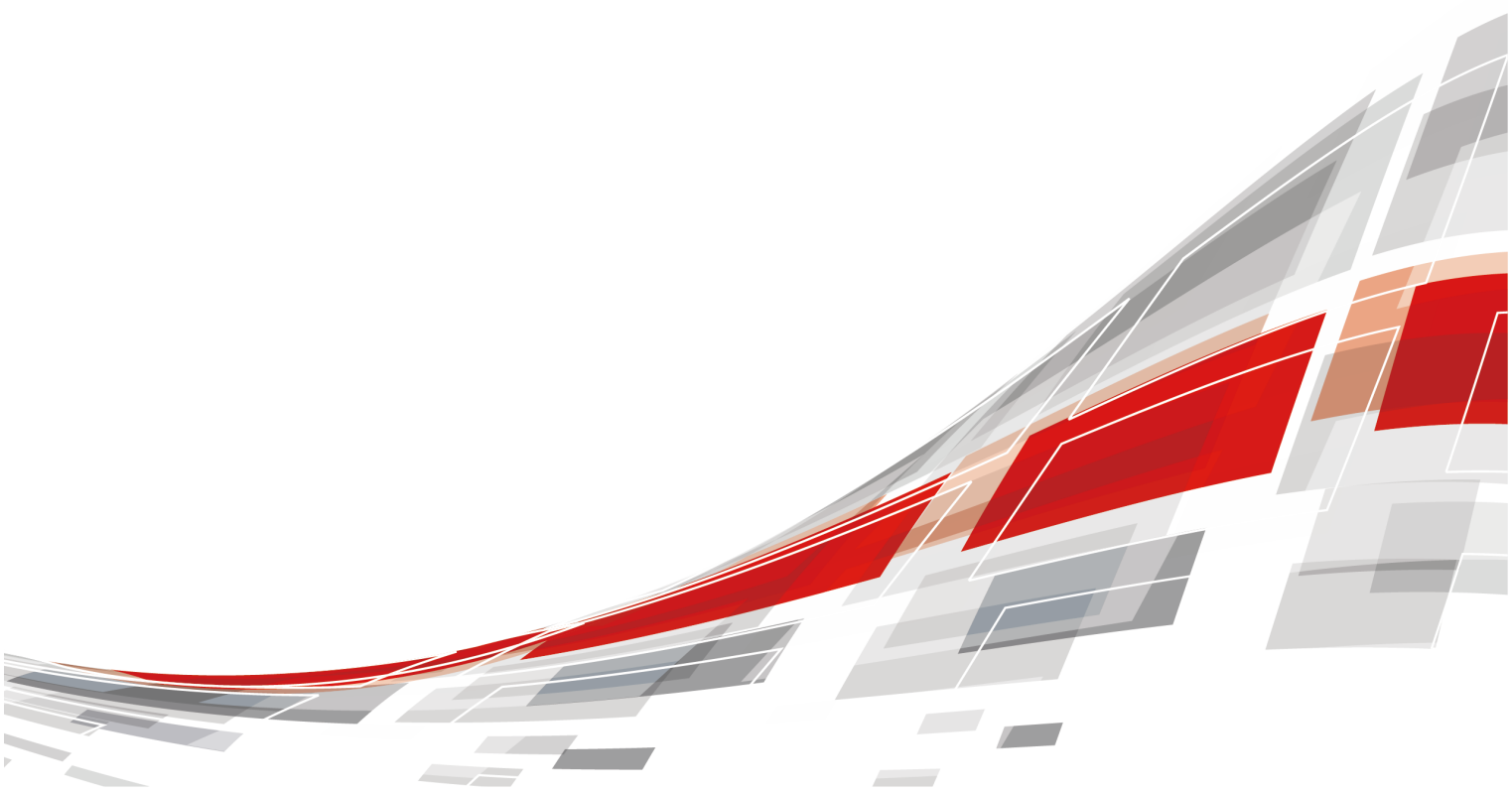
# FusionServer G8600 V7 Server

# Technical White Paper

**Issue** 06

**Date** 2024-07-10



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# About This Document

## Overview

This document describes the appearance, features, performance parameters, and hardware and software compatibility of FusionServer G8600 V7, so that users can have an in-depth and detailed understanding of FusionServer G8600 V7.

## Intended Audience

This document is intended for presales engineers.

## Symbol Conventions

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

| Symbol | Description |
| --- | --- |
| DANGER | Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury. |
| WARNING | Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury. |
| CAUTION | Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury. |
| NOTICE | Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results.<br>NOTICE is used to address practices not related to personal injury. |
| NOTE | Supplements the important information in the main text.<br>NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration. |

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# Change History

| Issue | Date | Description |
| --- | --- | --- |
| 06 | 2024-07-10 | Updated **1 Overview**, **5.4.1 DDR5 Memory**, **5.2.2 Indicators and Buttons** and **6.2 Environmental Specifications**. |
| 05 | 2024-04-30 | Updated **2 Features**, **4 Logical Structure**, **5.4.1 DDR5 Memory** and **6.1 Technical Specifications**. |
| 04 | 2023-11-28 | • Added **11 Waste Product Recycling**.<br>• Updated **10 Certification**. |
| 03 | 2023-09-15 | Updated the logical structure topology. |
| 02 | 2023-08-11 | Added the content related to high-performance configuration. |
| 01 | 2023-04-27 | This issue is the first official release. |


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# 1 Overview

FusionServer G8600 V7 is a new-generation AI infrastructure designed for the Internet, Internet Data Center (IDC), cloud computing, enterprise business, and telecom.

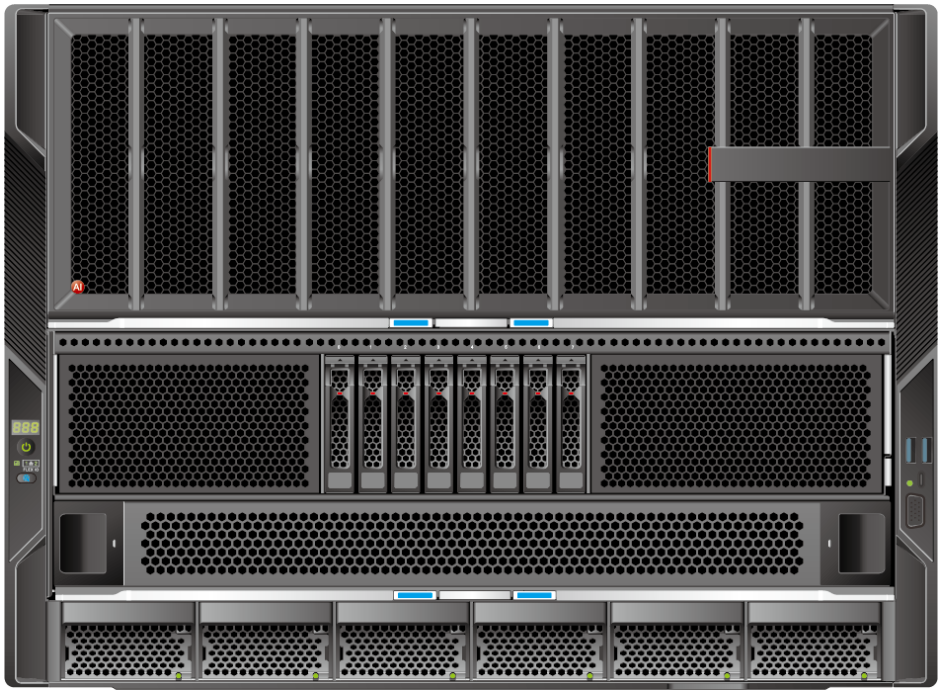
The G8600 V7 is ideal for large-scale and ultra-large-scale model training and high-performance computing scenarios.

It features high performance, high energy efficiency, and easy deployment.

NOTE

For details about the G8600 V7 nameplate, see **A.4 Nameplate**.

**Figure 1-1** Server Front View



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# 2 Features

## Performance

- The server supports the fourth-generation Intel® Xeon® Scalable processors (Sapphire Rapids) and the fifth-generation Intel® Xeon® Scalable processors (Emerald Rapids). The server provides up to 64 cores and 128 threads, up to 385 W TDP per processor, a maximum of 4.2 GHz turbo frequency, 2 MB L2 cache and 5 MB L3 cache per core, and four groups of 20 GT/s UPI interconnect links between the processors, which deliver supreme processing performance.
- The server supports up to 32 DDR5 RDIMMs with a maximum speed of 5600 MT/s registered dual-inline memory modules (RDIMMs), delivering up to 8192 GB total memory capacity (calculated using the maximum capacity of a single memory module: 256 GB). The memory modules feature high speed and availability.
- Supports NVIDIA HGX 8-GPU NVLink modules (Ampere generation or Hopper generation).

## Scalability

- The server supports up to eight 2.5" front SAS/SATA drives and eight 2.5" rear NVMe SSDs.
- The balanced configuration supports up to 12 PCIe 5.0 x16 standard expansion slots.
- The high-performance configuration supports up to nine PCIe 5.0 x16 standard expansion slots.
- The balanced configuration supports one OCP 3.0 GE/10GE/25GE/100GE NIC which features PCIe 5.0 x16 and allows orderly hot swap. The high-performance configuration does not support OCP 3.0 NICs.

  NOTE

  The hot swap of the OCP NIC depends on the OS driver. Ensure that the system enters the OS state and the OCP hot swap-related drivers have been loaded.
- Two M.2 modules can be configured.

## Availability and Serviceability

- Modular design for the server, so that the GPU module, system module, I/O module, fan module, and power module can be maintained independently.

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- Carrier-class components with process expertise ensure high system reliability.
- The server supports hot-swappable SAS/SATA drives for which RAID 0, 1, 1E, 10, 5, 50, 6, or 60 can be configured (the RAID level depends on the RAID controller card used). It also uses a supercapacitor to protect the RAID cache data against power failures.
- The panel provides UID or Healthy LED indicators and a fault diagnosis LED indicator. The iBMC WebUI displays key component status, enabling technical experts to quickly locate faulty or potentially faulty components, which simplifies maintenance, speeds up troubleshooting, and improves system availability.
- The panel provides the iBMC direct connect management port to support local iBMC O&M, improving O&M efficiency.
- Up to six 54 V PSUs (N+M redundancy supported) and two 12 V PSUs (N+N redundancy supported) reduce 54 V to 12 V power conversion and power consumption.
- The GPU heat dissipation system is decoupled from the system heat dissipation system. The two computing planes are designed with independent air ducts to provide an optimal heat dissipation solution.
- The onboard Intelligent Baseboard Management Controller (iBMC) can continuously monitor system parameters, trigger alarms, and take recovery measures to minimize shutdown.
- For more information about the warranty in the Chinese market, visit the **technical support website** > **service support** > **warranty**.

## Manageability and Security

- The built-in iBMC monitors server operating status and provides remote management.
- A password is required for accessing the BIOS, ensuring system boot and management security.
- The Network Controller Sideband Interface (NC-SI) feature allows a network port to simultaneously serve as a management port and a service port. The NC-SI feature is disabled by default and can be enabled or disabled on the iBMC or BIOS.

  NOTE

  The service port with NC-SI enabled supports the following configuration:

  - Configuring any network port on the OCP 3.0 network adapter or PCIe network adapter (with NC-SI enabled).
  - Enabling, disabling, and setting a virtual local area network (VLAN) ID for this port. The VLAN ID is **0** and disabled by default.
  - Configuring IPv4 addresses (IPv4 address, subnet mask, and default gateway) and IPv6 addresses (IPv6 address, prefix length) for this port.
- The integrated Unified Extensible Firmware Interface (UEFI) improves setup, configuration, and update efficiency and simplifies fault clearance.
- Intel Execute Disable Bit (EDB) function prevents certain types of malicious buffer overflow attacks when working with a supported OS.
- Intel® Trusted Execution Technology prevents malicious software attacks based on hardware, prevents the firmware on the device from being maliciously modified, and prevents unauthorized boot block execution.

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- Intel® Software Guard Extensions (Intel®SGX) technology allows applications to run in their own independent space without being affected by other software running in the system, thereby enhancing security.
- The secure boot based on the chip RoT implements level-by-level firmware verification starting from the hardware RoT and builds a complete secure boot chain.
- The trusted platform module (TPM) provides advanced encryption functions, such as digital signatures and remote authentication.
- The following requirements in NIST SP 800-147B are met:
  - The BIOS firmware digital signature update mechanism is supported. During the upgrade, the digital signature is verified to prevent unauthorized BIOS firmware upgrade.
  - The flash security protection mechanism is supported to prevent unauthorized modification of the flash memory in the OS.

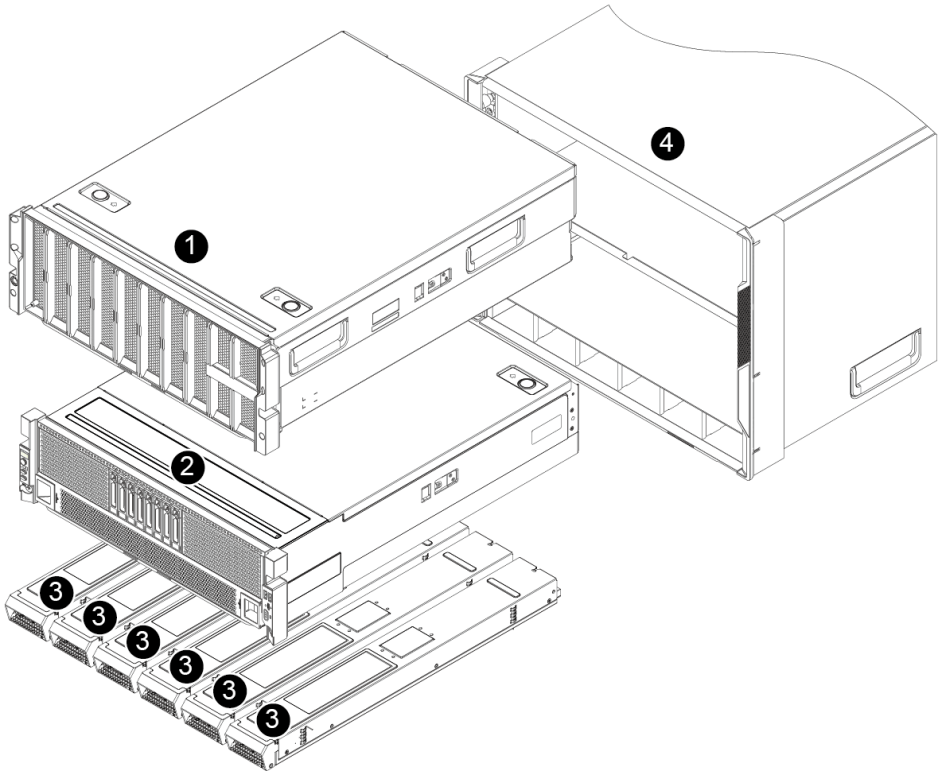
## Energy Efficiency

- The 80 PLUS Platinum or Titanium PSUs of multiple energy efficiency levels provide 96% power efficiency at 50% load.
- Active/standby power supply and HVDC power supply are supported, improving the efficiency of the power supply system.
- Efficient voltage regulator-down (VRD) power supplies for boards minimize the energy loss from DC-to-DC power conversion.
- Area-based, Proportional-Integral-Derivative (PID) intelligent fan speed adjustment and intelligent CPU frequency scaling optimize heat dissipation and reduce overall system power consumption.
- The improved thermal design with energy-efficient fans ensures optimal heat dissipation and reduces system power consumption.
- Staggered spinup of drives reduces the server boot power consumption.

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# 3 Physical Structure

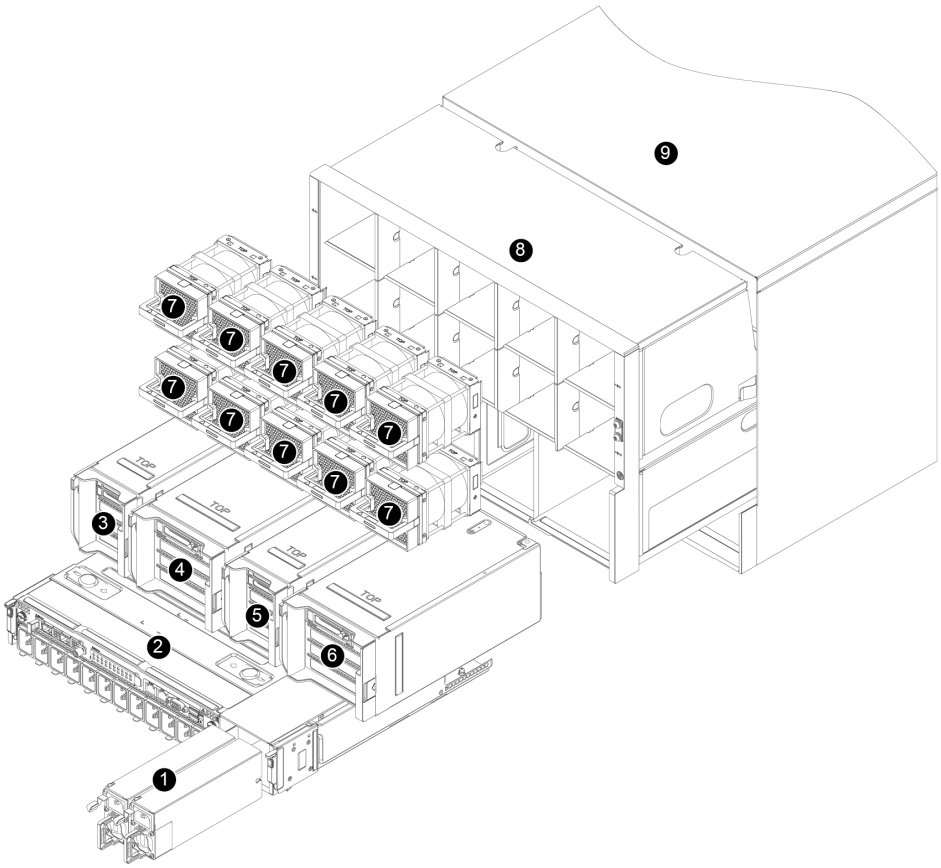
**Figure 3-1** Front view




| | | | |
|---|---|---|---|
| 1 | GPU module enclosure | 2 | System enclosure |
| 3 | 54 V dual-input PSUs (for GPU modules) | 4 | Chassis |

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**Figure 3-2** Rear view

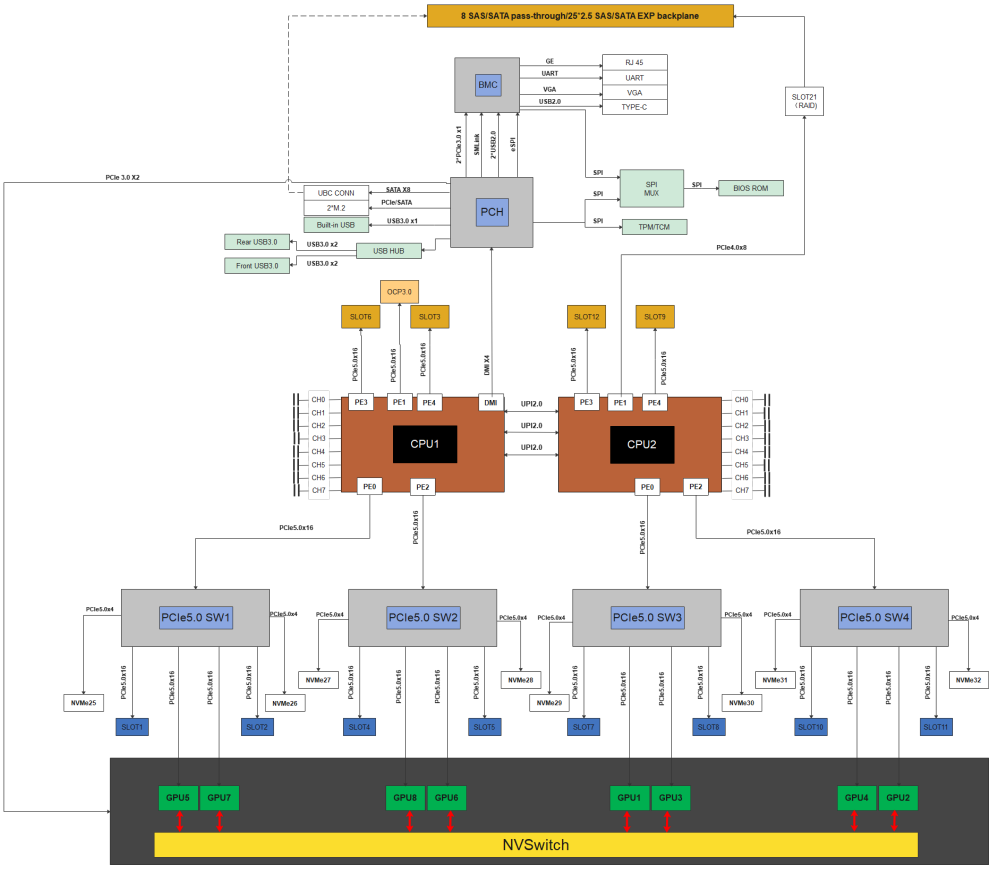



| | | | |
|---|---|---|---|
| 1 | 12 V PSUs (for the system enclosure) | 2 | Composite enclosure |
| 3 | I/O module 1 | 4 | I/O module 2 |
| 5 | I/O module 3 | 6 | I/O module 4 |
| 7 | Rear fan modules (used for heat dissipation of GPU modules) | 8 | Rear upper subrack |
| 9 | Chassis | - | - |

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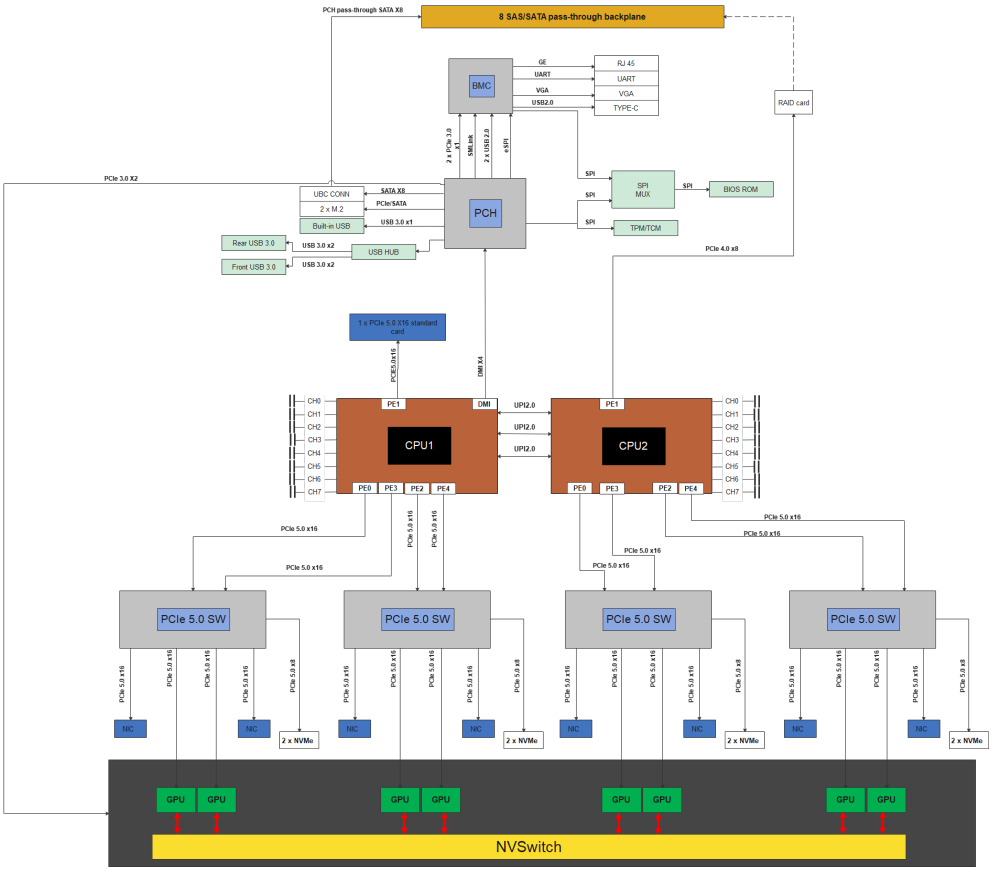
# 4 Logical Structure

**Figure 4-1** Logical structure of the balanced configuration




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**Figure 4-2** Logical structure of the high-performance configuration




- The server supports the fourth-generation Intel® Xeon® Scalable processors (Sapphire Rapids) and the fifth-generation Intel® Xeon® Scalable processors (Emerald Rapids). It supports 32 DDR5 memory modules. The processors interconnect with each other through three UltraPath Interconnect (UPI) links at a speed of up to 20 GT/s.
- High-speed resources of the CPU are connected through PCBs, high-speed connectors, and backplanes. PCIe 5.0 high-speed links are modularized and cable-free.
- The Baseboard Management Controller (BMC) card integrates the BMC management chip and provides external video graphic array (VGA), management network port, and serial port.

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# 5 Hardware Description

5.1 Front Panel
5.2 Rear Panel
5.3 Processors
5.4 Memory
5.5 Storage
5.6 Network
5.7 I/O Expansion
5.8 PSUs
5.9 Fan Modules
5.10 Board

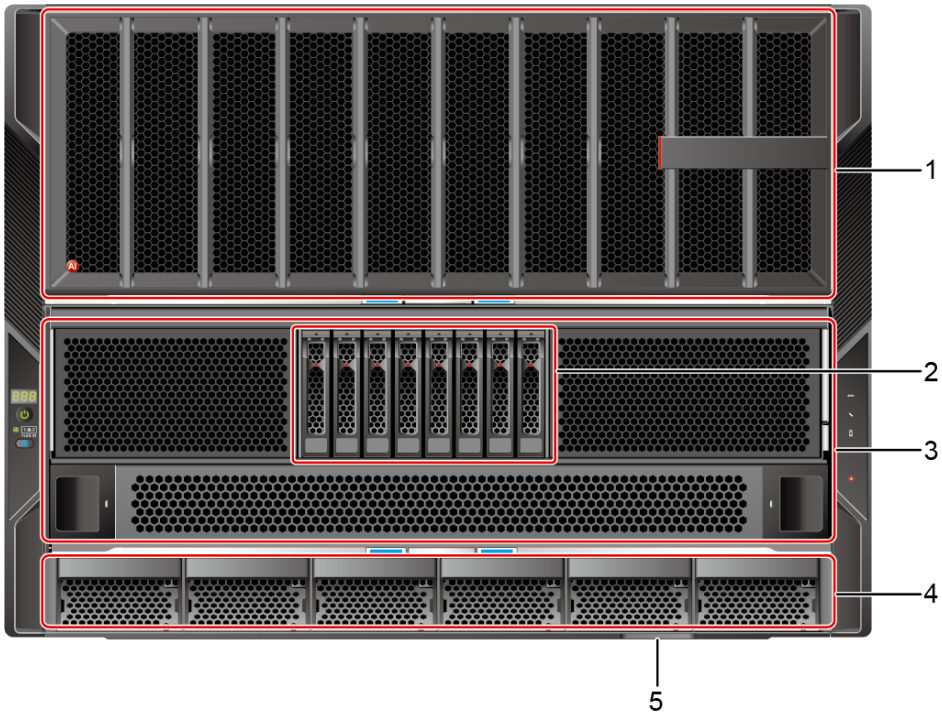
## 5.1 Front Panel

### 5.1.1 Appearance

- 8 x 2.5" drive configuration

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**Figure 5-1** Front view




| | | | |
|---|---|---|---|
| 1 | GPU module enclosure | 2 | Drives |
| 3 | System enclosure | 4 | 54 V dual-input PSUs (for GPU module enclosures) |
| 5 | Slide-out label plate (with an SN label) | - | - |

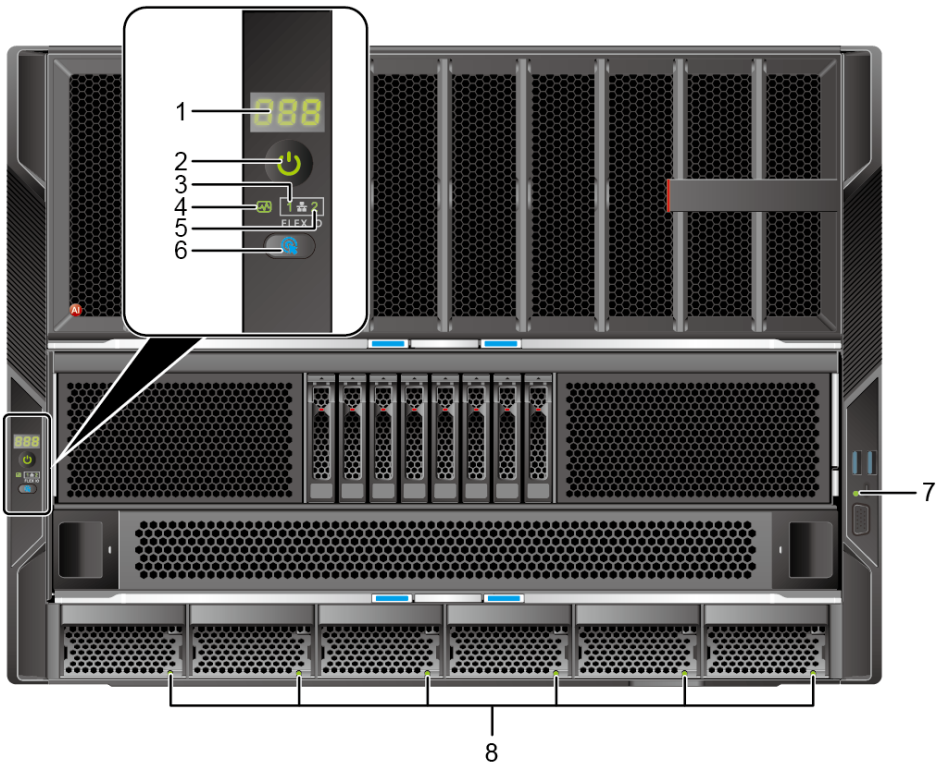
## 5.1.2 Indicators and Buttons

### Indicator and Button Locations

- 8 x 2.5" drive configuration

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**Figure 5-2** Indicators and buttons on the front panel




| | | | |
|---|---|---|---|
| 1 | Fault diagnosis LED | 2 | Power button/indicator |
| 3 | FlexIO card 1 presence indicator | 4 | Health status indicator |
| 5 | FlexIO card 2 presence indicator | 6 | UID button/indicator |
| 7 | iBMC direct connect management port indicator | 8 | 54 V PSU indicators |

## Indicator and Button Descriptions

**Table 5-1** Description of indicators and buttons on the front panel

| Identifier | Indicators and Buttons | State Description |
|---|---|---|
| 888 | Fault diagnosis LED | • ---: The device is operating properly.<br>• Error code: A component is faulty. For details about fault codes, see server *BMC Alarm Handling*. |

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| Identifier | Indicators and Buttons | State Description |
| --- | --- | --- |
| | Health status indicator | ● Off: The device is powered off or faulty.<br>● Blinking red at 1 Hz: A major alarm has been generated on the system.<br>● Blinking red at 5 Hz: A critical alarm has been generated on the system.<br>● Steady green: The device is operating properly. |
| | FlexIO card presence indicator | Indicates whether the FlexIO card is detected.<br>● Off: The OCP 3.0 network adapter is not in position.<br>● Blinking green at 0.5 Hz: The OCP 3.0 network adapter is in position but is not powered on.<br>● Blinking green at 2 Hz: The OCP 3.0 network adapter is in position and has just been inserted.<br>● Steady green: The OCP 3.0 network adapter is in position, and the power supply is normal. |
| | Power button/ indicator | Power indicator:<br>● Off: The device is powered off.<br>● Steady green: The device is powered on.<br>● Blinking yellow: The iBMC is starting. The power button is locked and cannot be pressed. The iBMC is started in about 1 minute, and then the power indicator is steady yellow.<br>● Steady yellow: The device is in the standby state.<br>Power button:<br>● When the device is powered on, you can press this button to gracefully shut down the OS.<br>**NOTE**<br>For different OSs, you may need to shut down the OS as prompted.<br>● When the device is powered on, you can hold down this button for 6 seconds to forcibly power off the device.<br>● When the power indicator is steady yellow, you can press this button to power on the server node. |

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| Identifier | Indicators and Buttons | State Description |
| --- | --- | --- |
|  | UID button/ indicator | The UID button/indicator helps identify and locate a device.<br>UID indicator:<br>● Off: The device is not being located.<br>● Blinking or steady blue: The device is being located.<br>UID button:<br>● You can control the UID indicator status by pressing the UID button or using the iBMC.<br>● You can press this button to turn on or off the UID indicator.<br>● You can press and hold down this button for 4 to 6 seconds to reset the iBMC. |
|  | iBMC direct connect management port indicator | Indicates the status when the iBMC direct connect management port connects to a terminal (local PC or Android mobile phone):<br>● Off: No terminal is connected.<br>● Blinking green at short intervals for 3 seconds and then off: The port is disabled.<br>● Steady green: The terminal is connected.<br>Indicates the status when the iBMC direct connect management port connects to a USB device:<br>● Blinking red at long intervals: The job fails or an error is reported when the job is complete.<br>● Blinking green at short intervals: The job is being executed.<br>● Blinking green at short intervals for 3 seconds and then off: The port is disabled.<br>● Steady green: The server configuration file is being copied from the USB device or the job is successfully completed. |

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| Identifier | Indicators and Buttons | State Description |
| --- | --- | --- |
| | 54 V PSU indicator | ● Off: There is no AC input.<br>● Blinking green (1 Hz):<br>– The input is normal, and the PSU shuts down 54 V output due to the INSTALLED signal.<br>– The input is normal. The PSU enters the shutdown mode because the PSON# signal is at high level.<br>– Input overvoltage or undervoltage occurs.<br>– The standby PSU is in cold standby mode.<br>– The PSU enters deep sleep mode.<br>● Blinking green (4 Hz): Online upgrade is in progress.<br>● Steady green: The input and 54 V mains output are normal.<br>● Steady orange:<br>– Normal input and overtemperature protection<br>– Output overcurrent or short-circuit<br>– Output overvoltage<br>– Short-circuit protection<br>– Component failure (excluding failure of all components) |

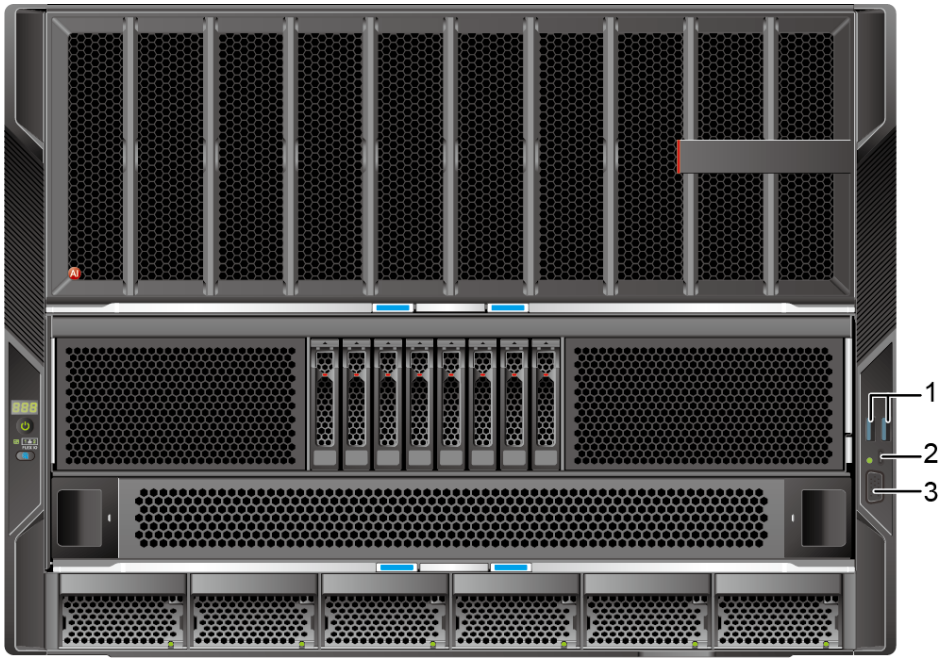
## 5.1.3 Port

### Port Positions

- 8 x 2.5" drive configuration

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**Figure 5-3** Ports on the front panel




| | | | |
|---|---|---|---|
| 1 | USB 3.0 ports | 2 | iBMC direct connect management port |
| 3 | VGA port | - | - |

## Interface Description

**Table 5-2** Ports on the front panel

| Name | Type | Quantity[Note] | Description |
|---|---|---|---|
| VGA port | DB15 | 1 | Used to connect a display terminal, such as a monitor or KVM. |

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| Name | Type | Quantity[Note] | Description |
| --- | --- | --- | --- |
| iBMC direct connect management port | USB Type-C<br>**NOTE**<br>The USB 2.0 protocol is supported. | 1 | Used to connect to a local PC using a USB Type-C cable to monitor and manage the system.<br>**NOTE**<br>Only local PCs running Windows 10 are supported.<br>● To log in to the iBMC from a local PC, enter **https:**//*IP address of the iBMC management network port* in the address box of the browser on the local PC.<br>Used to connect to a USB device.<br>**NOTICE**<br>● Before connecting an external USB device, ensure that the USB device functions properly; otherwise, it may adversely impact the server.<br>● For details about how to connect the iBMC direct management interface to a USB device, see the *iBMC User Guide*. |
| USB port | USB 3.0 | 2 | Used to connect to a USB 3.0 device.<br>**NOTICE**<br>● Before connecting an external USB device, ensure that the USB device functions properly; otherwise, it may adversely impact the server.<br>● The USB 3.0 port can be used to supply power to low-power peripherals. However, the USB 3.0 port must comply with the USB specifications. To run advanced peripherals, such as external CD/DVD drives, an external power supply is required. |
| Note: The number of ports varies depending on server configuration. This table lists the maximum number of ports in different configurations. | | | |

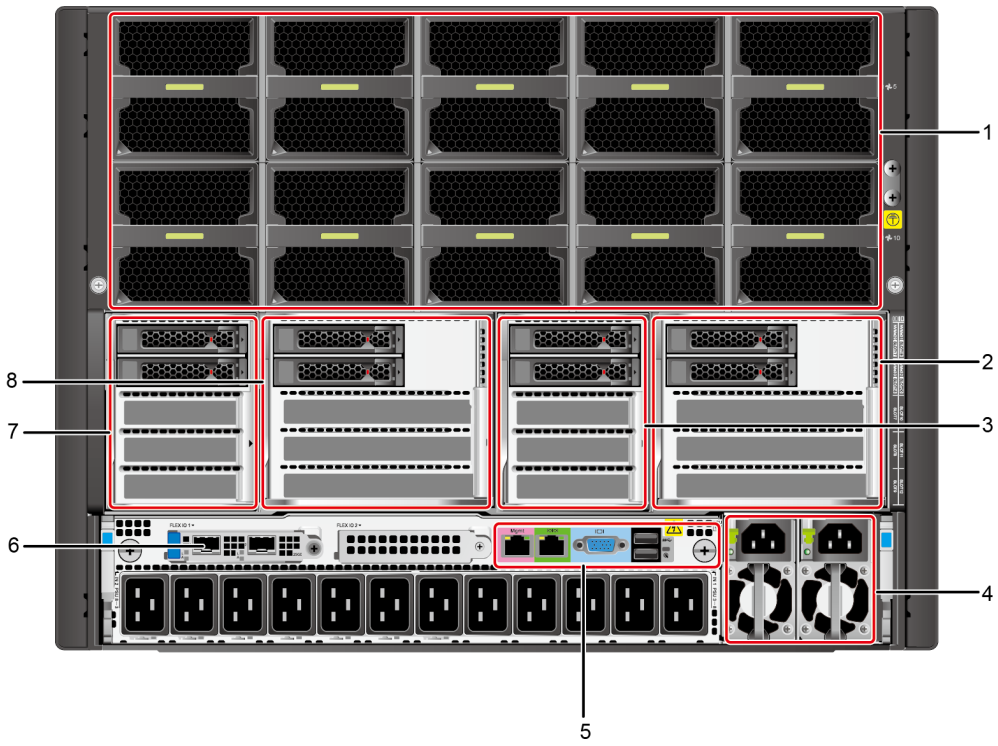
# 5.2 Rear Panel

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## 5.2.1 Appearance

- Balanced configuration

**Figure 5-4** Rear view




| | | | |
|---|---|---|---|
| 1 | Rear fan modules (used for heat dissipation of GPU modules) | 2 | I/O module 4 |
| 3 | I/O module 3 | 4 | 12 V PSUs (for the power supply system enclosure) |
| 5 | BMC card | 6 | FlexIO card<br>**NOTE**<br>The FlexIO card slot supports only an OCP 3.0 NIC. |
| 7 | I/O module 1 | 8 | I/O module 2 |

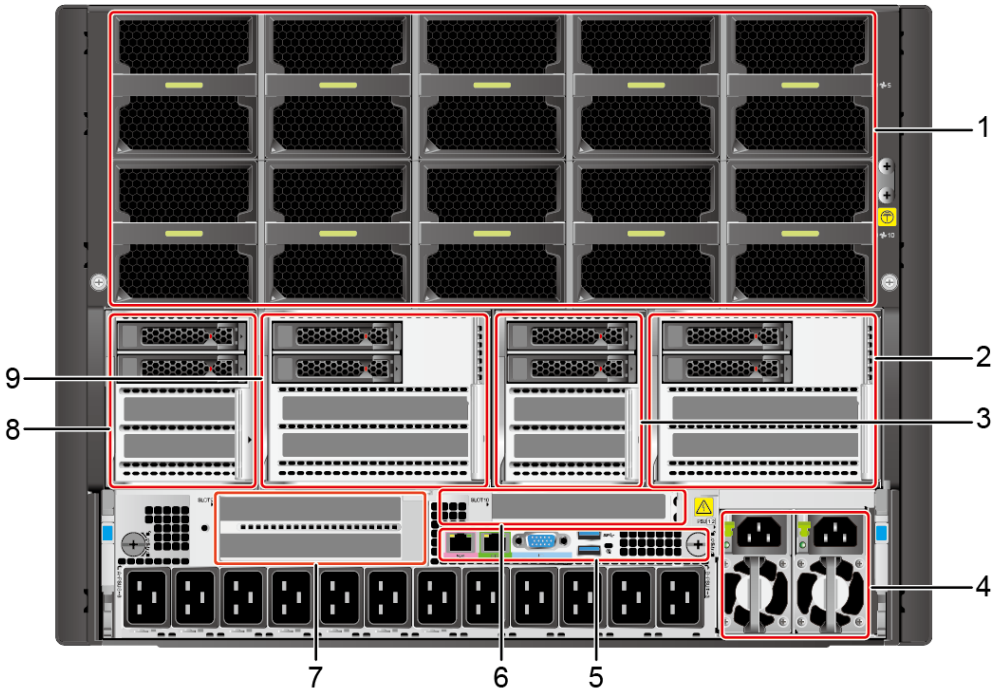
NOTE

- The rear panel supports four PCIe riser modules. Each module supports two NVMe SSDs and three PCIe 5.0 x16 standard cards.
- The standard configuration supports one OCP NIC. For details about the OCP 3.0 NICs, see **5.6.1 OCP 3.0 NIC**.
- The figure is for reference only. The actual configuration may vary.

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- High-performance configuration

**Figure 5-5** Rear view




| | | | |
|---|---|---|---|
| 1 | Rear fan modules (used for heat dissipation of GPU modules) | 2 | I/O module 4 |
| 3 | I/O module 3 | 4 | 12 V PSUs (for the power supply system enclosure) |
| 5 | BMC card | 6 | Riser module 2 of the composite enclosure |
| 7 | Riser module 1 of the composite enclosure | 8 | I/O module 1 |
| 9 | I/O module 2 | - | - |

NOTE

The figure is for reference only. The actual configuration may vary.

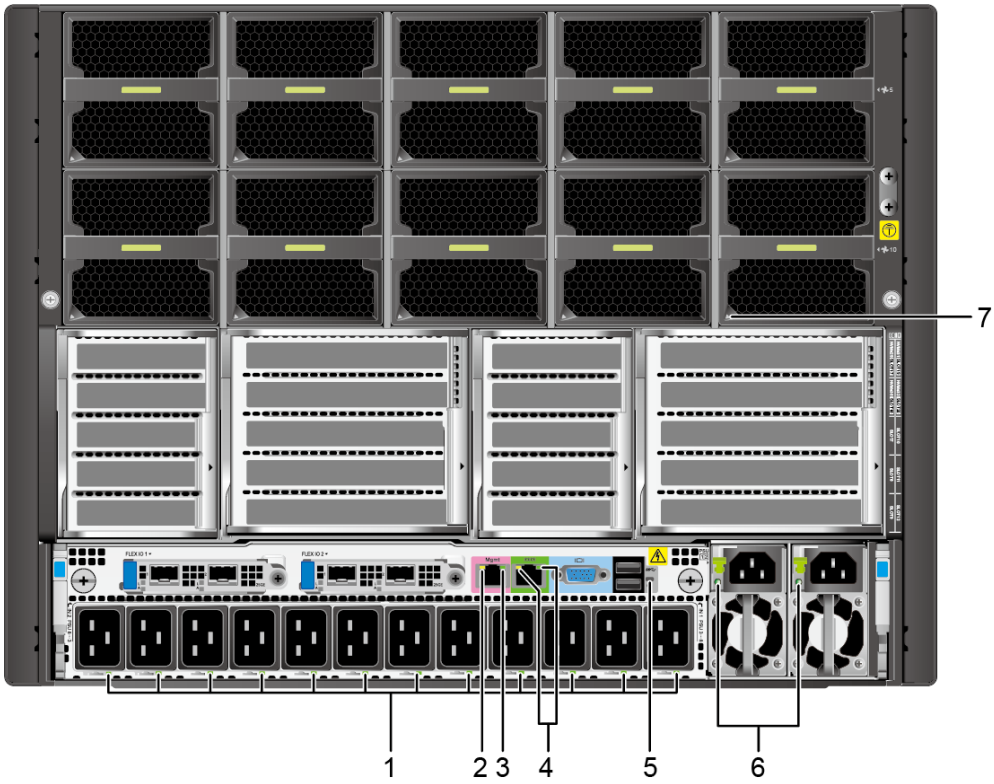
## 5.2.2 Indicators and Buttons

### Indicator Positions

- Balanced configuration

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**Figure 5-6** Indicators on the rear panel

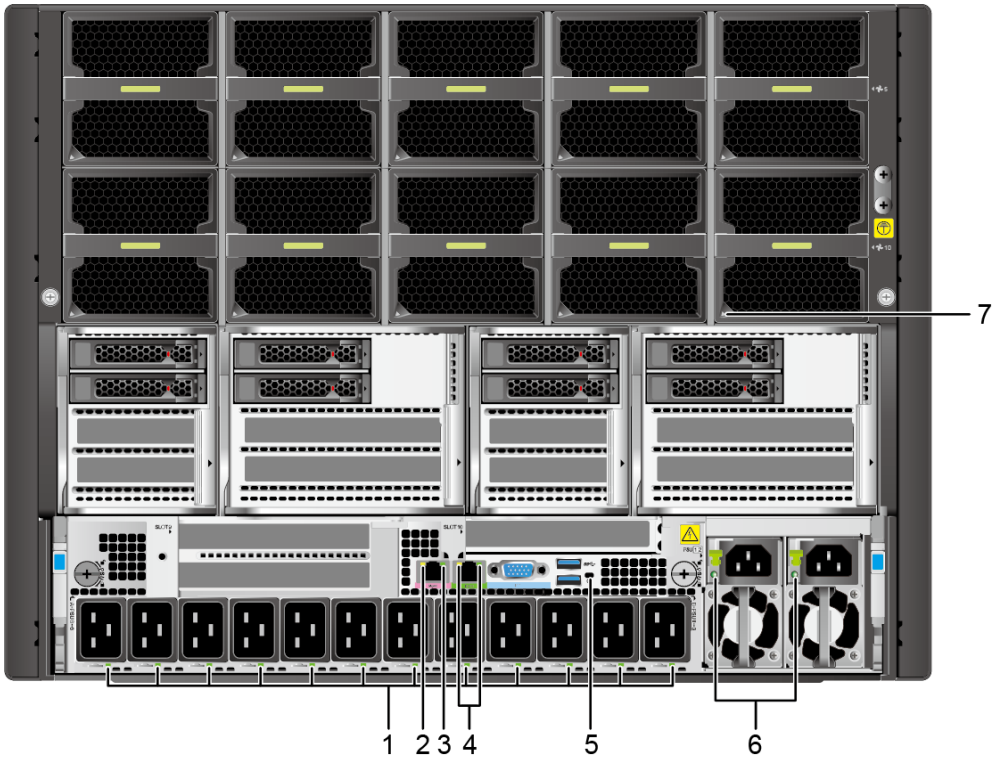



| | | | |
|---|---|---|---|
| 1 | 54 V PSU presence indicators | 2 | Data transmission status indicator of the management network port |
| 3 | Connection status indicator of the management network port | 4 | Serial port indicators<br>**NOTE**<br>Reserved and unavailable currently. |
| 5 | UID indicator | 6 | 12 V PSU indicators |
| 7 | Fan status indicator | - | - |

- High-performance configuration

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**Figure 5-7** Indicators on the rear panel




| | | | |
|---|---|---|---|
| 1 | 54 V PSU presence indicators | 2 | Data transmission status indicator of the management network port |
| 3 | Connection status indicator of the management network port | 4 | Serial port indicators<br>**NOTE**<br>Reserved and unavailable currently. |
| 5 | UID indicator | 6 | 12 V PSU indicators |
| 7 | Fan status indicator | - | - |

## Indicator description

**Table 5-3** Description of indicators on the rear panel

| Identifier | Indicator | State Description |
|---|---|---|
| - | 54 V PSU presence indicators | • Off: The corresponding front 54 V PSU is not detected.<br>• Steady green: The corresponding front 54 V PSU is installed. |

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| Identifier | Indicator | State Description |
| --- | --- | --- |
| - | Data transmission status indicator of the management network port | ● Off: No data is being transmitted.<br>● Blinking yellow: Data is being transmitted. |
| - | Connection status indicator of the management network port | ● Off: The network port is not connected.<br>● Steady green: The network port is properly connected. |
| - | PSU indicator | ● Off: No power is supplied.<br>● Blinking green at 1 Hz:<br>– The input is normal, and the server is in the standby state.<br>– The input is overvoltage or undervoltage.<br>– The PSU is in deep hibernation mode.<br>● Blinking green at 4 Hz: The firmware is being upgraded online.<br>● Steady green: The input and output are normal.<br>● Steady orange: The input is normal but there is no output.<br>**NOTE**<br>The possible causes of no power output are as follows:<br>● Power supply overtemperature protection<br>● Power output overcurrent or short-circuit<br>● Output overvoltage<br>● Short-circuit protection<br>● Device failure (excluding failure of all devices) |
|  | UID indicator | The UID indicator helps identify and locate a device.<br>● Off: The device is not being located.<br>● Blinking or steady blue: The device is being located.<br>**NOTE**<br>You can control the UID indicator status by pressing the UID button or using the iBMC. |

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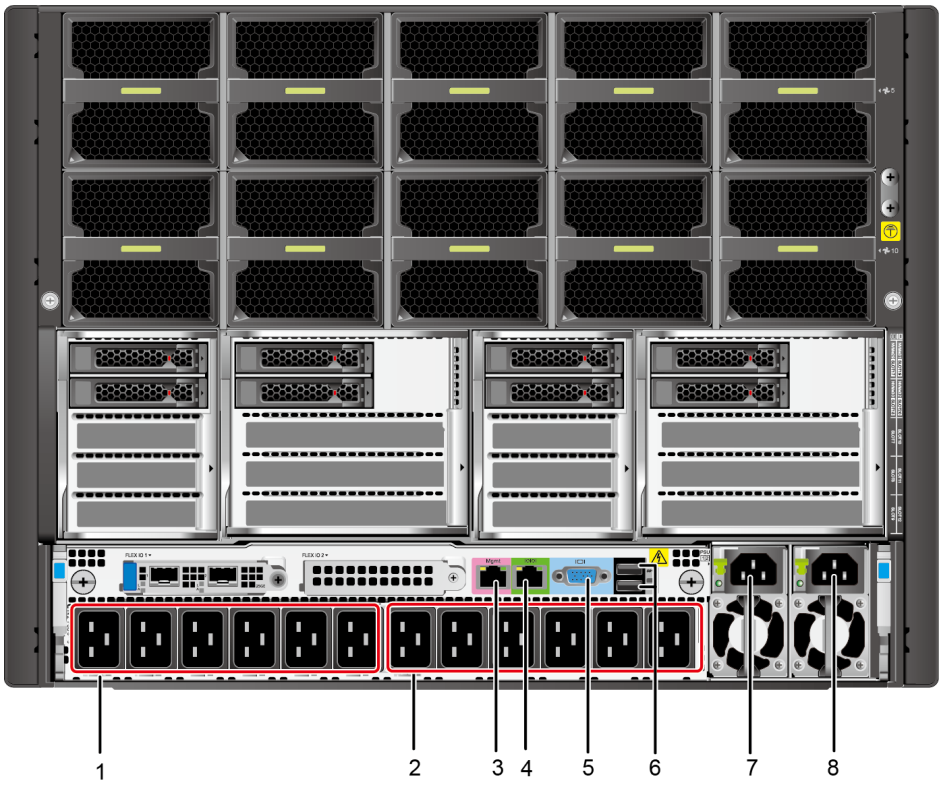
| Identifier | Indicator | State Description |
| --- | --- | --- |
| - | Fan status indicator | • Off: There is no power input.<br>• Steady green: The fan is working properly.<br>• Steady red: The fan is not working properly. |

## 5.2.3 Port

### Port Positions

- Balanced configuration

**Figure 5-8** Ports on the rear panel

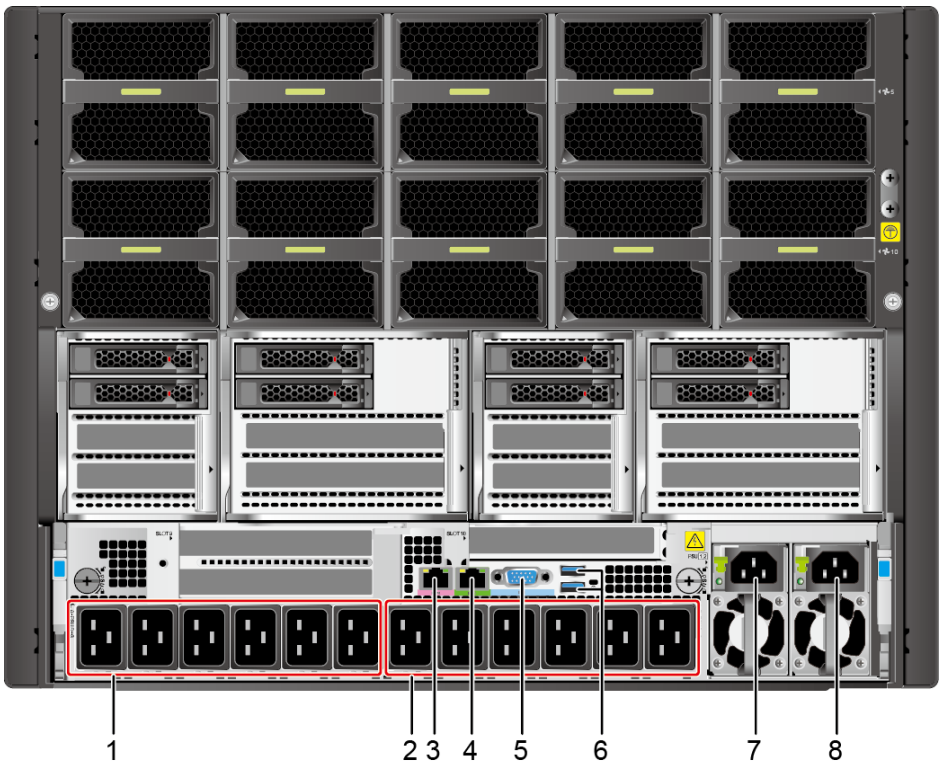



| | | | |
| --- | --- | --- | --- |
| 1 | A-input sockets of the 54 V dual-input PSUs | 2 | B-input sockets of the 54 V dual-input PSUs |
| 3 | Management network port | 4 | Serial port |
| 5 | VGA port | 6 | USB 3.0 port |
| 7 | Socket of 12 V PSU 1 | 8 | Socket of 12 V PSU 2 |

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- High-performance configuration

**Figure 5-9** Ports on the rear panel




| | | | |
|---|---|---|---|
| 1 | A-input sockets of the 54 V dual-input PSUs | 2 | B-input sockets of the 54 V dual-input PSUs |
| 3 | Management network port | 4 | Serial port |
| 5 | VGA port | 6 | USB 3.0 port |
| 7 | Socket of 12 V PSU 1 | 8 | Socket of 12 V PSU 2 |

## Port Description

**Table 5-4** Ports on the rear panel

| Name | Type | Quantity | Description |
|---|---|---|---|
| Management network port | RJ45 | 1 | iBMC management network port, which is used to manage the server.<br>**NOTE**<br>The management network port is a GE port that supports 100 Mbit/s and 1000 Mbit/s auto-negotiation. |

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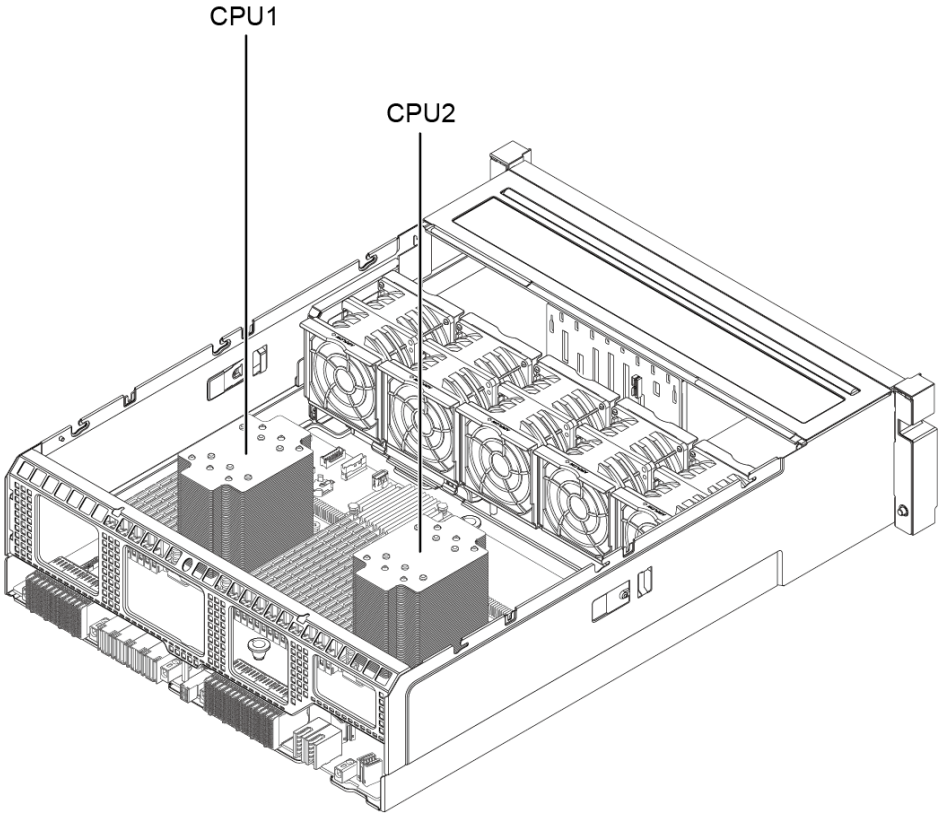
| Name | Type | Quantity | Description |
| --- | --- | --- | --- |
| Serial port | RJ45 | 1 | A port used for debugging. By default, it serves as the OS serial port. You can also set it as the iBMC serial port on the iBMC CLI.<br>**NOTE**<br>The port is a 3-wire serial communication port, and its default baud rate is 115,200 bit/s. |
| VGA port | DB15 | 1 | Used to connect a display terminal, such as a monitor or KVM. |
| USB port | USB 3.0 | 2 | Used to connect to a USB 3.0 device.<br>**NOTICE**<br>● Before connecting an external USB device, ensure that the USB device functions properly; otherwise, it may adversely impact the server.<br>● The USB 3.0 port can be used to supply power to low-power peripherals. However, the USB 3.0 port must comply with the USB specifications. To run advanced peripherals, such as external CD/DVD drives, an external power supply is required. |
| PSU socket | - | 14 | Used to connect to a power distribution unit (PDU) through a power cable. You can select the PSUs as required.<br>**NOTE**<br>When determining the PSUs, ensure that the rated power of the PSUs is greater than that of the server. |

# 5.3 Processors

- Two processors.
- Processors used in one server must be of the same model.
- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.

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**Figure 5-10** Positions of the processors




# 5.4 Memory

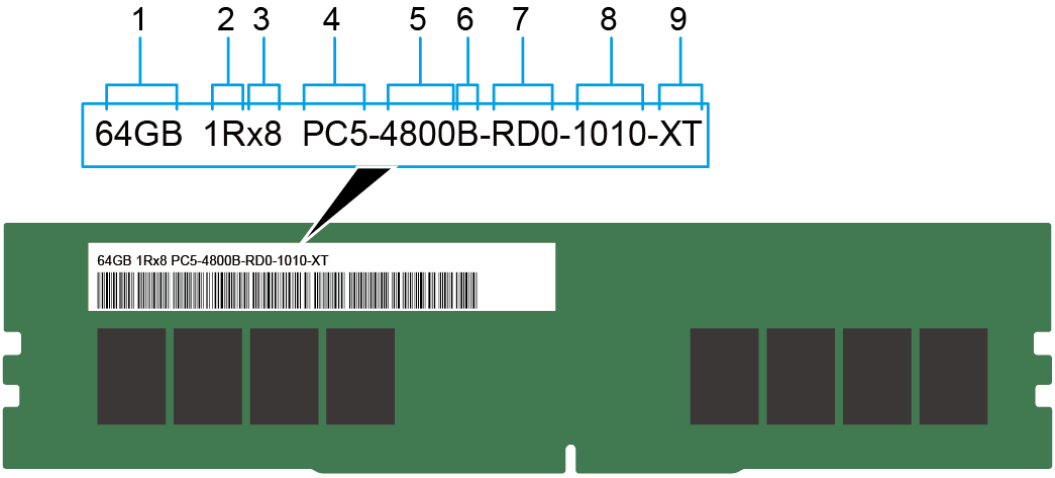
## 5.4.1 DDR5 Memory

### 5.4.1.1 Memory Identifier

You can determine the memory module properties based on the label attached to the memory module.

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**Figure 5-11** Memory identifier




| No. | 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>• 4R = Quad rank<br>• 8R = Octal rank |
| 3 | Data width on the DRAM | • x4: 4-bit<br>• x8: 8-bit |
| 4 | Type of the memory interface | • PC5 = DDR5 |
| 5 | Maximum memory speed | • 4800 MT/S |
| 6 | Memory latency parameter (CL-nRCD-nRP) | • A = 34-34-34<br>• B = 40-40-40<br>• C = 42-42-42 |
| 7 | DIMM type | • Reference design for version RDIMM D0 |
| 8 | SPD version | • 10: SPD version<br>• 10: SPD versions from byte 192 to byte 447 |

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| No. | Description | Example |
| --- | --- | --- |
| 9 | Temperature class | • XT (Extended Temperature Grade): 0ºC to 95ºC (32ºF to 203ºF)<br>• NT (Normal Temperature grade): 0ºC to 85ºC (32ºF to 185ºF) |

### 5.4.1.2 Memory Subsystem Architecture

The server provides 32 memory interfaces. Each processor integrates eight memory channels.

Install the memory modules in the primary memory channels first. If the primary memory channel is not populated, the memory modules in secondary memory channel cannot be used.

**Table 5-5** Memory channels

| CPU | Channel | DIMM |
| --- | --- | --- |
| CPU 1 | A (primary) | DIMM000(A) |
| | A | DIMM001(I) |
| | B (primary) | DIMM010(B) |
| | B | DIMM011(J) |
| | C (primary) | DIMM020(C) |
| | C | DIMM021(K) |
| | D (primary) | DIMM030(D) |
| | D | DIMM031(L) |
| | E (primary) | DIMM040(E) |
| | E | DIMM041(M) |
| | F (primary) | DIMM050(F) |
| | F | DIMM051(N) |
| | G (primary) | DIMM060(G) |
| | G | DIMM061(O) |
| | H (primary) | DIMM070(H) |
| | H | DIMM071(P) |
| CPU 2 | A (primary) | DIMM100(A) |

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| CPU | Channel | DIMM |
|---|---|---|
| | A | DIMM101(I) |
| | B (primary) | DIMM110(B) |
| | B | DIMM111(J) |
| | C (primary) | DIMM120(C) |
| | C | DIMM121(K) |
| | D (primary) | DIMM130(D) |
| | D | DIMM131(L) |
| | E (primary) | DIMM140(E) |
| | E | DIMM141(M) |
| | F (primary) | DIMM150(F) |
| | F | DIMM151(N) |
| | G (primary) | DIMM160(G) |
| | G | DIMM161(O) |
| | H (primary) | DIMM170(H) |
| | H | DIMM171(P) |

### 5.4.1.3 Memory Compatibility

Observe the following rules when configuring DDR5 memory modules:

NOTICE

- A server must use DDR5 memory modules of the same part number (P/N code), and the memory speed is the minimum value of the following items:
  - Memory speed supported by a processor.
  - Maximum operating speed of a memory module
- The DDR5 memory modules of different types (RDIMM and RDIMM-3DS) and specifications (capacity, bit width, rank, and height) cannot be used together.
- For details about the type of a single memory module, see "Search Parts" in the compatibility list on the technical support website.

- The server supports the fourth-generation Intel® Xeon® Scalable processors (Sapphire Rapids) and the fifth-generation Intel® Xeon® Scalable processors (Emerald Rapids). The maximum memory capacity supported by all processor models is the same.
- The calculation formula of the total memory capacity supported is as follows: the total memory capacity equals the capacity sum of all DDR5 memory modules.

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- For details about the type of a single memory module, see "Search Parts" in the compatibility list on the technical support website.
- The maximum number of memory modules supported depends on the memory module type and number of ranks.

**Table 5-6** DDR5 memory parameters

| Parameter | | Value | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Capacity of a DDR5 memory (GB) | | 16 | 32 | 48 | 64 | 96 | 128 | 256 |
| Type | | RDIMM | RDIMM | RDIMM | RDIMM | RDIMM | RDIMM-3DS | RDIMM-3DS |
| Rated speed (MT/s) | | 4800 | 5600[c] | 5600 | 5600[c] | 5600[c] | 4800 | 4800 |
| Operating voltage (V) | | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 | 1.1 |
| Maximum number of DDR5 DIMMs in a server[a] | | 32 | 32 | 16 | 32 | 32 | 32 | 32 |
| Maximum DDR5 memory capacity of the server (GB) | | 512 | 1024 | 768 | 2048 | 3072 | 4096 | 8192 |
| Actual rate (MT/s) | 1DPC[b] | 4800 | 4800 | 5600 | 5600 | 5600 | 4800 | 4800 |
| | 2DPC | 4400 | 4400 | - | 4400 | 4400 | 4400 | 4400 |

- a: The maximum number of DDR5 memory modules is based on dual-processor configuration.
- b: DIMM per channel (DPC) indicates the number of memory modules per channel.
- c: When the SPR CPU is configured, the maximum memory rate can reach 4800 MT/s. When the EMR CPU is configured, the maximum memory rate can reach 5600 MT/s.
- The information listed in this table is for reference only. For details, consult the local sales representative.

### 5.4.1.4 DIMM Installation Rules

Observe the following rules when configuring DDR5 memory modules:

- The memory modules configured must be DDR5 RDIMMs.

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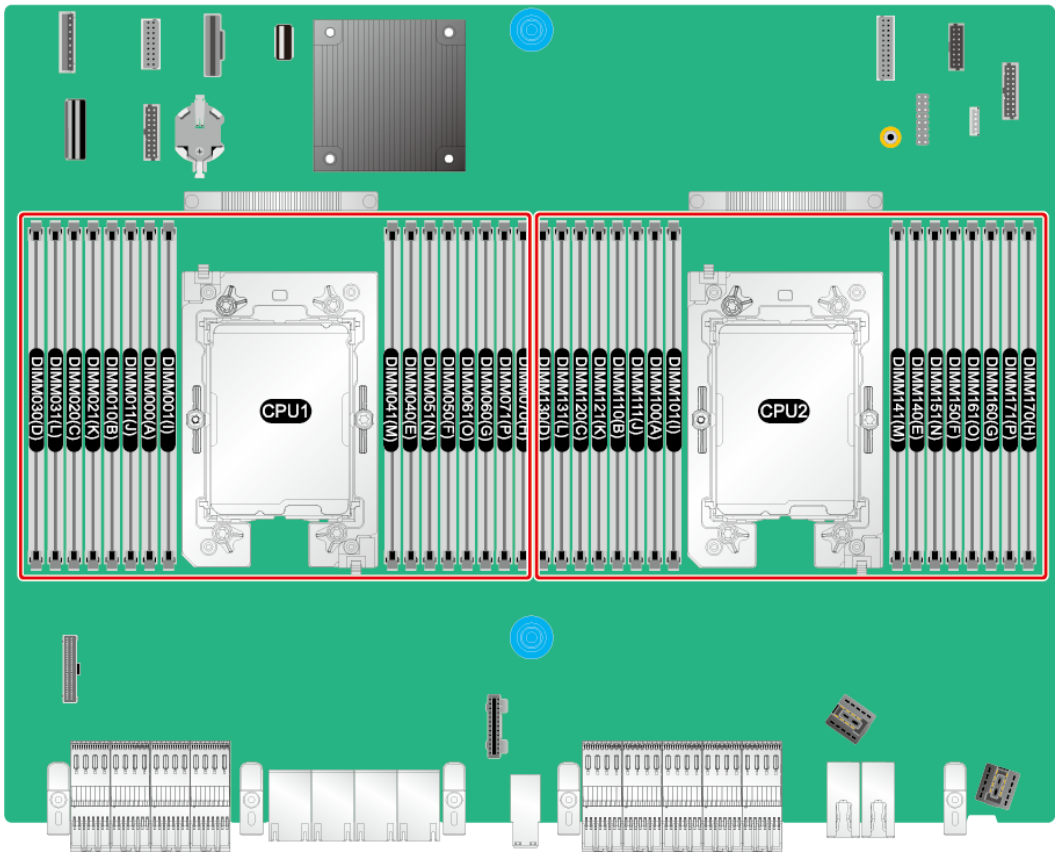
- The memory modules must be configured with the same number of ranks.
- Install filler memory modules in vacant slots.

### 5.4.1.5 Positions of Memory Modules

A server supports up to 32 DDR5 memory modules. To maximize performance, it is advised to use balanced memory configuration.

Observe the memory module installation rules when configuring memory modules. For details, see the Memory Configuring Guide of the server on the technical support website.

**Figure 5-12** Memory installation positions




NOTE

2 Processors: When 48 GB DIMMs are configured, only 16 DIMMs and insertion methods are supported. When 96 GB DIMMs are configured, only 16 or 32 DIMMs and insertion methods are supported.

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**Figure 5-13** DDR5 memory installation guidelines (2 processors)

| CPU | Channel | DIMM Slot | Number of DIMMs | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 2 | 4 | 8 | 12 | 16 | 24 | 32 |
| CPU1 | A | DIMM000(A) | ● | ● | ● | ● | ● | ● | ● |
| | | DIMM001(I) | | | | | | ● | ● |
| | B | DIMM010(B) | | | | | ● | ● | ● |
| | | DIMM011(J) | | | | | | | ● |
| | C | DIMM020(C) | | | ● | ● | ● | ● | ● |
| | | DIMM021(K) | | | | | | ● | ● |
| | D | DIMM030(D) | | | | ● | ● | ● | ● |
| | | DIMM031(L) | | | | | | | ● |
| | E | DIMM040(E) | | | ● | ● | ● | ● | ● |
| | | DIMM041(M) | | | | | | ● | ● |
| | F | DIMM050(F) | | | | ● | ● | ● | ● |
| | | DIMM051(N) | | | | | | | ● |
| | G | DIMM060(G) | | ● | ● | ● | ● | ● | ● |
| | | DIMM061(O) | | | | | | ● | ● |
| | H | DIMM070(H) | | | | | ● | ● | ● |
| | | DIMM071(P) | | | | | | | ● |
| CPU2 | A | DIMM100(A) | ● | ● | ● | ● | ● | ● | ● |
| | | DIMM101(I) | | | | | | ● | ● |
| | B | DIMM110(B) | | | | | ● | ● | ● |
| | | DIMM111(J) | | | | | | | ● |
| | C | DIMM120(C) | | | ● | ● | ● | ● | ● |
| | | DIMM121(K) | | | | | | ● | ● |
| | D | DIMM130(D) | | | | ● | ● | ● | ● |
| | | DIMM131(L) | | | | | | | ● |
| | E | DIMM140(E) | | | ● | ● | ● | ● | ● |
| | | DIMM141(M) | | | | | | ● | ● |
| | F | DIMM150(F) | | | | ● | ● | ● | ● |
| | | DIMM151(N) | | | | | | | ● |
| | G | DIMM160(G) | | ● | ● | ● | ● | ● | ● |
| | | DIMM161(O) | | | | | | ● | ● |
| | H | DIMM170(H) | | | | | ● | ● | ● |
| | | DIMM171(P) | | | | | | | ● |

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#### 5.4.1.6 Memory Protection Technologies

DDR5 memory modules support the following memory protection technologies:

- ECC
- Memory Mirroring
- Memory Single Device Data Correction (SDDC)
- Failed DIMM Isolation
- Memory Thermal Throttling
- Command/Address Parity Check and Retry
- Memory Demand/Patrol Scrubbing
- Memory Data Scrambling
- Post Package Repair (PPR)
- Write Data CRC Protection
- Adaptive Data Correction - Single Region (ADC-SR)
- Adaptive Double Device Data Correction - Multiple Region (ADDDC-MR)
- Partial Cache Line Sparing (PCLS, HBM CPU only)

# 5.5 Storage

## 5.5.1 Drive Configuration and Drive Numbering

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#### 5.5.1.1 8 x 2.5" Drive Configuration

## Drive Configuration

**Table 5-7** Drive configuration

| Configuration | Front Drive | Rear Drive | Drive Management Mode |
|---|---|---|---|
| 8 x 2.5" drive configuration (balanced) | ● Front drive (8 x 2.5"):<br>– Slots 0 to 7 support only SAS/SATA drives | ● I/O module 1 (2 x 2.5"):<br>– Slots 25 to 26 support only NVMe drives<br>● I/O module 2 (2 x 2.5"):<br>– Slots 27 to 28 support only NVMe drives<br>● I/O module 3 (2 x 2.5"):<br>– Slots 29 to 30 support only NVMe drives<br>● I/O module 4 (2 x 2.5"):<br>– Slots 31 to 32 support only NVMe drives | ● SAS/SATA drive: 1 x PCIe plug-in RAID controller card<br>● SATA drive: PCH pass-through<br>● NVMe drive: PCIe SW |

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| Configuration | Front Drive | Rear Drive | Drive Management Mode |
|---|---|---|---|
| 8 x 2.5" drive configuration (high-performance) | • Front drive (8 x 2.5"):<br>– Slots 0 to 7 support only SAS/SATA drives | • I/O module 1 (2 x 2.5"):<br>– Slots 25 to 26 support only NVMe drives<br>• I/O module 2 (2 x 2.5"):<br>– Slots 27 to 28 support only NVMe drives<br>• I/O module 3 (2 x 2.5"):<br>– Slots 29 to 30 support only NVMe drives<br>• I/O module 4 (2 x 2.5"):<br>– Slots 31 to 32 support only NVMe drives | • SAS/SATA drive: 1 x PCIe plug-in RAID controller card<br>• SATA drive: PCH pass-through<br>• NVMe drive: PCIe SW |
| For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website. | | | |

## Drive Numbering

NOTICE

The drive numbers identified by the RAID controller card vary depending on the cabling of the RAID controller card. This section uses the drive numbers identified by a RAID controller card that adopts the default cabling described in "Internal Cabling" in the *Maintenance and Server Guide*.

- Drive numbering of the 8 x 2.5" drive configuration in **Table 5-7** (balanced configuration)

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**Figure 5-14** Drive numbering

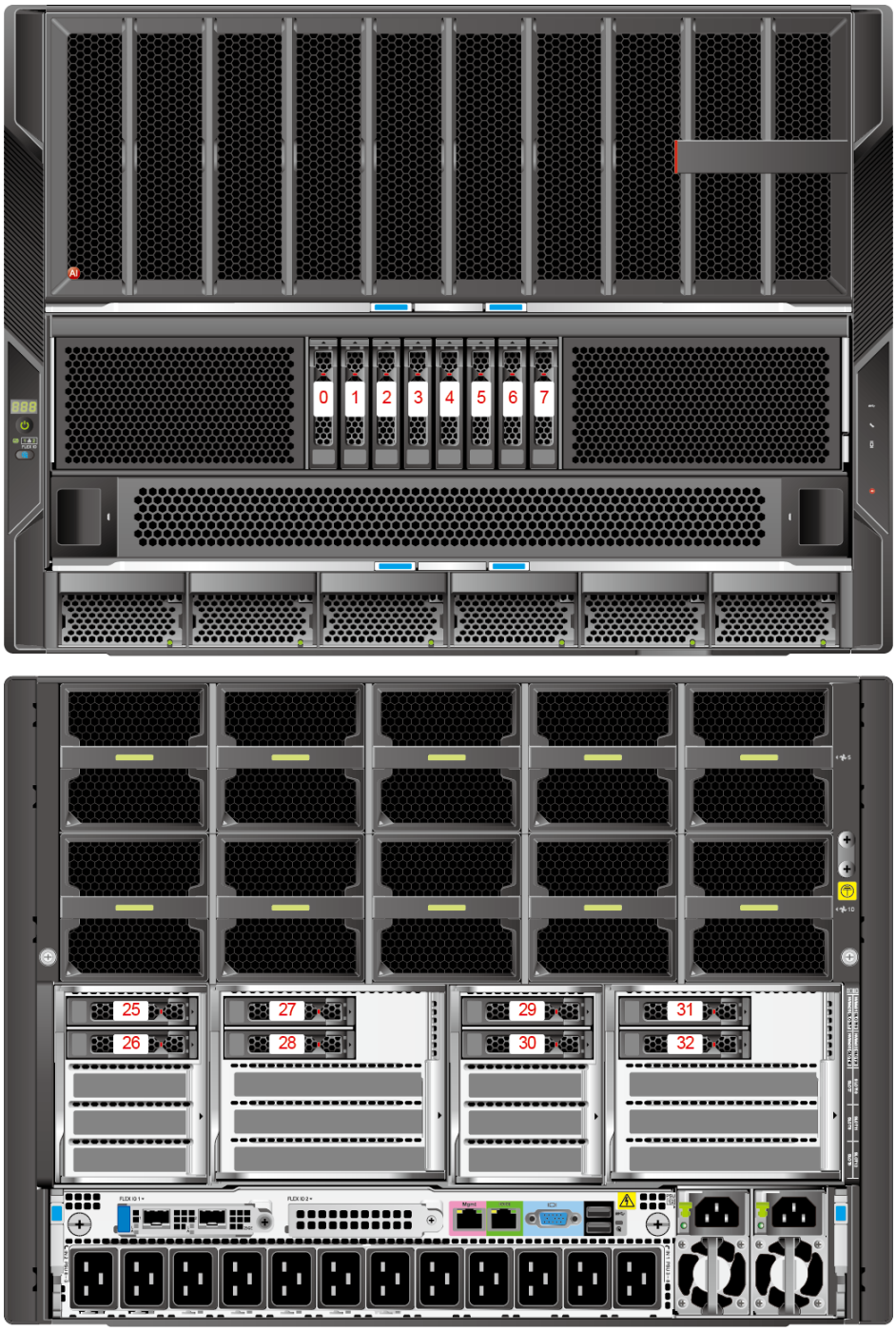



**Table 5-8** Drive numbering

| Drive No. | Drive Number Displayed on the iBMC WebUI | Drive Number Identified by the RAID Controller Card |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 1 | 1 |

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| Drive No. | Drive Number Displayed on the iBMC WebUI | Drive Number Identified by the RAID Controller Card |
|---|---|---|
| 2 | 2 | 2 |
| 3 | 3 | 3 |
| 4 | 4 | 4 |
| 5 | 5 | 5 |
| 6 | 6 | 6 |
| 7 | 7 | 7 |
| 25 | 25 | - |
| 26 | 26 | - |
| 27 | 27 | - |
| 28 | 28 | - |
| 29 | 29 | - |
| 30 | 30 | - |
| 31 | 31 | - |
| 32 | 32 | - |

- Drive numbering of the 8 x 2.5" drive configuration in **Table 5-7** (high-performance configuration)

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**Figure 5-15** Drive numbering

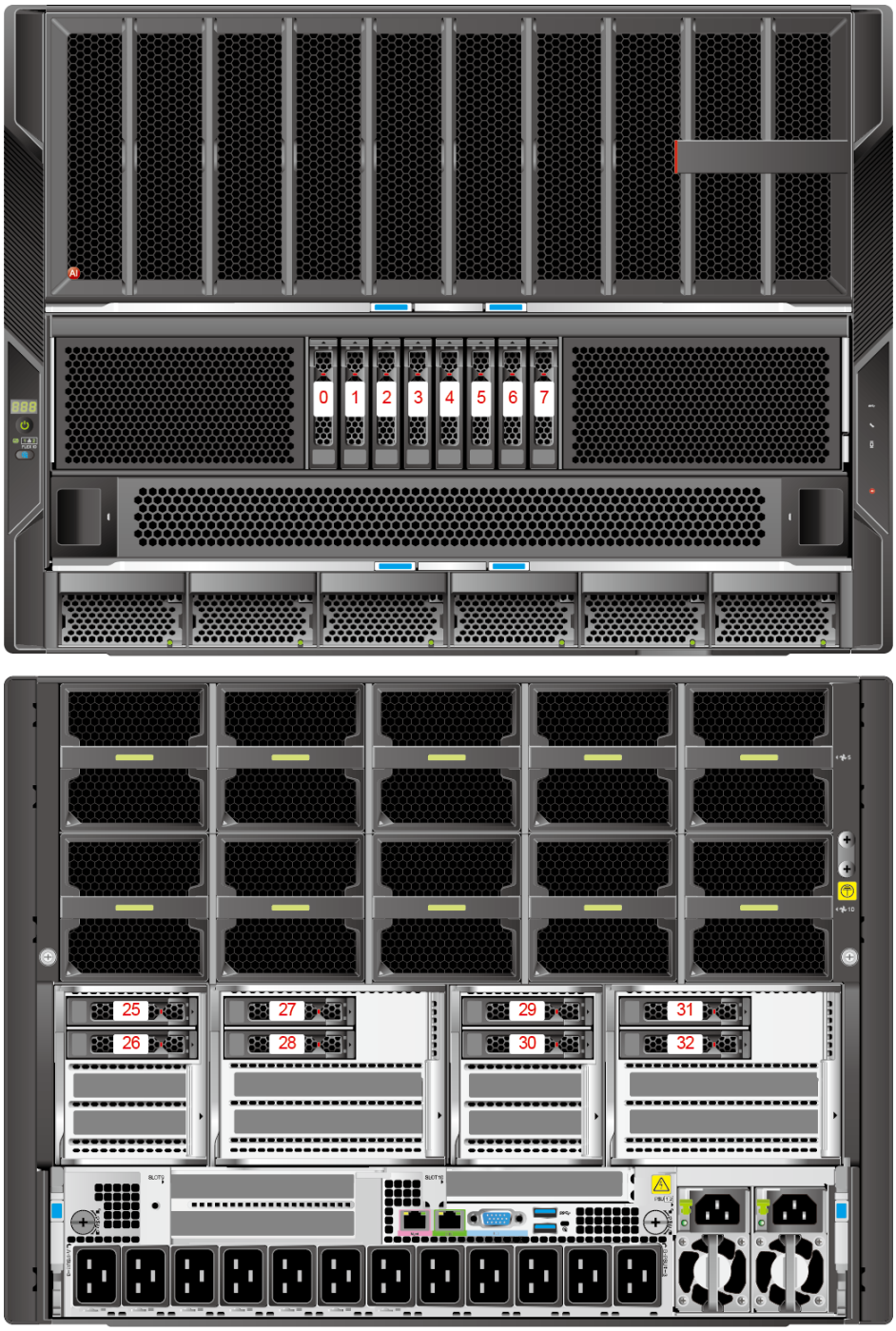



**Table 5-9** Drive numbering

| Drive No. | Drive Number Displayed on the iBMC WebUI | Drive Number Identified by the RAID Controller Card |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 1 | 1 |

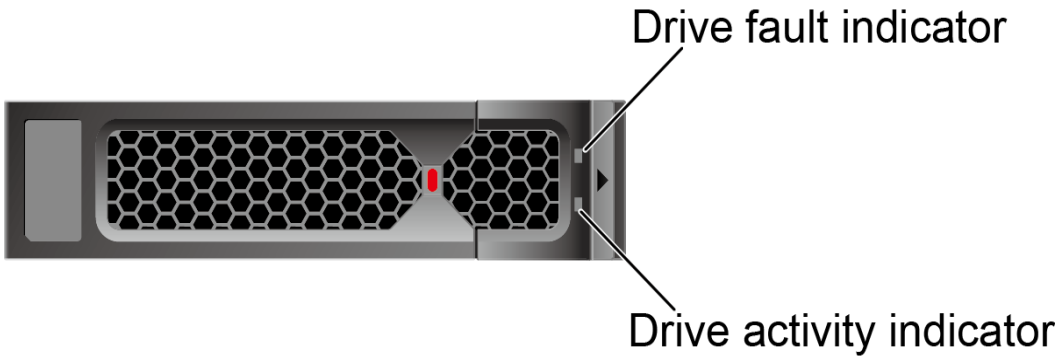
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| Drive No. | Drive Number Displayed on the iBMC WebUI | Drive Number Identified by the RAID Controller Card |
|---|---|---|
| 2 | 2 | 2 |
| 3 | 3 | 3 |
| 4 | 4 | 4 |
| 5 | 5 | 5 |
| 6 | 6 | 6 |
| 7 | 7 | 7 |
| 25 | 25 | - |
| 26 | 26 | - |
| 27 | 27 | - |
| 28 | 28 | - |
| 29 | 29 | - |
| 30 | 30 | - |
| 31 | 31 | - |
| 32 | 32 | - |

## 5.5.2 Drive Indicators

### SAS/SATA Drive Indicators

**Figure 5-16** SAS/SATA drive indicators




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**Table 5-10** SAS/SATA drive indicator description

| Active Indicator (Green) | Fault Indicator (Red/Blue) | State Description |
|---|---|---|
| Off | Off | The drive is not detected. |
| Steady on | Off | The drive is detected. |
| Blinking at 4 Hz | Off | Data is being read or written properly, or data on the primary drive is being rebuilt. |
| Steady on | Blinking blue at 4 Hz | The drive is being located. |
| Blinking at 1 Hz | Blinking red at 1 Hz synchronously | Data on the secondary drive is being rebuilt. |
| Off | Red steady on | A drive in a RAID array is removed. |
| Steady on | Red steady on | The drive is faulty. |

## NVMe Drive Indicators

**Figure 5-17** NVMe drive indicators

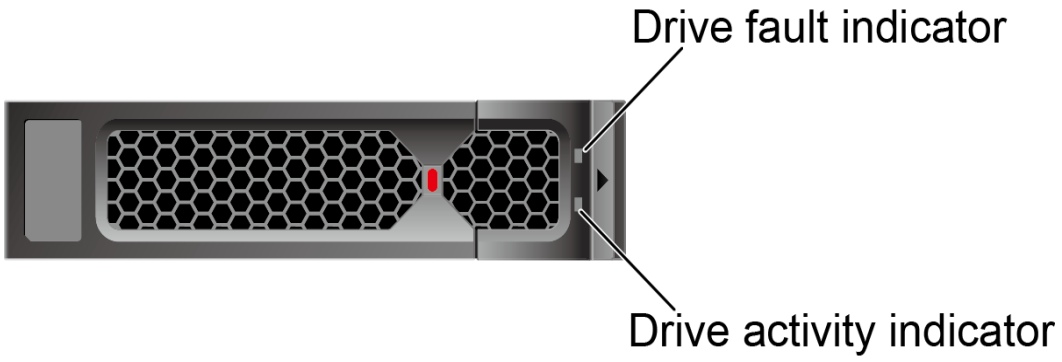



**Table 5-11** NVMe drive indicator description

| Active Indicator (Green) | Fault Indicator (Red/Blue) | State Description |
|---|---|---|
| Off | Off | The NVMe drive is not detected. |
| Steady on | Off | The NVMe drive is detected and operating properly. |
| Blinking at 4 Hz | Off | Data is being read from or written to the NVMe drive. |
| Steady on/blinking | Blinking blue at 4 Hz | The NVMe drive is being located. |

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| Active Indicator (Green) | Fault Indicator (Red/Blue) | State Description |
|---|---|---|
| Off | Blinking red at 0.5 Hz | The NVMe drive has completed the hot swap process and is removable. |
| Off | Blinking red at 2 Hz | The NVMe drive is being hot-swapped. |
| Steady on/off | Red steady on | The NVMe drive is faulty. |

### 5.5.3 RAID Controller Card

The RAID controller card supports RAID configuration, RAID level migration, and drive roaming.

- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.
- For details about the RAID controller card, see the server *RAID Controller Card User Guide*.

## 5.6 Network

### 5.6.1 OCP 3.0 NIC

OCP 3.0 NICs provide network expansion capabilities.

- The FlexIO slot supports an OCP 3.0 NIC, which can be configured as required.
- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.
- For details about OCP 3.0 NICs, see the documents of each OCP 3.0 NIC.

## 5.7 I/O Expansion

### 5.7.1 PCIe Card

PCIe cards provide ease of expandability and connection.

- The balanced configuration supports up to 12 PCIe 5.0 x16 standard expansion slots.
- The high-performance configuration supports up to nine PCIe 5.0 x16 standard expansion slots.
- For details about the optional components, consult the local sales representative or see "OS and Parts Compatibilit" in the compatibility list on the technical support website.

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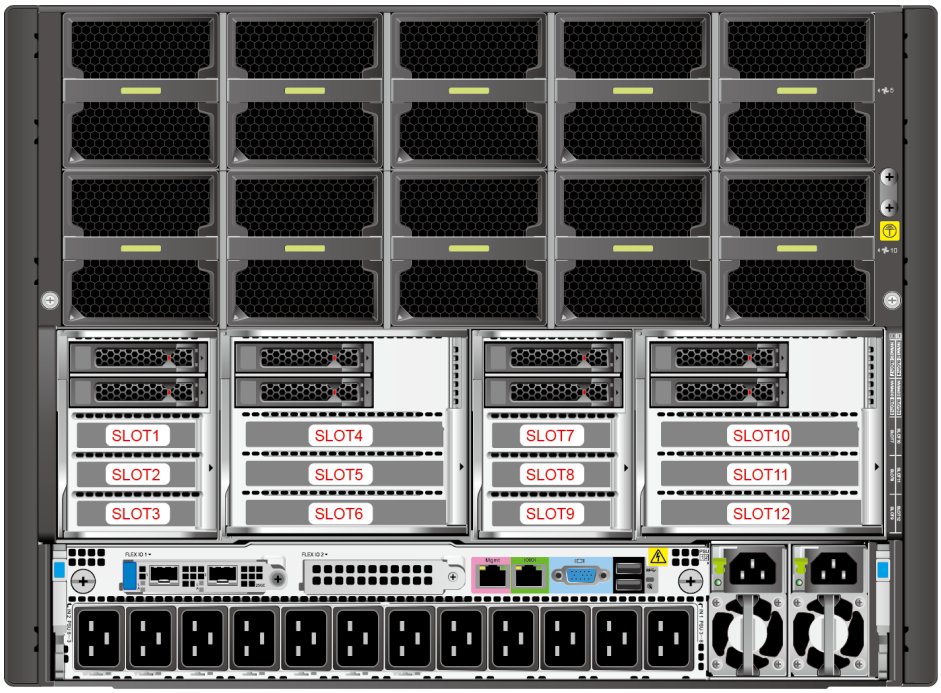
- When IB cards are used to build an IB network, ensure that the IPoIB modes of the IB cards at both ends of the network connection are the same. For details, contact technical support.

# 5.7.2 PCIe Slots

## PCIe Slots

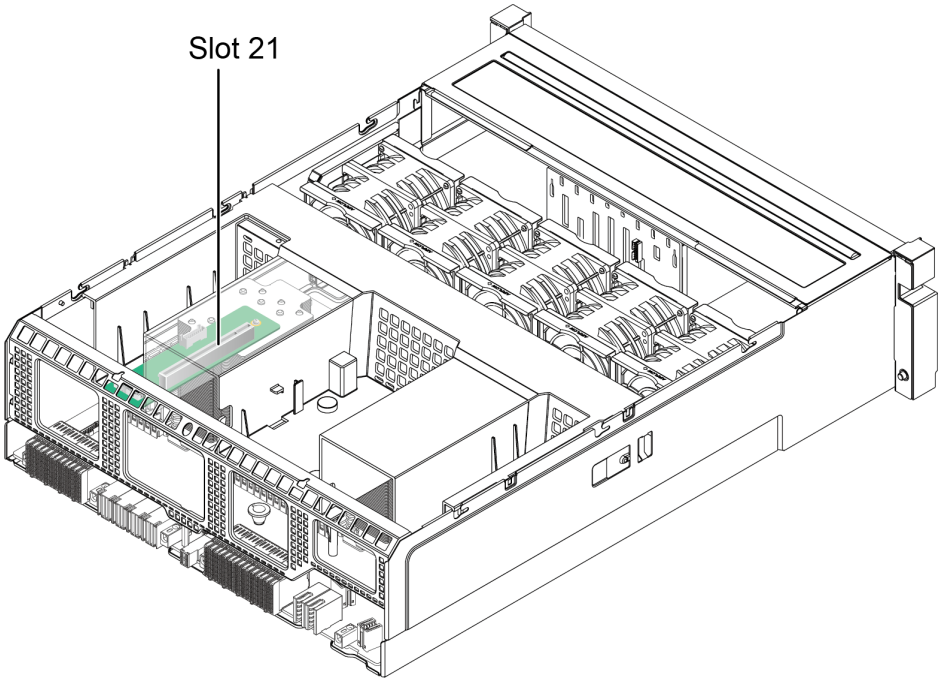
### Balanced configuration

**Figure 5-18** PCIe slots




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**Figure 5-19** PCIe slot (built-in)

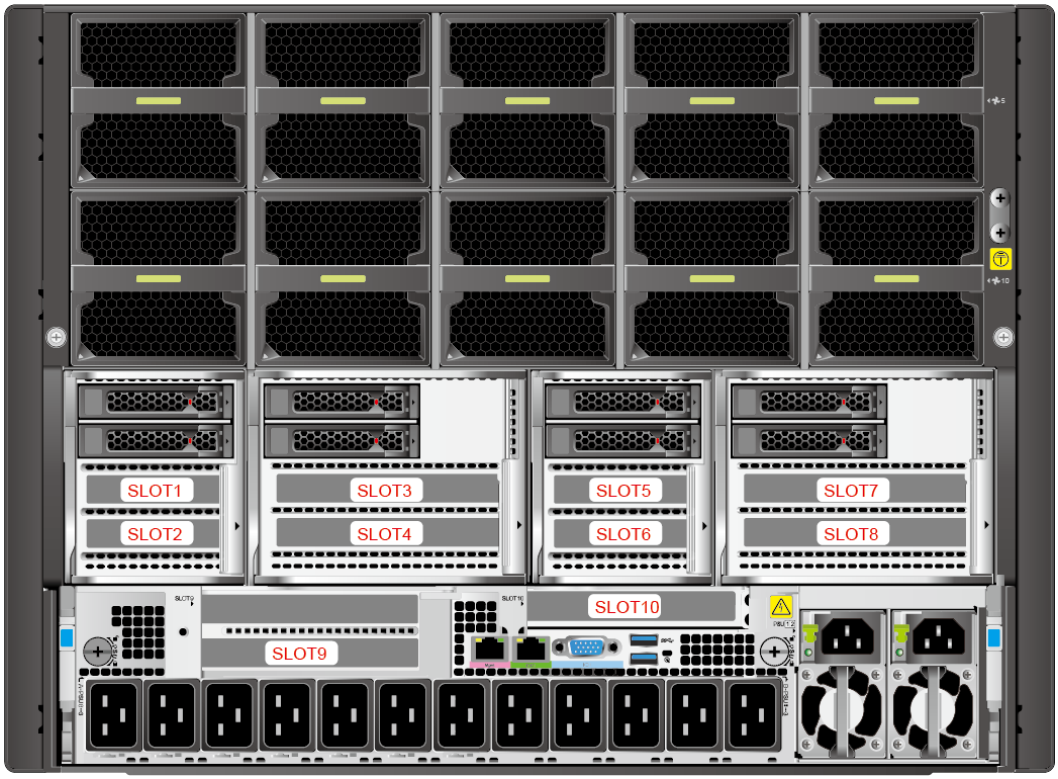



- I/O module 1 provides slots 1 to 3 and supports two 2.5" NVMe drives.
- I/O module 2 provides slots 4 to 6 and supports two 2.5" NVMe drives.
- I/O module 3 provides slots 7 to 9 and supports two 2.5" NVMe drives.
- I/O module 4 provides slots 10 to 12 and supports two 2.5" NVMe drives.
- The built-in module provides slot 21.

**High-performance configuration**

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**Figure 5-20** PCIe slots




- I/O module 1 provides slots 1 and 2 and supports two 2.5" NVMe drives.
- I/O module 2 provides slots 3 and 4 and supports two 2.5" NVMe drives.
- I/O module 3 provides slots 5 and 6 and supports two 2.5" NVMe drives.
- I/O module 4 provides slots 7 and 8 and supports two 2.5" NVMe drives.
- Riser module 1 of the composite enclosure provides slot 9.
- Riser module 2 of the composite enclosure provides slot 10.
- The built-in module provides slot 21.

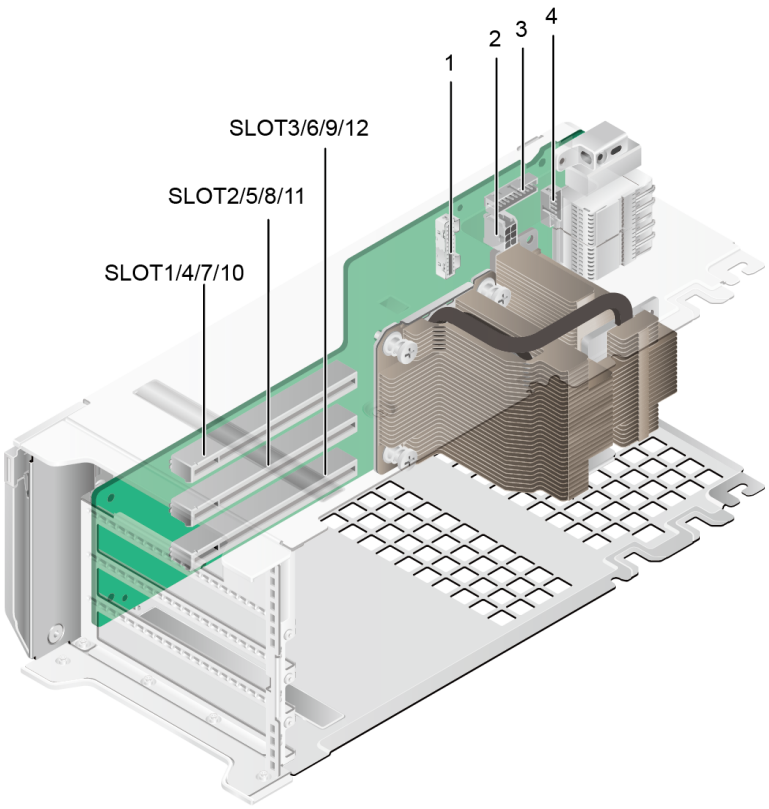
## PCIe Riser Card

### Balanced configuration

- PCIe riser card of an I/O module
  - Provides PCIe slots 1 to 3 when installed in I/O module 1.
  - Provides PCIe slots 7 to 9 when installed in I/O module 3.
  - Provides PCIe slots 4 to 6 when installed in I/O module 2.
  - Provides PCIe slots 10 to 12 when installed in I/O module 4.

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**Figure 5-21** PCIe riser card of an I/O module



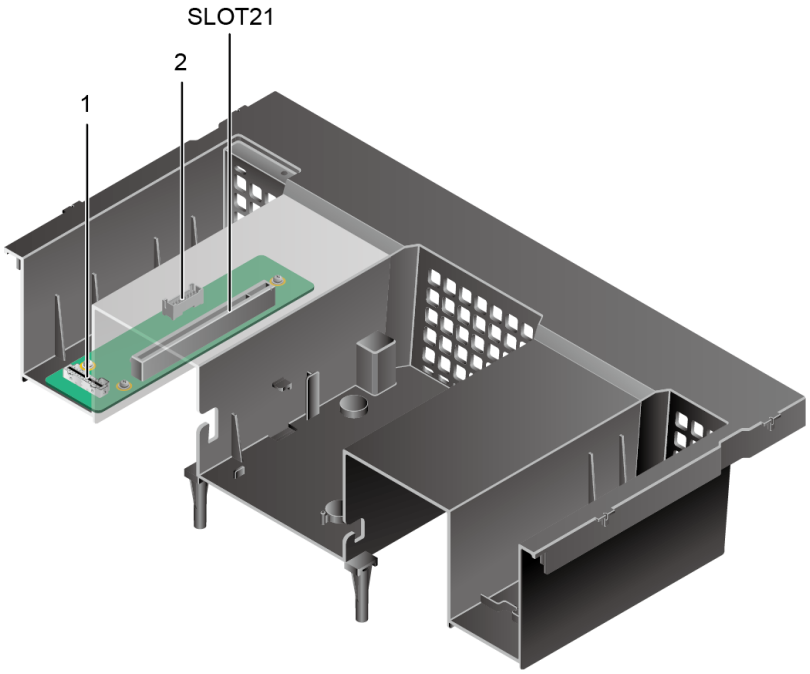

| | | | |
|---|---|---|---|
| 1 | UBC connector (UBC1/ J12) | 2 | NVMe power connector (PWR OUT/J18) |
| 3 | Signal connector (NVME BP/J19) | 4 | NC-SI connector (NCSI CONN/J3) |

- PCIe riser card in the built-in module

  Provides PCIe slot 21 when installed in the built-in module.

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**Figure 5-22** PCIe riser card in the built-in module



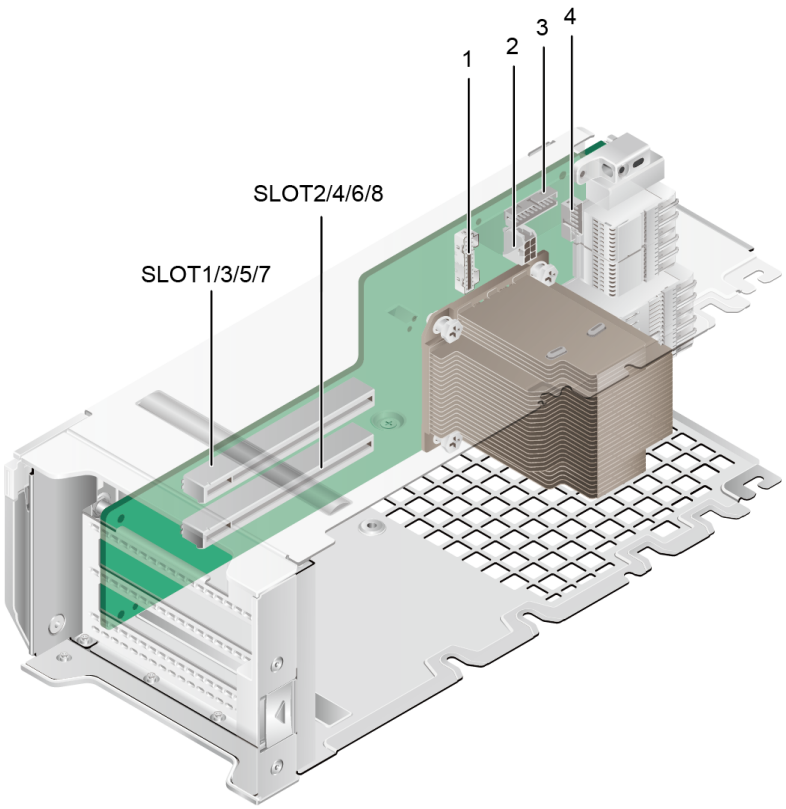

| | | | |
|---|---|---|---|
| 1 | UBC connector (J2) | 2 | Signal connector (J3) |

**High-performance configuration**

- PCIe riser card of an I/O module
  - Provides PCIe slots 1 and 2 when installed in I/O module 1.
  - Provides PCIe slots 3 and 4 when installed in I/O module 3.
  - Provides PCIe slots 5 and 6 when installed in I/O module 2.
  - Provides PCIe slots 7 and 8 when installed in I/O module 4.

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**Figure 5-23** PCIe riser card of an I/O module



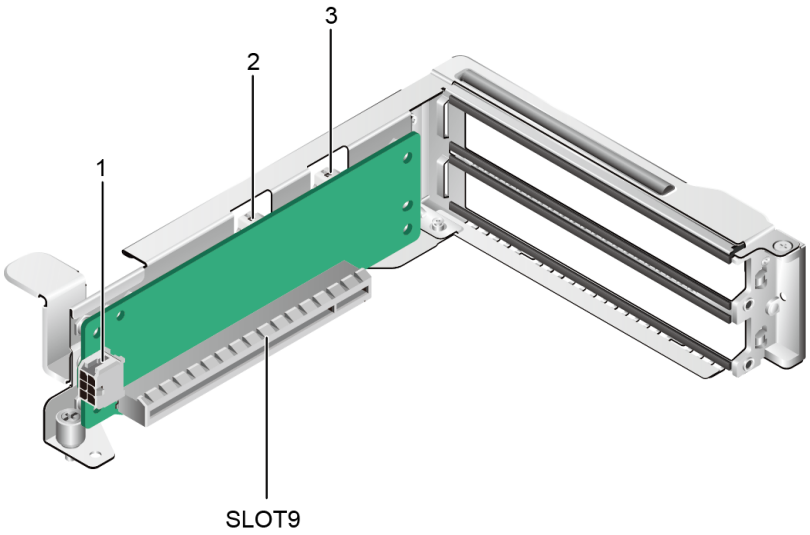

| | | | |
|---|---|---|---|
| 1 | UBC connector (UBC1/ J12) | 2 | NVMe power connector (PWR OUT/J18) |
| 3 | Signal connector (NVME BP/J19) | 4 | NC-SI connector (NCSI CONN/J3) |

- PCIe riser card in riser module 1 of the composite enclosure

  Provides PCIe slot 9 when installed in riser module 1 of the composite enclosure.

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**Figure 5-24** PCIe riser card in riser module 1 of the composite enclosure

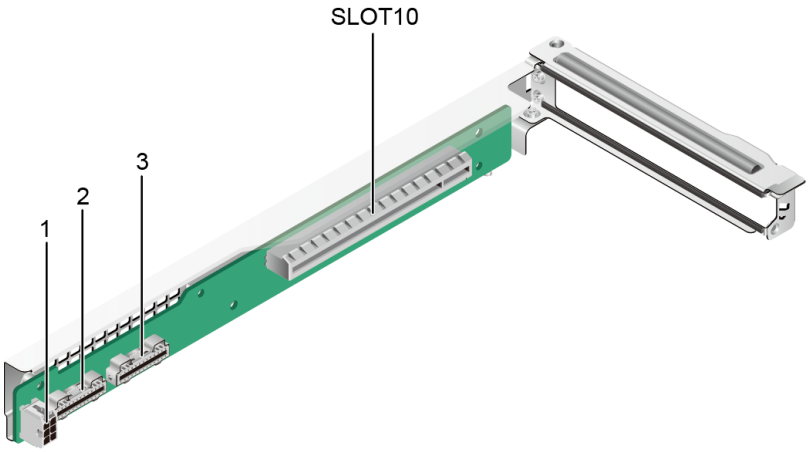



| | | | |
|---|---|---|---|
| 1 | Power connector (PWR_CONN/J4) | 2 | UBC connector (UBC2/J3) |
| 3 | UBC connector (UBC2/J3) | - | - |

- PCIe riser card in riser module 2 of the composite enclosure

  Provides PCIe slot 10 when installed in riser module 2 of the composite enclosure.

**Figure 5-25** PCIe riser card in riser module 2 of the composite enclosure

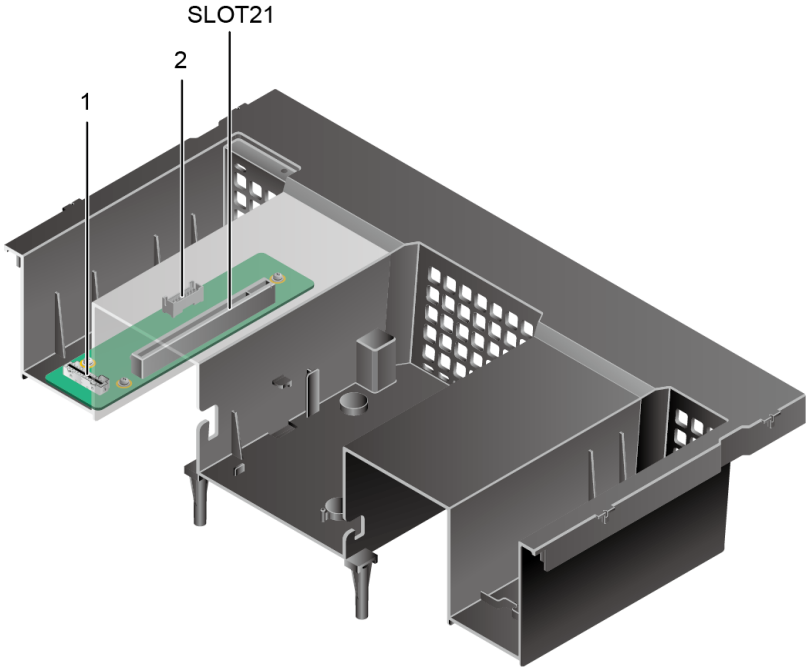



| | | | |
|---|---|---|---|
| 1 | Power connector (PWR_CONN/J4) | 2 | UBC connector (UBC2/J3) |
| 3 | UBC connector (UBC2/J3) | - | - |

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- PCIe riser card in the built-in module
  Provides PCIe slot 21 when installed in the built-in module.

**Figure 5-26** PCIe riser card in the built-in module




| | | | |
|---|---|---|---|
| 1 | UBC connector (J2) | 2 | Signal connector (J3) |

# 5.7.3 PCIe Slot Description

## PCIe Slot Information for Balanced Configuration

NOTE

The following table lists the PCIe port numbers mapped to CPUs. For details about the PCIe port numbers displayed on the BIOS screen, see the *Eagle Stream Platform BIOS Parameter Reference*.

**Table 5-12** PCIe slot description

| PCIe Riser Card | PCIe Riser Card Installation Position | PCIe Slot on the PCIe Riser Card | PCIe Slot or Port Description | CPU | PCIe Port Number | PCIe Device Supported by the PCIe Slot or Port |
|---|---|---|---|---|---|---|
| PCIe riser card | I/O module 1 | Slot 1 | PCIe 5.0 x16[a] (x16) [b] | CPU 1-SW1 | CPU 1-PE0 | HHHL |

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| PCIe Riser Card | PCIe Riser Card Installation Position | PCIe Slot on the PCIe Riser Card | PCIe Slot or Port Description | CPU | PCIe Port Number | PCIe Device Supported by the PCIe Slot or Port |
|---|---|---|---|---|---|---|
| of an I/O module | | Slot 2 | PCIe 5.0 x16 (x16) | CPU 1-SW1 | CPU 1-PE0 | HHHL |
| | | Slot 3 | PCIe 5.0 x16 (x16) | CPU 1 | CPU 1-PE4 | HHHL |
| | I/O module 2 | Slot 4 | PCIe 5.0 x16 (x16) | CPU 1-SW2 | CPU 1-PE2 | FHHL |
| | | Slot 5 | PCIe 5.0 x16 (x16) | CPU 1-SW2 | CPU 1-PE2 | FHHL |
| | | Slot 6 | PCIe 5.0 x16 (x16) | CPU 1 | CPU 1-PE3 | FHHL |
| | I/O module 3 | Slot 7 | PCIe 5.0 x16 (x16) | CPU 2-SW3 | CPU 2-PE0 | HHHL |
| | | Slot 8 | PCIe 5.0 x16 (x16) | CPU 2-SW3 | CPU 2-PE0 | HHHL |
| | | Slot 9 | PCIe 5.0 x16 (x16) | CPU 2 | CPU 2-PE4 | HHHL |
| | I/O module 4 | Slot 10 | PCIe 5.0 x16 (x16) | CPU 2-SW4 | CPU 2-PE2 | FHHL |
| | | Slot 11 | PCIe 5.0 x16 (x16) | CPU 2-SW4 | CPU 2-PE2 | FHHL |
| | | Slot 12 | PCIe 5.0 x16 (x16) | CPU 2 | CPU 2-PE3 | FHHL |
| Built-in PCIe riser card | Built-in RAID controller card | Slot 21 | PCIe 4.0 x8 | CPU 2 | CPU 2-PE1 | HHHL |
| - | BMC&OCP adapter module | Flex IO 1 | PCIe 5.0 x16 | CPU 1 | CPU 1-PE1 | OCP 3.0 specifications |

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| PCIe Riser Card | PCIe Riser Card Installation Position | PCIe Slot on the PCIe Riser Card | PCIe Slot or Port Description | CPU | PCIe Port Number | PCIe Device Supported by the PCIe Slot or Port |
|---|---|---|---|---|---|---|
| • a: **PCIe 5.0** refers to the PCIe of the fifth generation, and **x16** refers to the physical slot width.<br>• b: The **x16** in brackets indicates that the link bandwidth is x16.<br>• The PCIe x16 slots are compatible with PCIe x16, PCIe x8, PCIe x4, and PCIe x1 cards. The bandwidth of the PCIe slot cannot be less than that of the inserted PCIe card.<br>• The FHFL PCIe slots are compatible with FHFL PCIe cards, FHHL PCIe cards, and HHHL PCIe cards.<br>• The FHHL PCIe slots are compatible with FHHL PCIe cards and HHHL PCIe cards.<br>• The maximum power supply of each PCIe slot is 75 W. | | | | | | |

## PCIe Slot Information for High-Performance Configuration

NOTE

The following table lists the PCIe port numbers mapped to CPUs. For details about the PCIe port numbers displayed on the BIOS screen, see the *Eagle Stream Platform BIOS Parameter Reference*.

**Table 5-13** PCIe slot description

| PCIe Riser Card | PCIe Riser Card Installation Position | PCIe Slot on the PCIe Riser Card | PCIe Slot or Port Description | CPU | PCIe Port Number | PCIe Device Supported by the PCIe Slot or Port |
|---|---|---|---|---|---|---|
| PCIe riser card of an I/O module | I/O module 1 | Slot 1 | PCIe 5.0 x16[a] (x16) [b] | CPU 1-SW1 | CPU 1-PE0 | HHHL |
| | | Slot 2 | PCIe 5.0 x16 (x16) | CPU 1-SW1 | CPU1-PE4 | HHHL |
| | I/O module 2 | Slot 3 | PCIe 5.0 x16 (x16) | CPU 1-SW2 | CPU 1-PE2 | FHHL |
| | | Slot 4 | PCIe 5.0 x16 (x16) | CPU 1-SW2 | CPU1-PE3 | FHHL |

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| PCIe Riser Card | PCIe Riser Card Installation Position | PCIe Slot on the PCIe Riser Card | PCIe Slot or Port Description | CPU | PCIe Port Number | PCIe Device Supported by the PCIe Slot or Port |
|---|---|---|---|---|---|---|
| | I/O module 3 | Slot 5 | PCIe 5.0 x16 (x16) | CPU 2-SW3 | CPU 2-PE0 | HHHL |
| | | Slot 6 | PCIe 5.0 x16 (x16) | CPU 2-SW3 | CPU2-PE4 | HHHL |
| | I/O module 4 | Slot 7 | PCIe 5.0 x16 (x16) | CPU 2-SW4 | CPU 2-PE2 | FHHL |
| | | Slot 8 | PCIe 5.0 x16 (x16) | CPU 2-SW4 | CPU2-PE3 | FHHL |
| PCIe riser card of the composite enclosure | Riser module 1 of the composite enclosure | Slot9[c] | PCIe 5.0 x16 (x16) | CPU 1 | CPU 1 pass-through | FHHL |
| | Riser module 2 of the composite enclosure | Slot 10 | PCIe 5.0 x16 (x16) | CPU 1 | CPU 1 pass-through | FHHL |
| Built-in PCIe riser card | Built-in RAID controller card | Slot 21 | PCIe 4.0 x8 | CPU 2 | CPU 2-PE1 | HHHL |

- a: **PCIe 5.0** refers to the PCIe of the fifth generation, and **x16** refers to the physical slot width.
- b: The **x16** in brackets indicates that the link bandwidth is x16.
- c: Slot9 is used only in the DPU scenario. It is unavailable in other scenarios.
- The PCIe x16 slots are compatible with PCIe x16, PCIe x8, PCIe x4, and PCIe x1 cards. The bandwidth of the PCIe slot cannot be less than that of the inserted PCIe card.
- The FHFL PCIe slots are compatible with FHFL PCIe cards, FHHL PCIe cards, and HHHL PCIe cards.
- The FHHL PCIe slots are compatible with FHHL PCIe cards and HHHL PCIe cards.
- The maximum power supply of each PCIe slot is 75 W.

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### Server Bus/Device/Function Number (B/D/F) Information

The B/D/F information of the server may change with PCIe card configurations. You can obtain the B/D/F information of the server using the following methods:

- BIOS serial port log: If the serial port log has been collected, you can query the B/D/F information of the server by searching for the keyword **dumpiio**.
- UEFI Shell: You can obtain the B/D/F of the server running the **pci** command. Run the **help pci** command to obtain the specific usage of the **pci** command.
- The following describes how to obtain the B/D/F information on different OSs.
  - Linux OS: You can obtain the B/D/F information of the server running the **lspci -vvv** command.

    NOTE

    If the OS does not support the **lspci** command by default, obtain the **pci-utils** package from the **yum** source and install it to make the OS support the command.
  - Windows OS: After installing the **pci-utils** package, run the **lspci** command to obtain the B/D/F information of the server.
  - VMware OS: The **lspci** command is supported by default. You can directly obtain the B/D/F information of the server running the **lspci** command.

## 5.8 PSUs

- Supports hot swap.
- The PSUs are protected against short circuit. Double-pole fuse is provided for the PSUs with dual input live wires.
- If you want to use a DC power supply, purchase a DC power supply that meets the requirements of the safety standards or a DC power supply that has passed the CCC certification.
- The power consumption parameters vary with hardware configurations (including the configurations complying with EU ErP). For details, see Power Calculator on the technical support website.
- For details about the optional components, consult the local sales representative or see "OS and Parts Compatibilit" in the compatibility list on the technical support website.

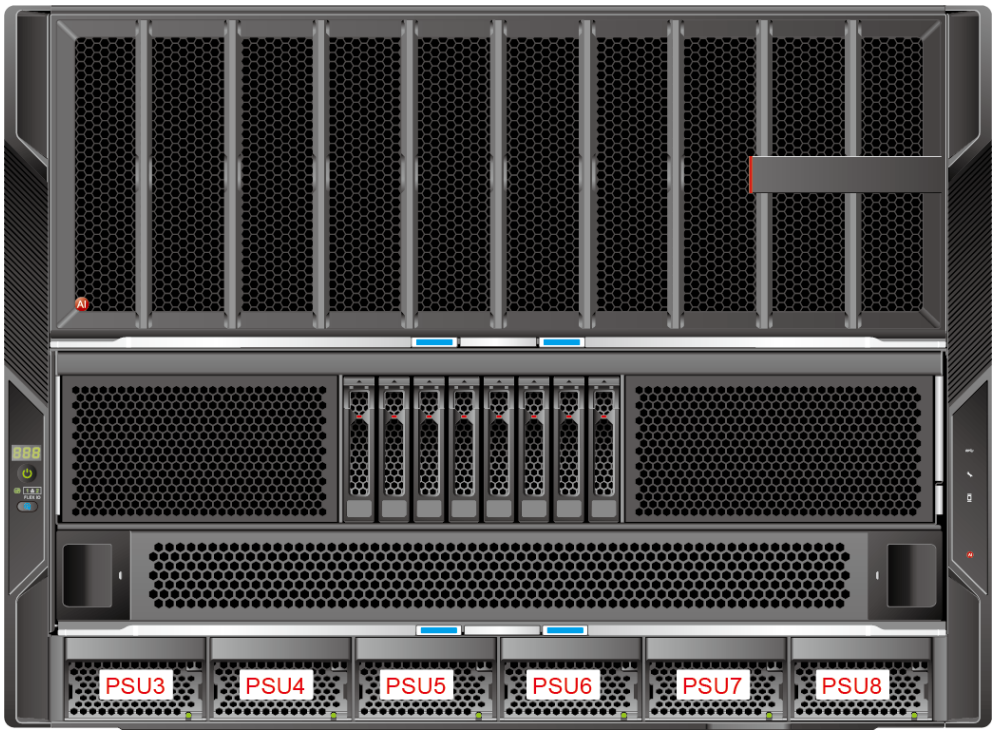
### 54 V Dual-Input PSUs

- The 54 V dual-input PSUs supply power to the GPUs and the 54 V fans that dissipates heat for the GPUs.
- Up to six PSUs can be configured. Each PSU supports 3000 W power. Cabinet-level N+N redundancy backup with 2+2, 3+1, 3+3, 4+2, and 5+1 configuration based on the load is supported.
  - 2+2 (6000 W)
  - 3+1 (9000 W)
  - 3+3 (9000 W)
  - 4+2 (12,000 W)
  - 5+1 (15,000 W)

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- Supports one AC power input or one 240 V DC power input from the external power supply.
- The P/N numbers of the 54 V dual-input PSUs configured on the same server must be the same.
- The 54 V dual-input PSUs are located at the front of the chassis. The PSUs are numbered from PSU 3 to PSU 8, as shown in **Figure 5-27**.
- The AC terminals of the 54 V dual-input PSUs are located at the rear of the chassis. Terminals A and terminals B are respectively on the left and right sides to facilitate cabinet deployment. The six terminals on the left correspond to terminals A on the six PSUs, and the six terminals on the right correspond to terminals B on the six PSUs.
- Two power cables are required for each 54 V PSU. In single-input mode, one power cable is required for each PSU.
- For more information about the PSUs, see the *FusionServer G8600 V7 Server Power Supply Technical White Paper*.

**Figure 5-27** Positions of the 54 V PSUs




## 12 V single-input PSUs

- The 12 V single-input PSUs supply power to the CPUs, mainboard, NICs, drives, and 12 V fans that dissipate heat for the mainboard.
- Up to two PSUs can be configured. Each PSU supports a maximum of 3000 W in 1+1 redundancy.

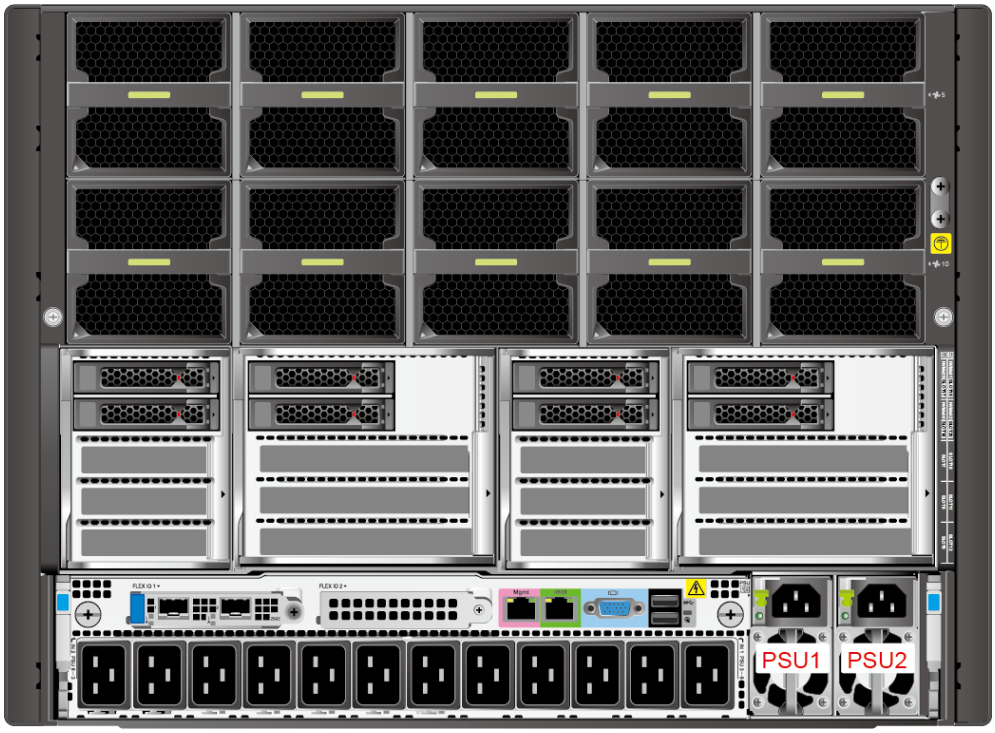
NOTE

A 12 V single-input PSU can be a 3000 W titanium PSU (maximum power), a 2000 W platinum PSU, or a 2000 W titanium PSU.

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- One AC power input or one 240 V DC power input from the external power supply is supported.
- The P/N numbers of the 12 V single-input PSUs configured on the same server must be the same.
- The 12 V single-input PSUs are located at the rear of the chassis. The PSUs are numbered PSU 1 and PSU 2, as shown in **Figure 5-28**.
- The 12 V PSUs are single-input PSUs. Each PSU is configured with one power cable.
- For more information about the PSUs, see the server *Power Technology White Paper*.

**Figure 5-28** Positions of the 12 V PSUs




## Cable Requirements

- **54 V PSUs**
  - When the dual-input mode is selected, the 3000 W PSU is connected to the C19 connector and is equipped with two C19 cables. The two terminals are connected to the PDUs of inputs A and B through one cable.
  - When the single-input mode is selected, the 3000 W PSU is connected to the C19 connector and is equipped with one C19 cable. One terminal is connected to the PDUs of inputs A and B through one cable.

  Take the PSU 3 in the 54 V PSUs as an example. When the dual-input mode is selected, the front PSU 3 terminals are PSU 3-A and PSU 3-B, as shown in **Figure 5-29**. PSU 3-A is connected to the PDU of input A through a C19 cable, and PSU 3-B is connected to the PDU of input B through another C19 cable.

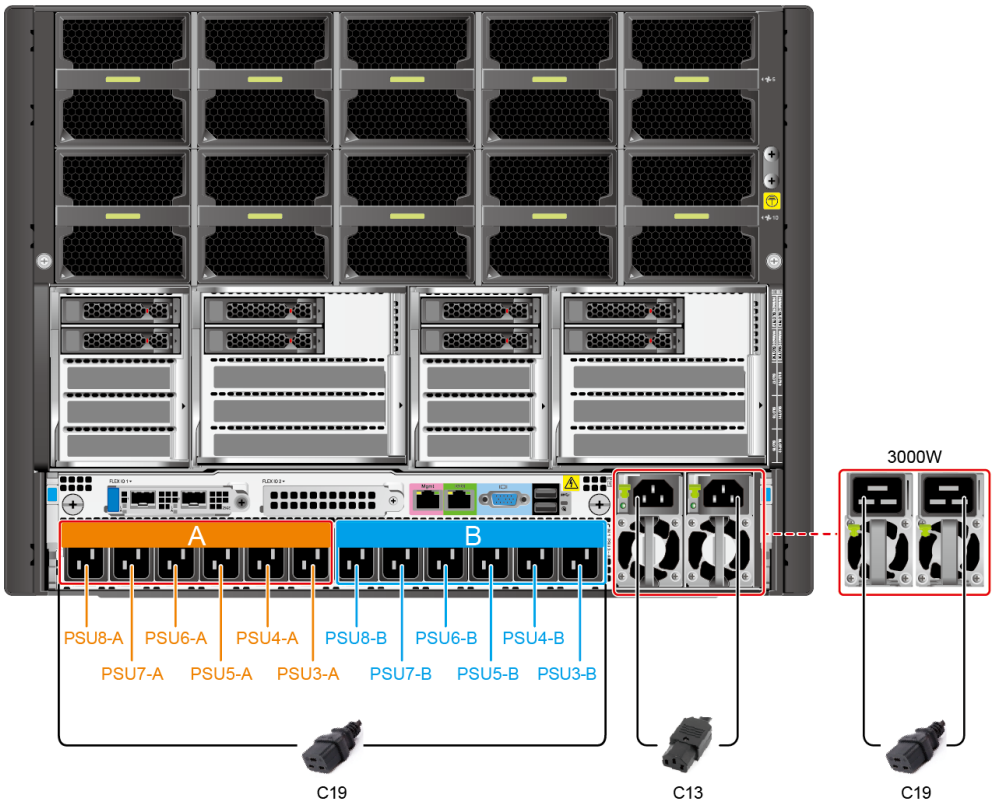
  Take the PSU 3 in the 54 V PSUs as an example. When the single-input mode is selected, the front PSU 3 terminal is PSU 3-A, as shown in **Figure 5-29**. The PSU 3-A is connected to the PDU of input A through a C19 cable.

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- **12 V PSUs**
  - When a PSU of 2000 W or less is used, it is connected to the C13 connector and is equipped with one C13 cable.
  - When a PSU of more than 2000 W is used, it is connected to the C19 connector and is equipped with one C19 cable.

  For example, two 12 V PSUs with power of more than 2000 W need to be configured with two C19 cables. It is recommended that PSU 1 be connected to the PDU of input A through a C19 cable, and PSU 2 be connected to the PDU of input B through another C19 cable.

**Figure 5-29** Connections of PDU connectors



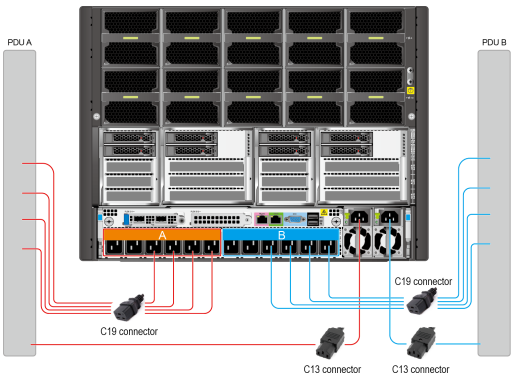
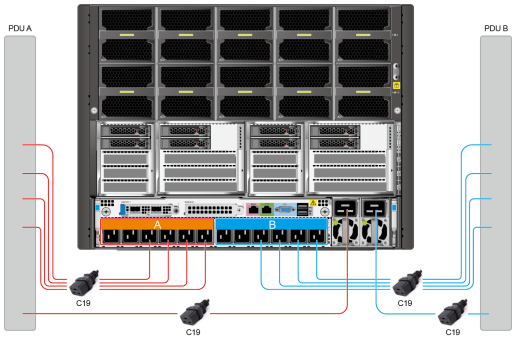

## Recommended Solution for Typical Configurations

Table 5-14 shows the recommended PSU configuration solutions when the server is configured with two types of GPUs.

**Table 5-14** Recommended solutions

| A100 GPU module (HGX A100 8-GPU) | H100 GPU module (HGX H100 8-GPU) |
| --- | --- |
| Recommended cabinet power consumption: 10 kW | Recommended cabinet power consumption: 12 kW |
| Power consumption of the entire system: 8 kW | Power consumption of the entire system: 10 kW |

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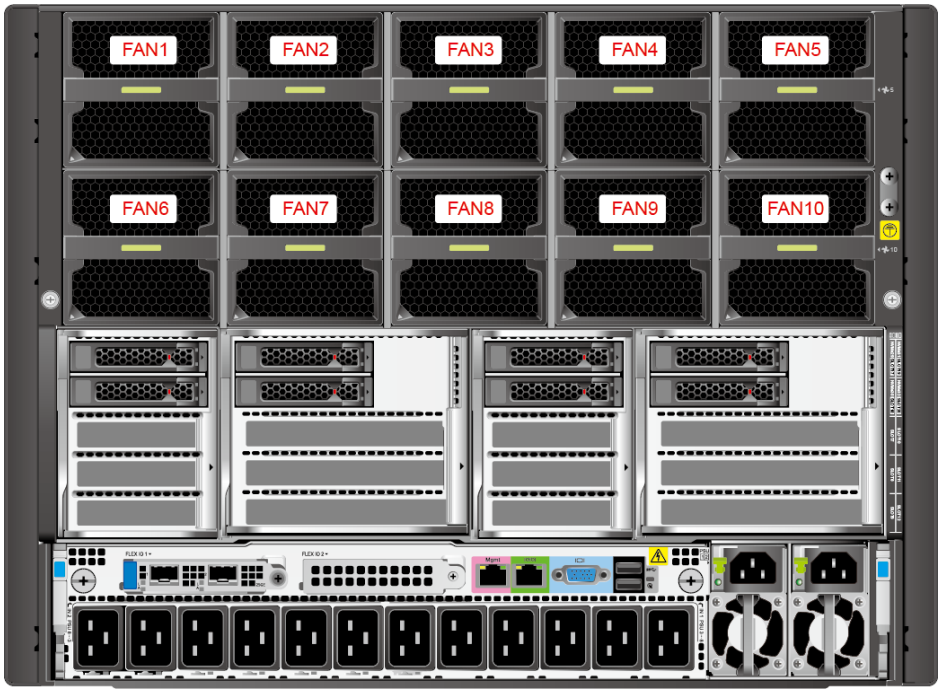
| A100 GPU module (HGX A100 8-GPU) | H100 GPU module (HGX H100 8-GPU) |
| --- | --- |
| Recommended PSU configurations:<br>Two 12 V 2000 W PSUs (1+1 redundancy)<br>Four 54 V 3000 W PSUs (2+2 redundancy, dual-input mode) | Recommended PSU configurations:<br>Two 12 V 3000 W PSUs (1+1 redundancy)<br>Four 54 V 3000 W PSUs (3+1 redundancy, dual-input mode) |
| Power cables:<br>2 x C13 cables + 8 x C19 cables | Power cables:<br>10 x C19 cables |
| Recommended slots:<br>12 V 2000 W PSU slots: PSU 1 and PSU 2.<br>54 V 3000 W PSU slots: PSU 3, PSU 4, PSU 5, and PSU 6. | Recommended slots:<br>12 V 3000 W PSU slots: PSU 1 and PSU 2.<br>54 V 3000 W PSU slots: PSU 3, PSU 4, PSU 5, and PSU 6. |
| Recommended PDU connection modes:<br>12 V 2000 W PSUs<br>• PSU 1 is connected to the PDU of input A through a C13 cable.<br>• PSU 2 is connected to the PDU of input B through a C13 cable.<br>54 V 3000 W PSUs<br>• The PSU 3-A, PSU 4-A, PSU 5-A, and PSU 6-A are connected to the PDU of input A through C19 cables.<br>• The PSU 3-B, PSU 4-B, PSU 5-B, and PSU 6-B are connected to the PDU of input B through C19 cables. | Recommended PDU connection modes:<br>12 V 3000 W PSUs<br>• PSU 1 is connected to the PDU of input A through a C19 cable.<br>• PSU 2 is connected to the PDU of input B through a C19 cable.<br>54 V 3000 W PSUs<br>• The PSU 3-A, PSU 4-A, PSU 5-A, and PSU 6-A are connected to the PDU of input A through C19 cables.<br>• The PSU 3-B, PSU 4-B, PSU 5-B, and PSU 6-B are connected to the PDU of input B through C19 cables. |
| **Figure 5-30** Connection mode of the A100<br> | **Figure 5-31** Connection mode of the H100<br> |

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# 5.9 Fan Modules

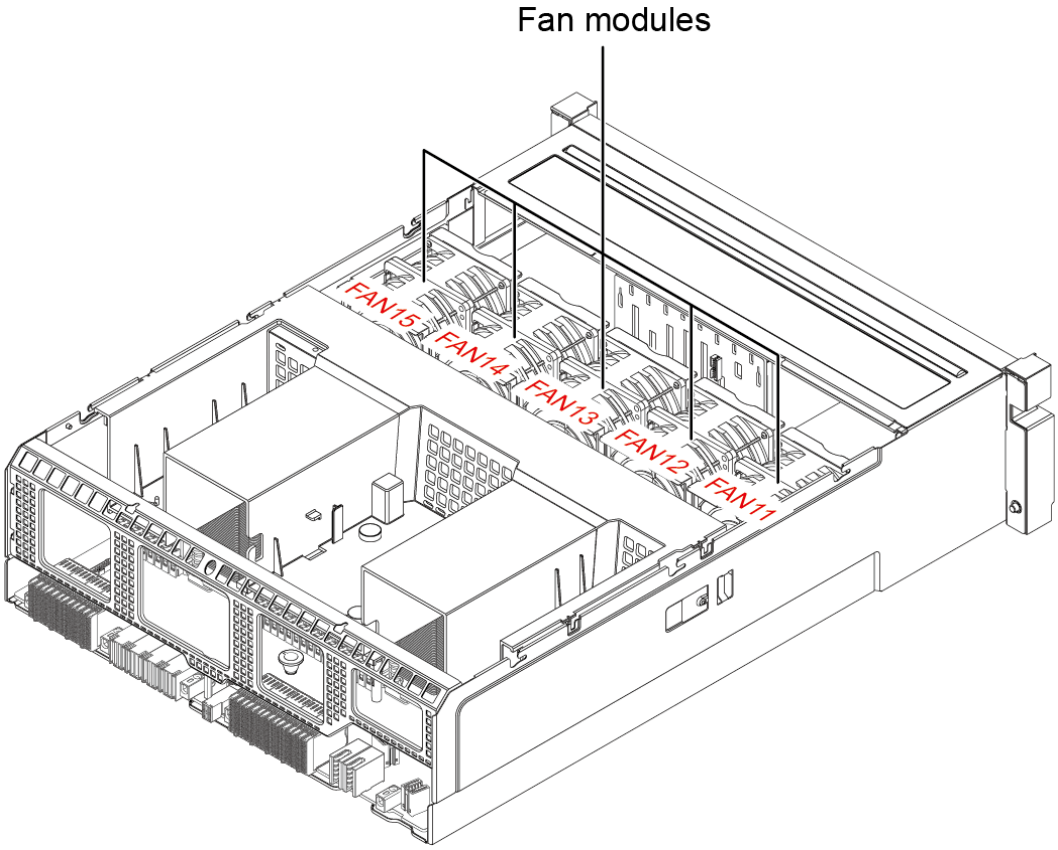
- Supports 15 fan modules. Ten of them are located on the rear panel to dissipate heat from the GPU modules. The other five are located in the system enclosure to dissipate heat from the CPUs, memory modules, drives, and NICs.
- Supports hot swap.
- Supports N+1 redundancy. That is, the server can work properly when a single fan fails.
- Supports intelligent fan speed adjustment.
- The P/N codes of the fan modules on the rear panel must be the same. The P/N codes of the fan modules in the system enclosure must be the same.

**Figure 5-32** Position of the fan module on the rear panel




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**Figure 5-33** Positions of the built-in fan modules in the system enclosure

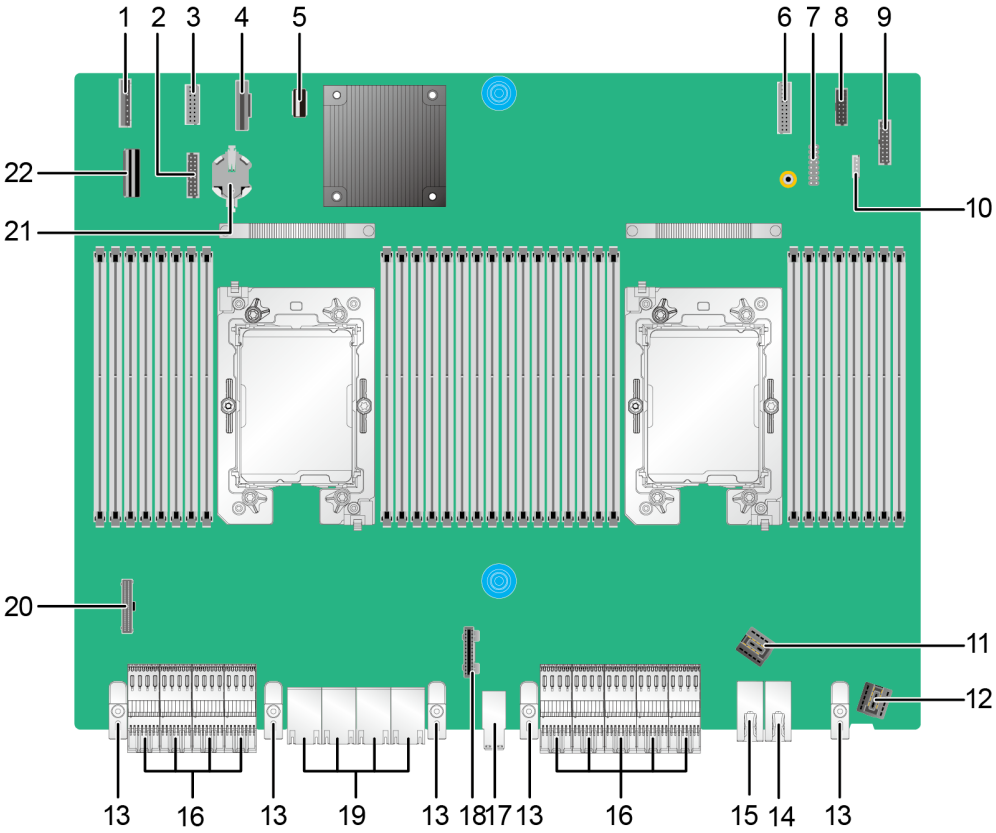



# 5.10 Board


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## 5.10.1 Mainboard

**Figure 5-34** Mainboard




| | | | |
|---|---|---|---|
| 1 | LCD connector (LCD CON/J31)[a] | 2 | RAID controller card low-speed signal connector (RAID MIS/J52) |
| 3 | M.2 low-speed signal connector (M.2MIS/J6063) | 4 | M.2 high-speed signal connector (PORT (A-B) M.2/J6104) |
| 5 | Built-in USB 3.0 connector (INNER USB3.0/J37) | 6 | Left mounting ear connector (L_EARBOARD/J6080) |
| 7 | TPM/TCM connector (TPM CONN/J6065) | 8 | Front-drive backplane low-speed signal connector (FRONT HDD BP/J6082) |
| 9 | 12 V fan board signal connector (FANBOARD/J61) | 10 | VROC key connector (VROC key/J6066)[a] |
| 11 | 12 V fan board power connector (FAN PWR/J6093) | 12 | Front-drive backplane power connector (HDD BP PWR/J6094) |


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| | | | |
|---|---|---|---|
| 13 | Backplane guide pin (J53, J54, J55, J56, and J57) | 14 | 12 V copper bar power connector (PWR IN/J58) |
| 15 | GND copper bar power connector (PWR GND/J59) | 16 | High-speed backplane connector (J43, J44, J45, J46, J47, J39, J40, J41, and J42) |
| 17 | BMC adapter board power connector (V_12V0_IN_OCP/J60) | 18 | RAID controller card high-speed signal connector (CPU1-RAID/J64) |
| 19 | BMC adapter board connector (J48, J66, J50, and J51) | 20 | Right mounting ear connector (R_EARBOARD/J6081) |
| 21 | RTC battery holder | 22 | PCH SATA (PCH-SATA/J38) |
| a: The reserved connector is temporarily unavailable. | | | |

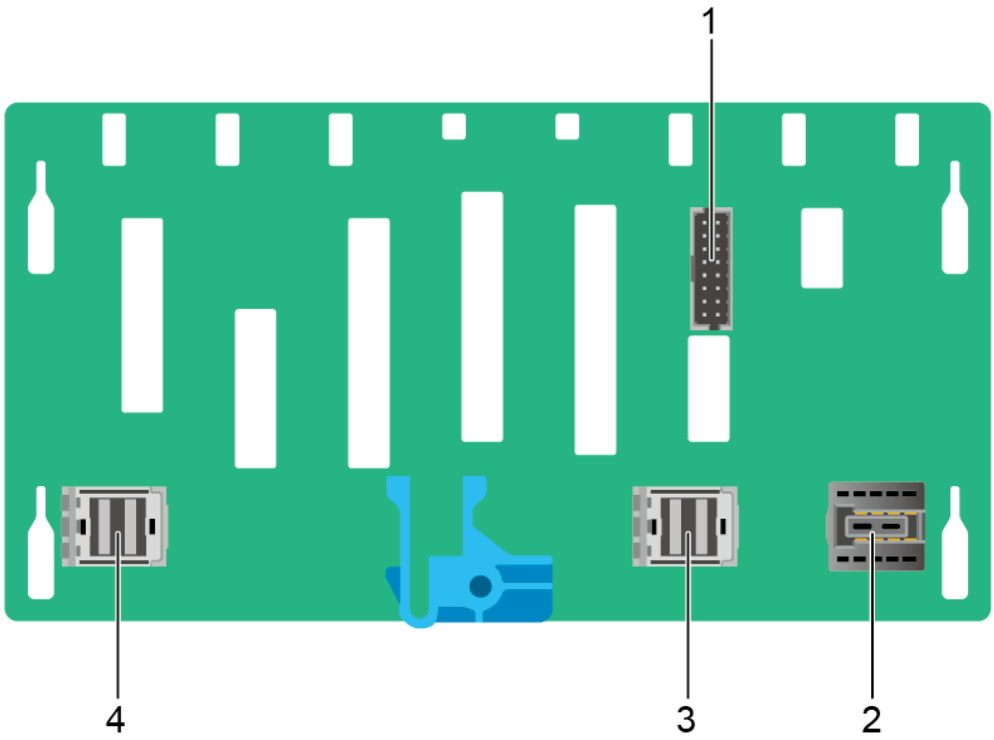
## 5.10.2 Drive Backplane

### Front-Drive Backplane

- 8 x 2.5" drive pass-through backplane

  All drive configurations in **5.5.1.1 8 x 2.5" Drive Configuration** support this backplane.

  **Figure 5-35** 8 x 2.5" drive pass-through backplane

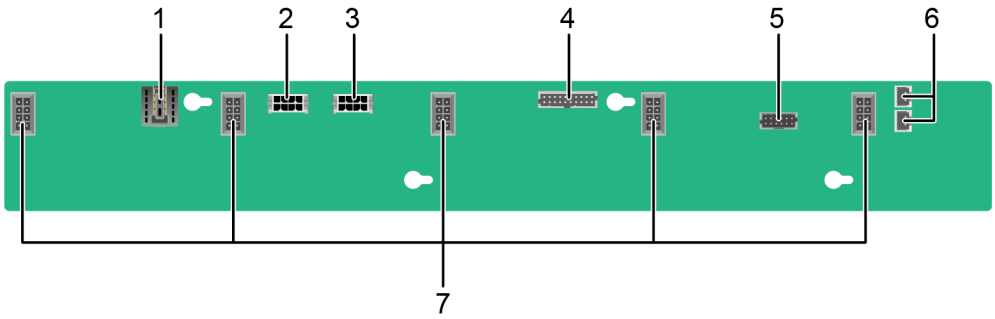



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| No. | Connector | Managed Drive Slot |
|---|---|---|
| 1 | Backplane signal cable connector (HDD BP/ J12) | - |
| 2 | Power connector (HDD_POWER/J14) | - |
| 3 | Mini-SAS HD connector (PORT A/J28) | Slots 0 to 3 |
| 4 | Mini-SAS HD connector (PORT B/J1) | Slots 4 to 7 |

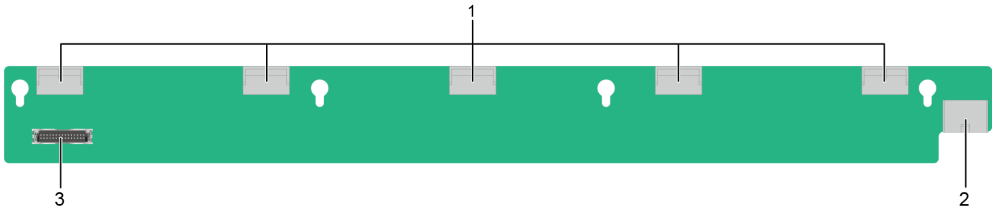
## 5.10.3 Fan Boards

**Figure 5-36** 12 V fan board




| | | | |
|---|---|---|---|
| 1 | Fan 1 to fan 5 power connector (12V_IN/J1) | 2 | LAAC1 connector (LAAC1/ J11) |
| 3 | LAAC2 connector (LAAC2/ J12) | 4 | Fan 1 to fan 5 board spurious signal connector (MISC CONN/J9) |
| 5 | LAAC JTAC connector (LAAC JTAG/J8) | 6 | Water cable connector (LIO LEAK1/J6, LIO PRES1/J7) |
| 7 | Fan connector (FAN5/J13, FAN4/J5, FAN3/J4, FAN2/J3, FAN1/J2) | - | - |

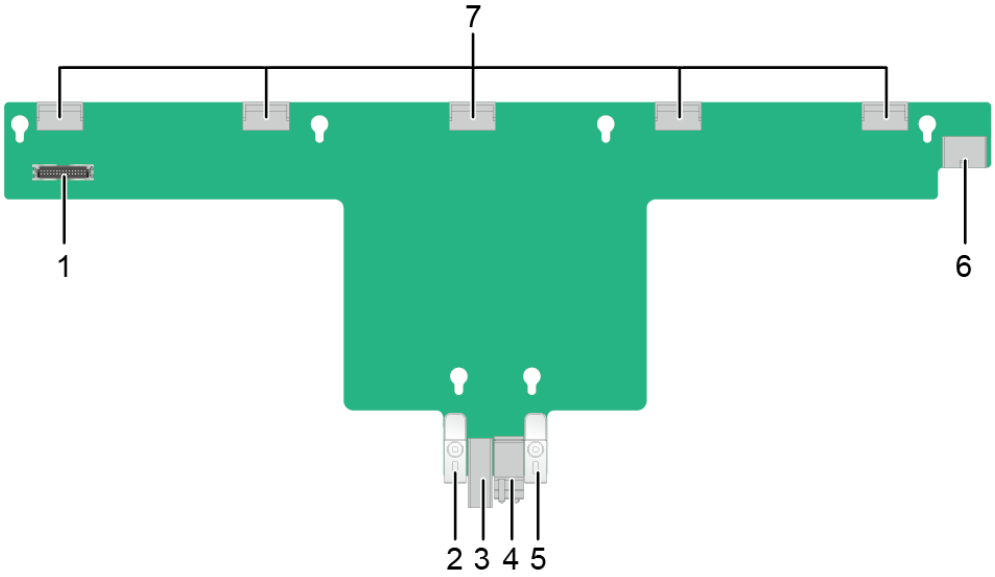
**Figure 5-37** Upper 54 V fan board




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| | | | |
|---|---|---|---|
| 1 | Fan connector (FAN1/J1, FAN2/J2, FAN3/J3, FAN4/J4, FAN5/J5) | 2 | Power connector (PWR_CONN/J7) |
| 3 | Spurious signal connector (MISC_CONN/J6) | - | - |

**Figure 5-38** Lower 54 V fan board

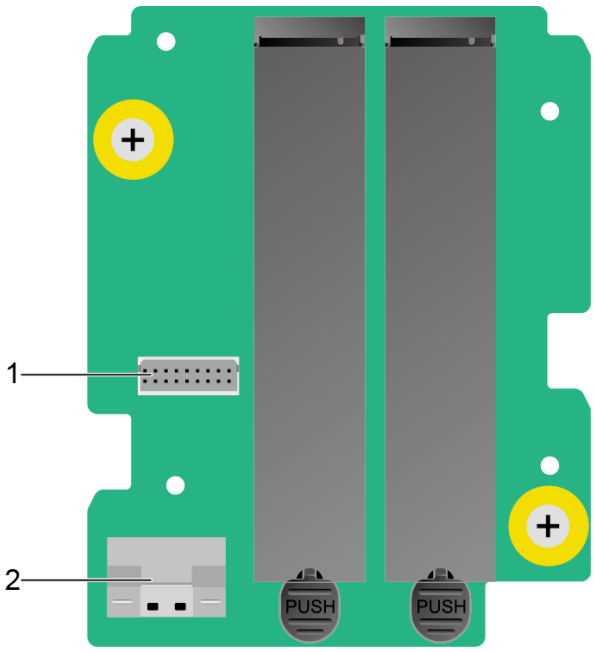



| | | | |
|---|---|---|---|
| 1 | Fan 1 to fan 5 board spurious signal connector (MISC_CONN/J1) | 2 | Guide column (J12) |
| 3 | Fan board power connector (J10) | 4 | Fan board spurious signal connector (J7) |
| 5 | Guide column (J11) | 6 | Fan 1 to fan 5 board power connector (PWR_CONN/J8) |
| 7 | Fan connector (FAN10/J6, FAN9/J5, FAN8/J4, FAN7/J3, FAN6/J2) | - | - |

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## 5.10.4 M.2 SSD Adapter Board

**Figure 5-39** M.2 SSD adapter board

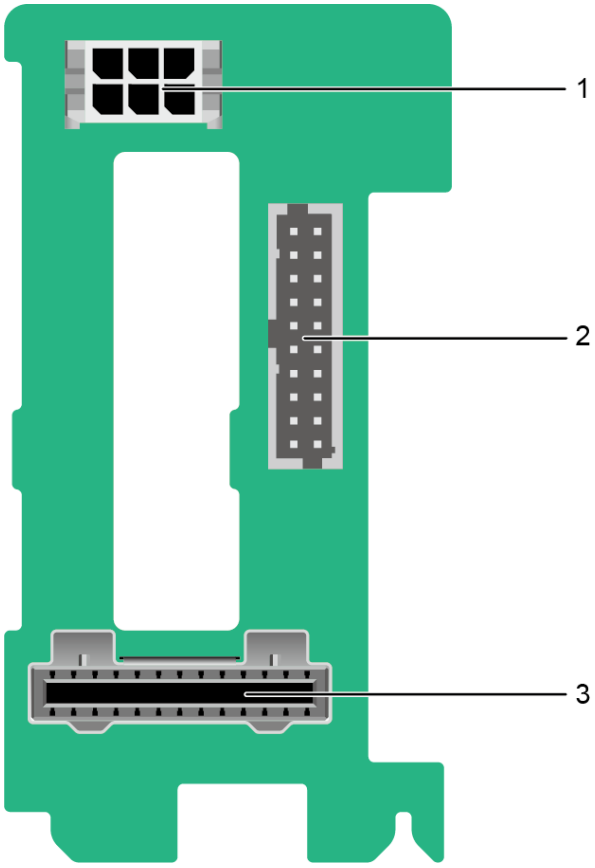



| | | | |
|---|---|---|---|
| 1 | Signal connector (J1) | 2 | High-speed connector (J2) |


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## 5.10.5 NVMe Adapter

**Figure 5-40** NVMe adapter

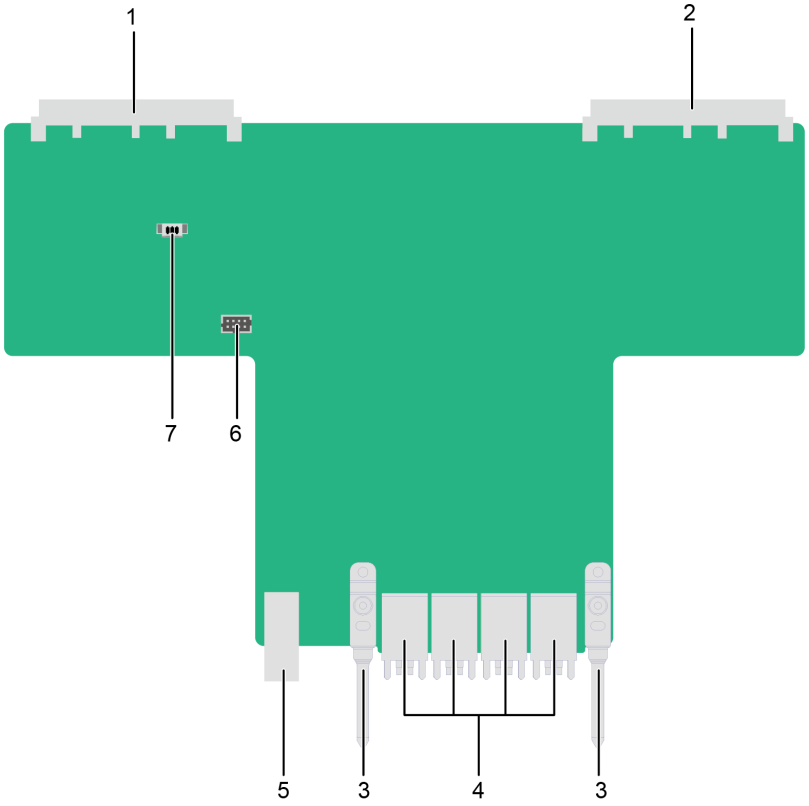



| | | | |
|---|---|---|---|
| 1 | Power connector (PWR-IN/J4) | 2 | Signal connector (NVME-BP/J5) |
| 3 | UBC connector (UBC1/J3) | - | - |


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## 5.10.6 BMC Adapter Board (Balanced)

**Figure 5-41** BMC adapter board

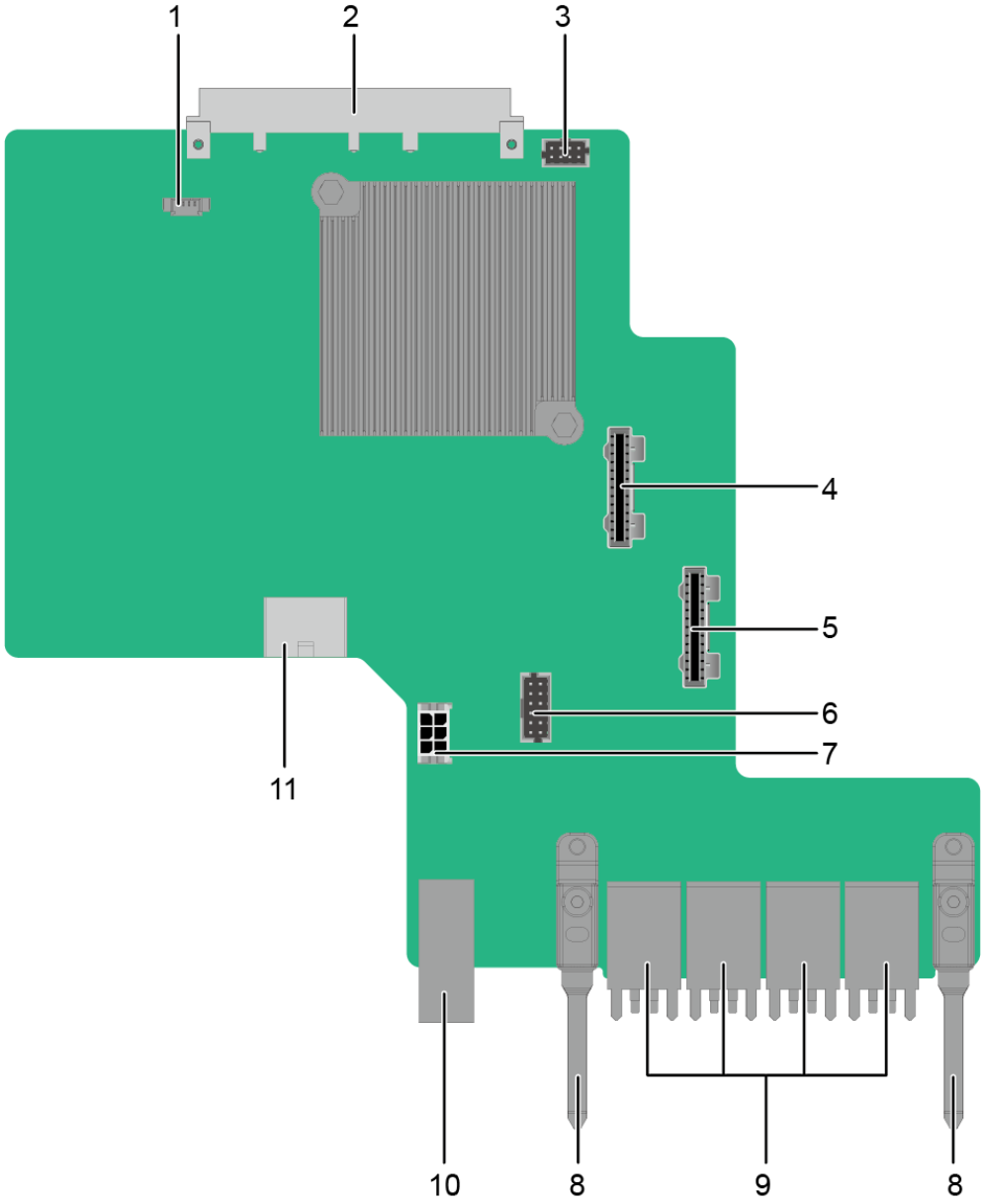



| | | | |
|---|---|---|---|
| 1 | 4C+ connector (BMC_CARD/J3) | 2 | 4C+ connector (OCP1_CARD/J5) |
| 3 | Guide pin (J11, J12) | 4 | High-speed connector (J7/J8/J9/J10) |
| 5 | Power connector (J1) | 6 | LCD UART connector (UART_CONN/J6)[a] |
| 7 | IIC DEBUG connector (DEBUG/J14) | - | - |
| a: The reserved connector is temporarily unavailable. | | | |

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# 5.10.7 BMC Adapter Board (High Performance)

**Figure 5-42** BMC adapter board




| | | | |
|---|---|---|---|
| 1 | IIC DEBUG connector (DEBUG/J14) | 2 | 4C+ connector (BMC_CARD/J3) |
| 3 | LCD UART connector (UART/J6)[a] | 4 | UBC connector 1A (UBC_1A/J5) |
| 5 | UBC connector 1B (UBC_1B/J4) | 6 | NC-SI connector (NCSI_CONN/J13) |

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| | | | |
|---|---|---|---|
| 7 | Riser card power connector (RISER_PWR/ J20) | 8 | Guide pins (J12/J11) |
| 9 | High-speed connectors (J10/J9/J8/J7) | 10 | Input power connector (J1) |
| 11 | Power connector (SDI_PWR/J19) | - | - |
| a: Reserved and unavailable currently. | | | |

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# 6 Product Specifications

6.1 Technical Specifications
6.2 Environmental Specifications
6.3 Physical Specifications

## 6.1 Technical Specifications

**Table 6-1** Technical specifications

| Category | Specification |
| --- | --- |
| Form factor | 8U AI server |
| Chipset | Emmitsburg PCH |

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| Category | Specification |
| --- | --- |
| Processor | Supports two processors<br>● The server supports the fourth-generation Intel® Xeon® Scalable processors (Sapphire Rapids) and the fifth-generation Intel® Xeon® Scalable processors (Emerald Rapids).<br>● Built-in memory controller and eight DIMM channels per processor<br>● Built-in PCIe controller, supporting PCIe 5.0 and 80 lanes per processor<br>● Three UltraPath Interconnect (UPI) buses between processors, providing up to 20 GT/s transmission per channel.<br>● Up to 64 cores.<br>● Max. 4.2 GHz turbo frequency<br>● Min. 2 MB L3 cache per core.<br>● Max. 385 W thermal design power (TDP).<br>**NOTE**<br>The preceding information is for reference only. For details, see "Search Parts" in the compatibility list on the technical support website. |
| Memory | 32 memory slots<br>● Up to 32 DDR5 DIMMs<br>– RDIMM or RDIMM-3DS supported<br>– Max. 5600 MT/s memory speed.<br>– The DDR5 memory modules of different types (RDIMM and RDIMM-3DS) and specifications (capacity, bit width, rank, and height) cannot be used together.<br>– A server must use DDR5 DIMMs of the same P/N code.<br>**NOTE**<br>The preceding information is for reference only. For details, see "Search Parts" in the compatibility list on the technical support website. |

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| Category | Specification |
| --- | --- |
| Storage | Supports a variety of drive configurations. For details, see **5.5.1 Drive Configuration and Drive Numbering**.<br>● 2 x M.2 SSDs<br>– M.2 SSDs are supported for VROC (SATA RAID) configuration when the server is configured with an M.2 SSD adapter card.<br>**NOTE**<br>● The M.2 SSD is used only as a boot device for installing the OS. Small-capacity (32 GB or 64 GB) M.2 SSDs do not support logging due to poor endurance. If a small-capacity M.2 SSD is used as the boot device, a dedicated log drive or log server is required for logging. For example, you can dump VMware logs in either of the following ways:<br>● Redirect **/scratch**. For details, see **https://kb.vmware.com/s/article/1033696**.<br>● Configure syslog. For details, see **https://kb.vmware.com/s/article/2003322**.<br>● The M.2 SSD cannot be used to store service data due to poor endurance. In write-intensive applications, the M.2 SSD will wear out in a short time.<br>If you want to use SSDs or HDDs as data storage devices, use enterprise-level SSDs or HDDs with high DWPD.<br>● The M.2 SSD is not recommended for write-intensive service software due to poor endurance.<br>● Do not use M.2 SSDs for cache.<br>● Hot-swappable SAS/SATA U.2 drives<br>● NVMe U.2 drives with support for orderly hot swap.<br>● Supports a variety of RAID controller cards.For details, visit the technical support website and see **Search Parts** in the compatibility list.<br>– The RAID controller card supports RAID configuration, RAID level migration, and drive roaming.<br>– The RAID controller card supports a supercapacitor for power-off protection to ensure user data security.<br>– The PCIe plug-in RAID controller card occupies one PCIe slot.<br>For details about the RAID controller card, see the server *RAID Controller Card User Guide*.<br>**NOTE**<br>If the BIOS is in legacy mode, the 4K drive cannot be used as the boot drive. |

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| Category | Specification |
| --- | --- |
| Network | The OCP 3.0 network adapters provide network expansion capabilities.<br>● Supports one OCP 3.0 NIC, which can be configured as required.<br>● Orderly hot swap.<br>● Supports a variety of OCP 3.0 NICs. For details, visit the technical support website and see **Search Parts** in the compatibility list. |
| I/O expansion | ● The balanced configuration supports 13 PCIe slots. One PCIe slot dedicated for an OCP 3.0 NIC and 12 standard PCIe slots.<br>● The high-performance configuration supports nine PCIe slots.<br>Nine standard PCIe slots.<br>For details, see **5.7.2 PCIe Slots** and **5.7.3 PCIe Slot Description**.<br>**NOTE**<br>The preceding information is for reference only. For details, see "Search Parts" in the compatibility list on the technical support website. |
| Port | A variety of ports.<br>● Ports on the front panel:<br>– One USB Type-C iBMC direct connect management port<br>– Two USB 3.0 ports<br>– One DB15 VGA port<br>● Ports on the rear panel:<br>– Two USB 3.0 ports<br>– One DB15 VGA port<br>– One RJ45 serial port<br>– One RJ45 management network port<br>**NOTE**<br>You are not advised to install the OS on the USB storage media. |
| Video card | An SM750 video chip with 32 MB display memory is integrated on the BMC card. The maximum display resolution is 1920 x 1200 at 60 Hz with 16M colors.<br>**NOTE**<br>● The integrated video card can provide the maximum display resolution (1920 x 1200) only after the video card driver matching the OS version is installed. Otherwise, only the default resolution supported by the OS is provided.<br>● If both the front and rear VGA ports are connected to monitors, only the monitor connected to the front VGA port displays information. |

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| Category | Specification |
| --- | --- |
| System management | • UEFI<br>• iBMC<br>• NC-SI<br>• Integration with third-party management systems |
| Security | • Power-on password<br>• Administrator password<br>• TPM/TCM (only for China)<br>• Secure boot |

# 6.2 Environmental Specifications

**Table 6-2** Environmental specifications

| Item | Specifications |
| --- | --- |
| Temperature | • Operating temperature: 5°C to 35°C (41°F to 95 °F), compliant with ASHRAE Classes A1 and A2<br>• Storage temperature (within three months): -30ºC to +60ºC (-22ºF to +140ºF)<br>• Storage temperature (within six months): –15ºC to +45ºC (5ºF to 113ºF)<br>• Storage temperature (within one year): –10ºC to +35ºC (14ºF to 95ºF)<br>• Maximum temperature change rate: 20ºC (36ºF) per hour, 5ºC (9ºF) per 15 minutes<br>**NOTE**<br>The highest operating temperature varies depending on the server configuration. For details, see **A.3 Operating Temperature Limitations**. |
| Relative humidity (non-condensing) | • Operating humidity: 8% to 90%<br>• Storage humidity (within three months): 8% to 85%<br>• Storage humidity (within six months): 8% to 80%<br>• Storage humidity (within one year): 20% to 75%<br>• Maximum rate of humidity change: 20% per hour<br>• Operational climatic range category<br>8% RH with -12°C (10.4°F) minimum dew point to 90% RH with 21°C (69.8°F) maximum dew point (ASHRAE Classes A2 compliant) |
| Air volume | 280CFM~1600CFM |

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| Item | Specifications |
| --- | --- |
| Operating altitude | ≤3050m<br>● When the server configuration complies with ASHRAE Classes A1 and A2 and the altitude is above 900 m (2952.76 ft), the highest operating temperature decreases by 1ºC (1.8ºF) for every increase of 300 m (984.24 ft).<br>● HDDs cannot be used at an altitude of over 3050 m (10,006.56 ft). |
| Corrosive gaseous contaminant | Maximum growth rate of the corrosion product thickness:<br>● Copper corrosion rate test: 300 Å/month (meeting level G1 requirements of the ANSI/ISA-71.04-2013 standard on gaseous corrosion)<br>● Silver corrosion rate test: 200 Å/month |
| Particle contaminant | ● Meets the requirements of ISO 14664-1 Class 8.<br>● There is no explosive, conductive, magnetic, or corrosive dust in the equipment room.<br>**NOTE**<br>It is recommended that the particulate pollution in the equipment room be monitored by a professional agency. |
| Noise | The declared A-weighted sound power levels (LWAd) and declared average bystander position A-weighted sound pressure levels (LpAm) listed are measured at 23ºC (73.4ºF) in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109).<br>● Idle:<br>– LWAd: 7.15 Bels<br>– LpAm: 55.2 dBA<br>● Operating:<br>– LWAd: 7.18 Bels<br>– LpAm: 55.5 dBA<br>**NOTE**<br>Actual sound levels generated during operation vary depending on the configuration, load, and ambient temperature. |

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NOTE

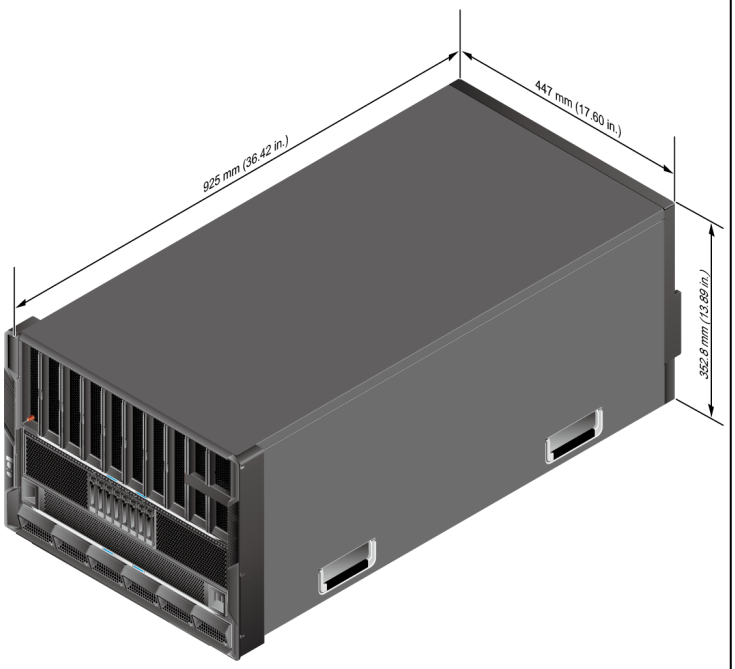
SSDs and HDDs (including NL-SAS, SAS, and SATA) cannot be preserved for a long time in the power-off state. Data may be lost or faults may occur if the preservation duration exceeds the specified maximum duration. When drives are preserved under the storage temperature and humidity specified in the preceding table, the following preservation duration is recommended:

- Maximum preservation duration of SSDs:
  - 12 months in power-off state without data stored
  - 3 months in power-off state with data stored
- Maximum preservation duration of HDDs:
  - 6 months in unpacked/packed and powered-off state
- The maximum preservation duration is determined according to the preservation specifications provided by drive vendors. For details, see the manuals provided by drive vendors.

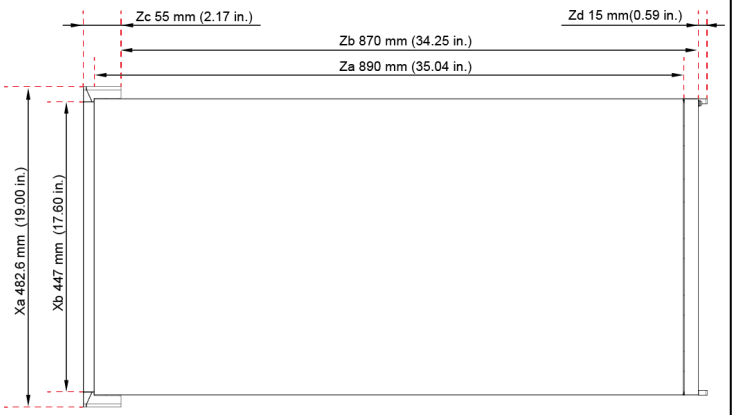
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# 6.3 Physical Specifications

**Table 6-3** Physical specifications

| Indicator | Description |
| --- | --- |
| Dimensions (H x W x D) | 352.8 mm x 447 mm x 925 mm (13.89 in. x 17.60 in. x 36.42 in.)<br><br>**Figure 6-1** Physical dimensions<br><br><br>Za (distance between front and rear panel): 890 mm (35.04 in.)<br>Zb (distance between the back of the mounting bar and the rear panel): 870 mm (34.25 in.)<br>Zc (distance between the front panel and the back of the mounting bar): 55 mm (2.17 in.)<br>Zd (thickness of the silkscreen): 15 mm (0.59 in.)<br>Xa (maximum width of the cabinet): 482.6 mm (19.00 in.)<br>Xb (width of the chassis): 447 mm (17.60 in.) |

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| Indicator | Description |
| --- | --- |
| | **Figure 6-2** Dimensions of the cabinet<br> |
| Installation space | ● Requirements for cabinet installation:<br>Cabinet compliant with the International Electrotechnical Commission (IEC) 297 standard<br>– Cabinet width: 482.6 mm (19.00 in.)<br>– Cabinet depth ≥ 1100 mm (43.31 in.)<br>● Requirements for guide rails installation:<br>– Adjustable L-shaped guide rails apply to cabinets with a distance of 610 mm to 950 mm (24.02 in. to 37.40 in.) between the front and rear mounting bars. |
| Weight in full configuration | ● Net weight:<br>Maximum weight for a server with 8 x 2.5" drives: 127 kg (279.99 lb)<br>● Packaging materials: 30.1 kg (66.36 lb) |
| Power consumption | Power consumption parameters vary with server configurations (including ErP-standard configurations). For details, see Power Calculator on the technical support website. |

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# 7 Software and Hardware Compatibility

For details about the OS and hardware, see the compatibility list on the technical support website.

**NOTICE**

- If incompatible components are used, the device may be abnormal. Such a fault is beyond the scope of technical support and warranty.
- The performance of servers is closely related to application software, basic middleware software, and hardware. The slight differences of the application software, middleware basic software, and hardware may cause performance inconsistency between the application layer and test software layer.
  - If the customer has requirements on the performance of specific application software, contact technical support to apply for proof of concept (POC) tests in the pre-sales phase to determine detailed software and hardware configurations.
  - If the customer has requirements on hardware performance consistency, specify the specific configuration requirements (for example, specific drive models, RAID controller cards, or firmware versions) in the presales phase.

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# 8 Safety Instructions

8.1 Security

8.2 Maintenance and Warranty

## 8.1 Security

### General Statement

- Comply with local laws and regulations when operating devices. These safety instructions are only a supplement.
- The "DANGER", "WARNING", and "CAUTION" information in this document does not represent all the safety instructions, but supplements to the safety instructions.
- Observe all safety instructions provided on the device labels when installing hardware. Follow them in conjunction with these Safety Instructions.
- Operators of special types of work (such as electricians and operators of forklifts) must be certified or authorized by the local government or authority.

**WARNING**

In a household scenario, operation of this device may cause wireless interference.

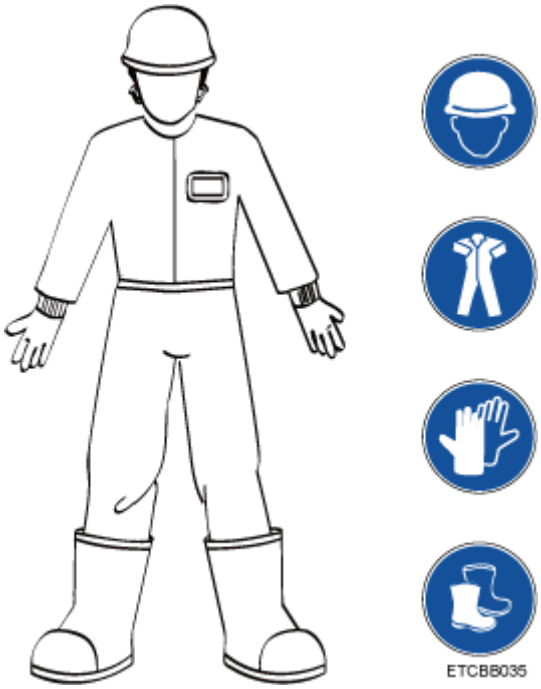
### Personal Safety

- This device is not suitable for use in places where children may be present.
- Only certified or authorized personnel are allowed to install device.
- Discontinue any dangerous operations and take protective measures. Report anything that could cause personal injury or device damage to a project supervisor.
- Do not move devices or install cabinets and power cables in hazardous weather conditions.

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- Do not carry the weight that is over the maximum load per person allowed by local laws or regulations. Check the maximum device weight and arrange required personnel.
- Wear clean protective gloves, ESD clothing, a protective hat, and protective shoes, as shown in **Figure 8-1**.

**Figure 8-1** Protective clothing




- Before touching a device, wear ESD clothing and gloves (or wrist strap), and remove conductive objects (such as watches and jewelry). **Figure 8-2** shows conductive objects that must be removed before you touch a device.

**Figure 8-2** Removing conductive objects

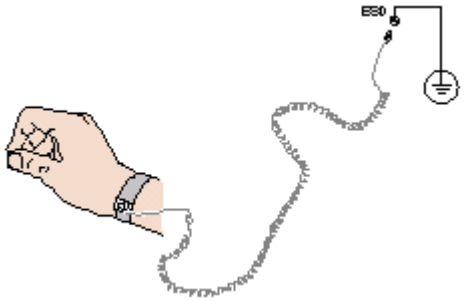



**Figure 8-3** shows how to wear an ESD wrist strap.

a. Put your hands into the ESD wrist strap.
b. Fasten the strap buckle and ensure that the ESD wrist strap is in contact with your skin.
c. Insert the ground terminal attached to the ESD wrist strap into the jack on the grounded cabinet or chassis.

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**Figure 8-3** Wearing an ESD wrist strap



- Exercise caution when using tools.
- If the installation position of a device is higher than the shoulders of the installation personnel, use a vehicle such as a lift to facilitate installation. Prevent the device from falling down and causing personal injury or damage to the device.
- The device is powered by high-voltage power sources. Direct or indirect contact (especially through damp objects) with high-voltage power sources may result in serious injury or death.
- Ground a device before powering it on. Otherwise, high voltage leakage current may cause personal injury.
- When a ladder is used, ensure that another person holds the ladder steady to prevent accidents.
- Do not look into optical ports without eye protection when installing, testing, or replacing optical cables.

## Device Security

- Use the recommended power cables at all times.
- Use power cables only for dedicated servers. Do not use them for other devices.
- Use dedicated power cables to ensure equipment and personal safety.
- When moving a device, hold the bottom of the device. Do not hold the handles of the installed modules, such as the PSUs, fan modules, drives, and the mainboard. Handle the device with care.
- Exercise caution to prevent damage to the device when using tools during installation or maintenance.
- Connect the primary and secondary power cables to different power distribution units (PDUs) to ensure reliable device operation.
- Ground a device before powering it on. Otherwise, high voltage leakage current may cause device damage.

## Transportation Precautions

Improper transportation may damage device. Contact the manufacturer for precautions before attempting transportation.

Transportation precautions include but are not limited to:

- The logistics company engaged to transport the device must be reliable and comply with international standards for transporting electronics. Ensure that the

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device being transported is always kept upright. Take necessary precautions to prevent collisions, corrosion, package damage, damp conditions, and pollution.

- Transport each device in its original packaging.
- If the original packaging is unavailable, package heavy, bulky parts (such as chassis and blades) and fragile parts (such as PCIe cards and optical modules) separately.

  NOTE

  For details about components supported by the server, see "Search Parts" in the compatibility list on the technical support website.
- Ensure that all devices are powered off before transportation.

### Maximum Weight Carried by a Person

CAUTION

The maximum weight allowed to be carried by a person is subject to local laws or regulations. The markings on the device and the descriptions in the documentation are for reference only.

Table 8-1 lists the maximum weight a person is permitted to carry as stipulated by a number of organizations.

**Table 8-1** Maximum weight carried per person

| Organization | Weight (kg/lb) |
| --- | --- |
| 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 |
| General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) | • Male: 15/33.08<br>• Female: 10/22.05 |

For more information about safety instructions, see *Server Safety Information*.

## 8.2 Maintenance and Warranty

For details about the maintenance policy, visit **Customer Support Service**.

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For details about the warranty policy, visit **Warranty**.

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# 9 System Management

The server the new-generation Intelligent Baseboard Management Controller (iBMC), which complies with Intelligent Platform Management Interface 2.0 (IPMI 2.0) specifications and provides highly reliable hardware monitoring and management.

The iBMC supports the following features and protocols:

- Various management interfaces

  The iBMC provides the following standard interfaces to meet various system integration requirements:

  – DCMI 1.5 interface
  – IPMI 1.5/IPMI 2.0 interface
  – Command-line interface
  – Redfish interface
  – Hypertext Transfer Protocol Secure (HTTPS)
  – Simple Network Management Protocol (SNMP)
- Fault monitoring and diagnosis

  Faults can be detected and rectified in advance to ensure 24/7 stable running of the device.

  – The iBMC allows screenshots and videos to be created when the system breaks down, facilitating cause analysis of the system breakdown.
  – The iBMC offers screen snapshots and videos, simplifying routine preventive maintenance, recording, and auditing.
  – The fault diagnose management (FDM) function supports component-based precise fault diagnosis, facilitating component fault locating and replacement.
  – The iBMC supports the reporting of alarms through syslog packets, trap packets, and emails, helping the upper-layer NMS to collect the fault information about the server.
- Security management
  – Software image backup improves system security. Even if the running software breaks down, the system can be started from the backup image.
  – Diversified user security control interfaces are provided to ensure user login security.

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  - Multiple types of certificates can be imported and replaced to ensure data transmission security.
- System maintenance interface
  - The virtual KVM and virtual media functions facilitate remote maintenance.
  - Out-of-band RAID monitoring and configuration are supported to improve RAID configuration efficiency and management capability.
  - Smart Provisioning provides a convenient operation interface for installing the OS, configuring RAID, and performing the upgrade without a CD-ROM.
- Various network protocols
  - The NTP synchronizes network time to optimize time configuration.
  - The iBMC supports domain name system (DNS) and Lightweight Directory Application Protocol (LDAP) to implement domain management and directory service.
- Intelligent power management
  - The power capping technology helps you easily improve deployment density.
  - The iBMC uses dynamic power saving to reduce operational expenditure (OPEX).
- License Management

  By managing licenses, you can use the features of the iBMC advanced edition in authorization mode.

  Compared with the standard edition, the iBMC advanced edition provides more advanced features, such as:
  - Implements the OS deployment using Redfish.
  - Collect the original data of intelligent diagnosis using Redfish.

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# 10 Certification

| Country/Region | Certification | Standard |
| --- | --- | --- |
| Europe | WEEE | 2012/19/EU |
| | REACH | EC NO. 1907/2006 |
| | CE | Safety:<br>EN 62368-1:2014+A11:2017<br>EMC:<br>EN 55032:2015+A11:2020 CISPR 32:2015+A1:2019<br>EN IEC 61000-3-12:2011<br>EN 61000-3-11:2017<br>EN 55035:2017+A11:2020<br>CISPR 35:2016<br>EN 55024:2010+A1:2015<br>CISPR 24:2010+A1:2015<br>ETSI EN 300 386 V2.1.1:2016<br>RoHS: EN IEC 63000:2018<br>ErP:<br>Commission Regulation(EU) 424/2019 |

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| Country/Region | Certification | Standard |
| --- | --- | --- |
| UK | UKCA | Safety:<br>EN 62368-1:2014+A11:2017<br>EMC:<br>EN 55032:2015+A11:2020 CISPR 32:2015+A1:2019<br>EN IEC 61000-3-12:2011<br>EN 61000-3-11:2017<br>EN 55035:2017+A11:2020<br>CISPR 35:2016<br>EN 55024:2010+A1:2015<br>CISPR 24:2010+A1:2015<br>ETSI EN 300 386 V2.1.1:2016<br>RoHS: EN IEC 63000:2018<br>ErP:<br>Commission Regulation(EU) 424/2019 |
| China | RoHS | SJ/T-11364<br>GB/T 26572 |
| | CQC | GB 4943.1-2022<br>GB / T 9254.1-2021 (Class A))<br>GB 17625.1-2022 |
| US | FCC | FCC PART 15 |
| Canada | IC | ICES-003 |
| Japan | VCCI | VCCI 32-1 |
| Global | CB | IEC 62368-1:2014 |

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# 11 Waste Product Recycling

If product users need product recycling service provided by xFusion after products are scrapped, contact technical support for services.

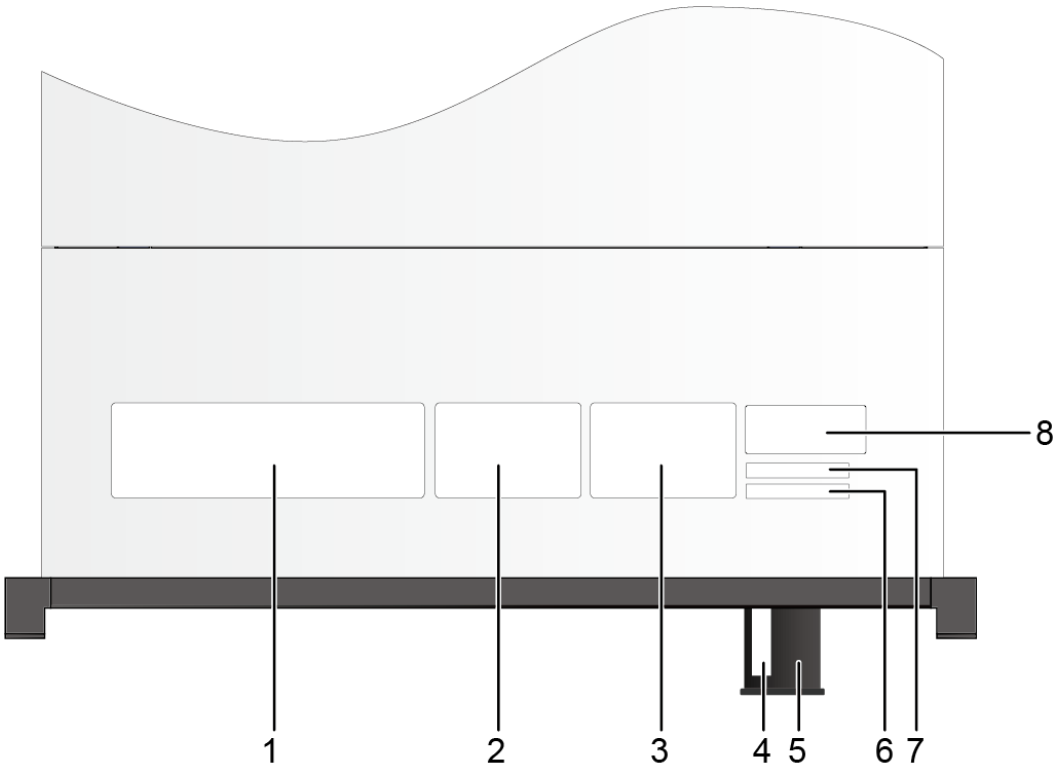
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# A Appendix

## A.1 Chassis Label Information

### A.1.1 Chassis Head Label

**Figure A-1** Chassis Head Label




| | | | |
|---|---|---|---|
| 1 | Nameplate | 2 | Certificate |

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| | | | |
|---|---|---|---|
| 3 | Quick access label | 4 | Product SN<br>**NOTE**<br>For details, see **A.2 SN**. |
| 5 | Slide-out label plate<br>**NOTE**<br>The location of the slide-out label plate varies depending on the server model or configuration. For details, see **5.1.1 Appearance**. | 6 | SN<br>**NOTE**<br>For details, see **A.2 SN**. |
| 7 | Reserved space for customized label | 8 | Pressure-proof label<br>**NOTE**<br>This label warns users not place any objects on top of a rack-mounted device. |

### A.1.1.1 Nameplate

**Figure A-2** Nameplate example

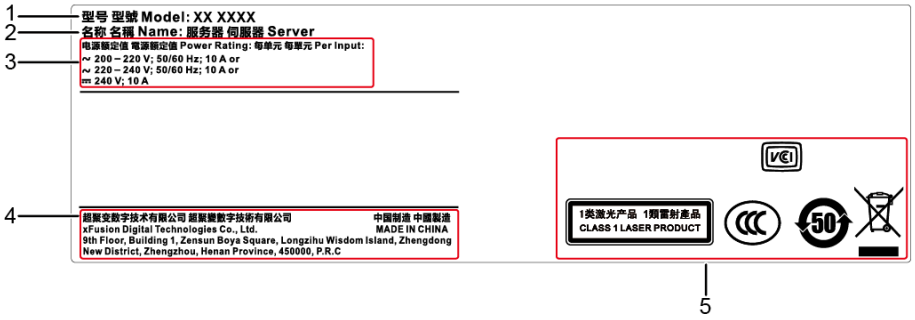



**Table A-1** Nameplate description

| No. | Description |
|---|---|
| 1 | Server model<br>**NOTE**<br>For details, see **A.4 Nameplate**. |
| 2 | Device name |
| 3 | Power supply requirements |
| 4 | Vendor information |
| 5 | Certification marks |

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### A.1.1.2 Certificate

**Figure A-3** Certificate example




**Table A-2** Certificate description

| No. | Description |
| --- | --- |
| 1 | Order |
| 2 | No.<br>**NOTE**<br>For details, see **Figure A-4** and **Table A-3**. |
| 3 | QC inspector |
| 4 | Production date |
| 5 | No. barcode |

**Figure A-4** Certificate number example

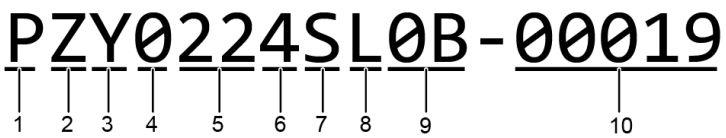



**Table A-3** Certificate number description

| No. | Description |
| --- | --- |
| 1 | **P**: a fixed value for this digit |
| 2 | **Z**: a fixed value for this digit |
| 3 | • **Y**: a server<br>• **B**: a semi-finished server<br>• **N**: a spare part |

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| No. | Description |
| --- | --- |
| 4 | **0**: a value for the reserved digit |
| 5 | Year (two characters) |
| 6 | Month (one character)<br>● Digits 1 to 9 indicate January to September respectively.<br>● Letters A to C indicate October to December respectively. |
| 7 | Day (one character)<br>● Digits 1 to 9 indicate the 1st to 9th.<br>● Letters A to H indicate the 10th to 17th.<br>● Letters J to N indicate the 18th to 22nd.<br>● Letters P to Y indicate the 23rd to 31st. |
| 8 | Hour (one character)<br>● Digits 0 to 9 indicate 0:00 to 9:00.<br>● Letters A to H indicate 10:00 to 17:00.<br>● Letters J to N indicate 18:00 to 22:00.<br>● Letters P to Q indicate 23:00 to 24:00. |
| 9 | Serial number (two characters). |
| 10 | Manufacturing serial number (five characters). |

### A.1.1.3 Quick Access Label

**Figure A-5** Quick access label example

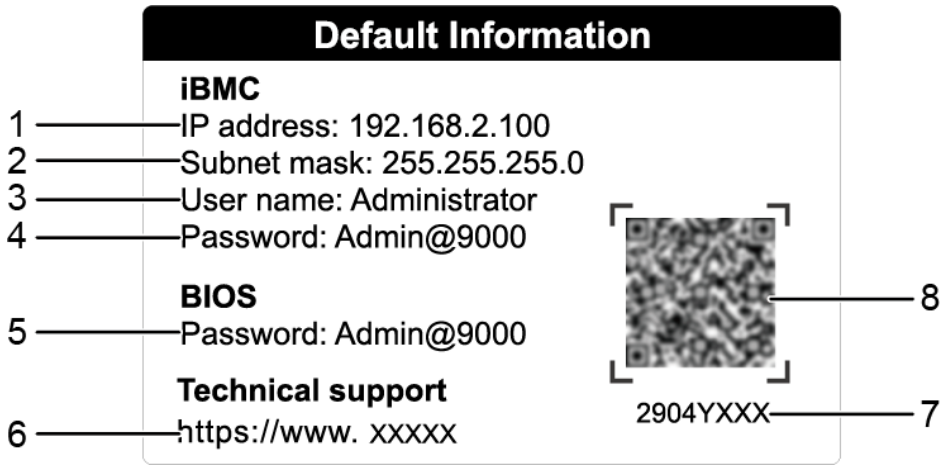
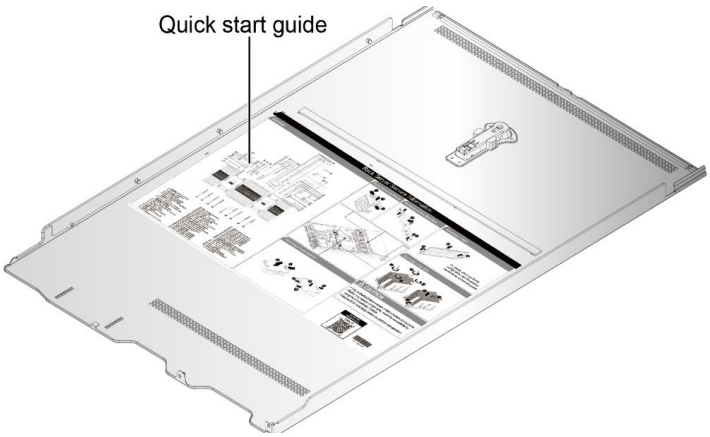


**Table A-4** Quick access label description

| No. | Description |
| --- | --- |
| 1 | Default IP address of the iBMC management network port |
| 2 | Default subnet mask of the iBMC management network port |
| 3 | Default iBMC username |
| 4 | Default iBMC password |
| 5 | Default BIOS password |
| 6 | Technical support website |
| 7 | P/N code |
| 8 | QR code<br>**NOTE**<br>Scan the QR code to obtain technical support resources. |

## A.1.2 Chassis Internal Label

**Figure A-6** Chassis internal label



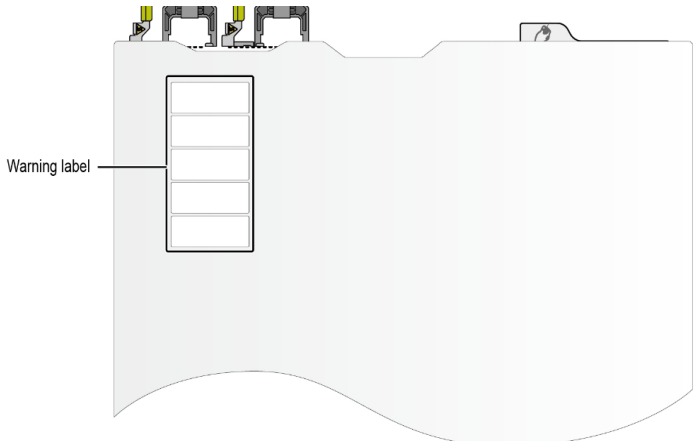

NOTE

- The quick start guide is located on the inside of the chassis cover. It describes how to remove the mainboard components, important components of the chassis, precautions, and QR codes of technical resources. The pictures are for reference only. For details, see the actual product.
- The quick start guide is optional. For details, see the actual product.

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## A.1.3 Chassis Tail Label

**Figure A-7** Chassis tail label




NOTE

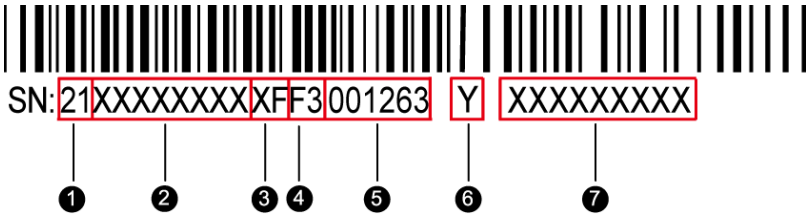
For details about the warning label, see *Server Security Information*.

# A.2 SN

The serial number (SN) on the slide-out label plate uniquely identifies a device. The SN is required when you contact technical support. **SN example 1** and **SN example 2** show two SN examples.

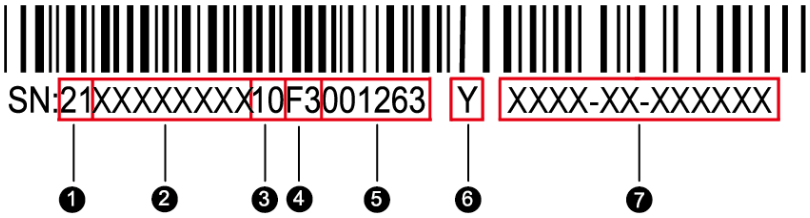
- SN example 1

**Figure A-8** SN example 1




- SN example 2

**Figure A-9** SN example 2




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**Table A-5** SN description

| No. | Description |
| --- | --- |
| 1 | SN ID (two characters), which is 21. |
| 2 | Material identification code (eight digits), that is, processing code. |
| 3 | Vendor code (two digits), that is, the code of the processing place. |
| 4 | Year and month (two characters).<br>● The first character indicates the year.<br>– Digits 1 to 9 indicate years 2001 to 2009, respectively.<br>– Letters A to H indicate years 2010 to 2017, respectively.<br>– Letters J to N indicate years 2018 to 2022, respectively.<br>– Letters P to Y indicate years 2023 to 2032, respectively.<br>**NOTE**<br>The years from 2010 are represented by upper-case letters excluding I, O, and Z because the three letters are similar to the digits 1, 0, and 2.<br>● The second character indicates the month.<br>– Digits 1 to 9 indicate January to September, respectively.<br>– Letters A to C indicate October to December, respectively. |
| 5 | Sequence number (six characters). |
| 6 | RoHS compliance (one character). Y indicates environmental-friendly processing. |
| 7 | Internal model, that is, product name. The actual board model format may vary. For details, see the actual board model. |

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# A.3 Operating Temperature Limitations

**Table A-6** Operating temperature limitations

| Configuration | Maximum operating temperature: 30°C (86°F) | Maximum operating temperature: 35°C (95°F) |
| --- | --- | --- |
| 8 x 2.5" drive configuration | All configurations in the system compatibility list are supported. | All configurations in the system compatibility list are supported. |

NOTE

- When configuring components that are not in the compatibility list, re-test and evaluate the system compatibility.
- When a single fan is faulty, the highest operating temperature is 5°C (9°F) lower than the rated value.
- When a single fan is faulty, the system performance may be affected.
- 8470Q and 6458Q liquid-cooled processors are not supported.

# A.4 Nameplate

| Certified Model | Remarks |
| --- | --- |
| H82GM-07 | Global |
| G8600 V7 | Global |
| Note: The nameplate depends on the actual product. | |

# A.5 RAS Features

The server supports a variety of Reliability, Availability, and Serviceability (RAS) features. You can configure these features for better performance.

For details about RAS features, see the *Sapphire Rapids Platform Server RAS Feature Technical White Paper*.

# A.6 Sensor List

| Sensor | Description | Component |
| --- | --- | --- |
| Inlet Temp | Air inlet temperature | Right mounting ear |

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| Sensor | Description | Component |
| --- | --- | --- |
| Outlet Temp | Air outlet temperature | BMC card |
| PCH Temp | PCH bridge temperature | Mainboard |
| PCH Status | PCH chip fault diagnosis health status | Mainboard |
| 1711 Core Temp | Core temperature of the 1711 chip | BMC card |
| SSD Max Temp | Maximum SSD temperature (reported by BMA) | SSD |
| SSD Disk$ Temp | SSD temperature | SSD |
| HDD Max Temp | Maximum HDD temperature (reported by BMA) | HDD |
| CPU*N* Core Rem | CPU core temperature | CPU*N*<br>*N* indicates the CPU number. The value is **1** or **2**. |
| CPU*N* DTS | Difference between the real-time CPU temperature and the CPU core temperature threshold | CPU*N*<br>*N* indicates the CPU number. The value is **1** or **2**. |
| CPU*N* Margin | Difference between the real-time CPU temperature and the CPU Tcontrol threshold | CPU*N*<br>*N* indicates the CPU number. The value is **1** or **2**. |
| CPU*N* MEM Temp | CPU memory module temperature | Memory module corresponding to CPU *N*<br>*N* indicates the CPU number. The value is **1** or **2**. |
| CPU*N* 12V | 12 V voltage supplied by the mainboard to the CPU | Mainboard<br>*N* indicates the CPU number. The value is **1** or **2**. |
| CPU*N* Status | CPU status check | CPU*N*<br>*N* indicates the CPU number. The value is **1** or **2**. |

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| Sensor | Description | Component |
| --- | --- | --- |
| CPU*N* Memory | CPU memory status check | Memory module corresponding to CPU *N*<br>*N* indicates the CPU number. The value is **1** or **2**. |
| CPU*N* UPI Link | CPU UPI link fault diagnosis health status | Mainboard or CPU N<br>*N* indicates the CPU number. The value is **1** or **2**. |
| CPU*N* Prochot | CPU Prochot | CPU*N*<br>*N* indicates the CPU number. The value is **1** or **2**. |
| CPU*N* VRD Temp | CPU VRD temperature | Mainboard<br>*N* indicates the CPU number. The value is **1** or **2**. |
| CPU Power | CPU power | CPU |
| PS*N* VIN | PSU *N* input voltage | PSU *N*<br>*N* indicates the PSU number. The value is 1 to 8. |
| PS*N* VINA | PSU *N* input voltage of port A | PSU *N*<br>*N* indicates the PSU number. The value is 1 to 8. |
| PS*N* VINB | PSU *N* input voltage of port B | PSU *N*<br>*N* indicates the PSU number. The value is 1 to 8. |
| PS*N* IIn | PSU *N* input current | PSU *N*<br>*N* indicates the PSU number. The value is 1 to 8. |
| PS*N* IOut | PSU *N* output current | PSU *N*<br>*N* indicates the PSU number. The value is 1 to 8. |

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| Sensor | Description | Component |
| --- | --- | --- |
| PS*N* POut | PSU *N* output power | PSU *N*<br>*N* indicates the PSU number. The value is 1 to 8. |
| PS$ Temp | Maximum internal temperature of the PSU | PSU |
| PS$ Inlet Temp | PSU air inlet temperature | PSU |
| PS$ Status | PSU fault status | PSU |
| PS Redundancy | Redundancy failure due to PSU removal | PSU |
| Power | Server input power | PSU |
| Power*N* | PSU input power | PSU *N*<br>*N* indicates the PSU number. The value is 1 to 8. |
| AI GPU Power | Module GPU power | AI Module |
| AI HSC Power | Module HSC power | AI Module |
| AI GPU HBM Temp | Module GPU HBM chip temperature | AI Module |
| AI GPU Temp | Module GPU chip temperature | AI Module |
| AI FPGA Temp | Module FPGA temperature | AI Module |
| AI PEX8725 Temp | Module pcieswitch temperature | AI Module |
| AI HSC Temp | Module HSC temperature | AI Module |
| AI NVSwitch Temp | Module NVSwitch temperature | AI Module |
| AI PEX8800Temp | Module PCIe Gen4 Switch temperature | AI Module |
| GPU FAN Power | GPU fan power | Fan board |
| NPU FAN Power | NPU fan power | Fan board |
| System FAN Power | System fan power | Fan board |
| FAN*N* F Speed | Fan speed | Fan module *N*<br>*N* indicates the fan module number. The |

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| Sensor | Description | Component |
| --- | --- | --- |
| FAN*N* R Speed | | value ranges from 1 to 15. |
| FAN*N* Status | Fan fault status and fan presence status | Fan module *N*<br>*N* indicates the fan number. The value ranges from 1 to 8. |
| DIMM*N* | DIMM status | DIMM *N*<br>*N* indicates the DIMM slot number |
| MEM Power | Memory power | Memory |
| RTC Battery | RTC battery status. An alarm is generated when the voltage is lower than 1 V. | RTC battery on the mainboard |
| Power Button | Power button pressed status | Mainboard and power button |
| Watchdog2 | Watchdog | Mainboard |
| Mngmnt Health | Management subsystem health status | Management module |
| UID Button | UID button status | Mainboard |
| PwrOk Sig. Drop | Voltage drop status | Mainboard |
| PwrOn TimeOut | Power-on timeout | Mainboard |
| PwrCap Status | Power capping status | Mainboard |
| Riser$ Temp | Riser card temperature | Riser card |
| RISER$ VRD Temp | Riser card VRD temperature | Riser card |
| DISK$ | Drive status | Drive |
| Disks Temp | Maximum drive temperature | Drive |
| Disk BP$ Temp | Drive backplane temperature | Drive backplane |
| M2Disk$ | Status of the M.2 drive on the riser card | M.2 adapter card |
| M2 Adapter Temp | M.2 adapter temperature | M.2 adapter card |
| RAID Presence | RAID controller card presence | RAID controller card |

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| Sensor | Description | Component |
| --- | --- | --- |
| RAID$ Temp | RAID controller card temperature | RAID controller card |
| Raid BBU Temp | Temperature of the RAID controller card backup PSUs | Supercapacitor of the RAID controller card |
| PCIe RAID$ Temp | PCIe RAID controller card temperature | PCIe RAID controller card |
| PCIE Status | PCIe status error | PCIe card |
| PCIe$ OP Temp | PCIe card optical module temperature sensor | PCIe card |
| PCIe$ Temp | PCIe card chip temperature sensor | PCIe card |
| PCIe$ Card BBU | BBU status of the PCIe screw-in RAID controller card | PCIe screw-in RAID controller card |
| OCP$ OP Temp | OCP card optical module temperature sensor | OCP 3.0 NIC |
| OCP$ Temp | OCP card chip temperature sensor | OCP 3.0 NIC |
| System Notice | Hot restart reminder and fault diagnosis program information collection | N/A |
| System Error | System suspension or restart. Check the background logs. | |
| ACPI State | ACPI status | |
| SysFWProgress | Software processes and system startup errors | |
| SysRestart | System restart causes | |
| Boot Error | Boot error | |
| CPU Usage | CPU usage | |
| Memory Usage | Memory usage | |
| BMC Boot Up | BMC startup event | |
| BMC Time Hopping | Time hopping | |
| NTP Sync Failed | NTP synchronization failure and recovery events | |

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| Sensor | Description | Component |
| --- | --- | --- |
| SEL Status | SEL full or events being cleared | |
| Op. Log Full | Operation log full or events being cleared | |
| Sec. Log Full | Security log full or events being cleared | |
| Host Loss | System monitoring software (BMA) link loss detection | |

# A.7 FAQs About Optical Modules

The server NIC must be used with optical modules that have passed the compatibility test of xFusion. With uncertain transmission reliability, optical modules that have not been tested for compatibility may affect the service stability. xFusion is not liable for any problems caused by the use of optical modules that have not been tested for compatibility by xFusion and will not fix such problems in principle.

When performing the compatibility tests on the optical modules used by servers, xFusion comprehensively verifies their functions to ensure their quality. The verified items include optical module plugging or unplugging, transmit and receive optical power, signal transmission quality, basic data reading, error tolerance, compatibility, electromagnetic compatibility (EMC), and environmental performance.

**Table A-7** Problems of using optical modules that have not been tested for compatibility and corresponding causes

| Symptom | Cause |
| --- | --- |
| Due to non-standard structure and size, an optical module fails to be inserted into the optical interface or removed after being inserted. | Structures or sizes of some optical modules that have not been tested for compatibility do not comply with the Multi-Source Agreement (MSA). When such an optical module is installed on an optical interface, the size of this optical module hinders optical module installation on adjacent optical interfaces. In addition, optical modules can be unlocked through self-unlocking, press-unlocking, push-unlocking, or tilt-unlocking. For optical modules that have not been tested for compatibility, the server may not be able to have the optical modules removed that are not unlocked through press-unlocking. |
| Data bus defects cause the data bus suspension of a device. | Some optical modules that have not been tested for compatibility have defects in data bus designs. Using such an optical module causes suspension of the connected data bus on the device. As a result, data on the suspended bus cannot be read. |

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| Symptom | Cause |
| --- | --- |
| An optical module with improper edge connector size damages electronic components of the optical interface. | If an optical module that has not been tested for compatibility with improper edge connector size is used on an optical interface, electronic components of the optical interface will be damaged by short circuits. |
| Unnormalized temperature monitoring causes incorrect alarms. | The temperature monitoring systems of some optical modules that have not been tested for compatibility do not comply with industry standards and report temperature values higher than the real temperature. When such optical modules are used, the system will report incorrect temperature alarms. |
| Improper register settings cause errors or failures in reading parameters or diagnostic information. | Some optical modules that have not been tested for compatibility have improper register values on page A0, which can cause errors or failures when the data bus attempts to read parameters or diagnostic information. |
| Optical modules bring electromagnetic interference to nearby devices. | Some optical modules that have not been tested for compatibility are not designed in compliance with EMC standards and have low anti-interference capability. Additionally, they bring electromagnetic interference to nearby devices. |
| Services are interrupted when an optical module is operating under overtemperature. | The operating temperature ranges of optical modules that have not been tested for compatibility cannot meet service requirements. When they are used under a relatively high temperature, the optical power decreases, resulting in service interruption. |
| Optical modules cannot work properly when the temperature change rate exceeds the normal range without adapting to the heat dissipation policy of the server. | Some optical modules that are not tested for compatibility have poor heat dissipation. Since they are not adapted to the heat dissipation policy of the server, abnormally high temperatures may occur continuously after they are running for a period of time. As a result, the optical modules cannot work properly. |

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# B Glossary

## B.1 A-E

### B

| | |
|---|---|
| baseboard management controller (BMC) | The BMC complies with the Intelligent Platform Management Interface (IPMI). It collects, processes, and stores sensor signals, and monitors the operating status of components. The BMC provides the hardware status and alarm information about the managed objects to the management system so that the management system can implement unified management of the devices. |

### E

| | |
|---|---|
| ejector lever | A part on the panel of a device used to facilitate installation or removal of the device. |
| Ethernet | A baseband local area network (LAN) architecture developed by Xerox Corporation by partnering with Intel and DEC. Ethernet uses the Carrier Sense Multiple Access/Collision Detection (CSMA/CD) access method and allows data transfer over various cables at 10 Mbit/s. The Ethernet specification is the basis for the IEEE 802.3 standard. |

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# B.2 F-J

## G

| | |
|---|---|
| Gigabit Ethernet (GE) | An extension and enhancement of traditional shared media Ethernet standards. It is compatible with 10 Mbit/s and 100 Mbit/s Ethernet and complies with IEEE 802.3z standards. |

## H

| | |
|---|---|
| Hot swap | Replacing or adding components without stopping or shutting down the system. |

# B.3 K-O

## K

| | |
|---|---|
| KVM | A hardware device that provides public video, keyboard and mouse (KVM). |

# B.4 P-T

## P

| | |
|---|---|
| panel | An external component (including but not limited to ejector levers, indicators, and ports) on the front or rear of the server. It seals the front and rear of the chassis to ensure optimal ventilation and electromagnetic compatibility (EMC). |

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| | |
|---|---|
| Peripheral Component Interconnect Express (PCIe) | A computer bus PCI, which uses the existing PCI programming concepts and communication standards, but builds a faster serial communication system. Intel® is the main sponsor for PCIe. PCIe is used only for internal interconnection. PCIe is based on the existing PCI system. Therefore, the existing PCI system can be converted into PCIe only by modifying the physical layer without modifying the software. PCIe has a faster rate. It can replace almost all existing internal buses (including AGP and PCI). |

## R

| | |
|---|---|
| redundancy | A mechanism that allows a backup device to automatically take over services from a faulty device to ensure uninterrupted running of the system. |
| redundant array of independent disks (RAID) | A storage technology that combines multiple physical drives into a logical unit for the purposes of data redundancy and performance improvement. |

## S

| | |
|---|---|
| server | A special computer that provides services for clients over a network. |
| Standby 12 V Out (SV12) | Standby 12 V output of the PSU. |
| System event log (SEL) | Event records stored in the system used for subsequent fault diagnosis and system recovery. |

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# B.5 U-Z

## U

| | |
|---|---|
| U | A unit defined in International Electrotechnical Commission (IEC) 60297-1 to measure the height of a cabinet, chassis, or subrack. 1 U = 44.45 mm = 1.75 in. |
| UltraPath Interconnect (UPI) | A point-to-point processor interconnect developed by Intel®. |

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# C Acronyms and Abbreviations

## C.1 A-E

### A

| | |
|---|---|
| **AC** | alternating current |
| **AES** | Advanced Encryption Standard New Instruction Set |
| **ARP** | Address Resolution Protocol |
| **AVX** | Advanced Vector Extensions |

### B

| | |
|---|---|
| **BBU** | backup battery unit |
| **BIOS** | Basic Input/Output System |
| **BMC** | Baseboard Management Controller |

### C

| | |
|---|---|
| CCC | China Compulsory Certification |
| **CD** | calendar day |
| **CE** | Conformite Europeenne |
| **CIM** | Common Information Model |
| **CLI** | command-line interface |

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### D

| | |
|---|---|
| **DC** | direct current |
| **DDR4** | Double Data Rate 4 |
| **DDDC** | double device data correction |
| **DEMT** | Dynamic Energy Management Technology |
| **DIMM** | dual in-line memory module |
| **DRAM** | dynamic random-access memory |
| **DVD** | digital video disc |

### E

| | |
|---|---|
| **ECC** | error checking and correcting |
| **ECMA** | European Computer Manufacturer Association |
| **EDB** | Execute Disable Bit |
| **EID** | Enclosure ID (backplane ID) |
| **EN** | European Efficiency |
| **ERP** | enterprise resource planning |
| **ETS** | European Telecommunication Standards |

## C.2 F-J

### F

| | |
|---|---|
| **FB-DIMM** | Fully Buffered DIMM |
| **FC** | Fiber Channel |
| **FCC** | Federal Communications Commission |
| **FCoE** | Fibre Channel Over Ethernet |
| **FTP** | File Transfer Protocol |

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## G

| | |
|---|---|
| **GE** | Gigabit Ethernet |
| **GPIO** | General Purpose Input/Output |
| **GPU** | graphics processing unit |

## H

| | |
|---|---|
| **HA** | high availability |
| **HDD** | hard disk drive |
| **HPC** | high-performance computing |
| **HTTP** | Hypertext Transfer Protocol |
| **HTTPS** | Hypertext Transfer Protocol Secure |

## I

| | |
|---|---|
| **iBMC** | Intelligent Baseboard Management Controller |
| **IC** | Industry Canada |
| **ICMP** | Internet Control Message Protocol |
| **IDC** | Internet Data Center |
| **IEC** | International Electrotechnical Commission |
| **IEEE** | Institute of Electrical and Electronics Engineers |
| **IGMP** | Internet Group Message Protocol |
| **IOPS** | input/output operations per second |
| **IP** | Internet Protocol |
| **IPC** | intelligent power capability |
| **IPMB** | Intelligent Platform Management Bus |
| **IPMI** | Intelligent Platform Management Interface |

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# C.3 K-O

## K

| | |
|---|---|
| **KVM** | keyboard, video, and mouse |

## L

| | |
|---|---|
| **LC** | Lucent connector |
| **LRDIMM** | load-reduced dual in-line memory module |
| **LED** | light emitting diode |
| **LOM** | LAN on motherboard |

## M

| | |
|---|---|
| **MAC** | media access control |
| **MMC** | module management controller |

## N

| | |
|---|---|
| **NBD** | next business day |
| **NC-SI** | Network Controller Sideband Interface |

## O

| | |
|---|---|
| **OCP** | Open Compute Project |

# C.4 P-T

## P

| | |
|---|---|
| **PCIe** | Peripheral Component Interconnect Express |

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| | |
|---|---|
| **PDU** | power distribution unit |
| **PHY** | physical layer |
| **PMBUS** | power management bus |
| **POK** | power OK |
| **PWM** | pulse-width modulation |
| **PXE** | Preboot Execution Environment |

## R

| | |
|---|---|
| **RAID** | redundant array of independent disks |
| **RAS** | reliability, availability and serviceability |
| **RDIMM** | registered dual in-line memory module |
| **REACH** | Registration Evaluation and Authorization of Chemicals |
| **RJ45** | registered jack 45 |
| **RoHS** | Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment |

## S

| | |
|---|---|
| **SAS** | Serial Attached Small Computer System Interface |
| **SATA** | Serial Advanced Technology Attachment |
| **SCM** | supply chain management |
| **SDDC** | single device data correction |
| **SERDES** | serializer/deserializer |
| **SGMII** | serial gigabit media independent interface |
| **SMI** | serial management interface |
| **SMTP** | Simple Mail Transfer Protocol |
| **SNMP** | Simple Network Management Protocol |
| **SOL** | serial over LAN |

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| | |
|---|---|
| **SONCAP** | Standards Organization of Nigeria-Conformity Assessment Program |
| **SSD** | solid-state drive |
| **SSE** | Streaming SIMD Extensions |

### T

| | |
|---|---|
| **TACH** | tachometer signal |
| **TBT** | Turbo Boost Technology |
| **TCG** | Trusted Computing Group |
| **TCM** | trusted cryptography module |
| **TCO** | total cost of ownership |
| **TDP** | thermal design power |
| **TELNET** | Telecommunication Network Protocol |
| **TET** | Trusted Execution Technology |
| **TFM** | TransFlash module |
| **TFTP** | Trivial File Transfer Protocol |
| **TOE** | TCP offload engine |
| **TPM** | trusted platform module |

## C.5 U-Z

### U

| | |
|---|---|
| **UBC** | Union Bus Connector |
| **UBC DD** | Union Bus Connector Double Density |
| **UDIMM** | unbuffered dual in-line memory module |
| **UEFI** | Unified Extensible Firmware Interface |
| **UID** | unit identification light |
| **UL** | Underwriter Laboratories Inc. |
| **UPI** | UltraPath Interconnect |
| **USB** | Universal Serial Bus |

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## V

| | |
|---|---|
| **VCCI** | Voluntary Control Council for Interference by Information Technology Equipment |
| **VGA** | Video Graphics Array |
| **VLAN** | Virtual local area network |
| **VRD** | Voltage regulator-down |
| **VROC** | Virtual RAID on CPU |

## W

| | |
|---|---|
| **WEEE** | Waste Electrical and Electronic Equipment |
| **WSMAN** | Web Service Management |

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