running of the server.
- SSDs are much more reliable than traditional HDDs, increasing system uptime.
- The UID and status LEDs for fault diagnosis on the front panel, the plug-in LCD module, and the IPMI Web GUI indicate the status of key components and quickly lead technicians to failed (or failing) components, simplifying maintenance, speeding up troubleshooting, and enhancing system availability.
- The IPMI management port on the rear panel enables local IPMI O&M, improving O&M efficiency.
- Provides 2 hot-swap PSUs with 1+1 redundancy and 6 hot-swap fan modules with N+1 redundancy, improving overall system availability.
- The onboard IPMI monitors system parameters in real time and sends alerts in advance, enabling technicians to take appropriate measures to ensure system stable operation and minimize system downtime.

For documentation of the Mona 1.4SR system, such as product marketing materials, user manuals, product drivers, firmware, and product certifications, visit 2CRSi website: https://2crsi.com.

## 2.3 Manageability and Security

- The onboard IPMI monitors system operating status and enables remote management.
    - IPMI, a self-developed intelligent management system, is included with the server.
    - IPMI supports such mainstream management specifications in the industry as IPMI 2.0 and Redfish 1.13.
    - IPMI improves operational reliability.
    - IPMI delivers easy serviceability for different business scenarios.
    - IPMI provides comprehensive and accurate fault diagnosis capabilities.
    - IPMI offers industry-leading security reinforcement capabilities.
- The Network Controller Sideband Interface (NC-SI) feature allows a network port to serve as a management port and a service port. The NC-SI feature is disabled by default and can be enabled/disabled through the BIOS or IPMI.
- The industry-standard UEFI improves the efficiency of setup, configuration and update, and simplifying the error handling process.
- The Intel Platform Firmware Resilience (PFR) technology is supported.
- Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM) provide advanced encryption.
- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks.
- The firmware update mechanism based on digital signatures prevents unauthorized firmware updates.
- UEFI Secure Boot protects the system from malicious bootloaders.
- Hierarchical password protection in BIOS ensures system boot and management security.
- BIOS Secure Flash and BIOS Lock Enable (BLE) reduce attacks from malicious software on the BIOS flash region.
- Dual-image mechanism for BMC and BIOS recovers firmware upon detection of firmware damage.
- BMC Secure Boot protects BMC from malicious tampering.
- Flexible BMC access control policies improve BMC management security.

- Chassis intrusion detection enhances physical security.
- The optional front bezel with a lock prevents unauthorized users from removing or installing drives, and thus ensuring the security of local data.

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NOTE

The NC-SI port supports the following features:

- The NC-SI port can be bonded to any network port of the OCP card or of PCIe NIC that supports NC-SI.
- Supports the enable/disable and configuration of Virtual Local Area Network (VLAN). VLAN is disabled by default and the default VLAN ID is 0.
- Supports IPv6 and IPv4 addresses. IP address, subnet mask, default gateway, and prefix length of IPv6 address can be configured.

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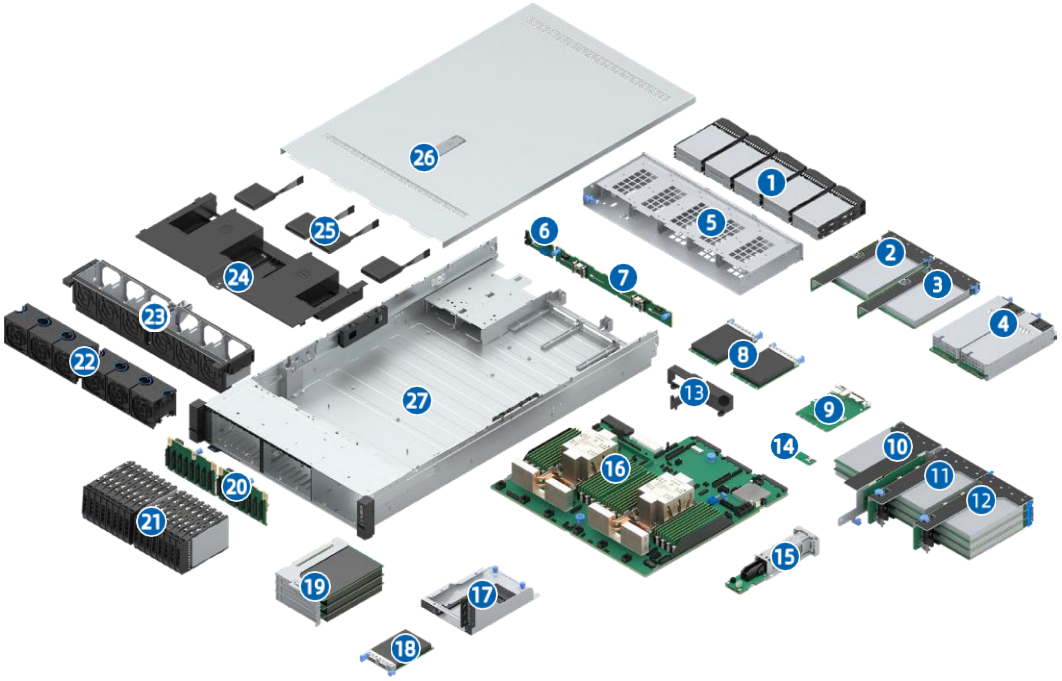
## 2.4 Energy Efficiency

- Equipped with 80 Plus Titanium power supplies of different power efficiency levels, with power efficiency up to 96% at a load of 50%.
- Supports 1+1 power supply redundancy and AC/DC power input, improving power conversion efficiency.
- Features the high-efficiency single-board voltage regulator down (VRD) solution, reducing DC-DC conversion loss.
- Supports Proportional-Integral-Derivative (PID) intelligent fan speed control and intelligent CPU frequency scaling, conserving energy.
- Offers a fully optimized system cooling design with energy-efficient cooling fans, lowering energy consumption from system cooling.
- Offers power capping and power control measures.
- Supports staggered spin-up of drives, reducing power consumption during server startup.
- Supports Intel Intelligent Power Capability (IIPC) to optimize energy usage in the processor cores by turning computing functions on only when needed.
- Supports low-voltage 4th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids), consuming less energy and meeting the demands of data centers and telecommunications environments constrained by power and thermal.

# 3. System Parts Breakdown

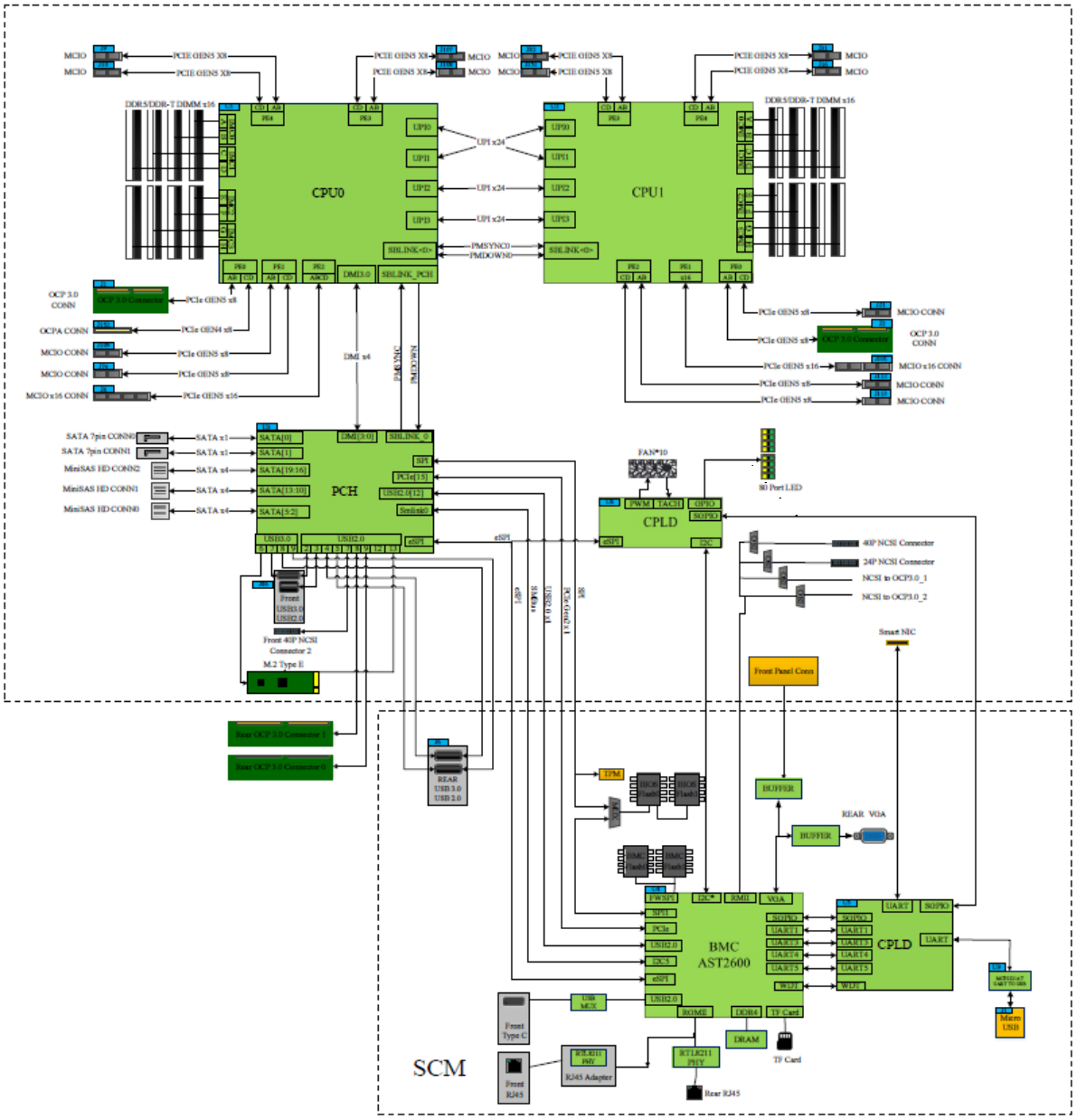
**EXPLODED VIEW**




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Rear 2.5-inch Drive × 10 | 15 | Rear M.2 Module |
| 2 | Right PCIe Riser-Card Assembly | 16 | Motherboard |
| 3 | Left PCIe Riser-Card Assembly | 17 | Front PCIe Cage |
| 4 | PSU × 2 | 18 | OCP 3.0 Card |
| 5 | Rear Drive Cage | 19 | Right PCIe Riser-Card Assembly (Front) |
| 6 | Rear Drive Backplane (for two 2.5-inch drives) | 20 | Front Drive Backplane (for eight 2.5-inch drives) × 2 |
| 7 | Rear Drive Backplane (for eight 2.5-inch drives) | 21 | Front Drive × 16 |
| 8 | OCP 3.0 Card × 2 | 22 | Fan × 6 |
| 9 | DC-SCM Board | 23 | Fan Cage |
| 10 | Right PCIe Riser-Card Assembly | 24 | System Air Duct |
| 11 | Middle PCIe Riser-Card Assembly | 25 | Super-Capacitor × 4 |
| 12 | Left PCIe Riser-Card Assembly | 26 | Top Cover |
| 13 | PSU Air Duct | 27 | Chassis |
| 14 | TF Card Adapter Board | | |

# 4. System Logical Diagram

**SYSTEM LOGICAL DIAGRAM**




- Up to two 4th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids).
- Up to 32 DIMMs.
- Up to 4 UPI links per CPU at up to 20 GT/s.
- Up to 13 PCIe slots and 2 OCP 3.0 slots. CPU0 and CPU1 each support 1 OCP 3.0 card.

- The mezz RAID card is connected to CPU0 via the PCIe bus and is connected to the drive backplane via the SAS signal cable. Multiple local storage configurations are supported through different drive backplanes. The motherboard integrates the EBG PCH (Platform Controller Hub) to support 3 USB 3.0 ports, 14 SATA 3.0 connectors, and 1 TF card adapter board.

- The DC-SCM board integrates an AST 2600 management chip which supports a VGA port, a BMC management network port, a serial port, a TF card slot, and other connectors.

# 5. Hardware Description

## 5.1 Front Panel

### 5.1.1 Front View

**8X 2.5-INCH DRIVE CONFIGURATION FRONT VIEW**


| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Serial Label Pull Tag (with an SN label) | 2 | Drive Bay × 8 |

### 5.1.2 LEDs and Buttons

**8X 2.5-INCH DRIVE CONFIGURATION FRONT PANEL LEDS AND BUTTONS**


| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Button and LED | 2 | Memory Status LED |
| 3 | System Status LED | 4 | Power Status LED |
| 5 | System Overheat LED | 6 | Fan Status LED |
| 7 | Network Status LED | 8 | UID/BMC RST Button and LED |
| 9 | USB Type-C Status LED | | |

## LED and Button Description

**FRONT PANEL LED AND BUTTON DESCRIPTION**

| Icon | LED and Button | Description |
|---|---|---|
| ⏻ | Power Button and LED | Power LED:<br>• Off = No power<br>• Solid green = Power-on state<br>• Solid orange = Standby state Power button:<br>• Long press the button for over 6 seconds to force a shutdown from the power-on state.<br>Notes:<br>Follow the prompt under the OS to shut it down.<br>Short press the power button to power on the system in standby state. |

| | | |
|---|---|---|
| **UID** | UID/BMC RST Button and LED | The UID LED is used to identify the device to be operated.<br>• Off = System unit not identified<br>• Solid blue = System unit identified<br>• Flashing blue = System being operated remotely<br>Notes:<br>The UID LED turns on when activated by the UID button or via IPMI remotely.<br>Long press the UID button for over 6 seconds to reset the BMC. |
| | Memory Status LED | • Off = Normal<br>• Flashing red (1 Hz) = A warning occurs<br>• Solid red = A failure occurs |
| | System Status LED | • Off = Normal<br>• Flashing red (1 Hz) = A warning occurs<br>• Solid red = A failure occurs |
| | Power Status LED | • Off = Normal<br>• Flashing red (1 Hz) = A warning occurs<br>• Solid red = A failure occurs |
| | System Overheat LED | • Off = Normal<br>• Flashing red (1 Hz) = A warning occurs<br>• Solid red = A failure occurs |
| | Fan Status LED | • Off = Normal<br>• Flashing red (1 Hz) = A warning occurs<br>• Solid red = A failure occurs |
| | Network Status LED | • Off = Self-developed OCP card not installed or no network connection<br>• Flashing green = Network connected with data being transmitted<br>• Solid green = Network connected without data being transmitted<br>Note:<br>It only indicates the status of the self-developed OCP card. |
| | USB Type-C Status LED | Connects to a USB storage device:<br>• Off = Port not connected to a USB storage device. |

| Icon | LED and Button | Description |
|---|---|---|
| | | • Slow flashing red = Job has failed, or job has been completed with an error reported<br>• Fast flashing green = Job in progress.<br>• Fast flashing green for 5 seconds and then off = Port function has been disabled.<br>• Solid green = Job has been completed. |

### 5.1.3 Ports

**8X 2.5-INCH DRIVE CONFIGURATION FRONT PANEL PORTS**


| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | USB Type-C Port | 2 | VGA Port |
| 3 | USB 3.0 Port | 4 | USB 2.0/LCD Port |

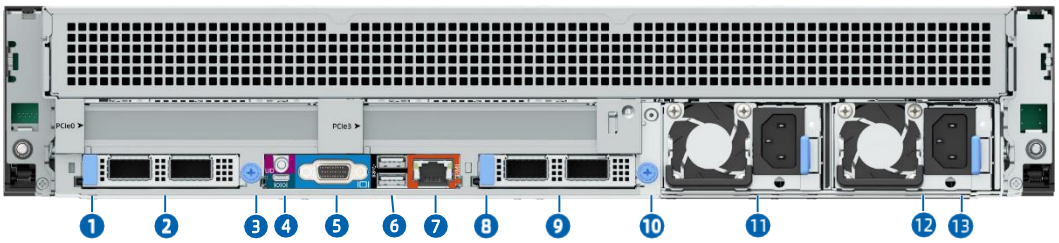
# Port Description

## FRONT PANEL PORT DESCRIPTION

| Feature | Type | Quantity | Description |
|---|---|---|---|
| VGA Port | DB15 | 1 | Enables you to connect a display terminal, for example, a monitor or KVM, to the system. |
| USB 3.0 Port | USB 3.0 | 1 | Enables you to connect a USB 3.0 device to the system.<br><br>Important: Make sure that the USB device is in good condition, or it may cause the server to work abnormally. |
| USB 2.0/LCD Port | USB 2.0 | 1 | • Enables you to connect a USB 2.0 device to the system.<br><br>Important: Make sure that the USB device is in good condition or it may cause the server to work abnormally.<br><br>• Enables you to connect an 2CRSi exclusive LCD module to the system. |
| USB Type-C Port | Type-C | 1 | • Enables you to connect to a terminal (local PCs with Windows 10 or later OS, or Android/IOS mobile phones) for BMC local maintenance, to monitor and manage the system.<br><br>Notes:<br>On your local PC, enter the BMC IP address (for example, https://1.2.3.4) in the browser address bar to log in to the BMC.<br><br>• Enables you to connect a USB storage device to the system for automatic log copying to the USB device and automatic of importing to the BMC.<br>Notes:<br>BMC provides USB management interface, for searching and configuring functions of the BMC management network port.<br><br>• BMC provides the function to enable/disable the USB management (enabled by default), displaying the USB device access status of being connected or disconnected.<br><br>• BMC records operations on the USB device in the audit log after the device is connected to the system. |

## 5.2 Rear Panel

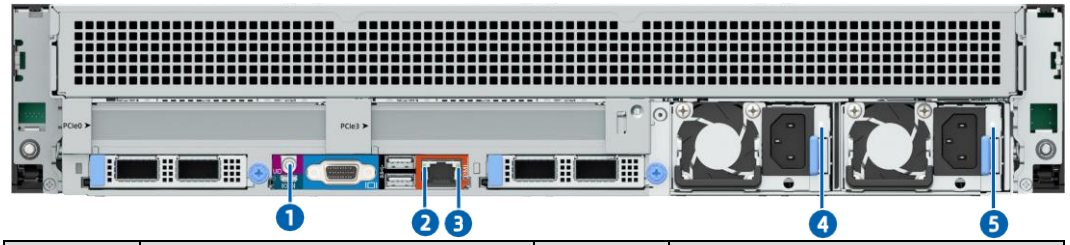
### 5.2.1 Rear View




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Left PCIe Rise Module (PCIe Slot × 3) | 7 | BMC Management Network Port |
| 2 | OCP 3.0 Card 0 | 8 | Middle PCIe Riser Module (PCIe Slot × 3) |
| 3 | UID/BMC RST Button and LED | 9 | OCP 3.0 Card 1 |
| 4 | System/BMC Serial Port | 10 | Right PCIe Riser Module (PCIe Slot × 2) |
| 5 | VGA Port | 11 | PSU0 |
| 6 | USB 3.0 Port × 2 | 12 | PSU1 |

### 5.2.2 LEDs and Buttons

**REAR PANEL BUTTONS AND LEDS**




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | UID/BMC RST Button and LED | 2 | Management Network Port Link Speed LED |
| 3 | Management Network Port Link Activity LED | 4 | PSU LED0 |
| 5 | PSU LED1 | | |

# LED and Button Description

## REAR PANEL LED AND BUTTON DESCRIPTION

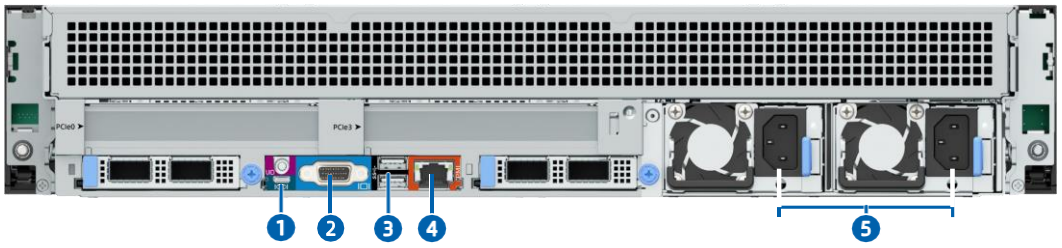
| LED and Button | Description |
|---|---|
| UID/BMC RST Button and LED | The UID LED is used to identify the device to be operated.<br>• Off = System unit not identified<br>• Solid blue = System unit identified<br>• Flashing blue = System unit being operated remotely<br>Notes:<br>• The UID LED turns on when activated by the UID button or via IPMI remotely.<br>• Long press the UID button for 6 seconds to reset the BMC. |
| Management Network Port Link Speed LED | • Off = No network connection<br>• Solid green = Network connected with link speed at 1,000 Mbps<br>• Solid orange = Network connected with link speed at 10/100 Mbps |
| Management Network Port Link Activity LED | • Off = No network connection<br>• Solid green = Network connected without data being transmitted<br>• Flashing green = Network connected with data being transmitted |

| | |
|---|---|
| PSU LED | • Off = No power to PSU<br>• Flashing green (1 Hz) = PSU operating in standby state with normal input<br>• Flashing green (2 Hz) = PSU firmware updating<br>• Flashing green (off for 1 second and on for 2 seconds) = PSU in cold redundant state<br>• Solid green = Normal input and output<br>• Flashing amber (1 Hz) = PSU warning event where the PSU continues to operate (possible causes: PSU overtemperature, PSU output overcurrent, excessively high or low fan speed)<br>• Solid amber = Normal input, but no output (possible causes: PSU overtemperature protection, PSU output overcurrent or short circuit, output overvoltage, short circuit protection, component (not all components) failure) |

### 5.2.3 Ports

## Port Location

**REAR PANEL PORTS**




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | System/BMC Serial Port | 2 | VGA Port |
| 3 | USB 3.0 Port × 2 | 4 | BMC Management Network Port |
| 5 | PSU Socket × 2 | | |

## Port Description

**REAR PANEL PORT DESCRIPTION**

| Feature | Type | Quantity | Description |
|---|---|---|---|
| System/BMC Serial Port | Micro USB | 1 | • Enables you to capture system and BMC logs and debug the BMC.<br>• Enables you to print system logs<br>Note:<br>It is a micro USB serial port with a default baud rate of 115,200 bit/s. |
| USB 3.0 Port | USB 3.0 | 2 | Enables you to connect a USB 3.0 device to the system.<br>Important:<br>• When using an external USB device, the current supported by the USB port is no more than 0.9 A.<br>• Make sure that the USB device is in good condition or it may cause the server to work abnormally. |
| BMC Management Network Port | RJ45 | 1 | IPMI management network port, used to manage the server.<br>Note: It is a Gigabit Ethernet port that supports 100 Mbps and 1,000 Mbps auto-negotiation. |

| | | | |
|---|---|---|---|
| VGA Port | DB15 | 1 | Enables you to connect a display terminal, for example, a monitor or<br>KVM, to the system. |
| PSU Socket | N/A | 2 | Connected through a power cord. Users can select the PSUs as needed.<br><br>Note:<br>Make sure that the total rated power of every PSU is greater than that of the server. |

## 5.3 Processors

- Supports up to two 4th Gen Intel Xeon Scalable processors.
- If only 1 processor is configured, install it in the CPU0 socket.
- The processors used in a server must be of the same model.

For specific system processor options, consult your local 2CRSi sales representative or refer to Hardware Compatibility.

# 5.4 Memory

## 5.4.1 DDR5 DIMMs

### Identification

To determine DIMM characteristics, refer to the label attached to the DIMM and the following table.

**DIMM IDENTIFICATION**

| Item | Description | Example |
|---|---|---|
| 1 | Capacity | • 16 GB<br>• 32 GB<br>• 64 GB<br>• 128 GB<br>• 256 GB |
| 2 | Rank(s) | • 1R = Single rank<br>• 2R = Dual rank<br>• 2S2R = Two ranks of two high stacked 3DS DRAM<br>• 4DR = Four ranks of dual die packaged DRAM<br>• 4R = Quad rank |
| 3 | Data width of DRAM | • x4 = 4 bits<br>• x8 = 8 bits |
| 4 | DIMM slot type | PC5 = DDR5 |
| 5 | Maximum memory speed | 4,800 MT/s |
| 6 | CAS latency | B = 4800 40-39-39 |
| 7 | DIMM type | R = RDIMM |

### Memory Subsystem Architecture

The server supports 32 DIMM slots and 8 channels per CPU.

Within a channel, populate the DIMM slot with its silk screen ending with D0 first and second the DIMM slot with its silk screen ending with D1. For instance, within CPU0 Channel 0, populate CPU0_C0D0 first and second CPU0_C0D1.

## DIMM Slot List

| CPU | Channel ID | Silk Screen |
|---|---|---|
| CPU0 | Channel 0 | CPU0_C0D0 |
| | | CPU0_C0D1 |
| | Channel 1 | CPU0_C1D0 |
| | | CPU0_C1D1 |
| | Channel 2 | CPU0_C2D0 |
| | | CPU0_C2D1 |
| | Channel 3 | CPU0_C3D0 |
| | | CPU0_C3D1 |
| | Channel 4 | CPU0_C4D0 |
| | | CPU0_C4D1 |
| | Channel 5 | CPU0_C5D0 |
| | | CPU0_C5D1 |
| | Channel 6 | CPU0_C6D0 |
| | | CPU0_C6D1 |
| | Channel 7 | CPU0_C7D0 |
| | | CPU0_C7D1 |
| CPU1 | Channel 0 | CPU1_C0D0 |
| | | CPU1_C0D1 |
| | Channel 1 | CPU1_C1D0 |
| | | CPU1_C1D1 |
| | Channel 2 | CPU1_C2D0 |
| | | CPU1_C2D1 |
| | Channel 3 | CPU1_C3D0 |
| | | CPU1_C3D1 |
| | Channel 4 | CPU1_C4D0 |
| | | CPU1_C4D1 |
| | Channel 5 | CPU1_C5D0 |
| | | CPU1_C5D1 |
| | Channel 6 | CPU1_C6D0 |
| | | CPU1_C6D1 |
| | Channel 7 | CPU1_C7D0 |
| | | CPU1_C7D1 |

## Compatibility

Refer to the following rules to select the DDR5 DIMMs.

IMPORTANT

- A server must use DDR5 DIMMs with the same part number (P/N code). All DDR5 DIMMs operate at the same speed, which is the lowest of:
    - Memory speed supported by a specific CPU.
    - Maximum operating speed of a specific memory configuration.
- Mixing DDR5 DIMM specifications (capacity, bit width, rank, height, etc.) is not supported.

For specific system memory options, consult your local 2CRSi sales representative or refer to 7.2 Hardware Compatibility.

- DDR5 DIMMs can be used with the 4th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids). The maximum memory capacity supported is identical for different CPU models.
- The total memory capacity is the sum of the capacities of all DDR5 DIMMs.

NOTE

Maximum number of DIMMs supported per channel ≤ Maximum number of ranks supported per channel/Number of ranks per DIMM.

**DDR5 DIMM SPECIFICATIONS**

| Item | Value | | | |
|---|---|---|---|---|
| Capacity per DDR5 DIMM (GB) | 16 | 32 | 64 | 128 |
| Type | RDIMM | RDIMM | RDIMM | RDIMM |
| Rated speed (MT/s) | 4,800 | 4,800 | 4,800 | 4,800 |
| Operating voltage (V) | 1.1 | 1.1 | 1.1 | 1.1 |
| Maximum number of DDR5 DIMMs supported in a server[a] | 32 | 32 | 32 | 32 |
| Maximum capacity of DDR5 DIMMs supported in a server (GB)[b] | 512 | 1,024 | 2,048 | 4,096 |

| | | | | | |
|---|---|---|---|---|---|
| Actual speed （MT/s） | 1DPC[c] | 4,800 | 4,800 | 4,800 | 4,800 |
| | 2DPC | 4,400 | 4,400 | 4,400 | 4,400 |
| a: The maximum number of DDR5 DIMMs supported is based on the 2-processor configuration. The number is halved for the 1-processor configuration.<br>b: It indicates the maximum memory capacity supported when all the DIMM slots are populated with DDR5 DIMMs.<br>c: DIMM Per Channel (DPC) is the number of DIMMs per memory channel. The above information is for reference only, consult your local 2CRSi sales representative for details. | | | | | |

## Population Rules

General population rules for DDR5 DIMMs:

- Install DIMMs only when the corresponding processor is installed.
- Install dummies in the empty DIMM slots.

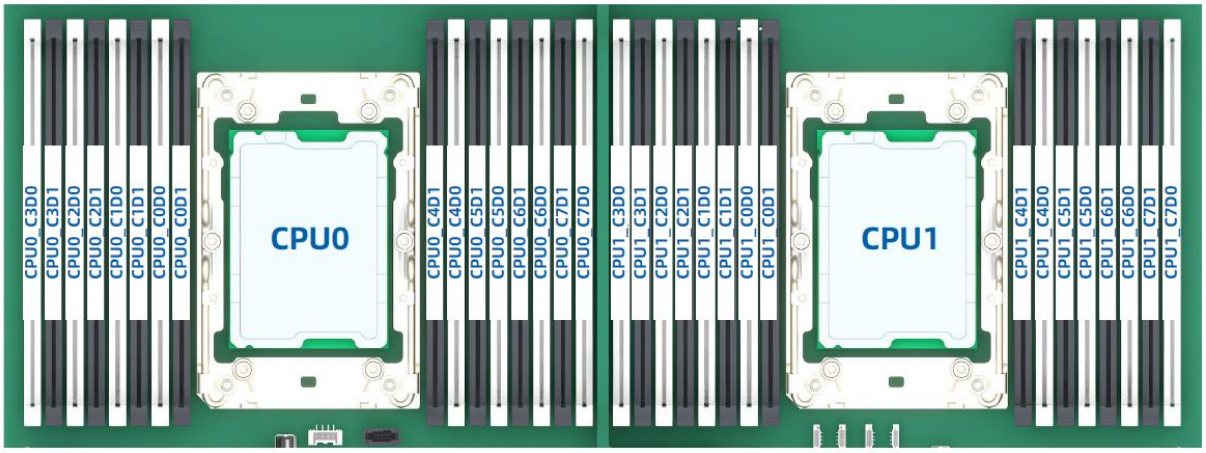
Population rules for DDR5 DIMMs in specific modes:

- Memory sparing
    - Follow the general population rules.
    - Each channel must have a valid online spare configuration.
    - Each channel can have a different online spare configuration.
    - Each channel with a DIMM installed must have a spare rank.
- Memory mirroring
    - Follow the general population rules.
    - Each processor supports 4 integrated memory controllers (IMCs). Each IMC
    - has 2 channels to be populated with DIMMs. Installed DIMMs must be identical in size and organization.
    - In a multi-processor configuration, each processor must have a valid memory mirroring configuration.

## DIMM Slot Layout

Up to 32 DDR5 DIMMs can be installed in a server, and a balanced DIMM configuration is recommended for optimal memory performance. DIMM configuration must be compliant with the DIMM population rules.

### DIMM SLOT LAYOUT




### DDR5 DIMM POPULATION RULES (1-PROCESSOR CONFIGURATION)

| DDR5 Qty | CPU0 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | iMC0 | | | | iMC1 | | | | iMC2 | | | | iMC3 | | | |
| | C0 | | C1 | | C2 | | C3 | | C4 | | C5 | | C6 | | C7 | |
| | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 |
| 1 | v | | | | | | | | | | | | | | | |
| 2 | v | | | | | | | | | | | | v | | | |
| 4 | v | | | | v | | | | v | | | | v | | | |
| 6 | v | | | | v | | v | | v | | v | | v | | | |
| 8 | v | | v | | v | | v | | v | | v | | v | | v | |
| 12 | v | v | v | | v | v | v | | v | v | v | | v | v | v | |
| 16 | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v |

**DDR5 DIMM POPULATION RULES (2-PROCESSOR CONFIGURATION)**

| DDR5 Qty | CPU0 | | | | | | | | | | | | | | | | CPU1 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | iMC0 | | | | iMC1 | | | | iMC2 | | | | iMC3 | | | | iMC0 | | | | iMC1 | | | | iMC2 | | | | iMC3 | | | |
| | C0 | | C1 | | C2 | | C3 | | C4 | | C5 | | C6 | | C7 | | C0 | | C1 | | C2 | | C3 | | C4 | | C5 | | C6 | | C7 | |
| | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 |
| 2 | v | | | | | | | | | | | | | | | | v | | | | | | | | | | | | | | | |
| 4 | v | | | | | | | | | | | | v | | | | v | | | | | | | | | | | | v | | | |
| 8 | v | | | | v | | | | v | | | | v | | | | v | | | | v | | | | v | | | | v | | | |
| 12 | v | | | | v | | v | | v | | v | | v | | | | v | | | | v | | v | | v | | v | | v | | | |
| 16 | v | | v | | v | | v | | v | | v | | v | | v | | v | | v | | v | | v | | v | | v | | v | | v | |
| 24 | v | v | v | | v | v | v | | v | v | v | | v | v | v | | v | v | v | | v | v | v | | v | v | v | | v | v | v | |
| 32 | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v | v |

## 5.5 Storage

### 5.5.1 Drive Configurations

**DRIVE CONFIGURATIONS**

| Configuration | Front Drives | Internal Drives | Drive Management Mode |
|---|---|---|---|
| 8x 2.5-inch SAS/SATA/NVMe Drive | SAS/SATA/NVMe drives in drive bays 0-7 | / | SAS drives: need 1x RAID controller card<br>SATA/NVMe drives: directly connected to CPUs |

### 5.5.2 Drive Numbering

NOTE

In this section, it is assumed that the 8i RAID controller card is used.

**8X 2.5-INCH SAS/SATA/NVME DRIVE CONFIGURATION**
**DRIVE NUMBERING**

| Physical Drive No. | Drive No. Identified by the IPMI | Drive No. Identified by the RAID Controller Card |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 1 | 1 |
| 2 | 2 | 2 |
| 3 | 3 | 3 |
| 4 | 4 | 4 |
| 5 | 5 | 5 |
| 6 | 6 | 6 |
| 7 | 7 | 7 |

### 5.5.3 Drive LEDs

## SAS/SATA Drive LEDs


**SAS/SATA DRIVE LED DESCRIPTION**

| Activity LED (Green) | Error LED (Blue/Red) | | | Description |
|---|---|---|---|---|
| | Blue | Red | | |
| Off | Off | RAID created | RAID not created | Drive absent |
| | | Solid on | Off | |
| Solid on | Off | Off | | Drive present but not in use |
| Flashing | Off | Off | | Drive present and in use |
| Flashing | Solid pink | | | Copyback/Rebuild in progress |
| Solid on | Solid on | Off | | Drive selected but not in use |
| Flashing | Solid on | Off | | Drive selected and in use |
| Off | Solid on | Off | | Drive selected and failed |
| Any status | Off | Solid on | | Drive failed |

## NVMe Drive LEDs

### NVME DRIVE LEDS


When the VMD function is enabled with the latest VMD driver installed, the NVMe drives support surprise hot swap.

### NVME DRIVE LED DESCRIPTION

| Activity LED (Green) | Error LED (Blue/Red) | | Description |
|---|---|---|---|
| | Blue | Red | |
| Off | Off | Off | Drive absent |
| Solid on | Off | Off | Drive present but not in use |
| Flashing | Off | Off | Drive present and in use |
| Flashing | Solid pink | | Copyback/Rebuilding/Initializing/ Verifying in progress |
| Solid on | Solid on | Off | Drive selected but not in use |
| Flashing | Solid on | Off | Drive selected and in use |
| Off | Solid on | Off | Drive selected and failed |
| Any status | Off | Solid on | Drive failed |

### 5.5.4 RAID Controller Cards

The RAID controller card provides functions such as RAID configuration, RAID level migration, and drive roaming. For specific RAID controller card options, consult your local 2CRSi sales representative or refer to Hardware Compatibility.

## 5.6 Network

NICs provide network expansion capabilities.

- The OCP I/O slot supports the OCP 3.0 card. Users can select the OCP 3.0 card as needed.
- The PCIe expansion slots support PCIe NICs. Users can select the PCIe cards as needed.
- For specific network options, consult your local 2CRSi sales representative or refer to 7.2 Hardware Compatibility.

# 5.7 I/O Expansion

## 5.7.1 PCIe Cards

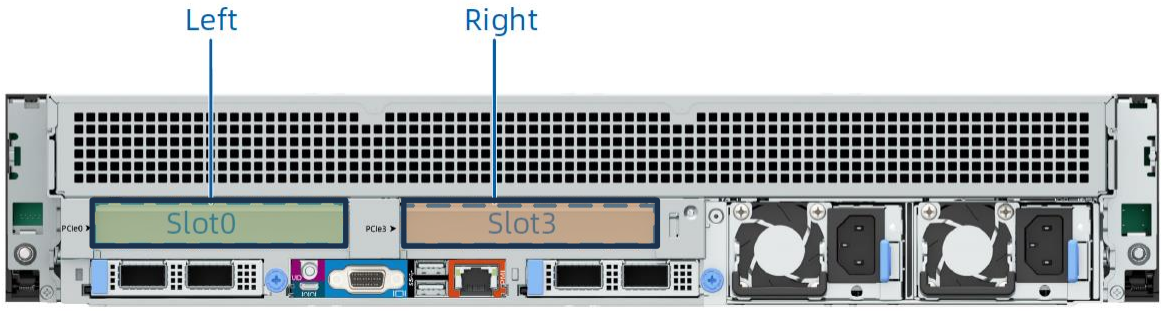
PCIe cards provide system expansion capabilities.

- The server supports up to 8 PCIe expansion slots.
- For specific PCIe card options, consult your local 2CRSi sales representative or refer to 7.2 Hardware Compatibility.

## 5.7.2 PCIe Slots

### PCIe Slot Positions

**PCIE SLOTS – GPU CONFIGURATION**




- The top 1U space supports up to 4 dual-slot GPUs.
- Slot 0/3 in the bottom 1U space supports an FHHL PCIe expansion card.

CPU 0

CPU 1

## 5.7.3 PCIe Slot Description

NOTE

When CPU1 is absent, the corresponding PCIe slots are not available.

**PCIE SLOT DESCRIPTION – GPU CONFIGURATION**

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| Slot 0 | CPU0 | PCIe 5.0 | x16 | x16 | PE2 | FHHL |
| Slot 3 | CPU1 | PCIe 5.0 | x16 | x16 | PE1 | FHHL |
| OCP 3.0 Slot | CPU0 | PCIe 5.0 | x16 | x16 | PE0 | Standard OCP 3.0 specs |
| OCP 3.0 | | | | | | Standard OCP |

| | | | | | | |
|---|---|---|---|---|---|---|
| Slot | CPU1 | PCIe 5.0 | x8/x16 | x8/x16 | PE0 | 3.0 specs |

## 5.8 PSUs

- Supports up to 2 PSUs.
- Supports AC or DC power input.
- The PSUs are hot-swappable.
- The server supports 2 PSUs with 1+1 redundancy.
- The server must use PSUs with the same part number (P/N code).
- The server provides short-circuit protection and provides PSUs supporting dual-live-wire input.

**PSU LOCATIONS**


| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | PSU0 | 2 | PSU1 |

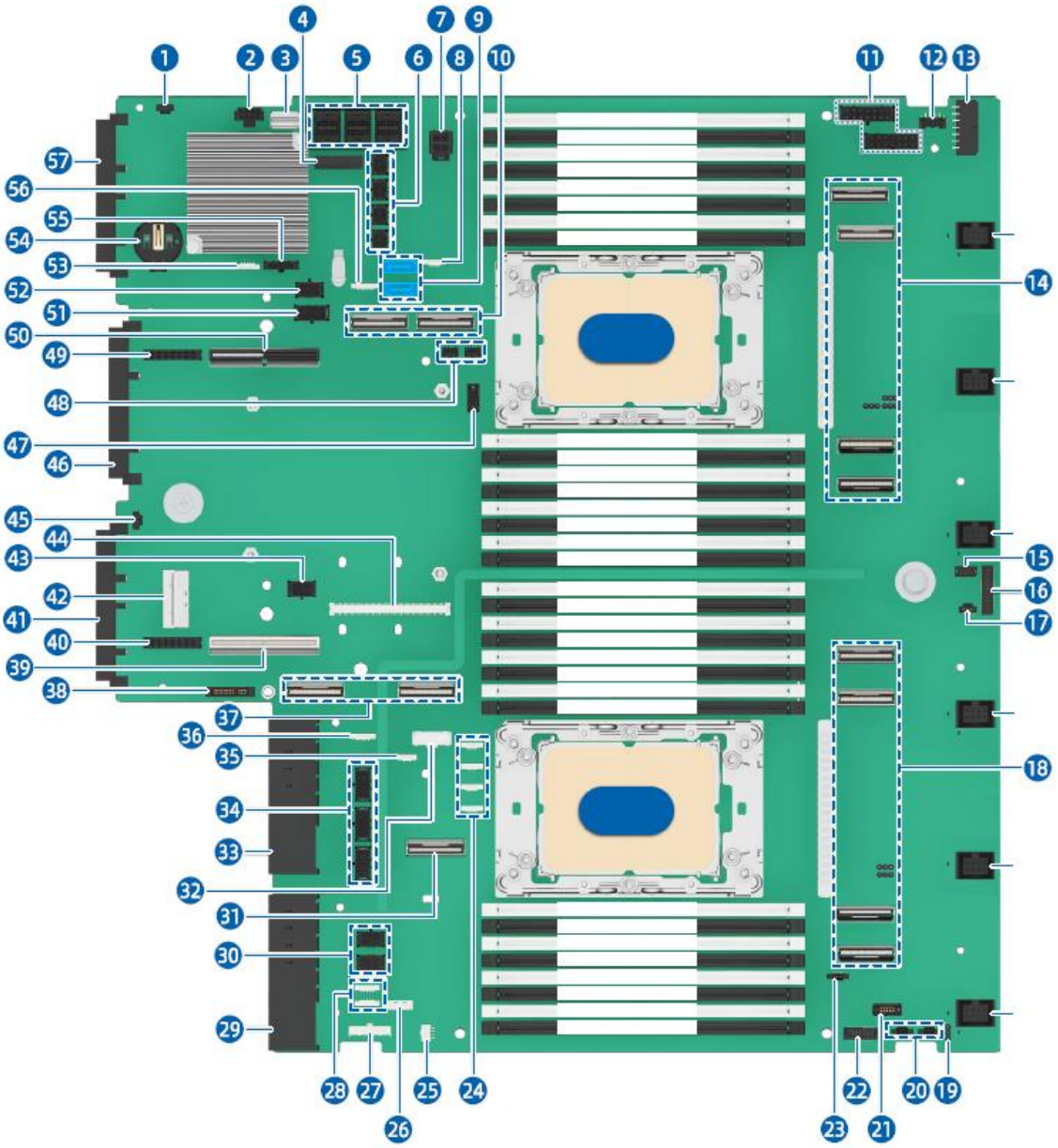
## 5.9 Fans

- Supports 6 fans. Users can select 6038 or 6056 fans based on the actual configuration.
- The fans are hot-swappable.
- The server supports fans with N+1 redundancy, which means that the server can continue working properly when a fan fails.
- Supports intelligent fan speed control.
- The server must use fans with the same part number (P/N number).

# 5.10 Boards

## 5.10.1 Motherboard

**MOTHERBOARD LAYOUT**

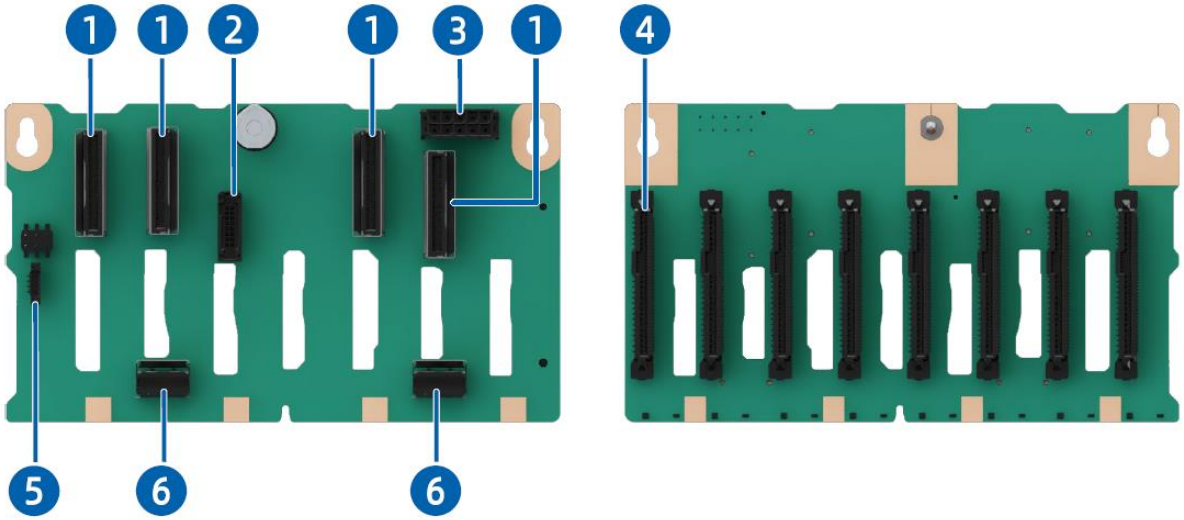


| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | OCP 3.0_0 Button and LED Connector | 2 | Mid-Backplane Power Connector |
| 3 | Right Control Panel Connector | 4 | SYS_TF Connector |
| 5 | Mini SAS Connector × 3 | 6 | Rear Backplane Power Connector × 4 |
| 7 | Front OCP Power Connector | 8 | $I^2C$ Connector |
| 9 | SATA Connector × 2 | 10 | MCIO x8 Connector (CPU0) × 2 |
| 11 | Front Backplane Power Connector × 2 | 12 | Sensor Connector |
| 13 | Front Backplane Power Connector | 14 | MCIO x8 Connector (CPU0) × 4 |
| 15 | Intrusion Switch Connector | 16 | OCP2 Sideband Signal Connector |
| 17 | OCP 3.0_2 Button and LED Connector | 18 | MCIO x8 Connector (CPU1) × 4 |
| 19 | CLR_CMOS Jumper | 20 | Backplane I2C Connector × 2 |
| 21 | VPP Connector | 22 | Left Control Panel Connector |
| 23 | Backplane I2C Connector | 24 | Backplane I2C Connector × 4 |
| 25 | IPMB Connector | 26 | RAID Key Connector |
| 27 | Capacitor Board Connector | 28 | $I^2C$ Connector × 2 |
| 29 | PSU1 Connector | 30 | GPU_Riser Power Connector × 2 |
| 31 | MCIO x8 Connector (CPU1) | 32 | NC-SI Connector |
| 33 | PSU0 Connector | 34 | GPU Power Connector × 3 |
| 35 | Smart NIC UART Connector | 36 | $I^2C$ Connector |
| 37 | MCIO x8 Connector (CPU1) × 2 | 38 | Riser Card Power Connector |
| 39 | MCIO x16 Connector (CPU1) | 40 | Riser Card Power Connector |
| 41 | OCP 3.0 Connector | 42 | OCP 3.0 MCIO Connector (CPU1) |
| 43 | GPU_Riser Power Connector | 44 | OCPA Slot (CPU0) |
| 45 | OCP 3.0_1 Button and LED Connector | 46 | DC-SCM Connector |
| 47 | VPP Connector | 48 | Leak Detection Connector |
| 49 | Riser Card Power Connector | 50 | MCIO x16 Connector (CPU0) |
| 51 | GPU0 Power Connector | 52 | GPU_Riser Power Connector |
| 53 | $I^2C$ Connector | 54 | Button Battery Socket |
| 55 | Smart NIC Power Connector | 56 | SGPIO Connector |
| 57 | OCP 3.0 Connector | | |

### 5.10.2 Drive Backplanes

## Front Drive Backplanes

**8 × 2.5-INCH SAS/SATA/NVME DRIVE BACKPLANE**




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | MCIO x8 Connector × 4 | 2 | VPP Connector |
| 3 | Backplane Power Connector × 3 | 4 | Drive Connector |
| 5 | BMC I2C Connector | 6 | Slimline x4 Connector × 2 |

# 6. Maintenance and Component Replacement

## 6.1 Installing the Server into the Rack

For detailed information on installing the server into the rack with rails supplied by us, see the rack server installation guide.

CAUTION

If you would like to use rails not provided by us, please contact us first to ensure the server can be installed into the rack safely and properly. The load-bearing capacity of rails must be higher than 100 kg (220.46 lbs). If not, you MUST use our rails as using rails not provided by us may cause such risks as installation failure. We will not assume any responsibility or liability for any damage or injury caused
by this.

WARNING

To reduce the risk of personal injury or equipment damage, DO secure the mounting ears to the mounting flanges firmly to prevent the server from moving
or sliding out from the rack.

## 6.2 Powering On/Off the Server

To power on or off the server, press the power button.

To completely shut down the server, press the power button and disconnect the power cords from the server.

DANGER

To reduce the risk of personal injury, electric shock, or equipment damage, disconnect the power cords to remove power from the server. Pressing the power button on the front panel does not shut off the system power completely.

Portions of the power supply and some internal circuitry remain active until the power is removed.

## 6.3 Preparing for Component Replacement

Read the installation instructions for all the hardware operations before removing or installing the components. All prerequisites must be completed prior to installation or maintenance.

WARNING

To reduce the risk of personal injury from hot surfaces, allow the drives and internal system components to cool before touching them.

CAUTION

To prevent damage to electrical components, properly ground the server before installation. Improper grounding may cause electrostatic discharge.

Do the following prior to installation or maintenance:

1. Power off the server.
2. Remove all cords from the server.

WARNING

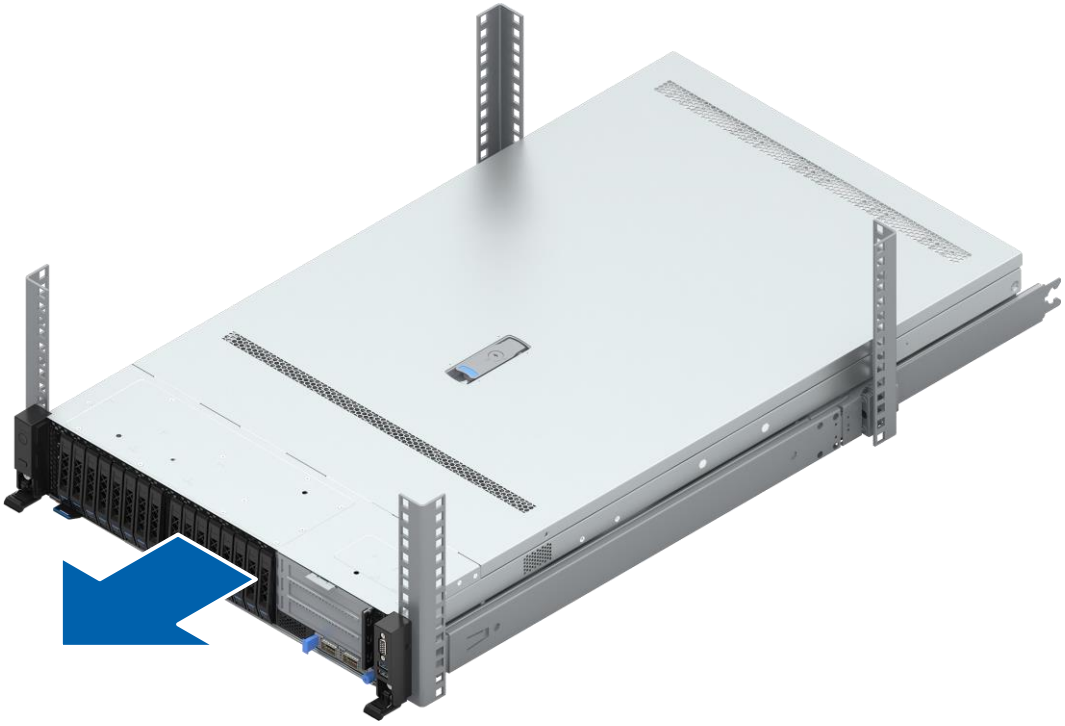
- To reduce the risk of personal injury or equipment damage, make sure that the rack is adequately stabilized before you pull the server or a component out of the rack.
- To reduce the risk of personal injury, be careful when sliding the server into the rack. The sliding rails could pinch your fingers.

3. Open the left and right ear latches, and then loosen the 2 captive screws under the ear latches.

Figure 4-1 Loosening the Captive Screw

4. Gently slide and remove the server out of the rack.

Figure 4-2 Removing the Server from the Rack



5. After installation or maintenance, slide the server all the way back into the rack to secure it in place.

## 6.4 Replacing System Components

NOTE

- When installing or removing system components, always wear anti-static gloves or an anti-static wrist strap.
- Before the installation or removal of any hardware, always ensure all data is backed up properly.
- Disconnect the server and all attached devices from the electrical outlets.
- Hot-swap components can be replaced with the server powered on.
- If more than one option is to be installed, read the installation instructions for all the hardware options and identify similar steps to streamline the installation process.

Component appearance may differ depending on actual configurations.

### 6.4.1 Replacing the Top Cover

WARNING

To reduce the risk of personal injury from hot surfaces, allow the drives and internal system components to cool before touching them.

CAUTION

- For proper cooling, do not operate the server without the top cover, air ducts, fans, dummies, or blanks installed.
- If the server supports hot-swap components, minimize the amount of time the top cover is open.

To remove the top cover:

1. Loosen the security screw on the latch counterclockwise to the unlocked position with a Phillips screwdriver.
2. Lift the latch handle until the top cover slides toward the rear of the server and the tabs on the top cover disengage from the guide slots on the chassis. Hold the top cover on both sides and remove the top cover away from the chassis.

Figure 4-3 Removing the Top Cover


To install the top cover:

1. Lift the latch handle, align the standoffs of the top cover with the J-slots on the chassis, and lower the top cover down onto the chassis.
2. Press down the latch handle until the top cover slides toward the front of the server to the closed position.
3. Tighten the security screw on the latch clockwise to the locked position with a Phillips screwdriver.

### 6.4.2 Replacing a Super-Capacitor

To remove the super-capacitor:

1. Remove the top cover.
2. Disconnect the cable of the super-capacitor.
3. Open the Velcro used to secure the super-capacitor.
4. Remove and put the super-capacitor into an anti-static bag.

Figure 4-4 Removing the Super-Capacitor

To install the super-capacitor:

1. Take a new super-capacitor out from the anti-static bag and put it into the super-capacitor holder.
2. Secure the super-capacitor firmly with the Velcro.
3. Connect the cable of the super-capacitor.
4. Install the top cover.

### 6.4.3 Replacing the Air Duct

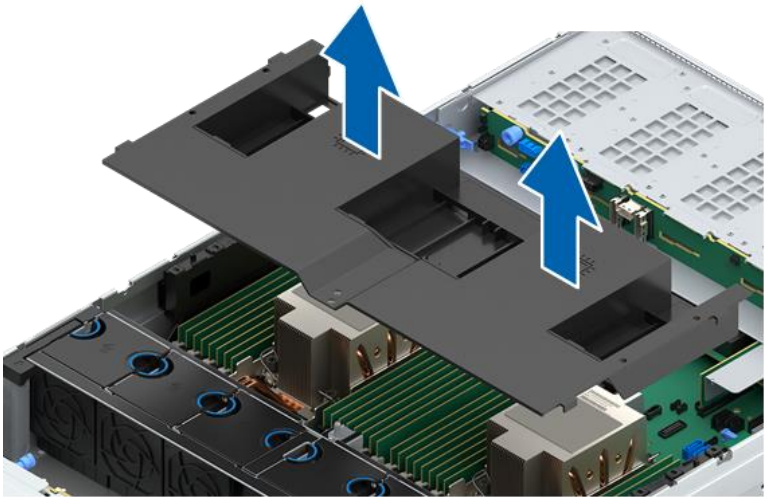
CAUTION

- For proper cooling, do not operate the server without the top cover, air ducts, fans, dummies, or blanks installed.
- If the server supports hot-swap components, minimize the amount of time the top cover is open.

To remove the air duct:

1. Remove the top cover.
2. Remove the super-capacitors on the air duct.
3. Lift the air duct to remove it.

Figure 4-5 Removing the Air Duct



To install the air duct:

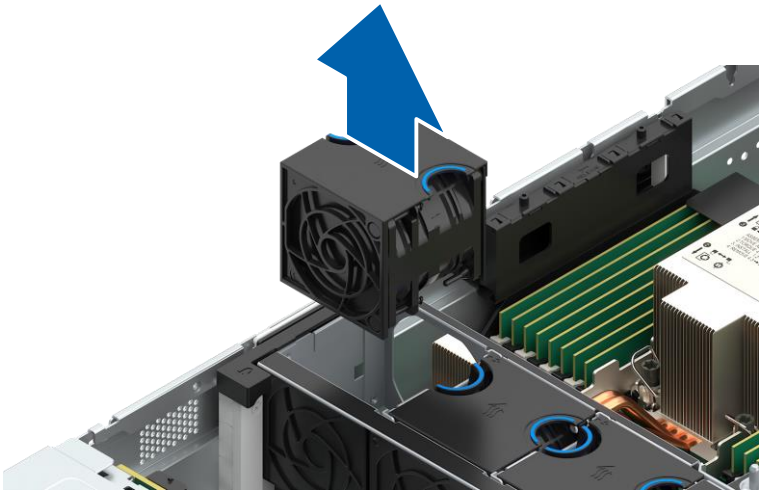
1. Lower down the air duct vertically into the chassis.
2. Install the super-capacitors.
3. Install the top cover.

### 6.4.4 Replacing a Hot-Swap Fan Module

To remove the fan module:

1. Remove the top cover.
2. Remove the fan module:
    a. Press and hold the release tab of the fan module, and then lift the fan module out of the fan bay.
    b. Put the fan module into an anti-static bag.

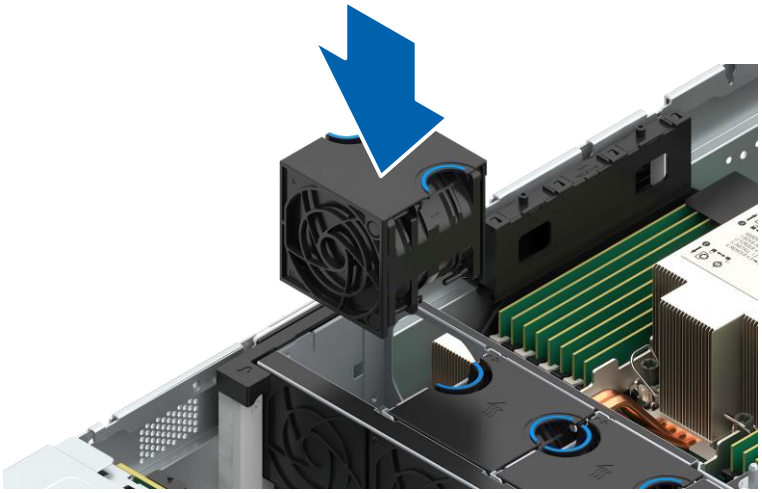
Figure 4-6 Removing the Fan Module



To install the fan module:

1. Take a new fan module out from the anti-static bag.
2. Align the connectors on the fan and the motherboard, lower down the fan module vertically into the fan bay, and secure it in place.

Figure 4-7 Installing the Fan Module



3. Install the top cover.
4. Check that the fan status LED is off when the server is powered on.

### 6.4.5 Replacing an Internal M.2 SSD

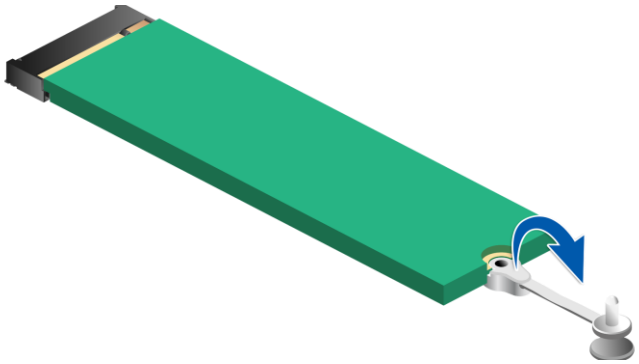
NOTE

Due to different installation positions of the M.2 SSDs, the fixing method will vary slightly. Please install and remove the SSDs according to the actual situation.

To remove the M.2 SSD:

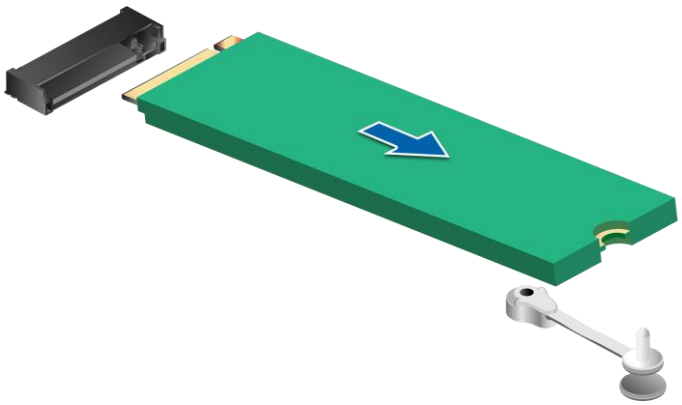
3. Remove the top cover.
4. Disconnect the cables of the super-capacitors (if any).
5. Remove the air duct.
6. Open the snap clip securing the M.2 SSD to release it.

Figure 4-8 Opening the M.2 Snap Clip



7. Tilt to pull the M.2 SSD out from the connector on the motherboard, and put it into an anti-static bag.

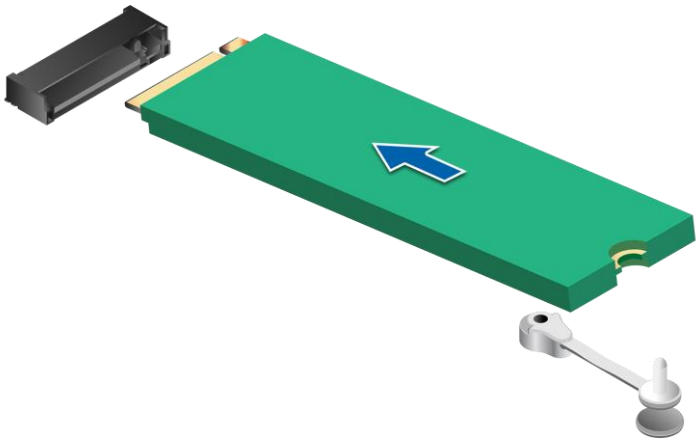
Figure 4-9 Removing the M.2 SSD



To install the M.2 SSD:

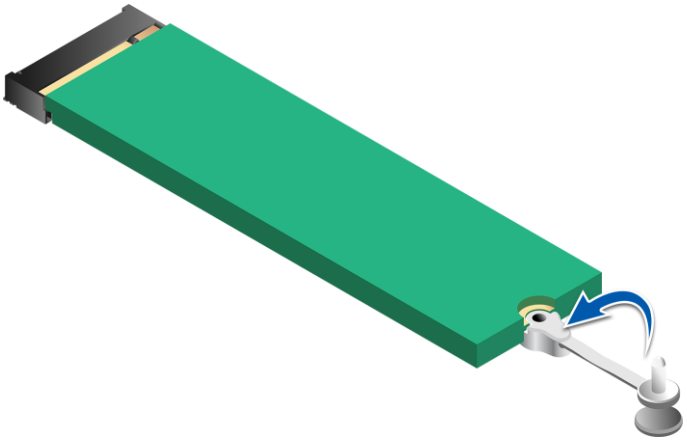
1. Take a new M.2 SSD out from the anti-static bag.
2. Tilt the M.2 SSD to insert it into the connector on the motherboard.

Figure 4-10 Installing the M.2 SSD



3. Close the snap clip to secure the M.2 SSD in place.

Figure 4-11 Closing the M.2 Snap Clip



4. Install the air duct.
5. Connect the cables of the super-capacitors (if any).
6. Install the top cover.

### 6.4.6 Replacing a DIMM

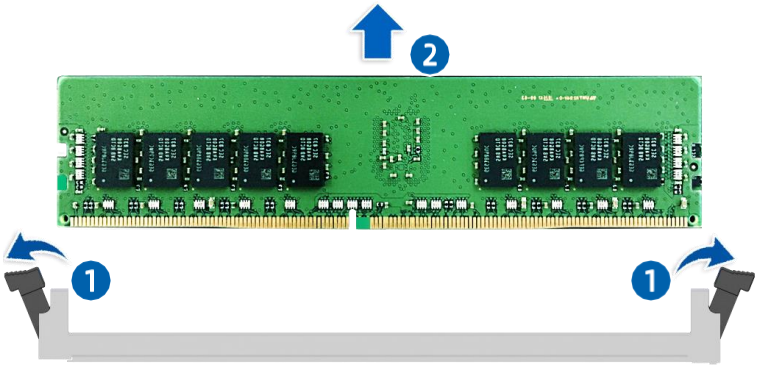
To remove the DIMM:

1. Remove the top cover.
2. Disconnect the cables of the super-capacitors (if any).
3. Remove the air duct.
4. Locate the DIMM to be replaced.
5. Remove the DIMM:
   a. Press the ejectors on both ends of the DIMM slot outward to unlock it. Gently lift and remove the DIMM from the slot.

NOTE

Make sure that the ejectors on both ends of the DIMM slot are fully opened.

Figure 4-12 Removing the DIMM

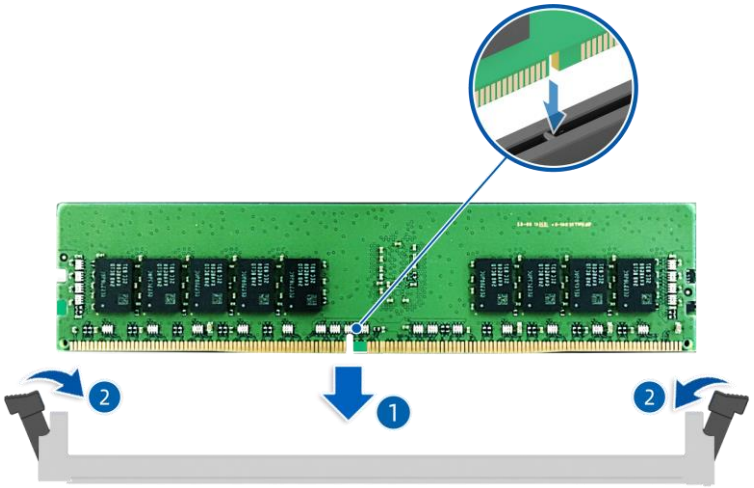



   b. Put the DIMM into a memory tray.

To install the DIMM:

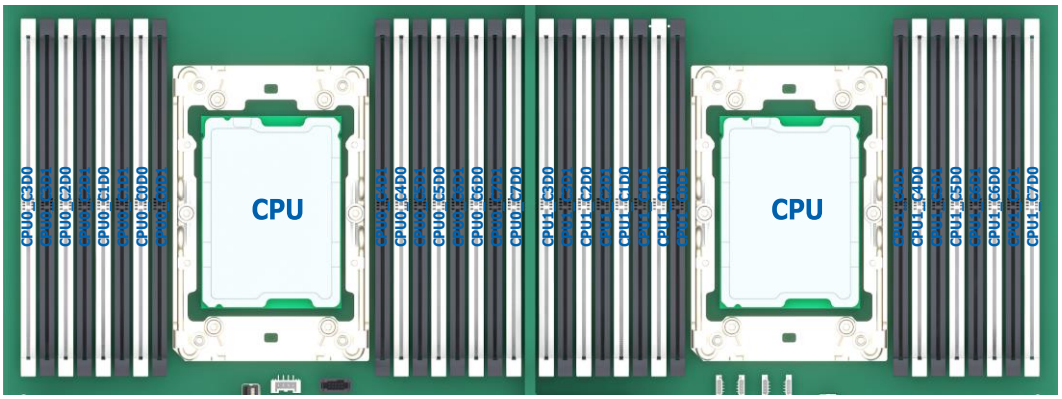
1. Take a new DIMM out from the memory tray.
2. Align the alignment keys on the DIMM and DIMM slot. Insert the DIMM into the slot. Press both ends of the DIMM at the same time with your thumbs until the DIMM snaps into place.

Figure 4-13 Installing the DIMM




3. Install the air duct.
4. Connect the cables of the super-capacitors (if any).
5. Install the top cover.

Figure 4-14 DIMM Slot Layout




Detailed DIMM population rules are as follows:

Table 4-1 DDR5 Population Rules for Single-CPU Configuration

| DDR5 QTY | CPU0 | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | |
| | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 |
| 1 | | | | | | | V | | | | | | | | | |
| 2 | | | | | | | V | | | | | | | V | | |
| 4 | | | V | | | | V | | | V | | | | V | | |
| 6 | V | | V | | | | V | | | V | | V | | V | | |
| 8 | V | | V | | V | | V | | | V | | V | | V | | V |

| | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 12 | V | | V | V | V | | V | V | V | V | | V | V | V | | V |
| 16 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V |

Table 4-2 DDR5 Population Rules for Dual-CPU Configuration

| DDR5 QTY | CPU0 | | | | | | | | | | | | | | | | CPU1 | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | | C3 | | C2 | | C1 | | C0 | | C4 | | C5 | | C6 | | C7 | |
| | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D0 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D1 | D0 | D1 | D0 | D1 | D0 | D1 | D0 |
| 2 | | | | | | | V | | | | | | | | | | | | | | | | V | | | | | | | | |
| 4 | | | | | | | V | | | | | | | V | | | | | | | | | V | | | | | | | V | | |
| 8 | | | V | | | | V | | | V | | | | V | | | | | V | | | | V | | | V | | | | V | | |
| 12 | V | | V | | | | V | | | V | | V | | V | | | V | | V | | | | V | | | V | | V | | V | | |
| 16 | V | | V | | V | | V | | | V | | V | | V | | V | V | | V | | V | | V | | | V | | V | | V | | V |
| 24 | V | | V | V | V | | V | V | V | V | | V | V | V | | V | V | | V | V | V | | V | V | V | V | | V | V | V | | V |
| 32 | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V | V |

## 6.4.7 Replacing the Processor Heatsink Module (PHM)

The server supports single- or dual-processor configuration depending on the model you purchased.

CAUTION

- To avoid damage to the processor and motherboard, do not install the processor without using the processor installation tool.
- To prevent possible server malfunction and equipment damage, processors in a multiprocessor configuration must bear the same part number.

To remove the PHM:

DANGER

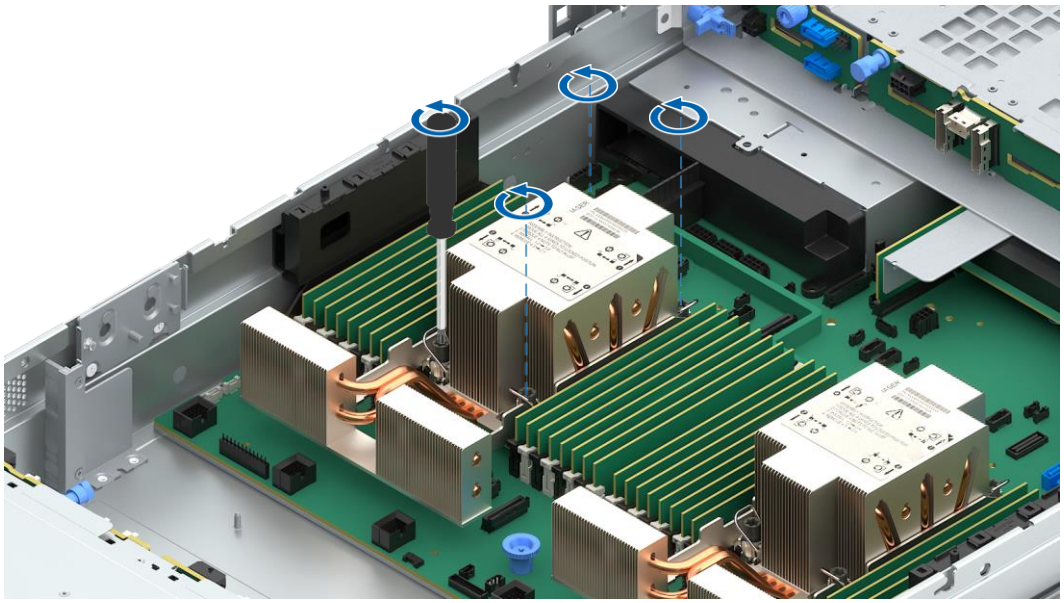
The heatsink may be hot after the system has been powered off. Allow the heatsink to cool for a few minutes before removing it.

1. Remove the top cover.
2. Disconnect the cables of the super-capacitors (if any).
3. Remove the air duct.
4. Remove the PHM:
   a. Loosen the 4 nuts securing the PHM to the CPU socket counterclockwise with a T30 Torx screwdriver in the sequence shown on the heatsink label.

b. Press the 4 lock-in wires inward to the unlocked position.

c. Gently remove the PHM from the CPU socket.

Figure 4-15 Removing the PHM

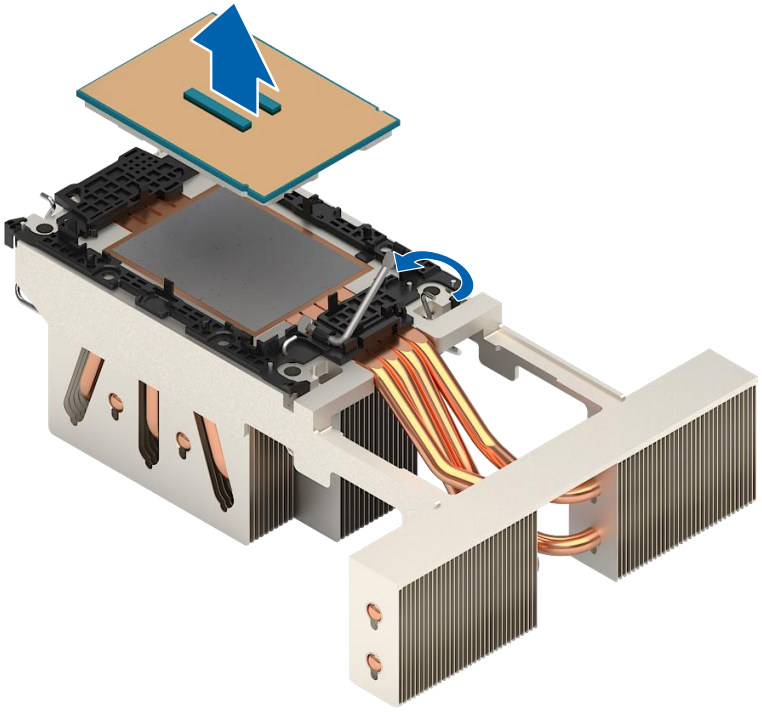


CAUTION

- Use a protective cover to protect the CPU socket to avoid damaging socket pins after removing the PHM.
- The CPU contacts are fragile and easily damaged. During removal and installation, always keep the CPU contacts side up when the dedicated processor installation/removal tool (CPU tray) is unavailable. DO NOT touch
  the CPU contacts.

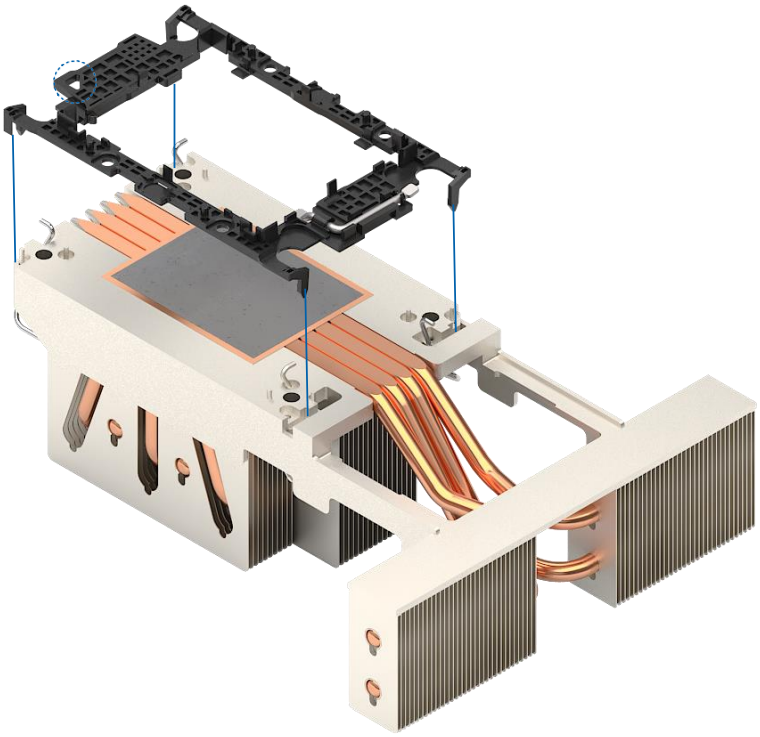
5. Lift the lever to release one side of the CPU off the carrier clip.
6. Open the release tabs securing the CPU to the carrier clip. Gently remove the CPU and put it into an anti-static bag.

Figure 4-16 Removing the CPU



7. Remove the CPU carrier clip:
    a. Close the lever.
    b. Push to release the tab near the triangle mark.
    c. Release the other 3 tabs.
    d. Gently remove the carrier clip from the heatsink.

Figure 4-17 Removing the CPU Carrier Clip



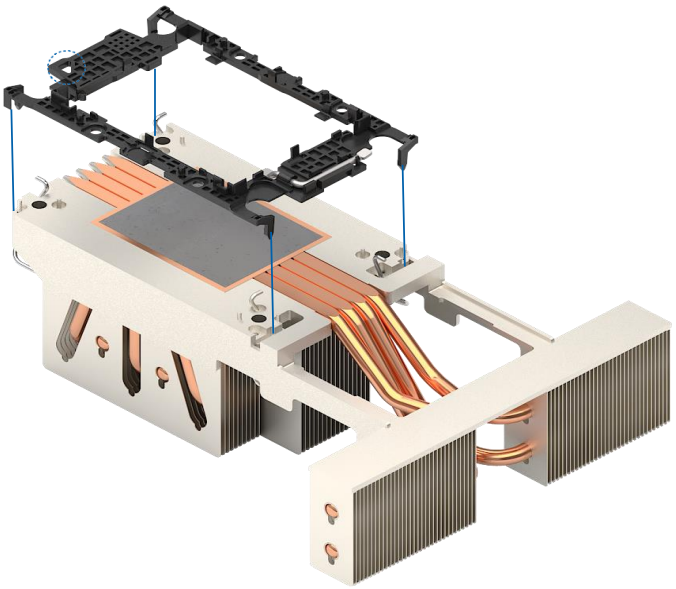
CAUTION

- Use a clean and lint-free cloth to wipe off the old thermal grease first if the heatsink is to be reused.
- Apply thermal grease evenly onto the heatsink before reusing the heatsink.

To install the PHM:

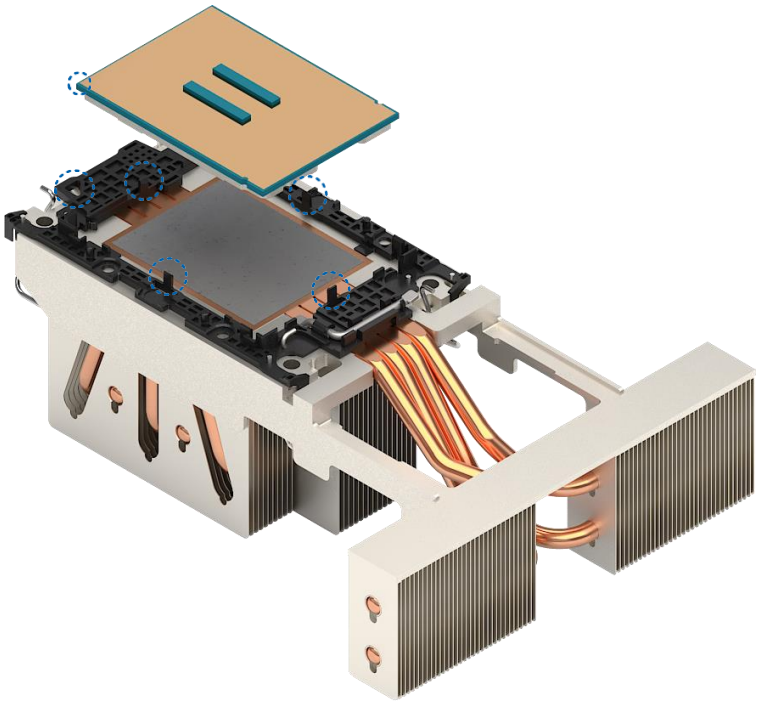
1. Install the CPU carrier clip:
   a. With the heatsink thermal grease side up, align the triangle mark on the carrier clip with that on the heatsink label.
   b. Install the carrier clip onto the heatsink until the 4 tabs of the carrier clip snap into place.

Figure 4-18 Installing the CPU Carrier Clip



2. Evenly apply the thermal grease on the heatsink surface in the size of the CPU.
3. Install the CPU:
   a. With the CPU contacts side up, align the triangle mark on the CPU with that on the carrier clip.
   b. Hold the CPU by its two edges, and install it into the carrier clip. Make sure that the CPU is secured in place by the release tabs on the four sides of the carrier clip.

Figure 4-19 Installing the CPU



4. Press down on the tabs of the protective cover (if any) to remove it from the CPU socket.
5. With the CPU contacts side down, align the triangle mark on the CPU with that on the CPU socket to attach the PHM onto the CPU socket.
6. Press the 4 lock-in wires outward to the locked position.
7. Tighten the 4 nuts securing the PHM to the CPU socket clockwise with a T30 Torx screwdriver in the sequence shown on the heatsink label.
8. Install the air duct.
9. Connect the cables of the super-capacitors (if any).
10. Install the top cover.

### 6.4.8 Replacing a PCIe Expansion Card

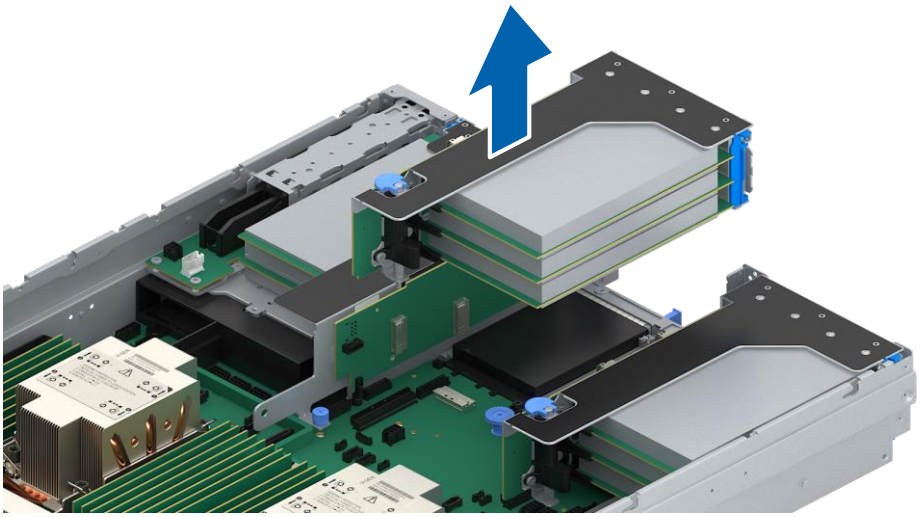
CAUTION

- To prevent damage to the server or expansion cards, power off the server and remove all power cords before removing or installing the PCIe expansion card.
- To prevent damage to the PCIe slot pins, be sure to apply even force and remove or install the PCIe expansion card vertically to the riser card.

To remove the PCIe expansion card:

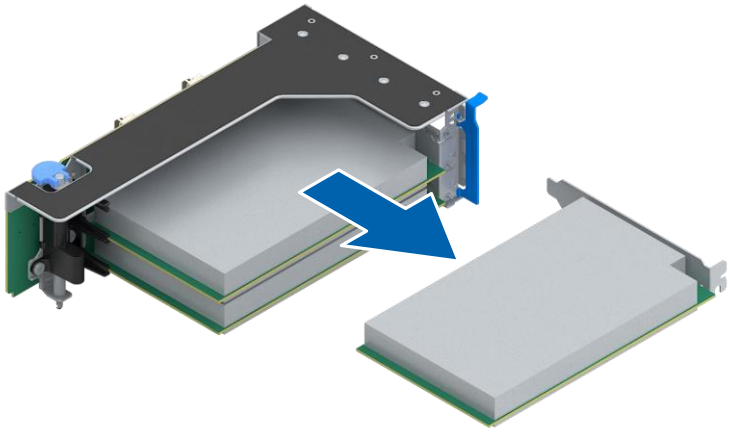
1. Remove the top cover.
2. If connected, remove the cables from the front of the riser card.
3. Lift the blue latch on the PCIe cage. Rotate the latch 180° counterclockwise to unlock it.
4. Gently lift and remove the PCIe riser-card assembly with both hands.

Figure 4-20 Removing the PCIe Riser-Card Assembly



5. Disconnect the cables from the side of the riser card. Take a record of the cables to avoid wrong cabling when installing.
6. Press down on the latch lock to open it.
7. Remove the PCIe expansion card horizontally and put it into an anti-static bag.

Figure 4-21 Removing the PCIe Expansion Card



To install the PCIe expansion card:

1. Take a new PCIe expansion card out from the anti-static bag.
2. Align and insert the PCIe expansion card into the riser card slot.
3. Close the latch lock.
4. Connect the cables to the side of the riser card. Be sure to connect the cables properly.
5. Align and insert the riser card vertically into the slot on the motherboard.
6. Press and rotate the blue latch 180° clockwise, and depress it 90° to secure the PCIe cage in place.
7. Connect the cables (if any) to the front of the riser card.
8. Install the top cover.

### 6.4.9 Replacing a GPU/Graphics Card

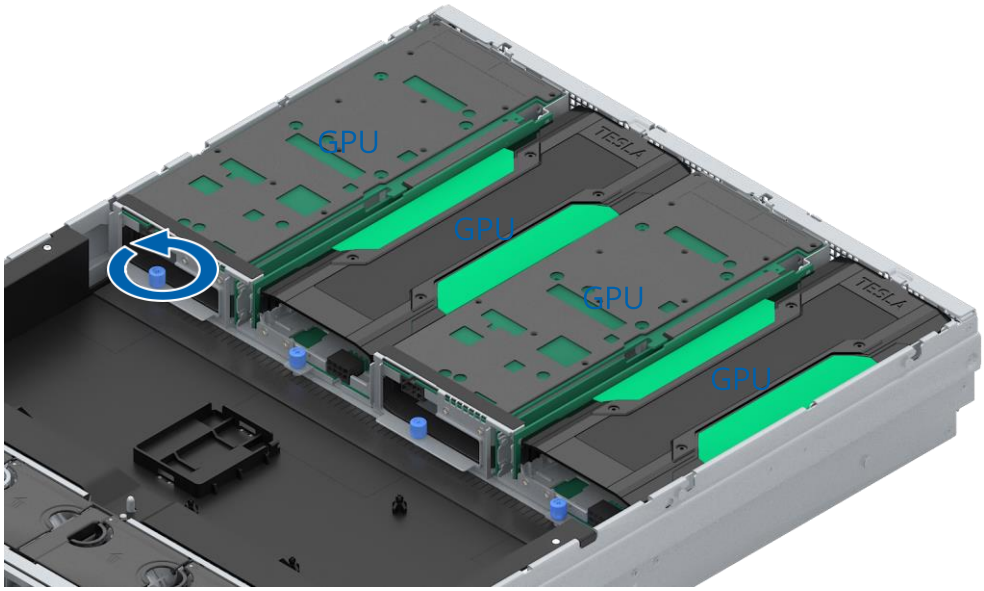
NOTE

- The procedure to replace the graphics card and the GPU is similar. This section demonstrates with the GPU replacement.
- Figure 4-22 shows the layout of GPUs. To avoid interference, GPU1/GPU3 needs to be removed first in order to remove GPU0/GPU2, and GPU0/GPU2 needs to be installed first in order to install GPU1/GPU3.
- Keep the removed screws and brackets during GPU removal for later use.

To remove the GPU:

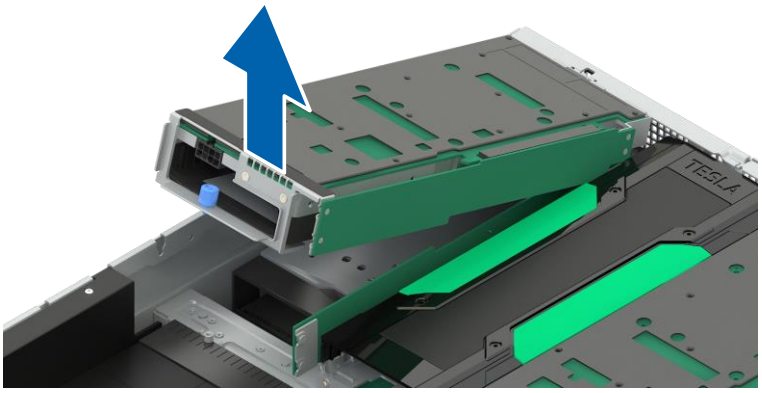
1. Remove the top cover.
2. Disconnect all the cables from the GPU module and take a record for subsequent installation.
3. Loosen the thumbscrew counterclockwise.

Figure 4-22 Loosening the Thumbscrew



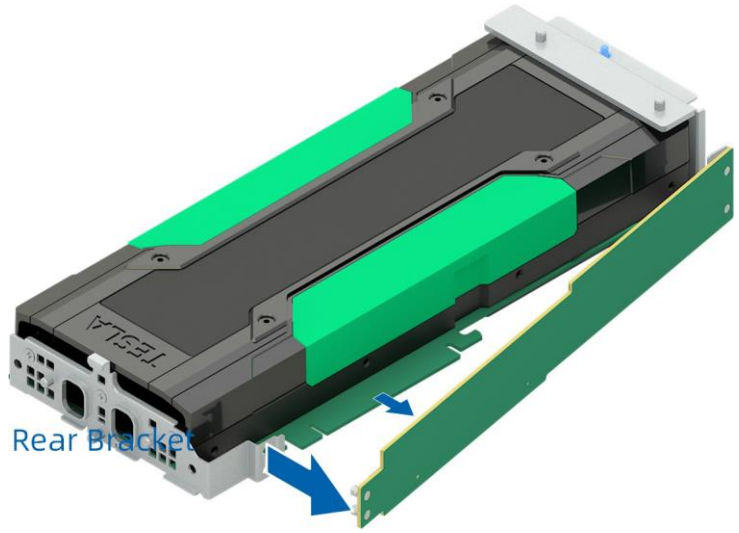

4. Lift the front end of the GPU module slightly, and then remove the GPU module.

Figure 4-23 Removing the GPU module




5. Detach the locating pins from the GPU rear bracket and the gold finger from the riser card slot to disengage the riser card from the GPU module.

Figure 4-24 Removing the GPU Riser Card




6. Remove the screws on the front bracket with a Phillips screwdriver and remove the bracket.

NOTE

The front bracket varies with different GPUs or graphics cards.

Figure 4-25 Front Bracket of GPU0/GPU2

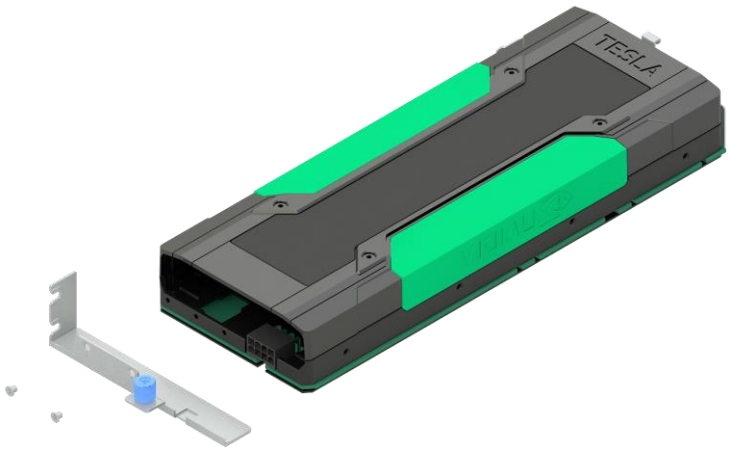
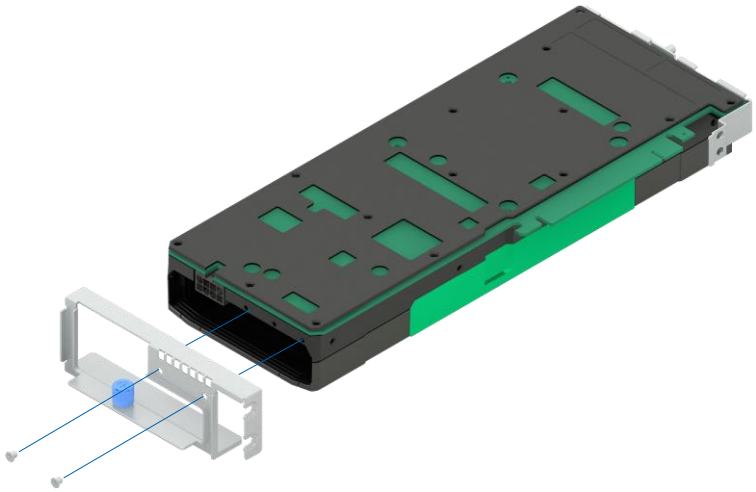


Figure 4-26 Front Bracket of GPU1/GPU3

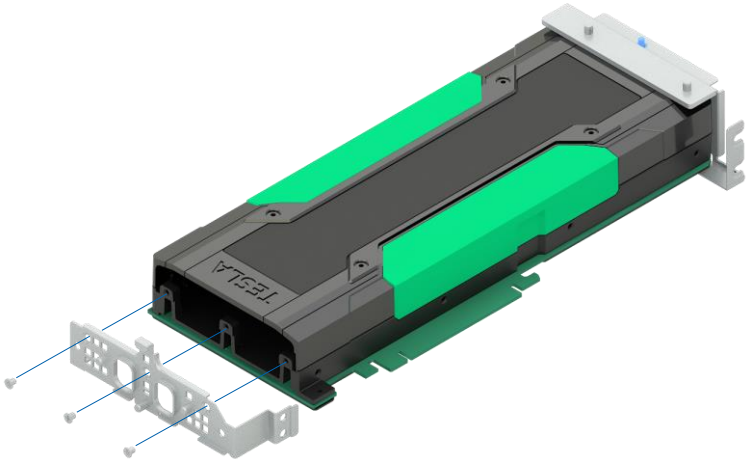


7. Remove the screws on the rear bracket with a Phillips screwdriver and remove the bracket.

NOTE

The rear bracket varies with different GPUs or graphics cards.

Figure 4-27 Removing the Rear Bracket

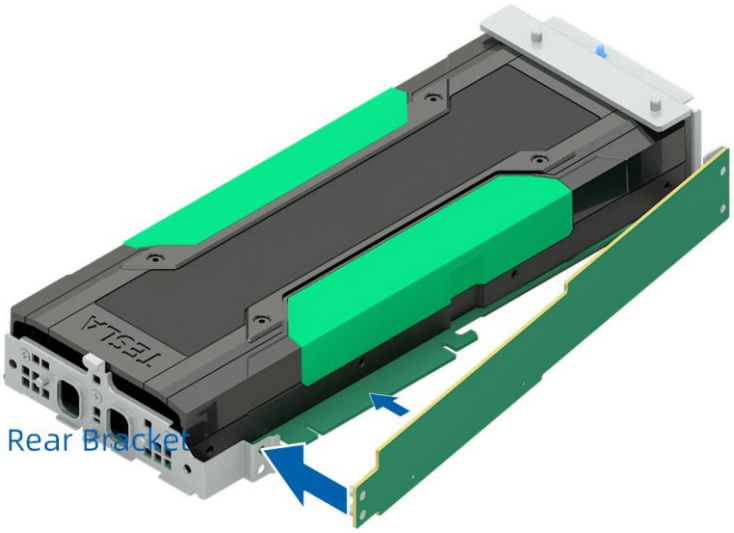


8. Put the removed GPU into an anti-static bag.

To install the GPU:

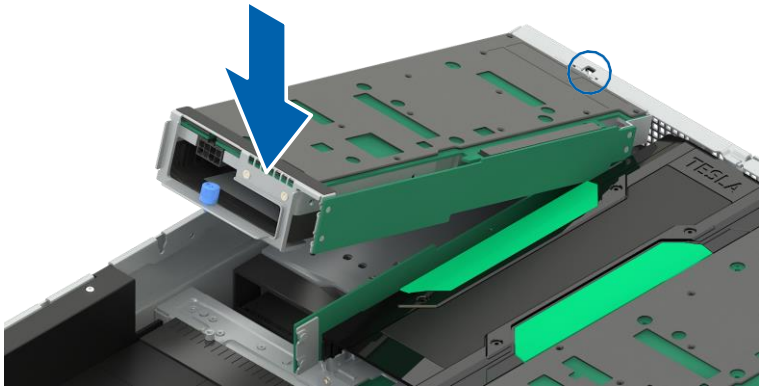
1. Take a new GPU out from the anti-static bag.
2. If installed, remove the blank that comes with the GPU.
3. Install the rear bracket.
4. Install the front bracket.
5. Attach the riser card to the front bracket, and then attach the riser slot to the gold finger and the locating pins to the rear bracket.

Figure 4-28 Installing the GPU Riser Card



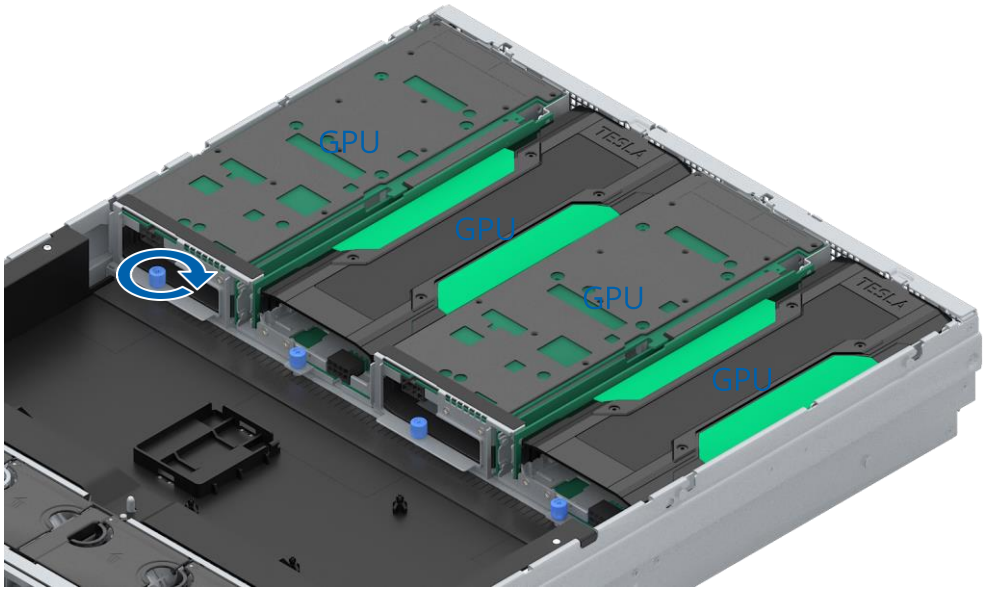

6. Align the GPU rear bracket with the locating slot at the rear of the chassis to install it to the chassis, and then rotate down the GPU module until it is firmly seated.

Figure 4-29 Installing the GPU Module



7. Tighten the thumbscrew clockwise to secure the GPU module in place.

Figure 4-30 Tightening the Thumbscrew




8. Connect the cables to the GPU module as recorded.
9. Install the top cover.

### 6.4.10 Replacing a Hot-Swap Drive

CAUTION

- For proper cooling, do not operate the server without the top cover, air ducts, dummies, or blanks installed.
- If the server supports hot-swap components, minimize the amount of time the top cover is open.

To remove the drive:

1. Press the release button to release the drive tray handle.

Figure 4-31 Pressing the Release Button

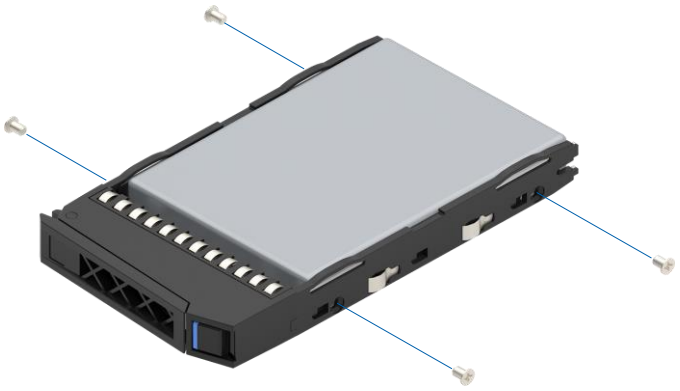
2. Hold the handle and pull the drive module out of the drive bay.

Figure 4-32 Pulling out the Drive Module

3. Remove the drive from the drive tray and put it into an antistatic bag.

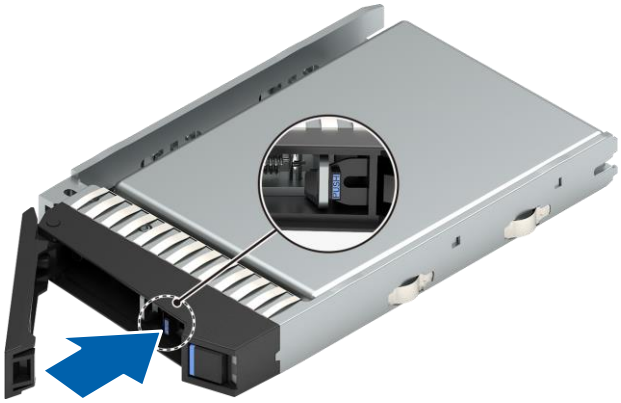
- For the drive tray with screws: Remove the 4 screws securing the drive to the drive tray counterclockwise with a Phillips screwdriver, and then remove the drive from the drive tray.

Figure 4-33 Removing the Screws



- For the tool-less drive tray: Press the PUSH button to release the drive tray latch, and then remove the drive from the drive tray.

Figure 4-34 Removing the Drive from the Tool-Less Drive Tray



To install the drive:

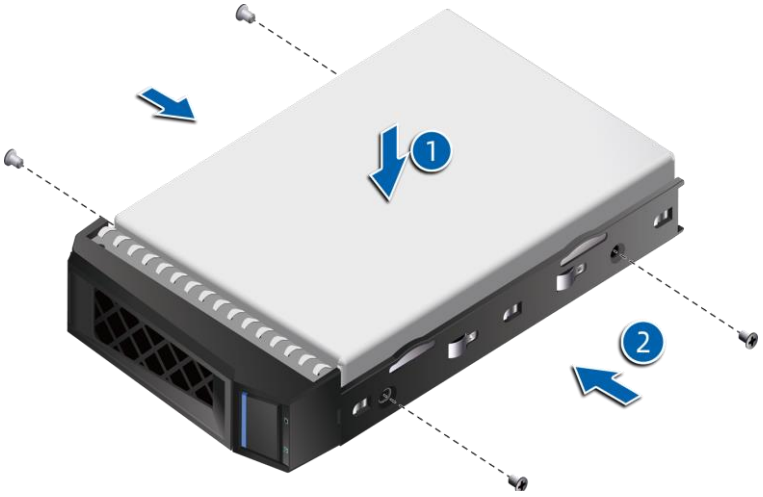
1. Take a new drive out from the antistatic bag.
2. Install the drive into the drive tray.

- For the drive tray with screws:

   a. Orient the drive into the drive tray with its connector toward the rear of the drive tray.

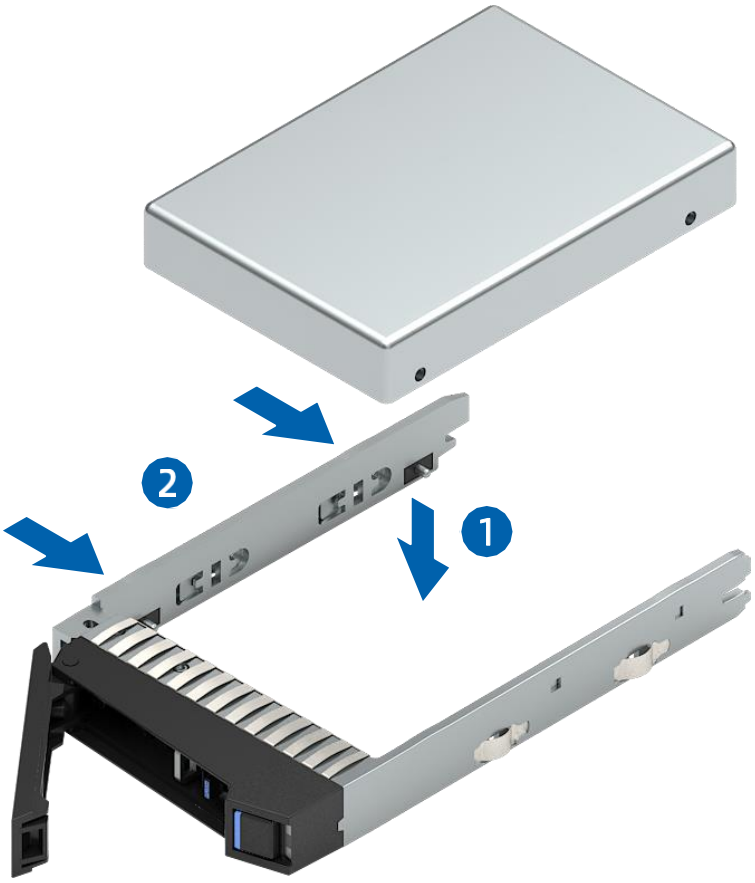
   b. Insert and tighten the 4 screws to secure the drive to the drive tray clockwise with a Phillips screwdriver.

Figure 4-38 Installing the Drive (Drive Tray with Screws)




- For the tool-less drive tray:
  a. Orient the drive into the drive tray with its connector toward the rear of the drive tray.
  b. Press the drive caddy bracket inward until the latch is locked.

Figure 4-39 Installing the Drive (Tool-Less Drive Tray)



### 6.4.11 Replacing a Hot-Swap PSU

WARNING

To reduce the risk of personal injury from hot surfaces, allow the power supply or power supply blank to cool before touching it.

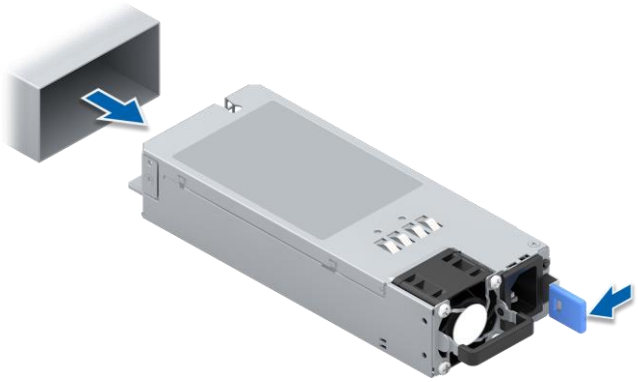
CAUTION

To prevent improper cooling and thermal damage, do not operate the server unless all bays are populated with either a component or a blank.

To remove the PSU:

1. Disconnect the power cord.
2. Hold the handle and press the blue release tab to pull the PSU out of the power bay.

Figure 4-42 Removing the PSU



3. Put the PSU into an anti-static bag.

To install the PSU:

1. Take a new PSU out from the anti-static bag.
2. Make sure that the blue release tab is on the right of the PSU. Hold the handle and push the PSU into the power bay until it snaps into place.
3. Connect the power cord.
4. Check that the PSU LED is solid green when the server is powered on.

### 6.4.12 Replacing an OCP Card

CAUTION

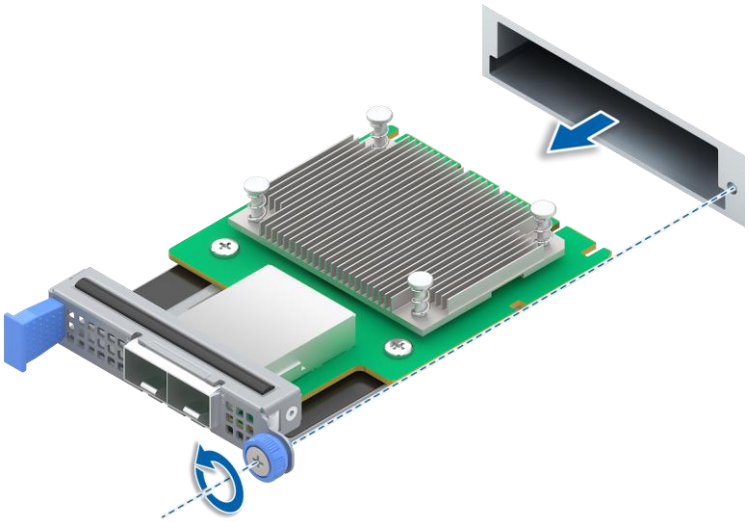
The OCP card supports hot-plug operations:

- To remove the OCP card with the server powered on, press the OCP hot-plug button, the LED turns off, and then remove the OCP card.
- To install the OCP card with the server powered on, after installing the OCP card, press the OCP hot-plug button, and the LED turns green.

To remove the OCP card:

1. Loosen the thumbscrew securing the OCP card to the chassis counterclockwise.
2. Pull out the OCP card from the chassis horizontally.

Figure 4-43 Removing the OCP Card



3. Put the OCP card into an anti-static bag.

To install the OCP card:

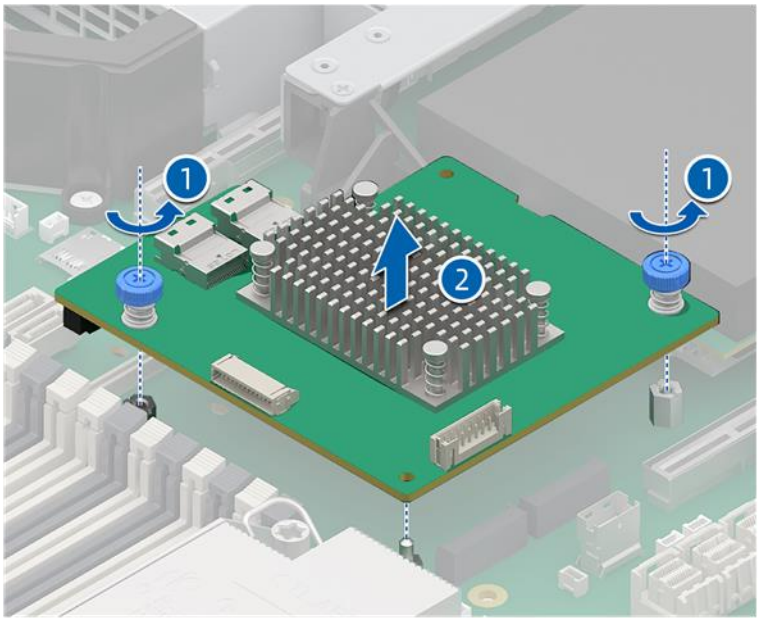
1. Take a new OCP card out from the anti-static bag.
2. Insert the OCP card horizontally into the slot until it snaps into place.
3. Tighten the thumbscrew securing the OCP card to the chassis clockwise.

### 6.4.13 Replacing the RAID Mezz Card

To remove the RAID mezz card:

1. Remove the top cover.
2. Remove the air duct.
3. Disconnect the cables from the RAID mezz card.
4. Loosen the 2 captive screws counterclockwise and vertically remove the RAID mezz card.

Figure 4-48 Removing the RAID Mezz Card




5. Put the RAID mezz card into an anti-static bag.

To install the RAID mezz card:

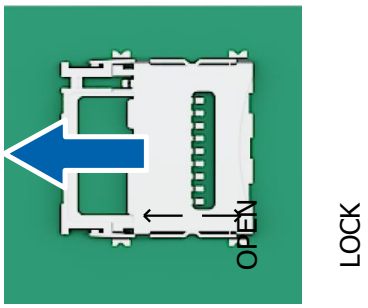
1. Take a new RAID mezz card out from the anti-static bag.
2. Align the connector and locating holes on the RAID mezz card with the connector and locating pins on the motherboard respectively, and install the RAID mezz card vertically onto the motherboard.
3. Tighten the 2 captive screws clockwise.
4. Connect the cables.
5. Install the air duct.
6. Install the top cover.

### 6.4.14 Replacing a TF Card

To remove the TF card:

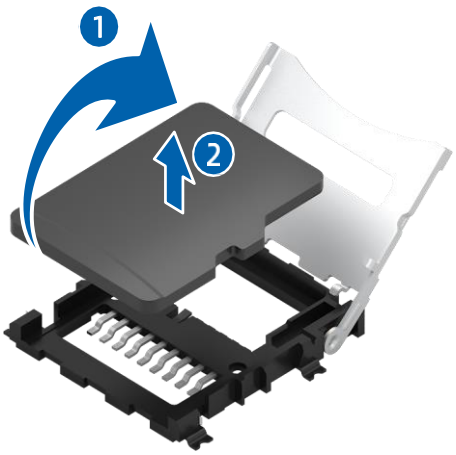
1. Remove the top cover.
2. Remove the air duct.
3. Remove the PCIe riser-card assembly.
4. Push the TF card cover in the direction of the OPEN arrow to unlock it.

Figure 4-49 Pushing the TF Card Cover




5. Open the TF card cover.
6. Remove the TF card and put it into an anti-static bag.

Figure 4-50 Removing the TF Card




To install the TF card:

1. Take a new TF card out from the anti-static bag.
2. Put the TF card into the TF card slot.

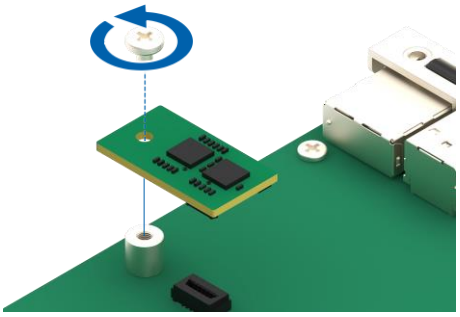
3. Close the TF card cover and push it in the direction of the LOCK arrow to lock it.
4. Install the PCIe riser-card assembly.
5. Install the air duct.
6. Install the top cover.

### 6.4.15 Replacing the TPM/TCM

To remove the TPM/TCM:

1. Remove the top cover.
2. Remove the air duct.
3. Loosen the screw counterclockwise with a Phillips screwdriver to remove it.
4. Vertically remove the TPM/TCM and put it into an anti-static bag.

Figure 4-51 Removing the TPM/TCM



To install the TPM/TCM:

1. Take a new TPM/TCM out from the anti-static bag.
2. Align the connector and screw hole on the TPM/TCM with the connector and locating post on the motherboard respectively, and install the TPM/TCM vertically onto the motherboard.
3. Insert and tighten the screw clockwise with a Phillips screwdriver.
4. Install the air duct.
5. Install the top cover.

## 6.5 Cable Routing

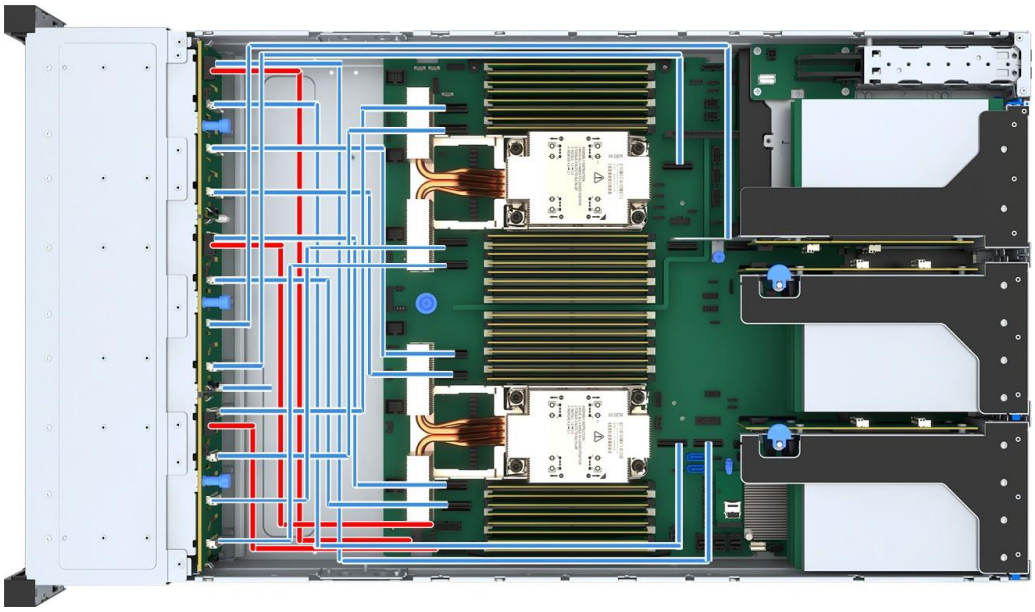
Blue lines indicate the data cable routing between the backplanes and the SAS/RAID cards/motherboard.

Red lines indicate the power cable routing between the backplanes and the motherboard.

CAUTION

Please route the cables based on the specific server configuration.

Figure 4-52 Cable Routing of 24 × 2.5-inch NVMe Drive Configuration



# 7. Replacing the CMOS Battery

DANGER

The CMOS battery contains lithium. A risk of fire and burns exists if the battery is not properly handled. To reduce the risk of personal injury:

- Do not attempt to recharge the battery.
- Do not expose the battery to temperatures higher than 60°C (140°F).
- Do not short-circuit external contacts, disassemble, crush, puncture, or dispose of the battery in fire or water.
- Replace batteries only with batteries designated for the product.
- To avoid damage to the components due to ESD, use anti-static gloves or wrist straps.

To remove the battery:

1. Power off the server and disconnect all the power cords to remove power completely.
2. Gently slide and remove the server out of the rack.
3. Remove the top cover.
4. Disconnect the cables of the super-capacitors (if any).
5. Remove the air duct.
6. Remove the left PCIe riser-card assembly at the rear of the server.
7. Locate the CMOS battery on the motherboard.
8. Gently push the release tab on the battery socket to release the battery.
9. Remove the battery from the battery socket.

CAUTION

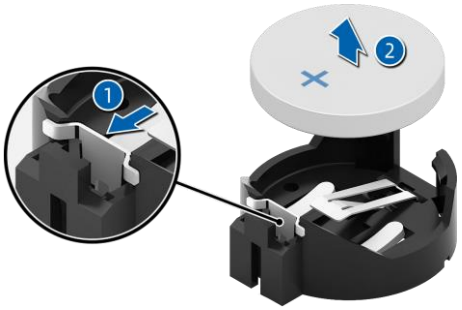
- DO NOT pry or press the battery with excessive force.
- Failing to remove the battery properly might damage the socket on the motherboard. Any damage to the socket might require replacing the motherboard.

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

NOTE

The figure shown below is for reference only. The location and orientation of the battery may differ depending on the models you purchased.

Figure 5-1 Removing the Battery




To install the battery:

1. Take a new battery out from the anti-static bag.
2. Place the new battery into the socket with the positive side facing up. Gently press the battery into the socket until it snaps into place.
3. Install the left PCIe riser-card assembly at the rear of the server.
4. Install the air duct.
5. Connect the cables of the super-capacitors (if any).
6. Install the top cover.
7. Reconfigure the server and reset the system date and time after powering on the server.

# 8. Troubleshooting

## 8.1 Hardware Issues

### 8.1.1 Power-On Issue

Symptom:

After pressing the power button, the power button LED is orange and does not turn green. The drive activity LEDs are off, the monitor screen is blank or shows “No input signal”, and the system fans do not spin.

Solution:

1. Be sure that the power cords are plugged into functioning outlets.
2. Be sure that no loose connections exist.
3. Be sure that the power cords work.
4. Be sure that all PSUs are firmly seated.
5. Check the status of the PSU LEDs on the rear panel.
    - If the PSU LEDs are off or amber, further action is needed to determine whether the PSUs are faulty. Replace with a known working PSU. If the problem persists, contact us for assistance; if the PSU LED flashes green, then the PSU in question is faulty. Replace the faulty PSU or contact us instead.
    - If the PSU LEDs are green, contact and inform us of the detailed error information and problems.

### 8.1.2 No Display Issue

Symptom:

After pressing the power button, the power button LED is green, the system fans work properly, but the monitor screen is blank or shows “No input signal”.

Solution:

1. Be sure that the monitor power cord is plugged into a working grounded outlet.
2. Be sure that no loose connections exist.

3. Power up the monitor and be sure that the monitor light is on.
4. Be sure that the monitor is cabled to the intended server.
5. Replace the monitor with a known functional monitor to be sure it is not faulty.
6. Log into the BMC Web GUI and launch the BMC remote control. (For more information on BMC Web GUI, refer to the BMC user manual.)
   - If the KVM works normally and there is display output, the server VGA port is faulty, contact us.
   - If the KVM does not work and there is no display output, review and export the system event logs related to the KVM status.
7. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

### 8.1.3 Front Panel LED Illuminates Red

Symptom: The LED on the front panel illuminates red.

Solution: Identify the abnormal LED based on Front Panel Buttons and LEDs.

1. If the system status LED illuminates red, check whether the server is working properly. If it is working normally, log into the BMC Web GUI to review the BMC logs and record the detailed error information. (For more information on BMC Web GUI, refer to the BMC user manual.)
2. If the power status LED illuminates red, check the PSU LEDs on the rear panel for any abnormality (amber or off).
   - If the PSU LEDs are normal, log into the BMC Web GUI to review the BMC logs and record the detailed error information. (For more information on BMC Web GUI, refer to the BMC user manual.)
   - If the PSU LEDs are abnormal, see PSU LED Off or Amber for handling suggestions.
3. If the system overheat LED is abnormal, be sure that the server room temperature is within the normal range (see Chapter 8 for temperature specifications); be sure that the air vents and chassis interior are dust-free; be sure that the top cover and air ducts are in place; be sure that

the thermal grease between the CPU and the heatsink is not dry or caked.

4. If other LEDs are abnormal, log into the BMC Web GUI to review the BMC logs and record the detailed error information.
5. If the instructions above do not locate or resolve the problem, contact and inform us of the detailed error information and problems.

### 8.1.4 Stuck in POST Interface or Other Interfaces after Powering on

Symptom:

After pressing the power button, the server does not power up normally and is stuck in the POST interface or other interfaces.

Solution:

1. If the interface in which the server is stuck contains hardware-related error information, such as memory or RAID card errors, record the detailed error information.
2. If the server is stuck in the POST interface, record the detailed error information if any.
3. If the server is stuck in the media test failure interface, be sure that the OS has been installed successfully and the hard drive has been set as Boot Option #1.
4. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

### 8.1.5 PSU LED Off or Amber

Symptom:

A certain PSU LED is off or amber when the server is working properly.

Solution:

1. Be sure that there is no surface damage on the server such as burning or vulcanization.
2. Be sure that the power cord is plugged into a functioning outlet.
3. Be sure that no loose connections exist and the power cord works.

4. Disconnect the power cord of the PSU in question. Reseat the PSU and connect the power cord.
5. If a shutdown is allowed, power off the server, remove the power, and swap the PSU in question with another PSU to test.
6. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

### 8.1.6 Drive LED Abnormal

Symptom:

The drive LED is abnormal (activity LED off or error LED red) when the server is working properly.

Solution:

1. Be sure that the drive is firmly seated in place.
2. Check whether the drive has been plugged or other manual operations have occurred. If above situations have occurred, and the server is configured with RAID cards, be sure that the drive is configured properly in the RAID array.
3. Be sure that the drive can be identified in OS. Log into the RAID management interface to check whether the drive is offline.
4. If the drive is offline or if the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

NOTE

- A hot-swap drive allows users to remove or replace the drive without shutting down or powering off the system, which improves the system disaster recovery capability, scalability and flexibility. It only means that the hot-swap drive can be plugged in and out during server operation without damaging the drive.
- Depending on the RAID level, hot-plugging out and in a drive in a RAID array may cause RAID degradation or failure. Different RAID cards have different policies. When re-inserting a drive, you may need to log into the RAID management interface for recovery.
- Do not remove the drive until the drive motor stops completely in order to

### 8.1.7 Excessive Noise from System Fans

Symptom:

The system fans make excessive noise when the server is working properly.

Solution:

1. Be sure that the top cover is closed properly and the air ducts are seated in place.
2. Check the fan status LED and other status LEDs for any alarm. If the fan status LED is red, contact us for repair; if other status LEDs are red, refer to Front Panel LED Illuminates Red.
3. Check the server temperature by touching the chassis or viewing sensor temperatures in BMC Web GUI.
4. Be sure that the server room temperature is within the proper range (see Chapter 8 for temperature specifications). Adjust the air conditioner temperature if necessary.
5. Be sure that the front bezel and chassis interior are dust-free. If necessary, clean with a soft and dry cloth or a specialized brush with the server powered off. Improve the server room environment so that the server is not exposed to dirt and dust to avoid over-temperature.
6. Be sure that the server is not running with high loads. Log into the BMC Web GUI and be sure that all fans are identified and the fan mode is auto. If a fan is not identified, swap test the fan to check whether the issue is with the fan bay or the fan itself.
7. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

### 8.1.8 Alarm Sound from the Server

Symptom:

An alarm goes off during server startup or operation.

Solution:

Identify the source of the alarm:

1. If the alarm sound comes from the PSU, check the PSU LEDs on the rear panel for any abnormality. If any, refer to PSU LED Off or Amber to handle this.
2. If the alarm sound comes from the chassis interior, remove the top cover to check further.
3. If the alarm sound comes from the RAID card, check the drive error LEDs or log into the RAID management interface to see whether the drives are normal. Record the error information if any.
4. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

### 8.1.9 Keyboard and Mouse Not Functioning

Symptom:

The keyboard and/or mouse are not operating normally.

Solution:

1. Be sure that all cables are securely and properly connected.
2. Connect the keyboard and mouse to a notebook or another server to test.
3. Power cycle the server and retest the devices.
4. Restart the server and enter BIOS or RAID configuration interface to test whether the keyboard and mouse can work: If the two devices work properly, then the USB driver has a problem; if the problem persists, then maybe the motherboard or I/O board connectors are defective.
5. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

### 8.1.10 USB Port Issue

Symptom:

Unable to use USB devices.

Solution:

1. Be sure that the OS on the server supports USB devices.
2. Be sure that the server has been installed with the correct USB driver. Reinstall the USB driver if necessary.
3. Connect the USB device to another server to test.
   - If the USB device does not work normally, replace with a known working USB device.
   - If the USB device works normally, a system fault has occurred. Contact us for repair.
4. Power cycle the server and retest the USB device.
5. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

## 8.2 Software Issues

### 8.2.1 OS Installation Issues

Unable to load the RAID driver

Symptom:

Unable to load the RAID driver during OS installation.

Solution:

1. Be sure that the server has been installed with the correct RAID driver.
2. Go to our official website to download the correct RAID driver. Some RAID drivers need to be loaded several times.
3. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

Unable to create partitions larger than 2 TB

Symptom:
Unable to create partitions larger than 2 TB during OS installation.

Solution:

1. Click **Advanced** > **CSM Configuration** > **Boot option filter** > **UEFI only** in BIOS to set the compatibility mode to UEFI only. (For more information, refer to the BIOS user manual.) Then save and exit BIOS.
2. Press <F11> on the BIOS boot screen, and then select the needed boot option to install the OS. The server will restart automatically after OS installation.
3. Be sure that the disk format is GPT during OS installation. Then you can create partitions larger than 2 TB.
4. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

Low disk space on C drive

Symptom:
After OS installation, the C drive is almost full and out of space.

Solution:

1. Turn down the virtual memory or allocate the virtual memory to other partitions by clicking **This PC** > **Properties** > **Advanced system settings** > **Advanced** > **Performance** > **Settings** > **Virtual Memory** > **Change** (demonstrated with Windows Server 2012).
2. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

### 8.2.2 PXE Boot Failure

Symptom:
Fail to install an OS via PXE.

Solution:

1. Be sure that the PXE server can be used to install an OS for another server.
2. Be sure that there is a network link by checking the network port LED.
3. Be sure that the NIC can be identified in BMC Web GUI, BIOS or Shell.
4. Be sure that PXE function is enabled in BIOS.
5. Be sure that the target drive and RAID array can be identified and are large enough for OS installation.
6. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

### 8.2.3 Displayed Memory Capacity Abnormal

Symptom:

The memory capacity displayed in OS is inconsistent with the physical memory capacity.

Solution:

1. Be sure that all DIMMs are properly seated.
2. Be sure that the DIMMs are installed as per the DIMM population rules of the server.

3. Be sure that the identified total memory capacity in BIOS matches the physical memory capacity.
4. Be sure that the memory capacity supported by the Windows version installed on the server is equal to or larger than the total physical memory capacity. The OS may be unable to access all the installed memories. For example, Windows server 2008 x86 supports up to 4 GB memory.
5. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

### 8.2.4 Network Performance Issue

Symptom:

The network connection is lost or slow.

Solution:

1. Be sure that the network cable is connected properly, the network port LED flashes normally and the network port is configured properly.
2. Reseat the network cable. If the problem persists, connect the server with a notebook via a known working network cable: If the network is normal, check the network cable or the switch port; if the network is faulty, go to our official website to download the latest NIC driver.
3. Be sure that the NIC can be identified in BMC Web GUI, BIOS or Shell and the MAC address is correct.
4. If the instructions above do not resolve the problem, contact and inform us of the detailed error information and problems.

# 9. System Specifications

## 9.1 Technical Specifications

**TECHNICAL SPECIFICATIONS**

| Item | Description |
|---|---|
| Form Factor | 2U rack server |
| Chipset | Intel Emmitsburg |
| Processor | Up to two 4th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids)<br>• Integrated memory controllers and 8 memory channels per processor<br>• Integrated PCIe controllers and 80 PCIe 5.0 lanes per processor<br>• Up to 4 UPI links per CPU at up to 20 GT/s<br>• Up to 64 cores<br>• Maximum Turbo frequency at 4.5 GHz<br>• TDP up to 350 W<br><br>Note:<br>The information above is for reference only, refer to 7.2 Hardware Compatibility for details. |
| Memory | • 32 DIMM slots<br>• memory channels per processor and up to 2 DIMMs per channel<br>• Speed up to 4,800 MT/s<br>• Supports RDIMM and CPS<br><br>Note:<br>The information above is for reference only, refer to 7.2 Hardware Compatibility for details. |
| Storage | Supports multiple drive configurations, see 5.5.1 Drive Configurations for details.<br><br>Notes:<br>• It is recommended that the M.2 SSD is only used as a boot device for installing the OS.<br>• The M.2 SSD has low endurance and cannot be used as a data storage device, especially in scenarios with frequent data erasing and re-writing. The reason is that write limits can be reached within a short period of time, which will result in damage and unavailability.<br>• For data storage, use enterprise-class SSDs with higher DWPD or HDDs. |

| | |
|---|---|
| | • Write-intensive business software will cause the M.2 SSD to reach write endurance and wear out; therefore, the M.2 SSD is not recommended for such business scenarios.<br>• Do not use the M.2 SSD as caching.<br><br>• Supports hot-swap SAS/SATA/NVMe drives<br><br>Notes:<br>When the server is configured with NVMe drives:<br>• When the VMD function is enabled and the latest VMD driver is installed, the NVMe drives support surprise hot swap.<br>• Supports multiple models of RAID controller cards. See 7.2 Hardware Compatibility for details.<br>○ Supports functions such as RAID configuration, RAID level migration, and disk roaming.<br>○ Supports power failure protection enabled by the super-capacitor to protect user data.<br>○ A standard RAID controller card occupies 1 PCIe slot. |
| Network | Supports multiple network expansion configurations.<br>• OCP 3.0 cards<br>○ 2 OCP 3.0 cards supported in 2 slots (on-demand selection)<br>○ Supports balanced mode and NC-SI feature under dual-CPU configuration<br>○ Hot-pluggable<br>○ Supports multi-host (only OCP1 NIC slot)<br><br>Note:<br>Redhat 7.9 supports hot-swap; Windows 2019 supports hot-swap when it starts up with the OCP 3.0 card installed; Redhat 8.X OS does not support hot- swap.<br>• 1/10/25/40/100 Gb PCIe NICs |
| I/O Expansion | Supports PCIe expansion slots.<br>• For servers with rear PCIe riser modules: 2 dedicated expansion slots for the OCP 3.0 card and 8 standard PCIe expansion slots. |

| | |
|---|---|
| Port | Supports multiple ports.<br>• Front:<br>o 1 × USB 2.0 port<br>o 1 × USB 3.0 port<br>o 1 × DB15 VGA port<br>o 1 × USB Type-C port<br>• Rear:<br>o 2 × USB 3.0 port<br>o 1 × DB15 VGA port<br>o 1 × serial port (micro USB)<br>o 1 × RJ45 management network port<br><br>Note:<br>OS installation on the USB storage media is not recommended. |
| Display | Integrated VGA with a video memory of 64 MB and a maximum 16M color resolution of 1,920 × 1,200 at 60 Hz.<br><br>Notes:<br>• The integrated VGA can support a maximum resolution of 1,920 × 1,200 only when the video driver matching the OS version is installed; otherwise only the default resolution of the OS is supported.<br>• When the front and rear VGA ports are both connected to monitors, only the monitor connected to the front VGA port works. |
| System Management | • UEFI<br>• IPMI<br>• NC-SI |
| Security | • Intel Platform Firmware Resilience (PFR)<br>• Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM)<br>• Intel Trusted Execution Technology<br>• Firmware update mechanism based on digital signatures |
| | • UEFI Secure Boot<br>• Hierarchical BIOS password protection<br>• BIOS Secure Flash and BIOS Lock Enable (BLE)<br>• BMC and BIOS dual-image mechanism<br>• Chassis intrusion detection |

## 9.2 Environmental Specifications

**ENVIRONMENTAL SPECIFICATIONS**

| Parameter | Description |
|---|---|
| Temperature[1,2,3] | • Operating: 5°C to 45°C (41°F to 113°F)<br>• Storage (packed): -40°C to +70°C (-40°F to +158°F)<br>• Storage (unpacked): -40°C to +55°C (-40°F to +131°F) |
| Relative Humidity (RH, non-condensing) | • Operating: 5% to 90% RH<br>• Storage (packed): 5% to 93% RH<br>• Storage (unpacked): 5% to 93% RH |
| Operating Altitude | ≤ 3050 m (10,007 ft)<br>• 0 to 1,000 m (0 to 3,281 ft): Operating temperature ranges from 0℃ to 40℃ (32°F to 104°F)<br>• 1,000 to 3,050 m (3,281 to 10,007 ft): Operating temperature ranges from 5℃ to 32℃ (5°F to 89.6°F) |
| Corrosive Gaseous Contaminants | Maximum growth rate of corrosion film thickness:<br>• Copper coupon: 300 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013)<br>• Silver coupon: 200 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013) |

| Parameter | Description |
| --- | --- |
| Acoustic Noise[4,5,6] | Noise emissions are measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). Listed are the declared A-weighted sound power levels (LWAd) and declared average bystander position A-weighted sound pressure levels (LpAm) at a server operating temperature of 23°C (73.4°F):<br>• Idle:<br>o LWAd：5.8 B for standard configuration<br>o LpAm：49.0 dBA for standard configuration<br>• Operating:<br>o LWAd：6.4 B for standard configuration<br>o LpAm：53 dBA for standard configuration |

Notes:

[1] Not all configurations support an operating temperature range of 5°C to 45°C (41°F to 113°F). GPU configurations support an operating temperature range of 10°C to 30°C (50°F to 86°F).

[2] Standard operating temperature:

- 10°C to 35°C (50°F to 95°F) is the standard operating temperature range at sea level. For temperatures between 10°C and 35°C (50°F and 95°F), derate the maximum allowable temperature by 1°C per 305 m (1°F per 556 ft) above sea level. No direct sustained sunlight is permitted. The maximum operating altitude is 3,050 m (10,007 ft) and the maximum temperature gradient is 20°C/h (36°F/h), both varying with different system configurations.
- Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.

[3] Expanded operating temperature:

- For certain approved configurations, the supported system inlet ambient temperature can be expanded to 5°C to 10°C (41°F to 50°F) and 35°C to 45°C (95°F to 113°F) at sea level. At an altitude of 900 to 3,050 m (2,953 to 10,007 ft), derate the maximum allowable operating temperature by 1°C per 175 m (1°F per 319 ft).
- For certain approved configurations, the supported system inlet ambient temperature can be expanded to 35°C to 45°C (95°F to 113°F) at sea level. At an altitude of 900 to 3,050 m (2,953 to 10,007 ft), derate the maximum allowable temperature by 1°C per 125 m (1°F per 228 ft).
- Any fan failure or operations under expanded operating temperature may lead to system performance degradation.

[4] This document lists the LWAd and LpAm of the product at a 23°C (73.4°F) ambient environment. All measurements are conducted in conformance with ISO 7779 (ECMA 74) and declared in conformance with ISO 9296 (ECMA 109). The listed sound levels apply to the standard configuration. Additional options may result in increased sound levels. Contact your sales representative for more information.

[5] The sound levels shown here were measured based on specific configurations of a server. Sound levels vary with server configuration. These values are for reference only and subject to change without further notice.

[6] Product conformance to cited normative standards is based on sample testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

## 9.3 Physical Specifications

**PHYSICAL SPECIFICATIONS**

| Item | Description |
|---|---|
| Dimensions (W × H × D) | • With mounting ears: 482.4 × 87 × 828.4 mm (19 × 3.43 × 32.61 in.)<br>• Without mounting ears: 435 × 87 × 800 mm (17.13 × 3.43 × 31.5 in.)<br>• Outer packaging: 600 × 295 × 1090 mm (23.62 × 11.61 × 42.91 in.) |
| Installation Dimension Requirements | • Installation requirements for the cabinet are as follows:<br>○ General cabinet compliant with the International Electrotechnical Commission 297 (IEC 297) standard<br>○ Width: 482.6 mm (19 in.)<br>○ Depth: Above 1,000 mm (39.37 in.)<br>• Installation requirements for the server rails are as follows:<br>○ L-bracket rails: applicable to 2CRSi cabinets only<br>○ Static rail kit: The distance between the mounting flanges at the front and rear of the cabinet ranges from 609 to 914 mm (23.98 to 35.98 in.)<br>○ Ball-bearing rail kit: The distance between the mounting flanges at the front and rear of the cabinet ranges from 609 to 914 mm (23.98 to 35.98 in.)<br>○ When the CMA is selected, the cabinet depth should be above 1,200 mm (47.24 in.) |

| | |
|---|---|
| Weight | • 24 × 2.5-inch drive configuration (with 24 drives loaded)<br>  ○ Net weight: 27 kg (59.52 lbs)<br>  ○ Gross weight: 37 kg (81.57 lbs) (including chassis + packaging, rails and accessory box)<br>• 12 × 3.5-inch drive configuration (with 12 drives and 2 GPUs loaded)<br>  ○ Net weight: 33 kg (72.75 lbs)<br>  ○ Gross weight: 43 kg (94.8 lbs) (including chassis + packaging, rails and accessory box) |

# 10. Operating System and Hardware Compatibility

This section describes the OS and hardware compatibility of the server. For the latest compatibility configuration and the component models not listed in this document, contact your local 2CRSi sales representative.

IMPORTANT

- Using incompatible components may cause the server to work abnormally, and such failures are not covered by technical support or warranty.
- The server performance is strongly influenced by application software, middleware and hardware. The subtle differences in them may lead to performance variation in the application and test software.
  - For requirements on the performance of specific application software, contact 2CRSi sales representatives to request for a proof of concept (POC) and confirm the detailed hardware and software configurations during the pre-sales phase.
  - For requirements on hardware performance consistency, define specific configuration requirements (for example, specific drive models, RAID controller cards, or firmware versions) during the pre-sales phase.

## 10.1Supported Operating Systems

**SUPPORTED OPERATING SYSTEMS**

| OS | OS Version |
|---|---|
| Windows | Windows Server 2019/2022 |
| Red Hat | Red Hat Enterprise Linux 8.6 |
| | Red Hat Enterprise Linux 9.0 |
| VMware | VMware ESXi 7.0 P06 and after |

## 10.2Hardware Compatibility

### 10.2.1 CPU Specifications

The server supports up to two 4th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids) based on the Eagle Stream platform.

**CPU SPECIFICATIONS**

| Model | Cores | Threads | Max Turbo Frequency | Processor Base Frequency | Cache | TDP |
|---|---|---|---|---|---|---|
| Gold 5415+ | 8 | 16 | 4.10 GHz | 2.90 GHz | 22.5 MB | 150 W |
| Gold 6434 | 8 | 16 | 4.10 GHz | 3.70 GHz | 22.5 MB | 195 W |
| Gold 6434H | 8 | 16 | 4.10 GHz | 3.70 GHz | 22.5 MB | 195 W |
| Bronze 3408U | 8 | 16 | 1.90 GHz | 1.80 GHz | 22.5 MB | 125 W |
| Silver 4410T | 10 | 20 | 4.00 GHz | 2.70 GHz | 26.25 MB | 150 W |
| Silver 4410Y | 12 | 24 | 3.90 GHz | 2.00 GHz | 30 MB | 150 W |
| Platinum 8444H | 16 | 32 | 4.00 GHz | 2.90 GHz | 45 MB | 270 W |
| Gold 5416S | 16 | 32 | 4.00 GHz | 2.00 GHz | 30 MB | 150 W |
| Gold 6426Y | 16 | 32 | 4.10 GHz | 2.50 GHz | 37.5 MB | 185 W |
| Gold 6444Y | 16 | 32 | 4.00 GHz | 3.60 GHz | 45 MB | 270 W |
| Gold 6416H | 18 | 36 | 4.20 GHz | 2.20 GHz | 45 MB | 165 W |
| Gold 5423N | 20 | 40 | 4.00 GHz | 2.10 GHz | 37.5 MB | 145 W |
| Gold 5433N | 20 | 40 | 4.10 GHz | 2.30 GHz | 37.5 MB | 160 W |
| Silver 4416+ | 20 | 40 | 3.90 GHz | 2.00 GHz | 37.5 MB | 165 W |
| Gold 6403N | 24 | 48 | 3.60 GHz | 1.90 GHz | 45 MB | 185 W |
| Gold 5411N | 24 | 48 | 3.90 GHz | 1.90 GHz | 45 MB | 165 W |
| Gold 5412U | 24 | 48 | 3.90 GHz | 2.10 GHz | 45 MB | 185 W |
| Gold 5418N | 24 | 48 | 3.80 GHz | 1.80 GHz | 45 MB | 165 W |
| Gold 5418Y | 24 | 48 | 3.80 GHz | 2.00 GHz | 45 MB | 185 W |
| Gold 6418H | 24 | 48 | 4.00 GHz | 2.10 GHz | 60 MB | 185 W |
| Gold 6442Y | 24 | 48 | 4.00 GHz | 2.60 GHz | 60 MB | 225 W |
| Gold 6423N | 28 | 56 | 3.60 GHz | 2.00 GHz | 52.5 MB | 195 W |
| Platinum 8450H | 28 | 56 | 3.50 GHz | 2.00 GHz | 75 MB | 250 W |
| Gold 5420+ | 28 | 56 | 4.10 GHz | 2.00 GHz | 52.5 MB | 205 W |
| Gold 6433N | 32 | 64 | 3.60 GHz | 2.00 GHz | 60 MB | 205 W |
| Gold 6433N | 32 | 64 | 3.60 GHz | 2.00 GHz | 60 MB | 205 W |
| Gold 6443N | 32 | 64 | 3.60 GHz | 2.00 GHz | 60 MB | 195 W |
| Platinum 8454H | 32 | 64 | 3.40 GHz | 2.10 GHz | 82.5 MB | 270 W |
| Platinum 8462Y | 32 | 64 | 4.10 GHz | 2.80 GHz | 60 MB | 300 W |
| Gold 6414U | 32 | 64 | 3.40 GHz | 2.00 GHz | 60 MB | 250 W |
| Gold 6421N | 32 | 64 | 3.60 GHz | 1.80 GHz | 60 MB | 185 W |
| Gold 6428N | 32 | 64 | 3.80 GHz | 1.80 GHz | 60 MB | 185 W |
| Gold 6430 | 32 | 64 | 3.40 GHz | 2.10 GHz | 60 MB | 270 W |
| Gold 6438M | 32 | 64 | 3.90 GHz | 2.20 GHz | 60 MB | 205 W |
| Gold 6438N | 32 | 64 | 3.60 GHz | 2.00 GHz | 60 MB | 205 W |
| Gold 6438Y | 32 | 64 | 4.00 GHz | 2.00 GHz | 60 MB | 205 W |

| | | | | | | |
|---|---|---|---|---|---|---|
| Gold 6448H | 32 | 64 | 4.10 GHz | 2.40 GHz | 60 MB | 250 W |
| Gold 6448Y | 32 | 64 | 4.10 GHz | 2.10 GHz | 60 MB | 225 W |
| Gold 6454S | 32 | 64 | 3.40 GHz | 2.20 GHz | 60 MB | 270 W |
| Gold 6458Q | 32 | 64 | 4.00 GHz | 3.10 GHz | 60 MB | 350 W |
| Platinum 8452Y | 36 | 72 | 3.20 GHz | 2.00 GHz | 67.5 MB | 300 W |
| Platinum 8460H | 40 | 80 | 3.80 GHz | 2.20 GHz | 105 MB | 330 W |
| Platinum 8460Y | 40 | 80 | 3.70 GHz | 2.00 GHz | 105 MB | 300 W |
| Platinum 8458P | 44 | 88 | 3.80 GHz | 2.70 GHz | 82.5 MB | 350 W |
| Platinum 8461V | 48 | 96 | 3.70 GHz | 2.20 GHz | 97.5 MB | 300 W |
| Platinum 8468 | 48 | 96 | 3.80 GHz | 2.10 GHz | 105 MB | 350 W |
| Platinum 8468H | 48 | 96 | 3.80 GHz | 2.10 GHz | 105 MB | 330 W |
| Platinum 8468V | 48 | 96 | 3.80 GHz | 2.40 GHz | 97.5 MB | 330 W |
| Platinum 8470 | 52 | 104 | 3.80 GHz | 2.00 GHz | 105 MB | 350 W |
| Platinum 8470N | 52 | 104 | 3.60 GHz | 1.70 GHz | 97.5 MB | 300 W |
| Platinum 8470Q | 52 | 104 | 3.80 GHz | 2.10 GHz | 105 MB | 350 W |
| Platinum 8471N | 52 | 104 | 3.60 GHz | 1.80 GHz | 97.5 MB | 300 W |
| Platinum 8480+ | 56 | 112 | 3.80 GHz | 2.00 GHz | 105 MB | 350 W |
| Platinum 8490H | 60 | 120 | 3.50 GHz | 1.90 GHz | 112.5 MB | 350 W |

### 10.2.2 DIMM Specifications

The server supports up to 32 DDR5 DIMMs. Each processor supports 8 memory channels with up to 2 DIMMs per channel. The supported DIMMs includes RDIMMs and CPS.

**DIMM SPECIFICATIONS**

| Type | Capacity (GB) | Frequency (MHz) | Data Width | Organization |
|---|---|---|---|---|
| RDIMM | 16 | 4,800 | x80 | 1R x8 |
| RDIMM | 32 | 4,800 | x80 | 1R x4/2R x8 |
| RDIMM | 64 | 4,800 | x80 | 2R x4 |
| CPS | 128 | 4,800 | | |

### 10.2.3 Drive Specifications

**SAS/SATA DRIVE SPECIFICATIONS**

| Type | Speed in rpm | Capacity |
|---|---|---|
| 2.5-inch SAS | 10K | 600 GB/1.2 TB/1.8 TB/2.4 TB |
| | 15K | 600 GB/900 GB |

**SSD SPECIFICATIONS**

| Type | Vendor | Model |
|---|---|---|
| 2.5" SATA SSD | | |
| | | |
| 2.5" SATA SSD | SAMSUNG | SSD SATA3 PM893 3.84TB_MZ7L33T8HBLT-00A07 |
| 2.5" SATA SSD | SAMSUNG | SSD SATA3 PM893 1.92TB_MZ7L31T9HBLT-00A07 |
| 2.5" SATA SSD | SAMSUNG | SSD SATA3 PM893 960GB_MZ7L3960HCJR-00A07 |
| 2.5" SATA SSD | SAMSUNG | SSD SATA3 PM893 480GB_MZ7L3480HCHQ-00A07 |
| 2.5" SATA SSD | SAMSUNG | SSD SATA3 PM893 240GB_MZ7L3240HCHQ-00A07 |
| 2.5" SATA SSD | INTEL | SSD SATA3 S4620 3.84TB_SSDSC2KG038TZ01 99A0DC |
| 2.5" SATA SSD | INTEL | SSD SATA3 S4620 1.92TB_SSDSC2KG019TZ01 99A0DA |
| 2.5" SATA SSD | INTEL | SSD SATA3 S4620 960GB_SSDSC2KG960GZ01 99A0D9 |
| 2.5" SATA SSD | INTEL | SSD SATA3 S4620 480GB_SSDSC2KG480GZ01 99A0D8 |
| 2.5" SATA SSD | INTEL | SSD SATA3 S4520 7.68TB_SSDSC2KB076TZ01 99A0D7 |
| 2.5" SATA SSD | INTEL | SSD SATA3 S4520 3.84TB_SSDSC2KB038TZ01 99A0D6 |
| 2.5" SATA SSD | INTEL | SSD SATA3 S4520 1.92TB_SSDSC2KB019TZ01 99A0CP |
| 2.5" SATA SSD | INTEL | SSD SATA3 S4520 960GB_SSDSC2KB960GZ01 99A0AF |
| 2.5" SATA SSD | INTEL | SSD SATA3 S4520 480GB_SSDSC2KB480GZ01 99A0AD |
| 2.5" SATA SSD | INTEL | SSD SATA3 S4520 480GB_SSDSC2KB240GZ01 99A0AA |

**U.2/U.3 NVME SSD SPECIFICATIONS**

| Type | Vendor | Model |
|---|---|---|
| 2.5" NVMe SSD | | |
| 2.5" NVMe SSD | WESTERN DIGITAL | ULTRASTAR DC SN655 TLC NVMe U.3 SFF-15mm RI-1 3.84TB - WUS5EA138ESP7E1 |
| 2.5" NVMe SSD | WESTERN DIGITAL | ULTRASTAR DC SN655 TLC NVMe U.3 SFF-15mm RI-1 7.68TB - WUS5EA176ESP7E1 |
| 2.5" NVMe SSD | WESTERN DIGITAL | ULTRASTAR DC SN655 TLC NVMe U.3 SFF-15mm RI-1 15.36TB - WUS5EA1A1ESP7E1 |
| 2.5" NVMe SSD | SAMSUNG | SSD PCIE5 PM1743 15.36TB_MZWLO15THBLA-00A07 |
| 2.5" NVMe SSD | SAMSUNG | SSD PCIE5 PM1743 7.68TB_MZWLO7T6HBLA-00A07 |
| 2.5" NVMe SSD | SAMSUNG | SSD PCIE5 PM1743 3.84TB_MZWLO3T8HCLS-00A07 |
| 2.5" NVMe SSD | SAMSUNG | SSD PCIE5 PM1743 1.92TB_MZWLO1T9HCJR-00A07 |
| 2.5" NVMe SSD | SAMSUNG | SSD PCIE4 PM9A3 7.68TB U.2_MZQL27T6HBLA-00A07 |
| 2.5" NVMe SSD | SAMSUNG | SSD PCIE4 PM9A3 3.84TB U.2_MZQL23T8HCLS-00A07 |
| 2.5" NVMe SSD | SAMSUNG | SSD PCIE4 PM9A3 1.92TB U.2_MZQL21T9HCJR-00A07 |

| | | |
|---|---|---|
| 2.5" NVMe SSD | SAMSUNG | SSD PCIE4 PM9A3 960GB U.2_MZQL2960HCJR-00A07 |
| 2.5" NVMe SSD | INTEL | SSD PCIE4 D7-P5510 7.68TB_SSDPF2KX076TZ01 99A5DR |
| 2.5" NVMe SSD | INTEL | SSD PCIE4 D7-P5510 3.84TB_SSDPF2KX038TZ01 99A5DP |
| 2.5" NVMe SSD | INTEL | SSD PCIE P5620 6.4TB_SSDPF2KE064T1 99AH31 |

**3.5" HDD SPECIFICATIONS**

| Type | Vendor | Model |
|---|---|---|
| 3.5" SATA HDD | | |
| 3.5" SATA HDD | WESTERN DIGITAL | ULTRASTAR DC HC580 24TB SATA Helium_WUH722424ALE6L1 |
| 3.5" SATA HDD | WESTERN DIGITAL | ULTRASTAR DC HC570 22TB SATA Helium_WUH722222ALE6L4 |
| 3.5" SAS HDD | WESTERN DIGITAL | ULTRASTAR DC HC570 22TB SAS Helium_WUH722222AL5204 |
| 3.5" SATA HDD | WESTERN DIGITAL | ULTRASTARDCHC320 8TB SATA AIR_HUS728T8TALE6L4 |
| 3.5" SATA HDD | WESTERN DIGITAL | ULTRASTARDCHC330 10TB SATA AIR_WUS721010ALE6L4 |
| 3.5" SATA HDD | WESTERN DIGITAL | ULTRASTARDCHC520 12TB SATA Helium_HUH721212ALE600 |
| 3.5" SATA HDD | WESTERN DIGITAL | ULTRASTAR DC HC550 16TB SATA Helium_WUH721816AL5204 |
| 3.5" SATA HDD | WESTERN DIGITAL | ULTRASTAR DC HC550 18TB SATA Helium_WUH721818ALE6L4 |
| 3.5" SATA HDD | WESTERN DIGITAL | ULTRASTAR DC HC560 20TB SATA Helium_WUH722020ALE6L4 |
| 3.5" SAS HDD | WESTERN DIGITAL | ULTRASTARDCHC320 8TB SAS AIR_HUS728T8TAL5204 |
| 3.5" SAS HDD | WESTERN DIGITAL | ULTRASTARDCHC330 10TB SAS AIR_WUS721010AL5204 |
| 3.5" SAS HDD | WESTERN DIGITAL | ULTRASTARDCHC520 12TB SAS Helium_HUH721212AL5200 |
| 3.5" SAS HDD | WESTERN DIGITAL | ULTRASTARDCHC530 14TB SAS Helium_WUH721414AL5204 |
| 3.5" SAS HDD | WESTERN DIGITAL | ULTRASTAR DC HC550 16TB SAS Helium_WUH721816AL5204 |
| 3.5" SAS HDD | WESTERN DIGITAL | ULTRASTAR DC HC550 18TB SAS Helium_WUH721818AL5204 |
| 3.5" SATA HDD | TOSHIBA | 18TB 7200RPM_MG09ACA18TE/0104 |
| 3.5" SATA HDD | TOSHIBA | 16TB 7200RPM_MG08ACA16TE/0102 |
| 3.5" SATA HDD | TOSHIBA | 14TB 7200RPM_MG07ACA14TE/0104 |
| 3.5" SATA HDD | TOSHIBA | 12TB 7200RPM_MG07ACA12TE/0104 |
| 3.5" SATA HDD | TOSHIBA | 10TB 7200RPM_MG06ACA10TE/FW:0109 |
| 3.5" SATA HDD | TOSHIBA | 8TB 7200RPM_MG08ADA800E/FW:0101 |
| 3.5" SATA HDD | TOSHIBA | 6TB 7200RPM_MG08ADA600E/FW:0101 |
| 3.5" SATA HDD | TOSHIBA | 4TB 7200RPM_MG08ADA400E/FW0101 |
| 3.5" SATA HDD | TOSHIBA | 2TB 7200RPM_MG04ACA200E/FW:FP4B |

| | | |
|---|---|---|
| 3.5" SATA HDD | TOSHIBA | 1TB 7200RPM_MG04ACA100N/FW:FJ5A |
| 3.5" SATA HDD | SEAGATE | 18TB 7200RPM_SEAGATE/ST18000NM000J/SN02 |
| 3.5" SATA HDD | SEAGATE | 10TB 7200RPM_SEAGATE/ST10000NM017B/SN01 |
| 3.5" SATA HDD | SEAGATE | 8TB 7200RPM_SEAGATE/ST8000NM017B/SN01 |
| 3.5" SATA HDD | SEAGATE | 6TB 7200RPM_SEAGATE/ST6000NM019B/SN01 |
| 3.5" SATA HDD | SEAGATE | 4TB 7200RPM_SEAGATE/ST4000NM024B/SN01 |

### 10.2.4 SAS/RAID Controller Card Specifications

**SAS/RAID CONTROLLER CARD SPECIFICATIONS**

| Type | Vendor | Model |
|---|---|---|
| RAID Card | BROADCOM | RAID CARD 9560-16I 8G_BROADCOM/05-50077-00 |
| RAID Card | BROADCOM | RAID CARD 9540-8I_BROADCOM/05-50134-03 |
| RAID Card | BROADCOM | RAID CARD 9560-8I 8G_BROADCOM/05-50077-01 |
| RAID Card | BROADCOM | RAID CARD 9500-16E 8G_BROADCOM/05-50075-00 |
| RAID Card | BROADCOM | RAID CARD 9500-8E 8G_BROADCOM/05-50075-01 |
| CACHE VAULT | BROADCOM | CACHE VAULT FOR 9460-16i, 9480-8i8e, 9560-16i, 9560-8i, 9580-8i8e, SAS 9365-28i, SAS 9460-8i_BCM/05-50039-00/CVPM05 |

### 10.2.5 NIC Specifications

**NIC SPECIFICATIONS**

| Type | Vendor | Model |
|---|---|---|
| OCP3.0 NIC Cards | | |
| OCP3.0 Card | BROADCOM | LAN CARD PCIE 2T 10G N210TP_BROADCOM/BCM957416A4160C |
| OCP3.0 Card | BROADCOM | LAN CARD PCIE 2S 10G N210P_BROADCOM/BCM957412N4120C |
| OCP3.0 Card | BROADCOM | LAN CARD PCIE 2P 25G N225P_BROADCOM/BCM957414N4140C |
| OCP3.0 Card | BROADCOM | LAN CARD PCIE 4P 25G N425G_BROADCOM/BCM957504-N425G |
| OCP3.0 Card | BROADCOM | LAN CARD PCIE 2P 100G N2100G_BROADCOM/BCM957508-N2100G |
| OCP3.0 Card | NVIDIA | LAN CARD OCP3 G5 2P NDR200 MCX7_NVIDIA/MCX753436MS-HEAB |
| OCP3.0 Card | NVIDIA | LAN CARD OCP3 G4 2P 100G MCX6DX_NVIDIA/MCX623436AN-CDAB |
| OCP3.0 Card | INTEL | LAN CARD OCP3 2P 100G E810_INTEL/E810CQDA20CPV3G 983094 |
| OCP3.0 Card | INTEL | LAN CARD OCP3 2P 25G E810_INTEL/E810XXVDA2OCP3G 983263 |
| Network Card | NVIDIA | LAN CARD PCIE G5 1P NDR MCX7V_NVIDIA/MCX75310AAS-NEAT |
| Network Card | NVIDIA | LAN CARD PCIE G5 2P NDR200 MCX7_NVIDIA/MCX755106AS-HEAT |

| | | |
|---|---|---|
| Network Card | MELLANOX | LAN CARD PCIE G4 1P 200G MCX6DX_MELLANOX/MCX623105AC-VDAT |
| Network Card | MELLANOX | LAN CARD PCIE 2PORT 100G_MELLANOX/MBF2H536C-CECOT |
| Network Card | MELLANOX | LAN CARD PCIE G4 2P 100G MCX6DX_MELLANOX/MCX623106AN-CDAT |
| Network Card | MELLANOX | LAN CARD PCIE G4 2P 25G MCX6LX_MELLANOX/MCX631102AN-ADAT |
| Network Card | MELLANOX | LAN CARD PCIE 2PORT 25G_MELLANOX/MBF2H532C-AECOT |
| Network Card | MELLANOX | LAN CARD PCIE 2PORT 25G MCX4_MELLANOX/MCX4121A-ACAT |
| Network Card | BROADCOM | LAN CARD PCIE 2T 10G P210TP_BROADCOM/BCM957416A4160C |
| Network Card | BROADCOM | LAN CARD PCIE 2S 10G P210P_BROADCOM/BCM957412A4120AC |
| Network Card | BROADCOM | LAN CARD PCIE 2P 25G P225P_BROADCOM/BCM957414A4142CC |
| Network Card | BROADCOM | LAN CARD PCIE 4P 25G P425G_BROADCOM/BCM957504-P425G |
| Network Card | BROADCOM | LAN CARD PCIE 2P 100G P2100G_BROADCOM/BCM957508-P2100G |

### 10.2.6 GPU compatibility

For Mona 1.4SR, it's possible to use up to 4 PCIe Gen5 GPU card.

**PCIE GPU SPECIFICATIONS**

| Type | Vendor | Model |
|---|---|---|
| PCIe Enterprise GPU | | |
| PCIe GPU | NVIDIA | H100 GH100 80GB HBM2 - 14592 Cores - PCIe Gen5 x16 - 350W |
| PCIe GPU | NVIDIA | RTX 6000 ADA102 - 48GB GDDR6 - 18176 Cores - PCIe Gen4 x16 - 300W |
| PCIe GPU | NVIDIA | L40 AD102 48GB GDDR6 - 18176 Cores - PCIe Gen4 x16 - 300W |
| PCIe GPU | NVIDIA | A30 GA100 24GB HBM2e - 3584 Cores - PCIe Gen4 x16 - 165W |
| PCIe GPU | NVIDIA | L40S ADA102 - 48GB GDDR6 - 18176 Cores - PCIe Gen4 x16 - 300W |
| PCIe GPU | NVIDIA | RTX 5000 TU104 - 16GB GDDR6 - 3072 Cores - PCIe Gen3 x16 - 230W |
| PCIe GPU | AMD | Radeon MI210 64GB HBM2e - 6656 Cores - PCIe Gen4 x16 - 300W |

### 10.2.7 PSU Specifications

The server supports up to 2 PSUs in 1+1 redundancy that follow the Intel Common Redundant Power Supply (CRPS) specification. The PSUs share a common electrical and structural design that allows for hot-swap and tool-less installation into the server with the PSUs locking automatically after being inserted into the power bay. The CRPS PSUs are 80 Plus Titanium rated with various output powers, allowing customers to choose as needed.

- The following rated 110 VAC to 230 VAC and 240 VDC PSUs in 1+1 redundancy are supported:
    - 1,300 W Titanium PSU: 1,000W (110 VAC), 1,300 W (230 VAC)
    - 2,700 W Platinum PSU: 1,200 W (110 VAC), 2,700 W (230 VAC)

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NOTE

At a rated input voltage of 110 VAC, the output power of a 1,300W PSU will be derated to 1,000 W, and the output power of a 2,700 W PSU will be derated to 1,200 W.

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Operating voltage range:

- 110 to 230 VAC: 90 to 264 VAC
- 240 VDC: 180 to 320 VDC

- The following rated 336 VDC PSUs in 1+1 redundancy are supported:
    - 1,300 W PSU: 1,300 W (230 VAC) (330 VDC)
    - 2,700 W PSU: 2,700 W (230 VAC) (330 VDC)

Operating voltage range:

- 336 VDC: 260 to 400 VDC
- 230 VDC: 176 to 264 VDC

- The following rated -48 VDC PSUs in 1+1 redundancy are supported:
    - 1,300 W PSU: 1,300 W (-48 VDC)

Operating voltage range:

- -48 VDC: -40 to -72 VDC

# 11. Regulatory Information

## 11.1Safety

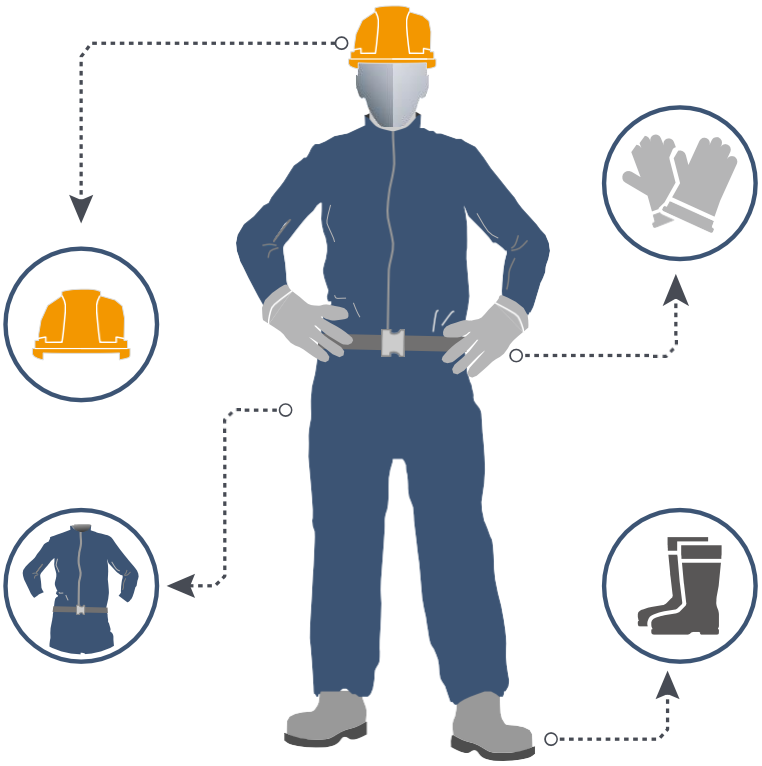
### 11.1.1 General

- Strictly comply with local laws and regulations while installing the equipment. The safety instructions in this section are only a supplement to local safety regulations.
- To ensure personal safety and to prevent damage to the equipment, all personnel must strictly observe the safety instructions in this section and on the device labels.
- People performing specialized activities, such as electricians and electric forklift operators, must possess qualifications recognized by the local government or authorities.

### 11.1.2 Personal Safety

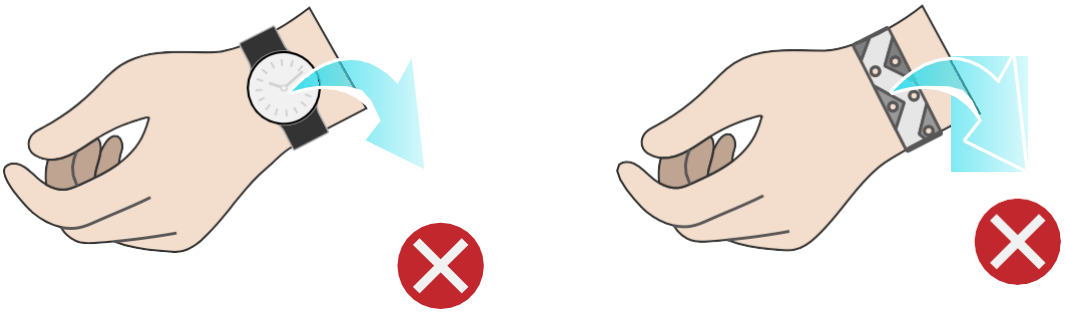
- Only personnel certified or authorized by 2CRSi are allowed to perform the installation procedures.
- Stop any operation that could cause personal injury or equipment damage. Report to the project manager and take effective protective measures.
- Working during thunderstorms, including but not limited to handling equipment, installing cabinets and installing power cords, is forbidden.
- Do not carry the weight over the maximum load per person allowed by local laws or regulations. Arrange appropriate installation personnel and do not overburden them.
- Installation personnel must wear clean work clothes, work gloves, safety helmets and safety shoes.

**PROTECTIVE CLOTHING**



- Before touching the equipment, put on ESD clothes and ESD gloves or an ESD wrist strap, and remove any conductive objects such as wrist watches or metal jewelry in order to avoid electric shock or burns.

**REMOVING CONDUCTIVE OBJECTS**



How to put on an ESD strap.

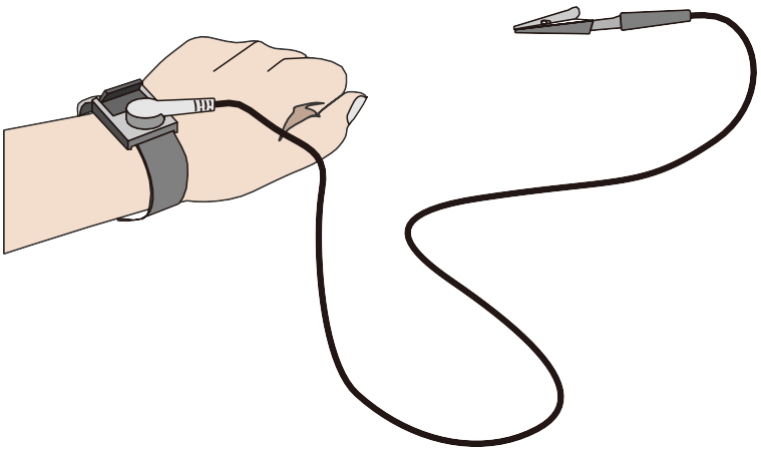
a) Put your hand through an ESD wrist strap.

b) Tighten the strap buckle to ensure a snug fit.

c) Plug the alligator clip of the ESD wrist strap into the corresponding jack on the grounded

cabinet or grounded chassis.

**WEARING AN ESD WRIST STRAP**



- Use tools correctly to avoid personal injury.
- When moving or lifting equipment above shoulder height, use lifting devices and other tools as necessary to avoid personal injury or equipment damage due to equipment slippage.
- The power sources of the server carry a high voltage. Direct contact or indirect contact through damp objects with the high-voltage power source is fatal.
- To ensure personal safety, ground the server before connecting power.
- When using ladders, always have someone hold and guard the bottom of the ladders. In order to prevent injury, never use a ladder alone.
- When connecting, testing or replacing optical fiber cable, avoid looking into the optical port without eye protection in order to prevent eye damage from laser light.

### 11.1.3 Equipment Safety

- To ensure personal safety and prevent equipment damage, use only the power cords and cables that come with the server. Do not use them with any other equipment.
- Before touching the equipment, put on ESD clothing and ESD gloves to prevent static electricity from damaging the equipment.
- When moving the server, hold the bottom of the server. Do not hold the handles of any module installed in the server, such as PSUs, fan modules, drive modules, or motherboard. Handle the equipment with care at all times.
- Use tools correctly to avoid damage to the equipment.
- Connect the power cords of active and standby PSUs to different PDUs to ensure high

system reliability.

- To ensure equipment safety, always ground the equipment before powering it on.

### 11.1.4 Transportation Precautions

Contact the manufacturer for precautions before transportation as improper transportation may damage the equipment. The precautions include but not limited to:

- Hire a trusted logistics company to move all equipment. The transportation process must comply with international transportation standards for electronic equipment. Always keep the equipment being transported upright. Avoid collision, moisture, corrosion, packaging damage or contamination.
- Transport the equipment in its original packaging.
- If the original packaging is unavailable, separately package heavy and bulky components (such as chassis, blade servers and blade switches), and fragile components (such as optical modules and PCIe cards).
- Power off all equipment before shipping.

### 11.1.5 Manual Handling Weight Limits


CAUTION

Observe local laws or regulations regarding the manual handling weight limits per person. The limits shown on the equipment and in the document are recommendations only.

The following table lists the manual handling weight limits per person specified by some organizations.

**MANUAL HANDLING WEIGHT LIMITS PER PERSON**

| Organization | Weight Limit (kg/lbs) |
|---|---|
| European Committee for Standardization (CEN) | 25/55.13 |
| International Organization for Standardization (ISO) | 25/55.13 |
| National Institute for Occupational Safety and Health (NIOSH) | 23/50.72 |
| Health and Safety Executive (HSE) | 25/55.13 |

# 12. Certifications

**CERTIFICATIONS**

| Country/Region | Certification | Mandatory/Voluntary |
|---|---|---|
| International Mutual Recognition | CB | Voluntary |
| EU | CE | Mandatory |
| US | FCC | Mandatory |
| | UL | Voluntary |
| | Energy Star | Voluntary |
| UK | CE | Mandatory |
| India | BIS | Mandatory |
| Australia | RCM | Mandatory |
| Israel | SII | Mandatory |
| Mexico | NOM | Mandatory |
| Egypt | NTRA | Voluntary |
| Saudi Arabia | SABER | Mandatory |
| Canada | IC | Mandatory |