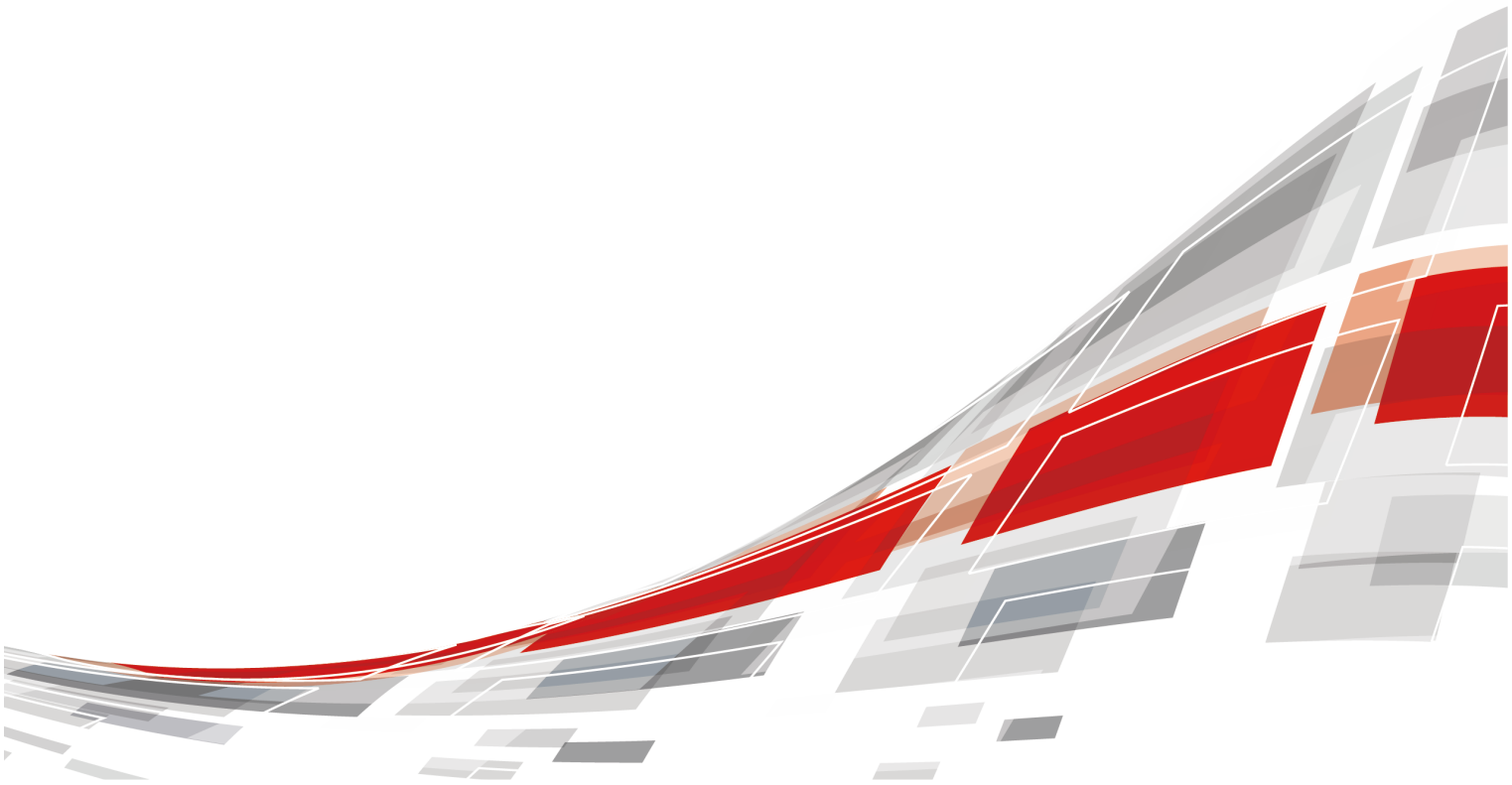
FusionServer 2258H V8 Server

Technical White Paper

Issue	03
Date	2026-01-06



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About This Document

Purpose

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

Intended Audience

This document is intended for pre-sales engineers.

Symbolic 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, could result in death or serious injury.
WARNING	Indicates a hazard with a medium risk which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a low-level hazard which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in device damage, data loss, device performance degradation, or other unpredictable results. NOTICE is used to address practices not related to personal injury.
NOTE	Supplements the important information in the main text. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Contents

1 Overview

2258H V8 is a new-generation 2U 2-socket rack server designed for the HPC, Internet, Internet data center (IDC), cloud computing, and enterprise market.

This product is ideal for IT core services, cloud computing, virtualization, high-performance computing, distributed storage, big data processing, enterprise or telecom applications, and other complex workloads.

This product features low power consumption, high scalability, high reliability, and easy management and deployment.

NOTE

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

Figure 1-1 Server appearance (example: 8 x 3.5" drives)

2 Features

Performance

- The server supports the 5th generation of AMD EPYC™ 9005 series processors (Turin).
- A processor provides up to 192 cores and 384 threads, up to 500 W TDP, a maximum of 5 GHz turbo frequency, 1 MB L2 cache and 32 MB L3 cache (shared by eight cores), which delivers supreme processing performance.
- The server supports a maximum of 24 DDR5 6400 MT/s registered dual-in-line memory modules (RDIMMs), delivering up to 1.5 TB total memory capacity (calculated using the maximum capacity of a single memory module: 64 GB). The memory modules feature high speed and availability.

Scalability

- Flexible drive configurations cater to a variety of business requirements and ensure high elasticity and scalability of storage resources.
- The server supports a maximum of 24 x 2.5" front drives.
- Supports a maximum of 10 x standard expansion slots. Among these slots, a maximum of six can be PCIe 4.0 x 16 slots, four of which support PCIe 5.0.
- Supports one FLEX IO mezzanine card (compatible with OCP 3.0 NIC).
- The server supports two M.2 SSDs, enabling quick start of OS drives and improving maintenance flexibility.

Availability and Serviceability

- Carrier-class components with process expertise ensure high system reliability and availability.
- The server supports hot-swappable SATA drives.
- The panel provides a UID/Healthy LED indicator and a fault diagnosis LED, enabling technical personnel to quickly locate components that have failed or are at risk of failure, thereby simplifying maintenance tasks, accelerating problem resolution, and enhancing system availability.
- The mounting ear provides the iBMC direct connect management port to support local iBMC O&M, improving O&M efficiency.

- A server provides two hot-swappable PSUs in 1+1 redundancy mode and four hot-swappable fan modules in *N*+1 redundancy mode, improving system availability.
- The intelligent Baseboard Management Controller (iBMC) can continuously monitor system parameters, trigger alarms, and take recovery measures to minimize shutdown.

Manageability and Security

- The built-in iBMC monitors server operating status and provides remote management.
- Supports BIOS menu passwords to ensure the security of system startup and system management.
- Supports the Network Controller Sideband Interface (NC-SI) feature that allows a network port to provide functions of both a management network port and a service network port. The NC-SI feature can be enabled or disabled through the iBMC or BIOS. The NC-SI feature is disabled by default.

  NOTE

  The service network port of the NC-SI feature supports the following configurations:

  - It can be bound to any network port of the server's OCP 3.0 NIC or other standard PCIe NICs that support the NC-SI function.
  - It allows users to enable or disable the virtual local area network ID (VLAN ID) and configure the VLAN ID. The VLAN ID is **0** and disabled by default.
  - It supports IPv4 and IPv6 addresses, and allows users to configure the IP address, subnet mask, default gateway, or prefix length of an IPv6 address.
- The integrated Unified Extensible Firmware Interface (UEFI) improves setup, configuration, and update efficiency and simplifies fault clearance.
- Supports the lockable server front bezel to ensure local data security.
- Supports chassis cover opening detection to enhance physical security.
- Supports secure boot based on the chip-level Root of Trust (RoT) and provides the level-by-level verification function starting from the hardware trusted root, building a complete secure boot chain.
- Supports the trusted platform module (TPM) and trusted password module (TCM) to provide advanced encryption functions, such as digital signature and remote authentication.
- Meets the following requirements in NIST SP 800-147B:
  - 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 in the OS.

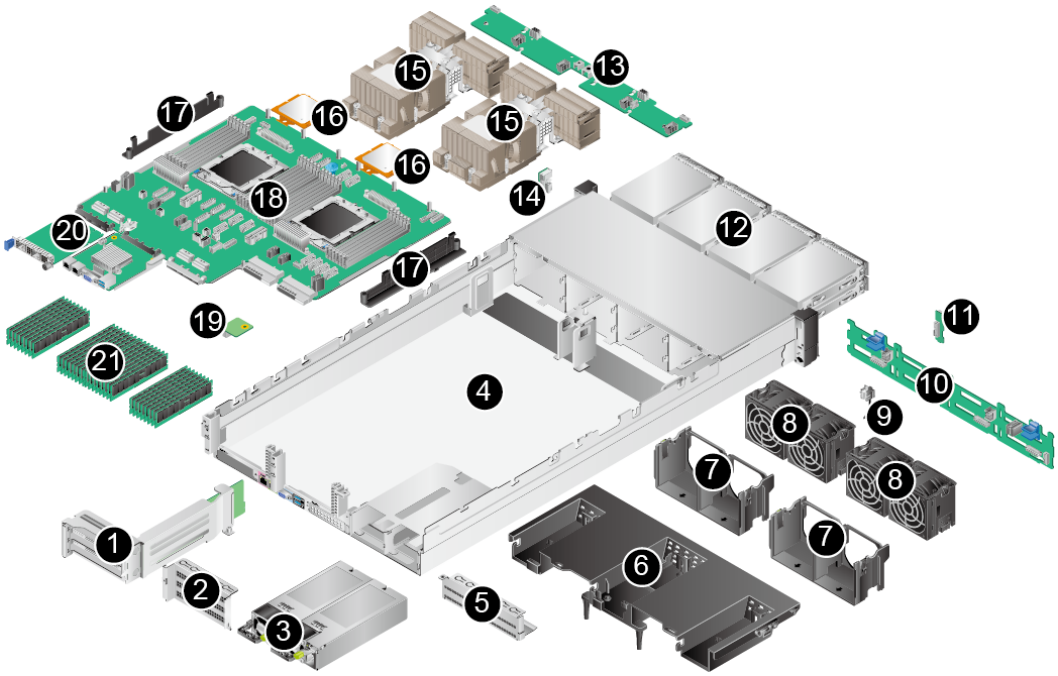
Energy Efficiency

- Provides 80 Plus Platinum/Titanium PSUs with different energy efficiency levels. The efficiency of the PSUs reaches 96% when the load is 50%.
- Supports active/standby power supply and high-voltage DC power supply to improve the efficiency of the power supply system.

- Efficient Voltage Regulator Down (VRD) power supplies for boards minimize the energy loss from 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.

3 Physical Structure

Figure 3-1 Physical structure of a serve

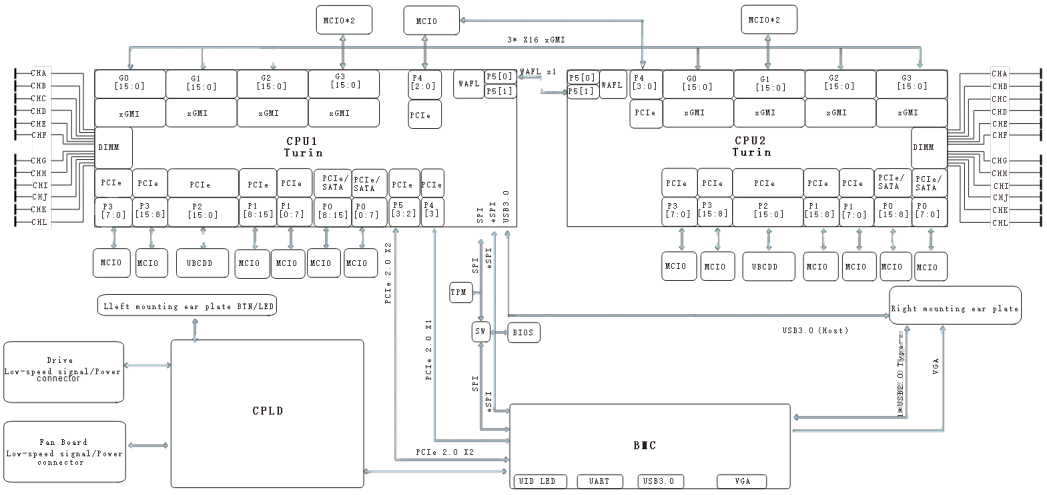


1	I/O module 1	2	I/O module 2
3	PSUs	4	Chassis
5	I/O module 3	6	Air duct
7	Fan module bracket	8	Fan module
9	Intrusion sensor	10	Front-Drive backplane
11	Left mounting ear plate	12	Front drive
13	Fan Board	14	Right mounting ear plate
15	Processor heat sink	16	Processor

17	Cable management arm	18	Mainboard
19	TPM/TCM	20	OCP
21	Memory	-	-

4 Logic Structure

Figure 4-1 Logic structure



NOTE

The maximum rate of the P4 port is PCIe Gen3.

- The server supports one or two fifth-generation AMD EPYC™ 9005 series (Turin) processors. 24 DDR5 DIMMs.
- The PCIe bus resources of the processor are connected to the PCIe riser card through PCBs or cables. Different PCIe riser cards support PCIe slots of different specifications. The general-purpose server supports two OCP 3.0 NICs.
- The BMC card integrates the BMC management chip and provides external video graphic array (VGA), management network port, and serial port.

5 Hardware Description

5.1 Front Panel

5.1.1 Appearance

Figure 5-1 8 x 3.5" drive configuration

Figure 5-2 Configuration without drives

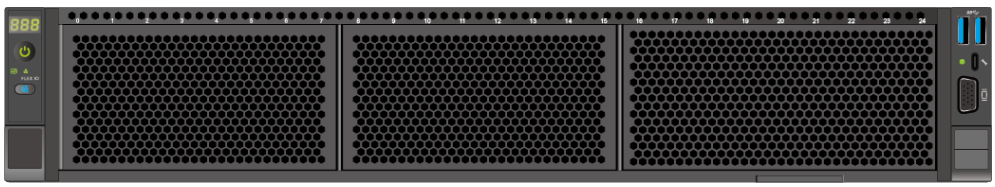


Figure 5-3 8 x 2.5" drive configuration 1

Figure 5-4 8 x 2.5" drive configuration 2

Figure 5-5 16 x 2.5" drive configuration 2

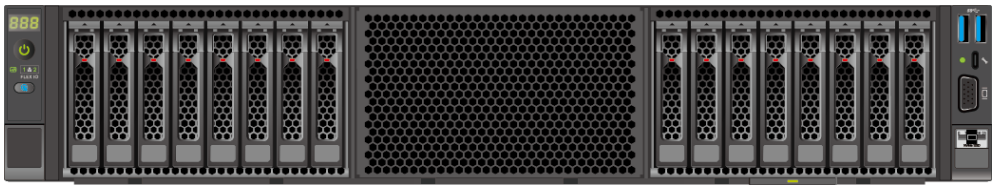


Figure 5-6 24 x 2.5" drive configuration

1	Drive	2	Slide-out label plate (with an SN label)

5.1.2 Indicators and Buttons

Indicator and Button Positions

Figure 5-7 8 x 3.5" drive configuration

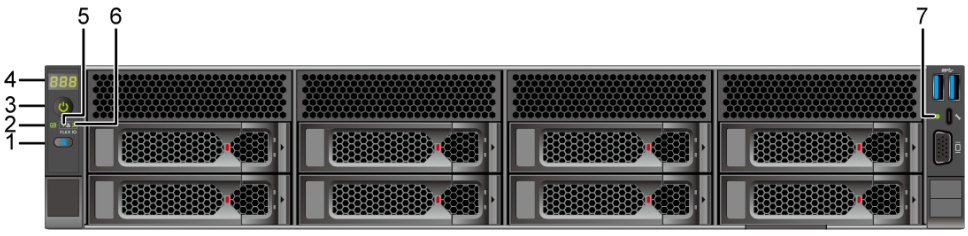


Figure 5-8 Configuration without drives

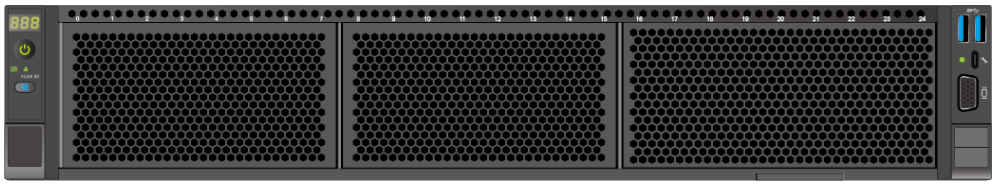


Figure 5-9 8 x 2.5" drive configuration 1

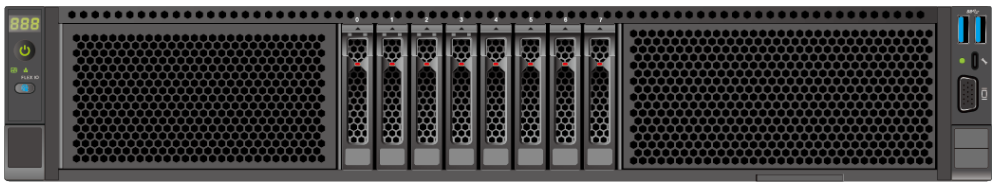


Figure 5-10 8 x 2.5" drive configuration 2

Figure 5-11 16 x 2.5" drive configuration 2

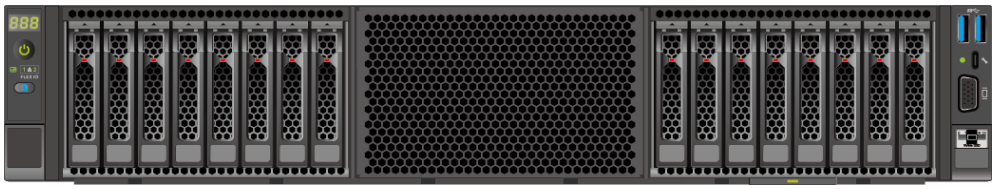


Figure 5-12 24 x 2.5" drive configuration

1	UID button/indicator	2	Health status indicator
3	Power button/indicator	4	Fault diagnosis LED
5	FlexIO card 1 presence indicator	6	FlexIO card 2 presence indicator (reserved)
7	iBMC direct connect management port indicator	-	-

Indicator and Button Description

Table 5-1 Indicators and buttons on the front panel

Sign	Indicators and Buttons	Description
	Fault diagnosis LED	● ---: The device is operating properly. ● Error code: A component is faulty. For details about fault codes, see the *iBMC Alarm Handling*.
	Health status indicator	● Off: The device is powered off or faulty. ● Blinking red at 1 Hz: A major alarm has been generated on the system. ● Blinking red at 5 Hz: A critical alarm has been generated on the system. ● Steady green: The device is operating properly.
	FlexIO card presence indicator	Indicates whether the FlexIO card is detected. ● Off: The FlexIO card is not detected. ● Blinking green at 0.5 Hz: The FlexIO card is detected but is not powered on. ● Blinking green at 2 Hz: The FlexIO card is detected and has just been inserted. ● Steady green: The FlexIO card is detected and the power supply is normal.

Sign	Indicators and Buttons	Description
	Power button/ indicator	Power indicator: ● Off: The device is powered off. ● Steady green: The device is powered on. ● 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 turns steady yellow. ● Steady yellow: The device is in the standby state. Power button: ● When the device is powered on, you can press this button to gracefully shut down the OS. **NOTE** For different OSs, you may need to shut down the OS as prompted. ● When the device is powered on, you can hold down this button for 6 seconds to forcibly power off the device. ● When the power indicator is steady yellow, you can press this button to power on the device.
	UID button/ indicator	The UID button/indicator helps identify and locate a device. UID indicator: ● Off: The device is not being located. ● Blinking or steady blue: The device is being located. UID button: ● You can control the UID indicator status by pressing the UID button or using the iBMC. ● You can press this button to turn on or off the UID indicator. ● You can press and hold down this button for 4 to 6 seconds to reset the iBMC.

Sign	Indicators and Buttons	Description
	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): ● Off: No terminal is connected. ● Blinking green at 5 Hz for 3 seconds and then off: The port is disabled. ● Steady green: The terminal is connected. Indicates the status when the iBMC direct connect management port connects to a USB device: ● Blinking red at 0.5 Hz: The job fails or an error is reported when the job is complete. ● Blinking green at 5 Hz: The job is being executed. ● Blinking green at 5 Hz for 3 seconds and then off: The port is disabled. ● Steady green: The server configuration file is being copied from the USB device or the job is successfully completed.

5.1.3 Ports

Port Positions

Figure 5-13 8 x 3.5" drive configuration

Figure 5-14 Configuration without drives

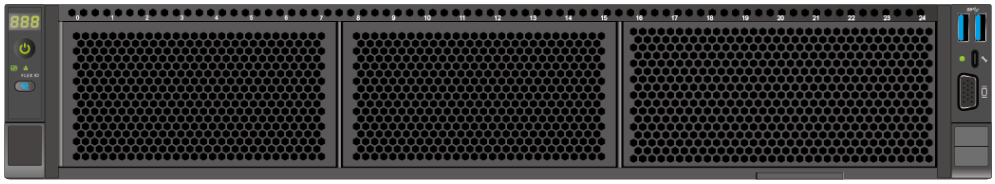


Figure 5-15 8 x 2.5" drive configuration 1

Figure 5-16 8 x 2.5" drive configuration 2

Figure 5-17 16 x 2.5" drive configuration 2

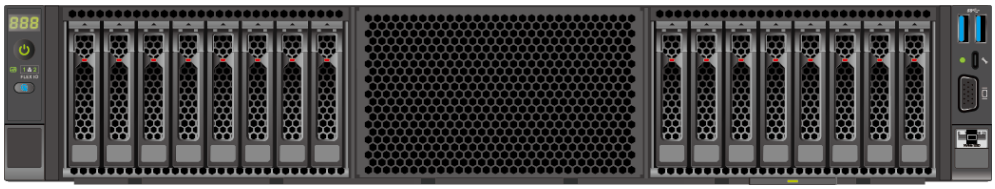


Figure 5-18 24 x 2.5" drive configuration

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

Port Description

Table 5-2 Ports on the front panel

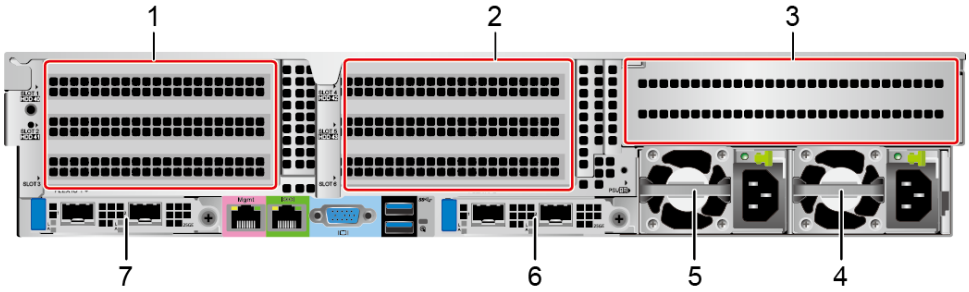
Name	Type	Quantity	Description
iBMC direct connect management port	USB Type-C **NOTE** The USB 2.0 protocol is supported.	1	Used to connect to a local PC or mobile phone using a USB Type-C cable to monitor and manage the system. **NOTE** Only local PCs running Windows 10 and mobile phones running Android are supported. ● To log in to the iBMC from a local PC, enter **https://** *169.254.1.5* in the address box of the browser on the local PC. Used to connect to a USB device. **NOTICE** ● Before connecting an external USB device, ensure that the USB device functions properly; otherwise, it may adversely impact the server. ● For details about how to connect a USB device to the iBMC direct connect management port, see the *iBMC User Guide*.
USB port	USB 3.0	1	Used to connect to a USB 3.0 device. **NOTICE** ● Before connecting an external USB device, ensure that the USB device functions properly; otherwise, it may adversely impact the server. ● 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.

5.2 Rear Panel

5.2.1 Appearance

- Server with drive modules or PCIe riser modules on the rear panel

Figure 5-19 Rear panel



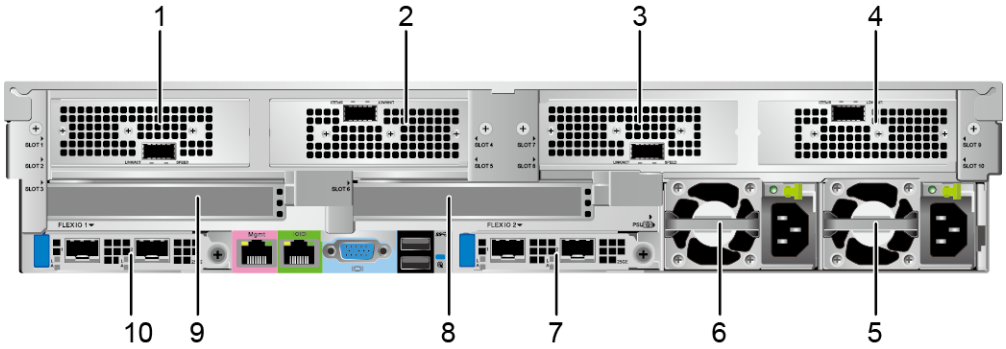
1	I/O module 1	2	I/O module 2
3	I/O module 3	4	PSU 2
5	PSU 1	6	FlexIO card 2 **NOTE** The FlexIO card slot supports only OCP 3.0 NICs.
7	FlexIO card 1 **NOTE** The FlexIO card slot supports only OCP 3.0 NICs.	-	-

NOTE

- I/O module 1 supports only a PCIe riser module.
- I/O module 3 supports a PCIe riser module or 4 x 2.5" rear-drive module.
- For details about the OCP 3.0 NIC, see **5.6.1 OCP 3.0 NICs**.
- The figure is for reference only. The actual configuration may vary.

- 4-GPU server

Figure 5-20 Rear panel



1	Slot1	2	Slot4
3	Slot7	4	Slot9
5	PSU 2	6	PSU 1
7	(Optional) FlexIO card 2 **NOTE** The FlexIO card slot supports only OCP 3.0 NICs.	8	(Optional) Slot 6
9	(Optional) Slot 3	10	(Optional) FlexIO card 1 **NOTE** The FlexIO card slot supports only OCP 3.0 NICs.

NOTE

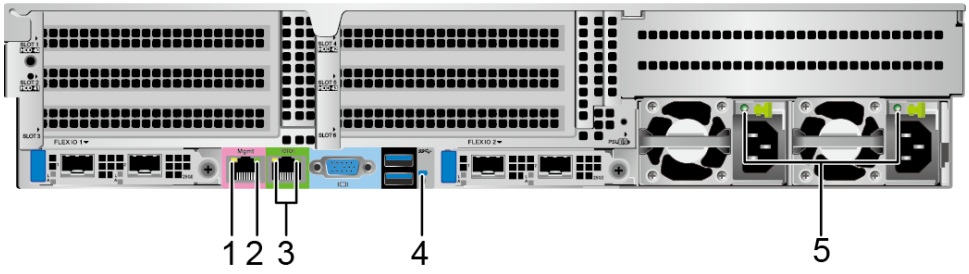
- For details about the OCP 3.0 NIC, see **5.6.1 OCP 3.0 NICs**.
- The figure is for reference only. The actual configuration may vary.

5.2.2 Indicators and Buttons

Indicator Positions

- Server with PCIe riser modules on the rear panel

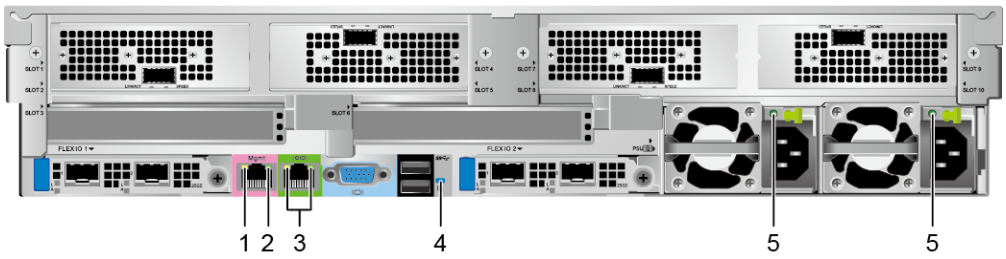
Figure 5-21 Indicators on the rear panel



1	Data transmission status indicator of the management network port	2	Connection status indicator of the management network port
3	Serial port indicator **NOTE** Reserved and unavailable currently.	4	UID indicator
5	PSU indicators	-	-

- 4-GPU server

Figure 5-22 Indicators on the rear panel



1	Data transmission status indicator of the management network port	2	Connection status indicator of the management network port
3	Serial port indicator **NOTE** Reserved and unavailable currently.	4	UID indicator
5	PSU indicators	-	-

Indicator Description

Table 5-3 Indicators on the rear panel

Sign	Indicator	Description
-	Data transmission status indicator of the management network port	• Off: No data is being transmitted. • Blinking yellow: Data is being transmitted.
-	Connection status indicator of the management network port	• Off: The network is not connected. • Steady green: The network port is properly connected.

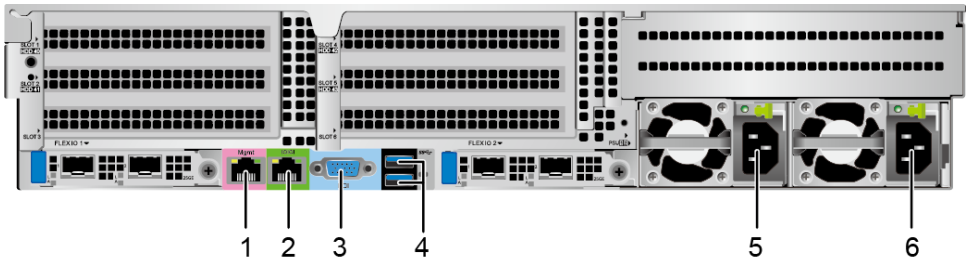
Sign	Indicator	Description
-	PSU indicator	● Off: No power is supplied. ● Blinking green at 1 Hz: – The input is normal and the power supply enters SV12 mode. – The input is overvoltage or undervoltage. – The PSU is in deep hibernation mode. ● Blinking green at 4 Hz: The firmware is being upgraded online. ● Steady green: The input and output are normal. ● Steady orange: The input is normal but there is no output. **NOTE** The possible causes of no output are as follows: ● Power supply overtemperature protection ● Power output overcurrent or short-circuit ● Output overvoltage ● Short-circuit protection ● Device failure (excluding failure of all devices)
	UID indicator	The UID indicator helps identify and locate a device. ● Off: The device is not being located. ● Blinking or steady blue: The device is being located. **NOTE** You can control the UID indicator status by pressing the UID button or using the iBMC.

5.2.3 Ports

Port Positions

- Server with drive modules or PCIe riser modules on the rear panel

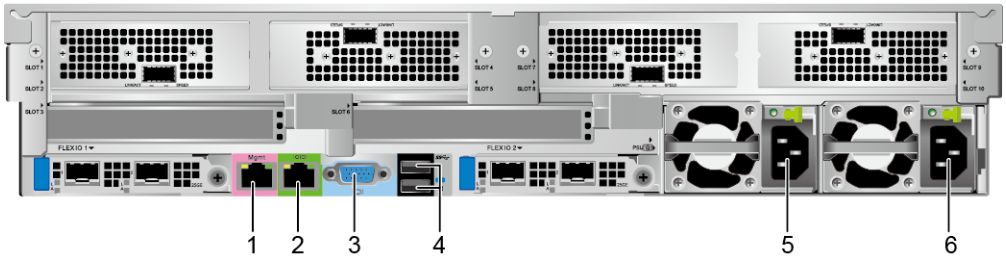
Figure 5-23 Ports on the rear panel



1	Management network port	2	Serial port
3	VGA port	4	USB 3.0 port
5	Socket for PSU 1	6	Socket for PSU 2

- 4-GPU server

Figure 5-24 Ports on the rear panel



1	Management network port	2	Serial port
3	VGA port	4	USB 3.0 port
5	Socket for PSU 1	6	Socket for PSU 2

Port Description

Table 5-4 Ports on the rear panel

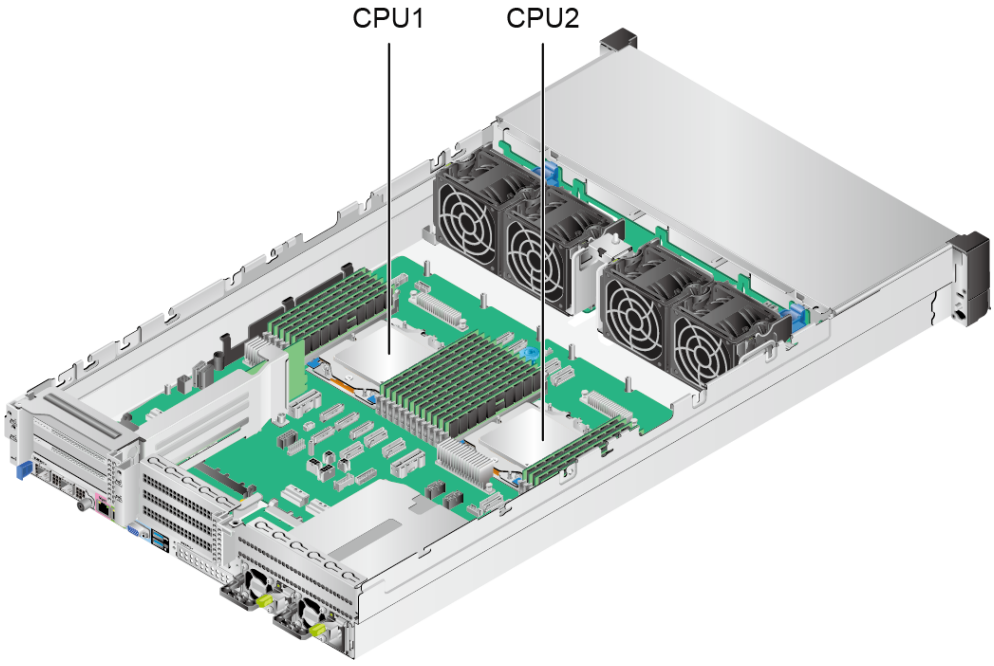
Name	Type	Quantity	Description
Management network port	RJ45	1	iBMC management network port, which is used to manage the server. **NOTE** ● The management network port is a GE port that supports 100 Mbit/s and 1000 Mbit/s auto-negotiation. ● The iBMC management network port cannot be connected to a PoE-powered device (such as a PoE switch with the PoE function enabled). Forcible interconnection may cause link communication problems or damage to the management network port.
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. **NOTE** 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.

Name	Type	Quantity	Description
USB port	USB 3.0	2	Used to connect to a USB 3.0 device. **NOTICE** ● The maximum current is 1.3 A for an external USB device. ● Before connecting an external USB device, ensure that the USB device functions properly; otherwise, it may adversely impact the server. ● 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	-	2	Used to connect to a power distribution unit (PDU) through a power cable. You can select the PSUs as required. **NOTE** When determining the PSUs, ensure that the rated power of the PSUs is greater than that of the server.

5.3 Processors

- Support one or two processors, and support configuring Turin processors.
- For details about the optional components, consult your local sales representative or see "Search Parts" in the compatibility list on the technical support website.

Figure 5-25 Positions of the processors



5.4 Memory

5.4.1 DDR5 Memory

5.4.1.1 Memory Subsystem Architecture

The server provides 24 memory interfaces. Each processor integrates 12 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 channels cannot be used.

Table 5-5 Memory channels

CPU	Channel	Memory Slot
CPU 1	DIMMA	DIMM000 (A)
	DIMMB	DIMM010 (B)
	DIMMC	DIMM020 (C)
	DIMMD	DIMM030 (D)
	DIMME	DIMM040 (E)
	DIMMF	DIMM050 (F)
	DIMMG	DIMM060 (G)

CPU	Channel	Memory Slot
	DIMMH	DIMM070 (H)
	DIMMI	DIMM080 (I)
	DIMMJ	DIMM090 (J)
	DIMMK	1 DIMM0A0 (K)
	DIMML	DIMM0B0 (L)
CPU 2	DIMMA	DIMM100 (A)
	DIMMB	DIMM110 (B)
	DIMMC	DIMM120 (C)
	DIMMD	DIMM130 (D)
	DIMME	DIMM140 (E)
	DIMMF	DIMM150 (F)
	DIMMG	DIMM160 (G)
	DIMMH	DIMM170 (H)
	DIMMI	DIMM180 (I)
	DIMMJ	DIMM190 (J)
	DIMMK	DIMM1A0 (K)
	DIMML	DIMM1B0 (L)

5.4.1.2 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 lower one of the following two speed values:
  - Memory speed supported by a CPU
  - Maximum operating speed of a memory module
- The DDR5 memory modules of different types and specifications (capacity, bit width, rank, and height) cannot be used together.
- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.

- The server supports the 5th generation AMD EPYC™ 9005 series Turin processors. All CPU models support the same maximum memory capacity.

- The calculation formula of total memory capacity supported is as follows: the total memory capacity equals the capacity sum of all DDR5 memory modules.
- For details about the type of a single memory module, consult your local sales representatives or 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		Specifications			
Capacity of a DDR5 memory (GB)		32	64	96	128
Type		RDIMM	RDIMM	RDIMM	RDIMM
Rated speed (MT/s)		6400	6400	6400	6400
Operating voltage (V)		1.1	1.1	1.1	1.1
Maximum number of DDR5 DIMMs of a server		24	24	24	24
Maximum DDR5 memory capacity of the server (GB)		768	1536	2304	3702
Actual rate (MT/s)	1DPC[a]	6400	6400	6400	6400
● a: DIMM per channel (DPC) indicates the number of memory modules per channel. ● The information listed in this table is for reference only. For details, consult the local sales representatives or see "Search Parts" in the compatibility list on the technical support website.					

5.4.1.3 DIMM Installation Rules

Observe the following rules when configuring DDR5 memory modules:

- The memory modules configured must be DDR5 RDIMMs.
- The memory modules must be configured with the same number of ranks.
- If no memory module is installed, a memory module filler must be installed in the memory slot to ensure the heat dissipation performance of the server.

5.4.1.4 Positions of the Memory Modules

A server supports up to 24 DDR5 memory modules.

Observe the memory module installation rules when configuring memory modules. For details, see the memory configuration guide on the technical support website.

Figure 5-26 Positions of the memory modules

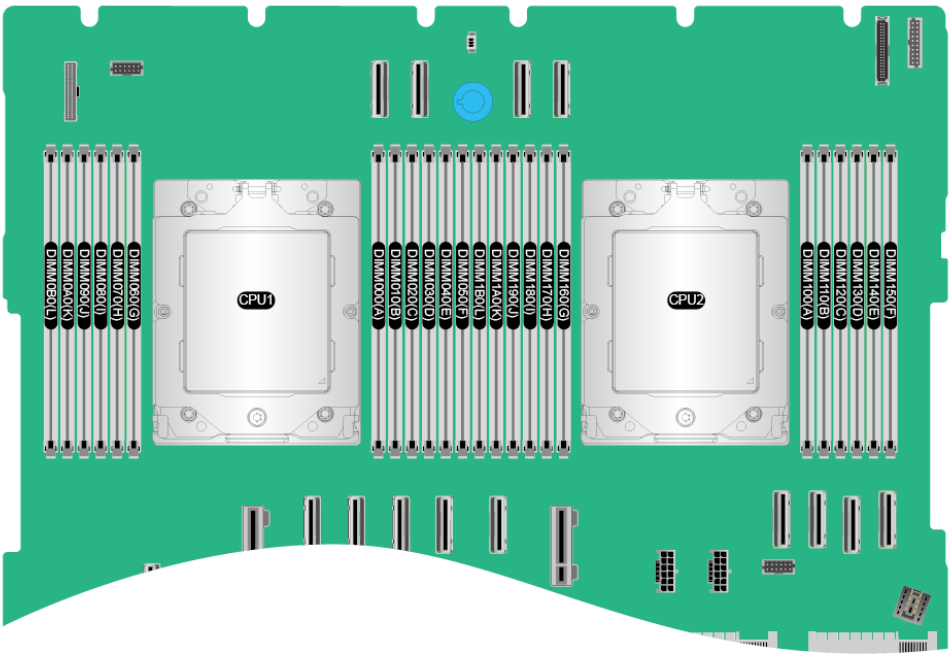


Table 5-7 DDR5 memory module installation guidelines (one processor)

Processor	Channel	Memory Slot	Number of Memory Modules						
			1	2	4	6	8	10	12
CPU 1	DIMMA	DIMM000(A)	●	●	●	●	●	●	●
	DIMMB	DIMM010(B)	X	X	X	●	●	●	●
	DIMMC	DIMM020(C)	X	X	●	●	●	●	●
	DIMMD	DIMM030(D)	X	X	X	X	X	●	●
	DIMME	DIMM040(E)	X	X	X	X	●	●	●
	DIMMF	DIMM050(F)	X	X	X	X	X	X	●
	DIMMG	DIMM060(G)	X	●	●	●	●	●	●
	DIMMH	DIMM070(H)	X	X	X	●	●	●	●
	DIMMI	DIMM080(I)	X	X	●	●	●	●	●
	DIMMJ	DIMM090(J)	X	X	X	X	X	●	●
	DIMMK	DIMM0A0(K)	X	X	X	X	●	●	●
	DIMML	DIMM0B0(L)	X	X	X	X	X	X	●
Note: ● indicates an installation position, and X indicates an empty slot.									

Table 5-8 DDR5 memory module installation guidelines (two processors)

Processor	Channel	Memory Slot	Number of Memory Modules						
			2	4	8	12	16	20	24
CPU 1	DIMMA	DIMM000(A)	●	●	●	●	●	●	●
	DIMMB	DIMM010(B)	X	X	X	●	●	●	●
	DIMMC	DIMM020(C)	X	X	●	●	●	●	●
	DIMMD	DIMM030(D)	X	X	X	X	X	●	●
	DIMME	DIMM040(E)	X	X	X	X	●	●	●
	DIMMF	DIMM050(F)	X	X	X	X	X	X	●
	DIMMG	DIMM060(G)	X	●	●	●	●	●	●
	DIMMH	DIMM070(H)	X	X	X	●	●	●	●
	DIMMI	DIMM080(I)	X	X	●	●	●	●	●
	DIMMJ	DIMM090(J)	X	X	X	X	X	●	●
	DIMMK	DIMM0A0(K)	X	X	X	X	●	●	●
	DIMML	DIMM0B0(L)	X	X	X	X	X	X	●
CPU 2	DIMMA	DIMM100(A)	●	●	●	●	●	●	●
	DIMMB	DIMM110(B)	X	X	X	●	●	●	●
	DIMMC	DIMM120(C)	X	X	●	●	●	●	●
	DIMMD	DIMM130(D)	X	X	X	X	X	●	●
	DIMME	DIMM140(E)	X	X	X	X	●	●	●
	DIMMF	DIMM150(F)	X	X	X	X	X	X	●
	DIMMG	DIMM160(G)	X	●	●	●	●	●	●
	DIMMH	DIMM170(H)	X	X	X	●	●	●	●
	DIMMI	DIMM180(I)	X	X	●	●	●	●	●
	DIMMJ	DIMM190(J)	X	X	X	X	X	●	●
	DIMMK	DIMM1A0(K)	X	X	X	X	●	●	●
	DIMML	DIMM1B0(L)	X	X	X	X	X	X	●
Note: ● indicates an installation position, and X indicates an empty slot.									

Table 5-9 Correspondence between memory and DIMM Channel

Processor	Channel	DIMM Slot
CPU1	0	DIMM000(A)
	1	DIMM010(B)
	2	DIMM020(C)
	3	DIMM030(D)
	4	DIMM040(E)
	5	DIMM050(F)
	6	DIMM060(G)
	7	DIMM070(H)
	8	DIMM080(I)
	9	DIMM090(J)
	A	DIMM0A0(K)
	B	DIMM0B0(L)
CPU2	0	DIMM100(A)
	1	DIMM110(B)
	2	DIMM120(C)
	3	DIMM130(D)
	4	DIMM140(E)
	5	DIMM150(F)
	6	DIMM160(G)
	7	DIMM170(H)
	8	DIMM180(I)
	9	DIMM190(J)
	A	DIMM1A0(K)
	B	DIMM1B0(L)

5.4.1.5 Memory Protection Technologies

- ECC
- Error Check and Scrub (ECS)
- UECC Retry
- Address/Command Parity with Replay

- Write Data CRC with Replay
- Read Data CRC with Replay
- Patrol Scrubber
- Redirect Scrubber
- Thermal Throttling
- Post-Package Repair

5.5 Storage

5.5.1 Drive Configuration and Drive Numbering

5.5.1.1 Chassis without Front Drives

Table 5-10 Drive configurations

Configuration	Front Drive	Rear Drive	Built-in Drive	Drive Management Mode
Configuration 1 without front drives	-	• I/O module 3 (4 x 2.5"): – Slots 44 to 47 support only NVMe drives[a].	M.2 SSD[b]	• NVMe drive: CPU pass-through
• a: NVMe drives are supported when CPU 2 is configured. A single-CPU server does not support NVMe drives. • b: Installed in slot 4. • 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 Numbers

Figure 5-27 Drive numbers

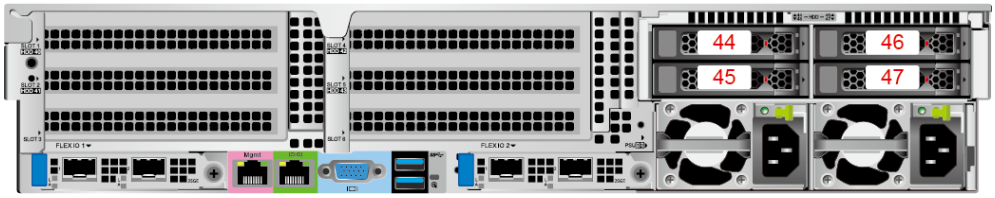


Table 5-11 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI
44	44
45	45
46	46
47	47

5.5.1.2 SAS/SATA Chassis

5.5.1.2.1 8 x 2.5" Drive Pass-Through Configurations

Table 5-12 Drive configurations

Configuration	Front Drive	Rear Drive	Built-in Drive	Drive Management Mode
8 x 2.5" SAS/SATA drive pass-through configuration 1	• Front drives (8 x 2.5"): – Slots 0 to 7 support only SATA drives.	• I/O module 3 (4 x 2.5"): – Slots 44 to 47 support only NVMe drives[a].	M.2 SSD[b]	• NVMe drive: CPU pass-through • SATA drive: PCH pass-through
8 x 2.5" SAS/SATA drive pass-through configuration 2	• Front drives (8 x 2.5"): – Slots 0 to 7 support only SAS/SATA drives.	• I/O module 3 (4 x 2.5"): – Slots 44 to 47 support only NVMe drives[a].	M.2 SSD[b]	• SAS/SATA drive: 1 x PCIe plug-in RAID controller card[c] • NVMe drive: CPU
• a: NVMe drives are supported when CPU 2 is configured. A single-CPU server does not support NVMe drives. • b: Installed in slot 4. • c: The PCIe plug-in RAID controller card is installed in slot 2 or slot 3. • For details about the optional components, consult the local sales representative.				

- Drive numbers of the "8 x 2.5" SAS/SATA drive pass-through configuration 1" in the **5.5.1.2.1 8 x 2.5" Drive Pass-Through Configurations**

Figure 5-28 Drive numbers

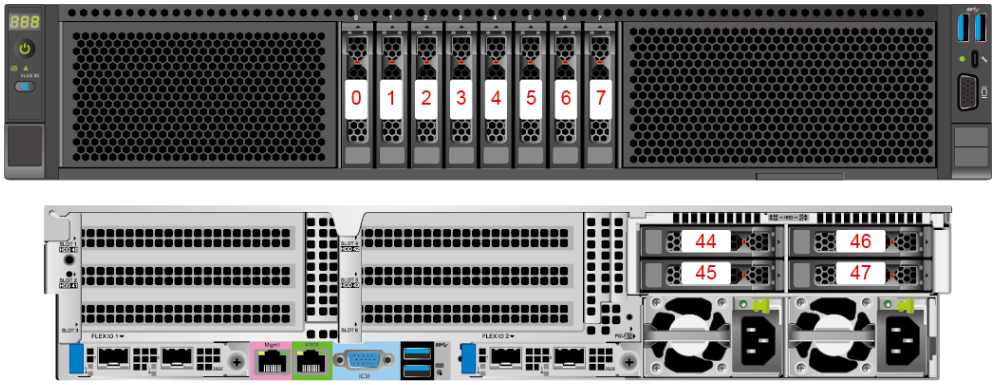


Table 5-13 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
44	44
45	45
46	46
47	47

- Drive numbers of the "8 x 2.5" SAS/SATA drive pass-through configuration 2" in the **5.5.1.2.1 8 x 2.5" Drive Pass-Through Configurations**

Figure 5-29 Drive numbers

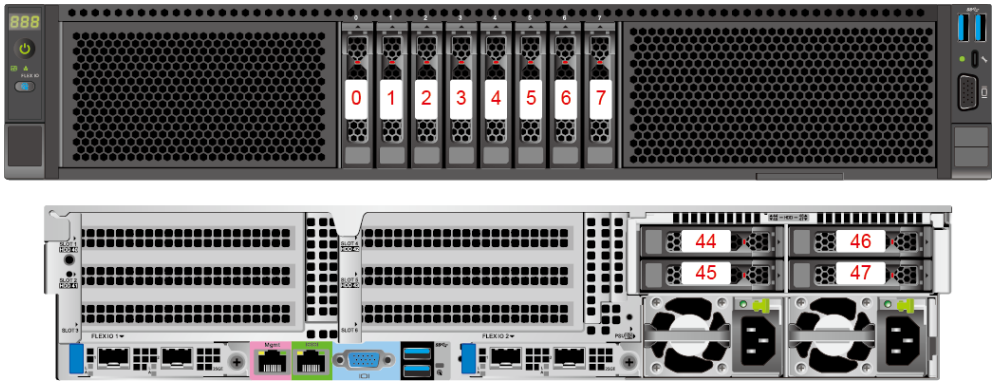


Table 5-14 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI	Drive Number Identified by the RAID Controller Card
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
44	44	-
45	45	-
46	46	-
47	47	-

5.5.1.2.2 8 x 3.5" Drive Pass-Through Configurations

Drive Configurations

Table 5-15 Drive configurations

Configuration	Front Drive	Rear Drive	Built-in Drive	Drive Management Mode
8 x 3.5" SAS/ SATA drive pass-through configuration 1	• Front drives (8 x 3.5"): – Slots 0 to 7 support only SATA drives.	• I/O module 3 (4 x 2.5"): – Slots 44 to 47 support only NVMe drives[a].	M.2 SSD[b]	• NVMe drive: CPU pass-through • SATA drive: CPU pass-through
8 x 3.5" SAS/ SATA drive pass-through configuration 2	• Front drives (8 x 3.5"): – Slots 0 to 7 support only SAS/ SATA drives.	• I/O module 3 (4 x 2.5"): – Slots 44 to 47 support only NVMe drives[a].	M.2 SSD[b]	• SAS/ SATA drive: 1 x PCIe plug-in RAID controller card[c] • NVMe drive: CPU
• a: NVMe drives are supported when CPU 2 is configured. A single-CPU server does not support NVMe drives. • b: Installed in slot 4. • c: The PCIe plug-in RAID controller card is installed in slot 2 or slot 3. • For details about component components, consult the local sales representative.				

Drive Numbers

- Drive numbers of the "8 x 3.5" drive pass-through configuration 1" in **Table 5-15**

Figure 5-30 Drive numbers

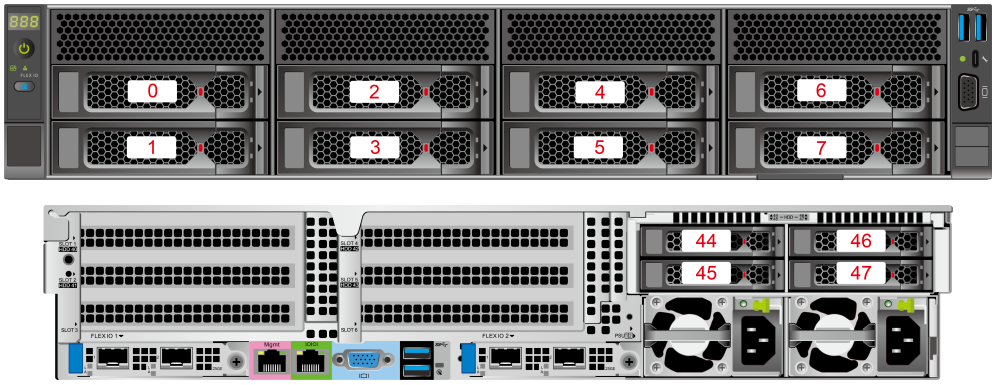


Table 5-16 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
44	44
45	45
46	46
47	47

- Drive numbers of the "8 x 3.5" drive pass-through configuration 2" in **Table 5-15**

Figure 5-31 Drive numbers

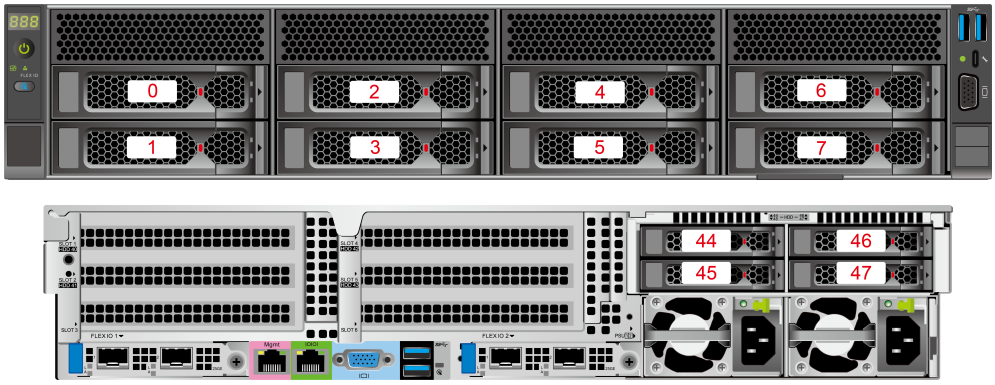


Table 5-17 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI	Drive Number Identified by the RAID Controller Card
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
44	44	-
45	45	-
46	46	-
47	47	-

5.5.1.3 SAS/SATA Chassis-Supporting 4 x GPU

Table 5-18 Drive configurations

Configuration	Front Drive	Rear Drive	Drive Management Mode
4 x 2.5" NVMe Drive-Supporting 4 x GPU Configuration	• Front drive (4 x 2.5"): – Slots 0 to 3 support only NVMe drives[a].	-	• NVMe drive: CPU 2 pass-through
8 x 2.5" SAS/SATA drive-supporting 4 x GPU configuration	• Front drive (8 x 2.5"): – Slots 0 to 3 support SAS/SATA/ NVMe drives [a]. – Slots 4 to 7 support only SAS/SATA drives.	-	• NVMe drive: CPU 2 pass-through • SAS/SATA: 1 x PCIe plug-in RAID controller card[b]
8 x 2.5" NVMe drive-supporting 4 x GPU configuration	• Front drives (8 x 2.5"): – Slots 0 to 7 support only SAS/SATA/ NVMe drives.	-	• NVMe drive: CPU pass-through • SAS/SATA: 1 x PCIe plug-in RAID controller card[b]
• a: NVMe drives are supported when CPU 2 is configured. A single-CPU server does not support NVMe drives. • b: The PCIe plug-in RAID controller card can be installed in slot 3. • 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 numbers of the "4 x 2.5" NVMe drive-supporting 4 x GPU configuration" in **5.5.1.3 SAS/SATA Chassis-Supporting 4 x GPU**.

Figure 5-32 Drive numbers

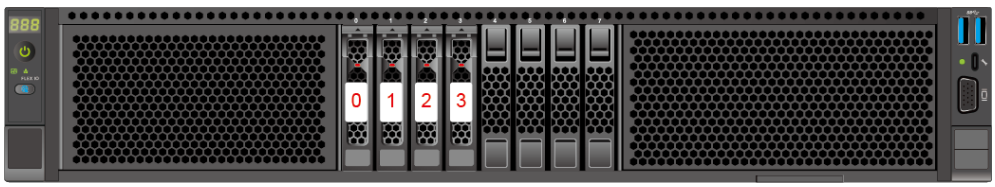


Table 5-19 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI
0	0
1	1
2	2
3	3

- Drive numbers of the "8 x 2.5" SAS/SATA drive-supporting 4 x GPU configuration" and 8 x 2.5" drive + 4 x GPU configuration in **5.5.1.3 SAS/SATA Chassis-Supporting 4 x GPU**

Figure 5-33 Drive numbers

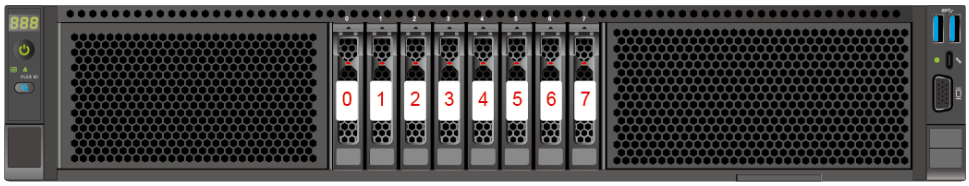


Table 5-20 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI	Drive Number Identified by the RAID Controller Card
0	0	0Note
1	1	1Note
2	2	2Note
3	3	3Note
4	4	4Note
5	5	5Note
6	6	6Note
7	7	7Note
Note: If the slot is configured with an SAS/SATA drive, the RAID controller card can manage the drive and allocate a number to the drive.		

5.5.1.4 SAS/SATA/NVMe Chassis

5.5.1.4.1 8 x 2.5" Drive Pass-Through Configurations

Table 5-21 Drive configurations

Configuration	Front Drive	Rear Drive	Built-in Drive	Drive Management Mode
8 x 2.5" SAS/SATA/NVMe drive pass-through configuration 1	• Front drives (8 x 2.5"): – Slots 0 to 7 support only SATA/NVMe drives[a].	• I/O module 3 (4 x 2.5"): – Slots 44 to 47 support only NVMe drives[b].	M.2 SSD[c]	• NVMe drive: CPU pass-through • SATA drive: CPU pass-through
8 x 2.5" SAS/SATA/NVMe drive pass-through configuration 2	• Front drive (8 x 2.5"): – Slots 0 to 7 support SAS/SATA/NVMe drives[a].	• I/O module 3 (4 x 2.5"): – Slots 44 to 47 support only NVMe drives[b].	M.2 SSD[c]	SAS/SATA/NVMe drives: RAID control standard card[d]
• a: When configured with a single CPU, slots 0 through 3 do not support NVMe drives. • b: NVMe drives are supported when CPU 2 is configured. A single-CPU server does not support NVMe drives. • c: Installed in slot 4. • c: The PCIe plug-in RAID controller card can be installed in slot 2 or slot 3. • For details about component components, consult the local sales representative.				

- Drive numbers of the "8 x 2.5" SAS/SATA/NVMe drive pass-through configuration 1" in the **5.5.1.4.1 8 x 2.5" Drive Pass-Through Configurations**

Figure 5-34 Drive numbers

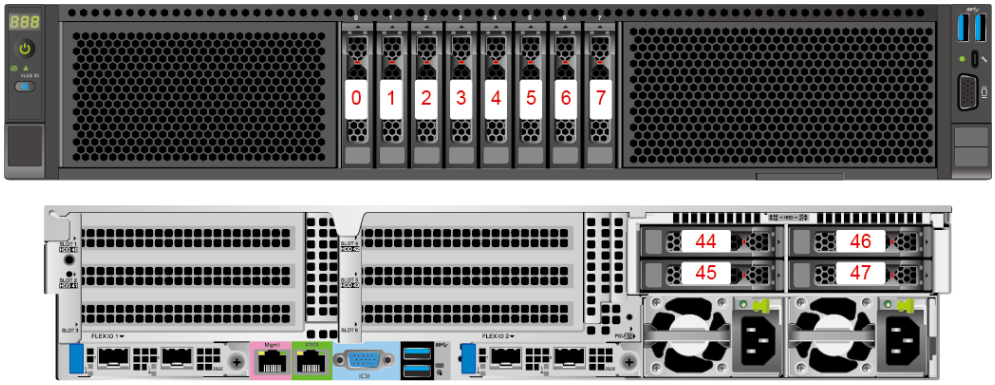


Table 5-22 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
44	44
45	45
46	46
47	47

- Drive numbers of the 8 x 2.5" SAS/SATA/NVMe drive pass-through configuration 2 in the **5.5.1.4.1 8 x 2.5" Drive Pass-Through Configurations**

Figure 5-35 Drive numbers

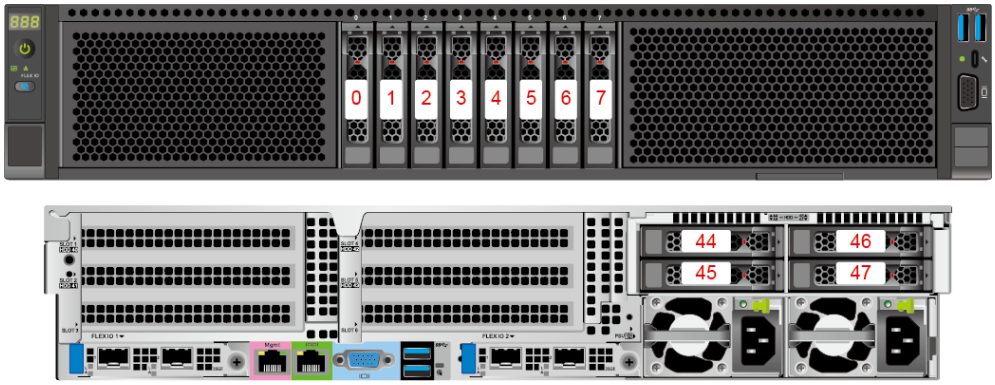


Table 5-23 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI	Drive Number Identified by the RAID Controller Card
0	0	0Note
1	1	1Note
2	2	2Note
3	3	3Note
4	4	4Note
5	5	5Note
6	6	6Note
7	7	7Note
44	44	-
45	45	-
46	46	-
47	47	-
Note: If the slot is configured with an SAS/SATA drive, the PCIe plug-in RAID controller card can manage the drive and allocate a number to the drive.		

5.5.1.4.2 8 x 3.5" Drive Pass-Through Configurations

Table 5-24 Drive configurations

Configuration	Front Drive	Rear Drive	Built-in Drive	Drive Management Mode
8 x 3.5" SAS/SATA/NVMe drive pass-through configuration 1	• Front drives (8 x 3.5"): – Slots 0 to 7 support only SATA/NVMe drives[a].	• I/O module 3 (4 x 2.5"): – Slots 44 to 47 support only NVMe drives[b].	M.2 SSD[c]	• NVMe drive: CPU pass-through • SATA drive: CPU pass-through
8 x 3.5" SAS/SATA/NVMe drive pass-through configuration 2	• Front drives (8 x 3.5"): – Slots 0 to 7 support SAS/SATA/NVMe drives[a].	• I/O module 3 (4 x 2.5"): – Slots 44 to 47 support only NVMe drives[b].	M.2 SSD[c]	• SAS/SATA drive: PCIe plug-in RAID controller card[d] • NVMe drive: CPU pass-through
• a: When configured with a single CPU, slots 0 through 3 do not support NVMe drives. • b: NVMe drives are supported when CPU 2 is configured. A single-CPU server does not support NVMe drives. • c: Installed in slot 4. • d: The PCIe plug-in RAID controller card can be installed in slot 2 or slot 3. • For details about the optional components, consult the local sales representative.				

- 8 x 3.5" SAS/SATA/NVMe drive pass-through configuration 1 in **5.5.1.4.2 8 x 3.5" Drive Pass-Through Configurations**

Figure 5-36 Drive numbers

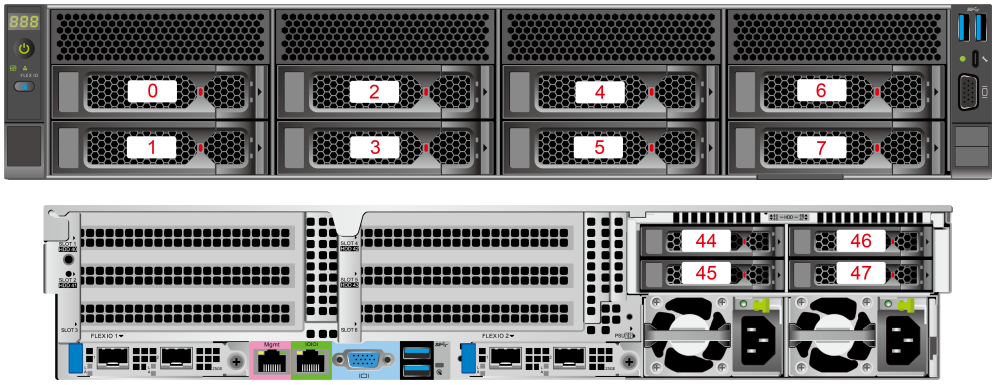


Table 5-25 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
44	44
45	45
46	46
47	47

- 8 x 3.5" SAS/SATA/NVMe drive pass-through configuration 2 in **5.5.1.4.2 8 x 3.5" Drive Pass-Through Configurations**

Figure 5-37 Drive numbers

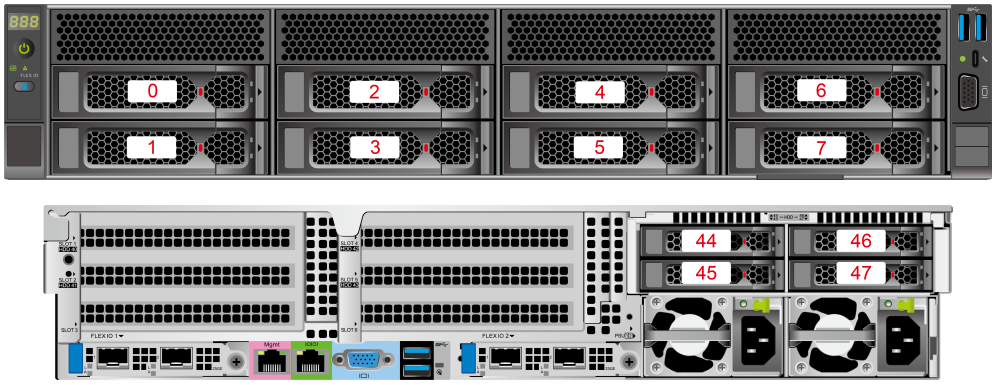


Table 5-26 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI	Drive Number Identified by the RAID Controller Card
0	0	0Note
1	1	1Note
2	2	2Note
3	3	3Note
4	4	4Note
5	5	5Note
6	6	6Note
7	7	7Note
44	44	-
45	45	-
46	46	-
47	47	-
Note: If the slot is configured with an SAS/SATA drive, the PCIe plug-in RAID controller card can manage the drive and allocate a number to the drive.		

5.5.1.4.3 16 x 2.5" Pass-Through Chassis

Table 5-27 Drive configurations

Configuration	Front Drive	Rear Drive	Built-in Drive	Drive Management Mode
16 x 2.5" drive pass-through configuration	• Front drive (8 x 2.5"): – Slots 0 to 7 support SAS/ SATA/ NVMe drives[a]. – Slots 8 to 15 support only NVMe drives	-	M.2 SSD[b]	• SAS/SATA drive: PCIe plug-in RAID controller card[c] • NVMe drive: CPU pass-through
• a: When configured with a single CPU, slots 0 through 7 do not support NVMe drives. • b: Installed in slot 4. • c: The PCIe plug-in RAID controller card can be installed in slot 2. • For details about the optional components, consult the local sales representative.				

- Drive numbers of the "16 x 2.5" drive pass-through configuration" in **5.5.1.4.3 16 x 2.5" Pass-Through Chassis**

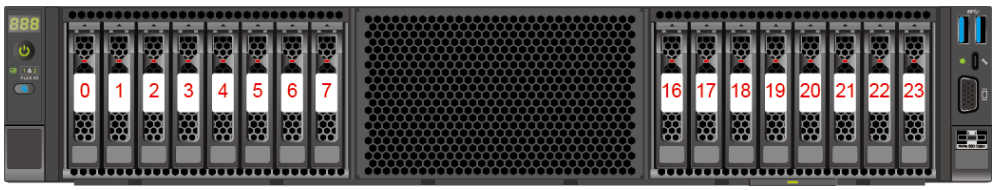


Table 5-28 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI
0	0
1	1
2	2
3	3
4	4

Drive Number	Drive Number Displayed on the iBMC WebUI
5	5
6	6
7	7
16	16
17	17
18	18
19	19
20	20
21	21
22	22
23	23

- Drive numbers of the "16 x 2.5" drive pass-through configuration 2" in **5.5.1.4.3 16 x 2.5" Pass-Through Chassis**

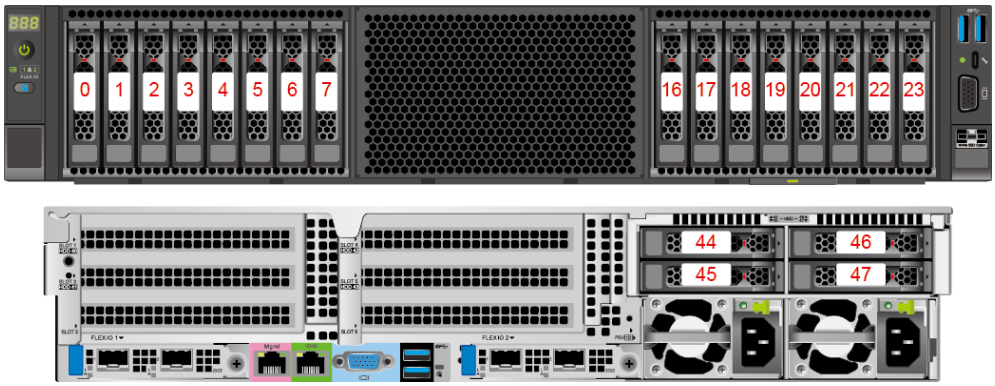


Table 5-29 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI	Drive Number Identified by the RAID Controller Card
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5

Drive Number	Drive Number Displayed on the iBMC WebUI	Drive Number Identified by the RAID Controller Card
6	6	6
7	7	7
16	16	-
17	17	-
18	18	-
19	19	-
20	20	-
21	21	-
22	22	-
23	23	-
44	44	-
45	45	-
46	46	-
47	47	-

5.5.1.4.4 24 x 2.5" Drive Pass-Through Configurations

Table 5-30 Drive configurations

Configuration	Front Drive	Rear Drive	Built-in Drive	Drive Management Mode
24 x 2.5" NVMe Drive Pass-Through Configuration	• Front drives (24 x 2.5"): – Slots 0 to 7 support only SAS/SATA/ NVMe drives[a]. – Slots 8 to 23 support only NVMe drives[a].	-	M.2 SSD[b]	SAS/ SATA/ NVMe drive: 1 x PCIe plug-in RAID controller card[c]

Configuration	Front Drive	Rear Drive	Built-in Drive	Drive Management Mode
• a: When configured with a single CPU, slots 0 through 11 do not support NVMe drives. • b: Installed in slot 4. • c: The PCIe plug-in RAID controller card is installed in slot 2. • For details about component components, consult the local sales representative.				

Drive Numbers

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 server *Maintenance and Service Guide*.

- Drive numbers of the "24 x 2.5" NVMe drive pass-through configuration" in **5.5.1.4.4 24 x 2.5" Drive Pass-Through Configurations**

Figure 5-38 Drive numbers

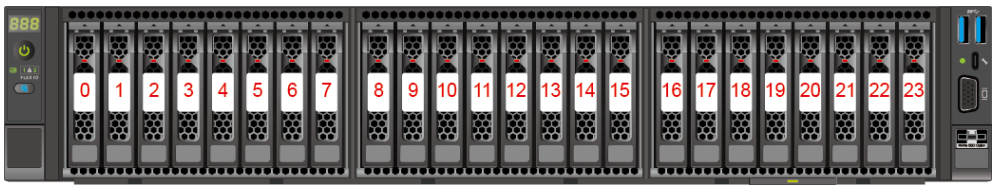


Table 5-31 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI	Drive Number Identified by the RAID Controller Card
0	0	0Note
1	1	1Note
2	2	2Note
3	3	3Note
4	4	4Note

Drive Number	Drive Number Displayed on the iBMC WebUI	Drive Number Identified by the RAID Controller Card
5	5	5[Note]
6	6	6[Note]
7	7	7[Note]
8	8	8
9	9	9
10	10	10
11	11	11
12	12	12
13	13	13
14	14	14
15	15	15
16	16	16
17	17	17
18	18	18
19	19	19
20	20	20
21	21	21
22	22	22
23	23	23
Note: If the slot is configured with an SAS/SATA drive, the RAID controller card can manage the drive and allocate a number to the drive.		

5.5.1.5 NVMe Hardware RAID Chassis

5.5.1.5.1 8 x 2.5" Pass-Through Chassis

Table 5-32 Drive configurations

Configuration	Front Drive	Rear Drive	Drive Management Mode
8 x 2.5" NVMe hardware RAID configuration	• Front drives (8 x 2.5"): – Slots 0 to 7 support only NVMe drives.	• I/O module 3 (4 x 2.5"): – Slots 44 to 47 support only NVMe drives.	NVMe drive: PCIe plug-in RAID controller card[a]
• a: The PCIe plug-in RAID controller card can be installed in slot 2 or slot 3. • For details about the optional components, consult the local sales representative.			

- Front drive numbers of 8 x 2.5" NVMe hardware RAID configuration in **5.5.1.5.1 8 x 2.5" Pass-Through Chassis**

Figure 5-39 Drive numbers

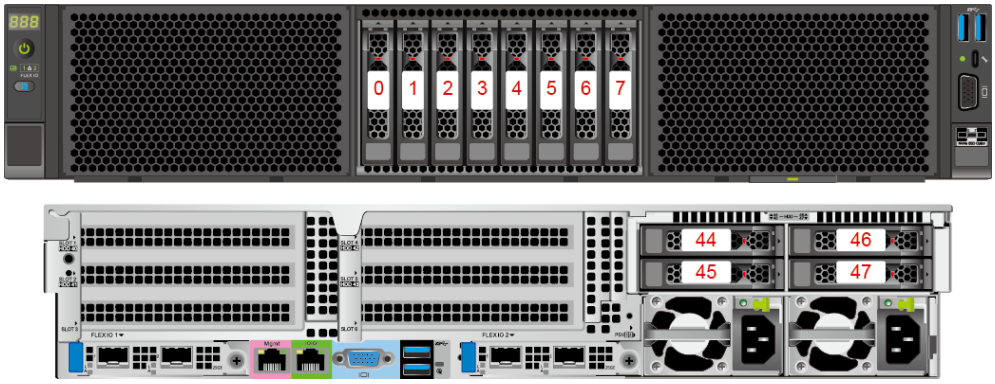


Table 5-33 Drive numbers

Drive Number	Drive Number Displayed on the iBMC WebUI	Drive Number Identified by the RAID Controller Card
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4

Drive Number	Drive Number Displayed on the iBMC WebUI	Drive Number Identified by the RAID Controller Card
5	5	5
6	6	6
7	7	7
Note: If the slot is configured with an SAS/SATA drive, the RAID controller card can manage the drive and allocate a number to the drive.		

5.5.2 Drive Indicators

SAS/SATA Drive Indicators

Figure 5-40 SAS/SATA drive indicators

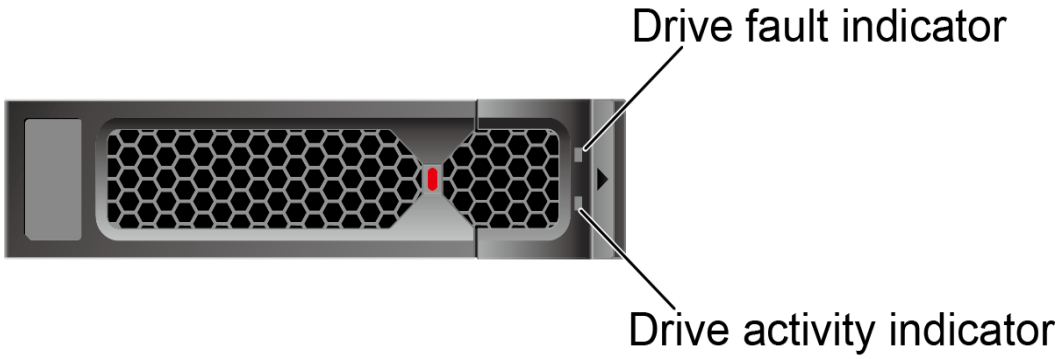
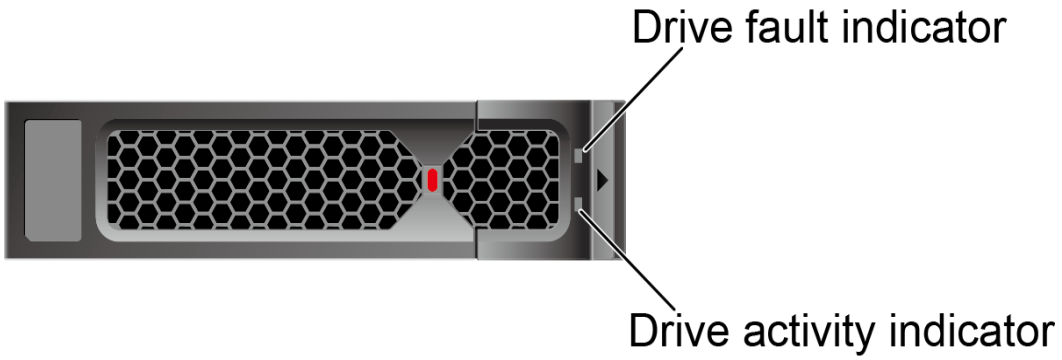


Table 5-34 SAS/SATA drive indicators

Activity Indicator (Green)	Fault Indicator (Red/Blue)	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 member drive in the RAID array is removed.
Steady on	Red steady on	The drive is faulty.

NVMe Drive Indicators

Figure 5-41 NVMe drive indicators



NVMe drives support surprise or orderly hot swap.

Table 5-35 NVMe drive indicator description

Activity Indicator (Green)	Fault Indicator (Red/Blue)	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.
Blinking at 1 Hz	Blinking red at 1 Hz synchronously	Data on the NVMe secondary drive is being rebuilt.
Steady on/Off	Red steady on	The NVMe drive is faulty.

5.5.3 RAID Controller Cards

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

- For details about the optional components, consult your 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 NICs

The OCP 3.0 NICs provide network expansion capabilities.

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

5.7 I/O Expansion

5.7.1 PCIe card

PCIe cards are used to provide ease of expandability and connection.

- The server supports a maximum of 10 standard PCIe slots.
- For details about the optional components, consult your local sales representative or see "Search Parts" in the compatibility list on the technical support website.
- 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

Positions of PCIe Slots

- Server with drive modules or PCIe riser modules on the rear panel

Figure 5-42 PCIe slots

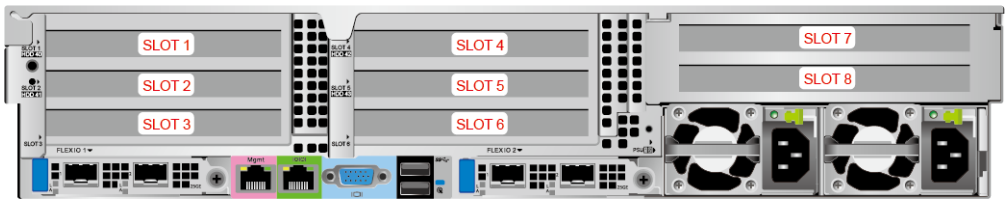
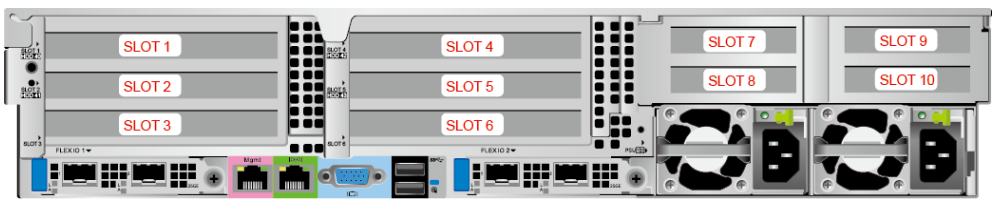
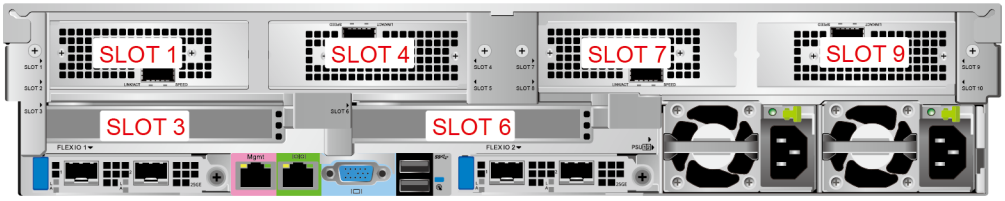


Figure 5-43 PCIe Slots



  - I/O module 1 provides slots 1, 2, and 3.
  - I/O module 2 provides slots 4, 5, and 6.
  - I/O module 3 provides slots 7, 8, 9, and 10.
- 4-GPU server

Figure 5-44 PCIe Slots

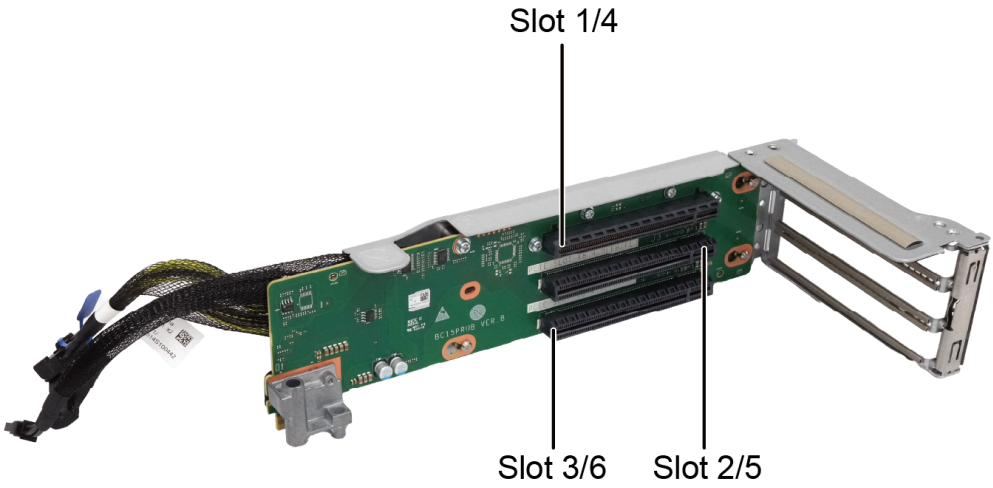


  - The 4-GPU Riser module provides slots 1, 4, 7, and 9.
  - I/O module 1 provides slot 3.
  - I/O module 2 provides slot 6.

PCIe Riser Cards (Applicable to the Server with a Drive Module or a PCIe Riser Module on the Rear Panel)

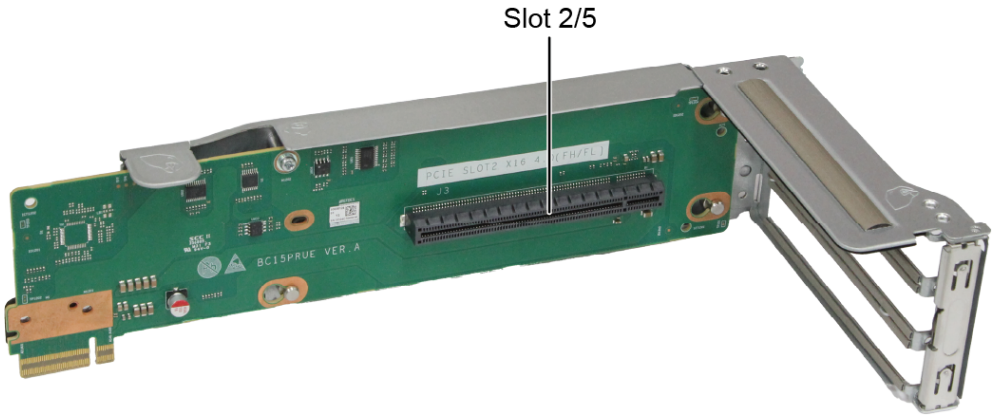
- PCIe riser card 1 of I/O module 1/2
  - Provides PCIe slots 1, 2, and 3 when installed in I/O module 1.
  - Provides PCIe slots 4, 5, and 6 when installed in I/O module 2.

Figure 5-45 PCIe riser card 1



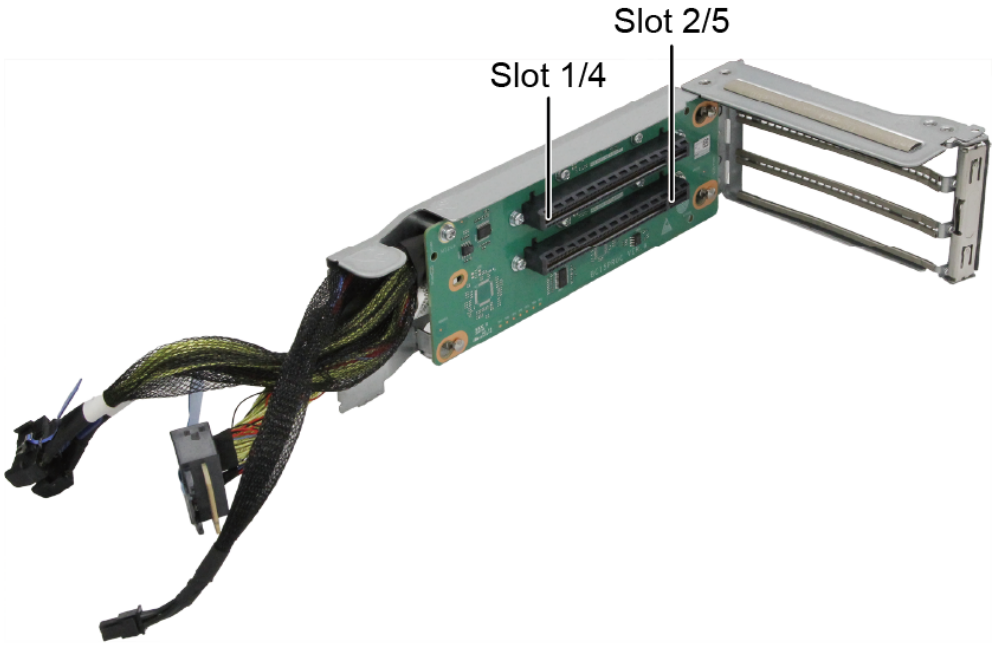
- PCIe riser card 2 of I/O module 1/2
  - Provides PCIe slot 2 when installed in I/O module 1.
  - Provides PCIe slot 5 when installed in I/O module 2.

Figure 5-46 PCIe riser card 2



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

Figure 5-47 PCIe riser card 3

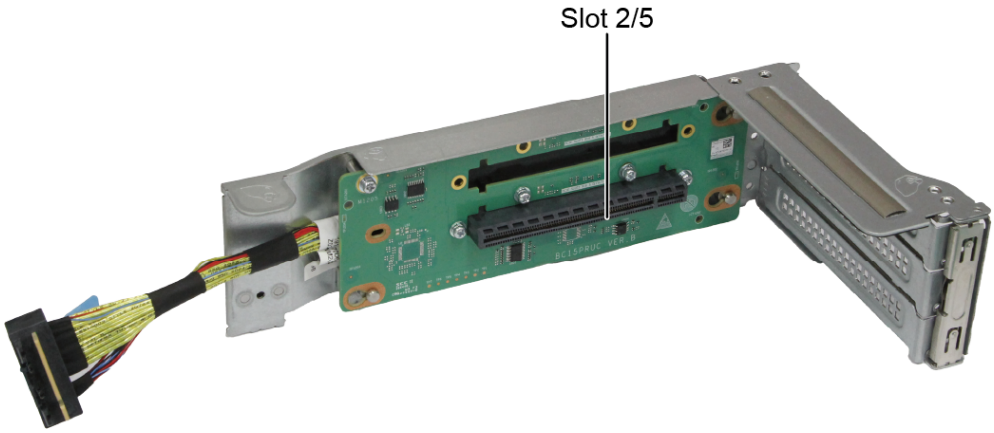


- PCIe riser card 4 of I/O module 1/2
  - Provides PCIe slot 3 when installed in I/O module 1.
  - Provides PCIe slot 6 when installed in I/O module 2.

Figure 5-48 PCIe riser card 4

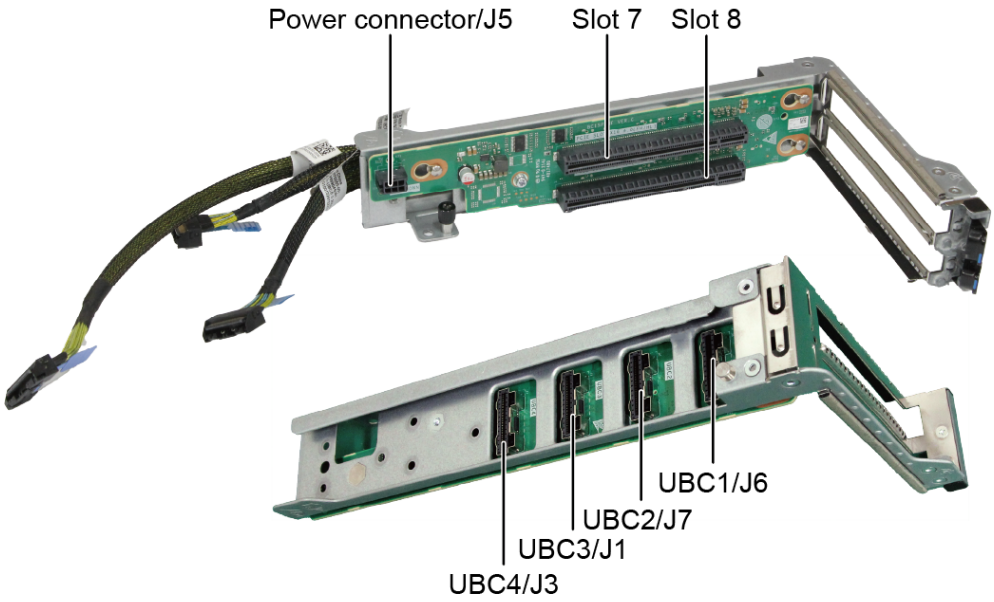
- PCIe riser card 5 of I/O module 1/2
  - Provides PCIe slot 2 when installed in I/O module 1.
  - Provides PCIe slot 5 when installed in I/O module 2.

Figure 5-49 PCIe riser card 5



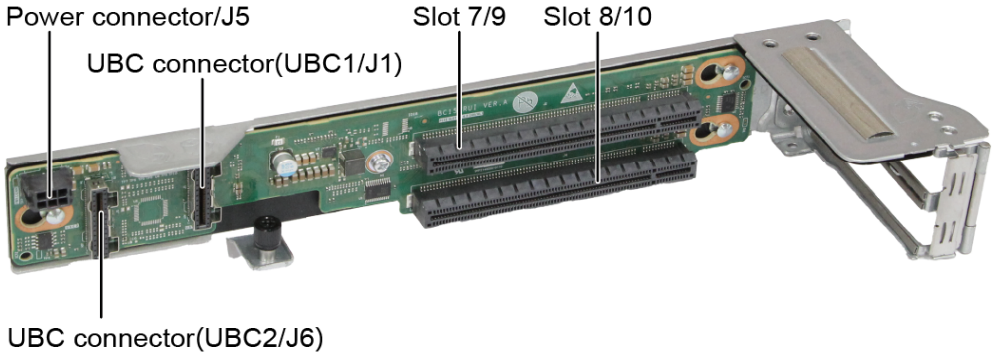
- PCIe riser card 1 of I/O module 3
  Provides PCIe slots 7 and 8 when installed in I/O module 3.

Figure 5-50 PCIe riser card 1 of I/O module 3



- PCIe riser card 2 of I/O module 3
  - When one PCIe riser card 2 is installed, slots 7, 8, 9, and 10 are provided.
  - When two PCIe riser cards 2 are installed, slots 7, 8, 9, and 10 are provided.

Figure 5-51 PCIe riser card 2 of I/O module 3



5.7.3 PCIe Slot Description

NOTE

The PCIe port numbers in table 1 correspond to CPUs. For details about the PCIe port number displayed on the BIOS screen, see the BIOS parameter reference of the server.

Server with PCIe Riser Modules on the Rear Panel

Table 5-36 PCIe slots

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 Devices Supported by the PCIe Slot or Port
PCIe riser card 1 of I/O module 1/2	I/O module 1	Slot 1	PCIe 5.0 x 16[a] (x16) [b]	CPU 1	P1	FHHL
		Slot 2	PCIe 4.0 x16 (x8)	CPU 1	P2-2	FHHL
		Slot 3	PCIe 4.0 x16 (x8)	CPU 1	P2-1	FHHL
	I/O module 2	Slot 4	PCIe 5.0 x16 (x16)	CPU2	P3	FHHL
		Slot 5	PCIe 4.0 x16 (x8)	CPU2	P2-1	FHHL
		Slot 6	PCIe 4.0 x16 (x8)	CPU2	P2-2	FHHL
PCIe riser card 2 of I/O module 1/2	I/O module 1	Slot 2	PCIe 4.0 x16 (x16)	CPU 1	P2	FHHL
	I/O module 2	Slot 5	PCIe 4.0 x16 (x16)	CPU2	P2	FHHL
PCIe riser card 3 of I/O module 1/2	I/O module 1	Slot 1	PCIe 5.0 x16 (x16)	CPU 1	P1	FHHL
		Slot 2	PCIe 5.0 x16 (x16)	CPU 1	P2	FHHL
	I/O module 2	Slot 4	PCIe 5.0 x16 (x16)	CPU2	P3	FHHL
		Slot 5	PCIe 5.0 x16 (x16)	CPU2	P2	FHHL
PCIe riser card 4 of I/O module 1/2	I/O module 1	Slot 3	PCIe 5.0 x16 (x16)	CPU 1	P1	FHHL
	I/O module 2	Slot 6	PCIe 5.0 x16 (x16)	CPU2	P3	FHHL

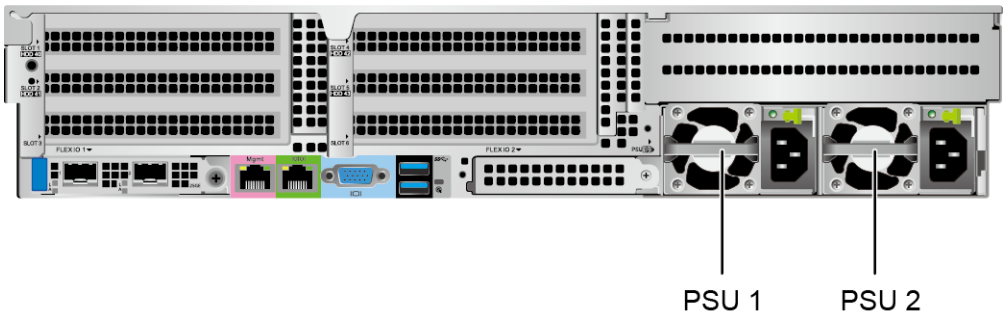
PCIe Riser Card	PCIe Riser Card Installation Position	PCIe Slot on the PCIe riser card	PCIe Slot or Port Description	CPU	PCIe Port Number	PCIe Devices Supported by the PCIe Slot or Port
PCIe riser card of I/O module 1	I/O module 1	Slot 2	PCIe 5.0 x16 (x16)	CPU 1	P2	FHHL
PCIe riser card 1 of I/O module 3	I/O module 3	Slot7	PCIe 4.0 x16 (x16)	CPU 1	P0	FHHL
		Slot8	PCIe 4.0 x16 (x16)	CPU 1	P1	FHHL
PCIe riser card 2 of I/O module 3	I/O module 3	Slot7	PCIe 4.0 x16 (x8)	CPU2	P0-2	HHHL
		Slot8	PCIe 4.0 x16 (x8)	CPU2	P0-1	HHHL
		Slot9	PCIe 4.0 x16 (x8)	CPU2	P1-2	HHHL
		Slot10	PCIe 4.0 x16 (x8)	CPU2	P1-1	HHHL
-	-	FlexIO card 1	PCIe4.0 x16 (x8 and x16[c])	CPU 1	P3	OCP 3.0 specifications
-	-	FlexIO card 2	PCIe 4.0 x16 (x8 and x16[c])	CPU2	P3	OCP 3.0 specifications

- 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: FLEX I/O card does not support this function by default. The link bandwidth can be extended to x16 using cables.
- The PCIe x16 slots are compatible with PCIe x16, PCIe x8, PCIe x4, and PCIe x1 cards. That is, the PCIe slot width cannot be smaller than the PCIe card link width.
- 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 and HHHL PCIe cards.
- The maximum power supply of each PCIe slot is 75 W.

5.8 PSUs

- The server supports one or two PSUs.
- Supports AC or DC PSUs.
- The server supports hot swap.
- When two PSUs are configured, 1+1 redundancy is supported.
- PSUs of the same P/N code must be used in a server.
- Short-circuit protection is provided, and bipolar fuses are provided for PSUs that support dual live wire input.
- The rated power of the power supply unit is related to the input voltage. Please refer to the technical manual of the relevant power supply for the detailed relation between voltage and power.
- If the DC power supply is used, purchase the DC power supply that meets the requirements of the safety standards or the DC power supply that has passed the CCC certification.
- For details about the optional components, consult the local sales representative or see "Search Parts" in the compatibility list on the technical support website.

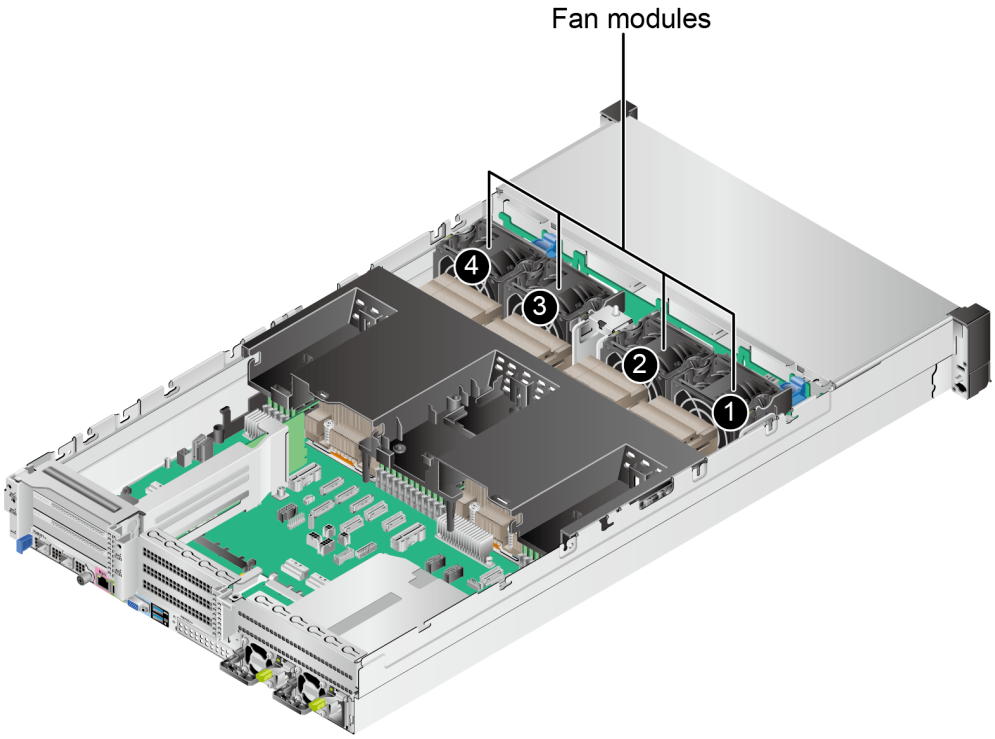
Figure 5-52 Position of the PSU



5.9 Fan Modules

- Supports four fan modules.
- Supports hot swap.
- Supports N+1 redundancy. The server runs properly when one fan fails.
- Supports intelligent fan speed adjustment.
- Fan modules of the same part number (P/N code) must be used in a server.

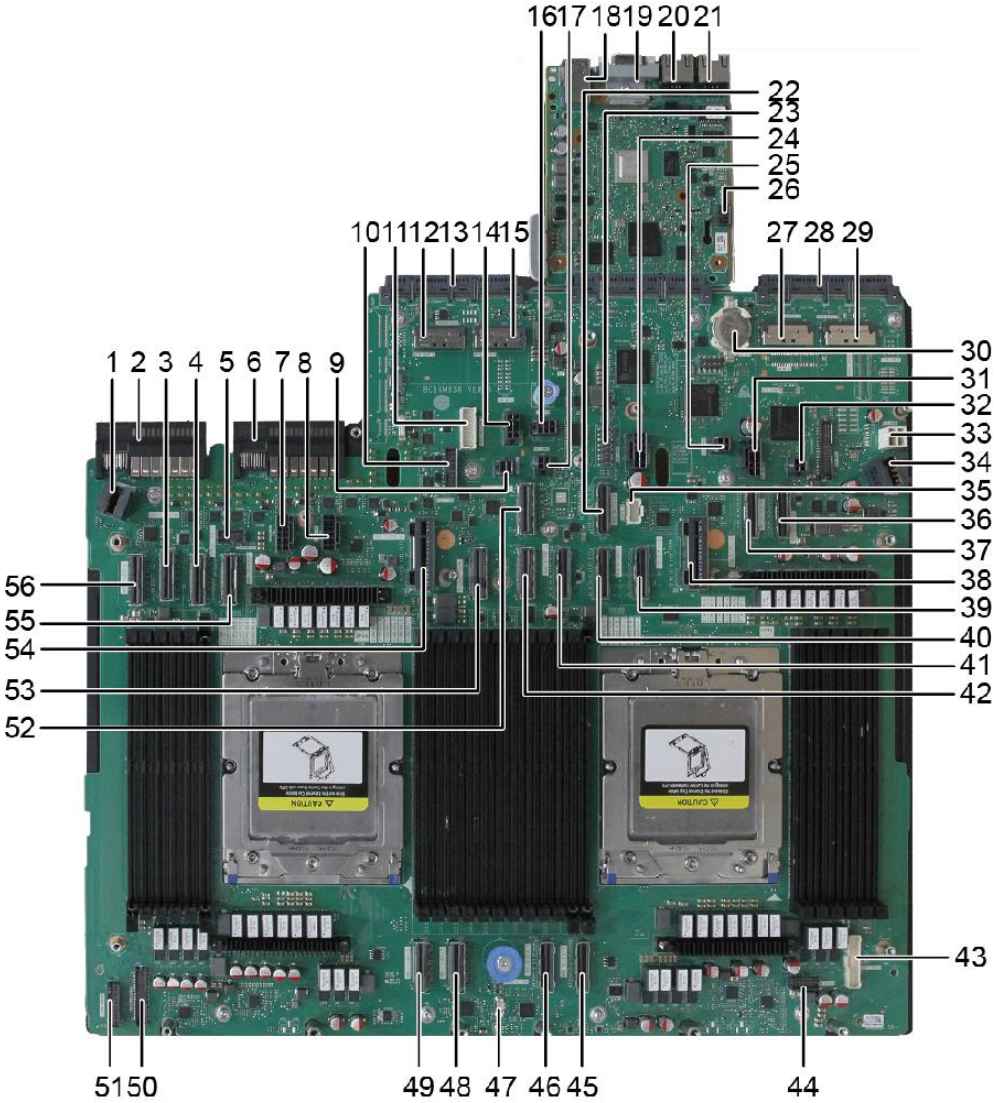
Figure 5-53 Positions of the fan modules



5.10 Board

5.10.1 Mainboard

Figure 5-54 Mainboard



1	Front-drive backplane power connector (FRONT HDD PWR/J110)	2	PSU 2 connector (PSU2/J19)
3	High-speed MCIO connector (MB 1-P0-0/ J156)	4	High-speed MCIO connector (MB 1-P1-1/J159)
5	Drive backplane signal connector of rear I/O module 3 (PSU HDD BP/ J13)	6	PSU 1 connector (PSU1/J18)
7	GPU 4 power connector (GPU4 PWR/J20)	8	GPU 3 power connector (GPU3 PWR/J21)

9	Power connector of I/O module 2 (IO2 PWR2/J187)	10	NCSI connector (NCSI CONN/J198)
11	RAID & M.2 mezzanine card signal connector (RAID & M.2 CONN/J142)	12	High-speed MCIO connector (MCIO OCP2-L /J173)
13	OCP 3.0 NIC 2 connector (OCP2 CONN/J177)	14	DPU power connector (DPU CEM/ J196)
15	High-speed MCIO connector (MCIO OCP2-H / J172)	16	SDI card power connector (SDI PWR/J197)
17	Power connector of I/O module 2 (IO2 PWR1/J188)	18	Two USB 3.0 ports (USB3.0 CONN/ J88)
19	Rear VGA port (VGA CONN/J60)	20	Serial port (COM/J6020)
21	BMC management port (BMC_GE/J6019)	22	High-speed MCIO connector (MB 0-P1-0/J151)
23	TPM/TCM connector (TMP CONN/J150)	24	GPU 2 power connector (GPU2 PWR/J22)
25	Power connector of I/O module 1 (IO1 PWR2/J194)	26	UART signal connector (UART_COM/J6024)
27	High-speed MCIO connector (MCIO OCP1-L/ J32)	28	OCP 3.0 NIC 1 connector (OCP1 CONN/J1)
29	High-speed MCIO connector (MCIO OCP1-H/ J34)	30	RTC battery connector (RTC BAT/ U19340)
31	GPU 1 power connector (GPU1 PWR/J25)	32	Power connector of I/O module 1 (IO1 PWR1/J195)
33	OCP 3.0 NIC power connector (OCP PWR/ J124)	34	Fan board power connector (FAN PWR/J76)
35	Built-in drive backplane signal connector (INNER BP /J14)	36	High-speed MCIO connector (MB 0-P3-1/J155)
37	High-speed MCIO connector (MB 0-P3-0/ J154)	38	CPU 1 UBC DD connector (MB 0-P2-0/J36)
39	High-speed MCIO connector (MB 0-P1-1/ J161)	40	High-speed MCIO connector (MB 0-P0-1/J153)

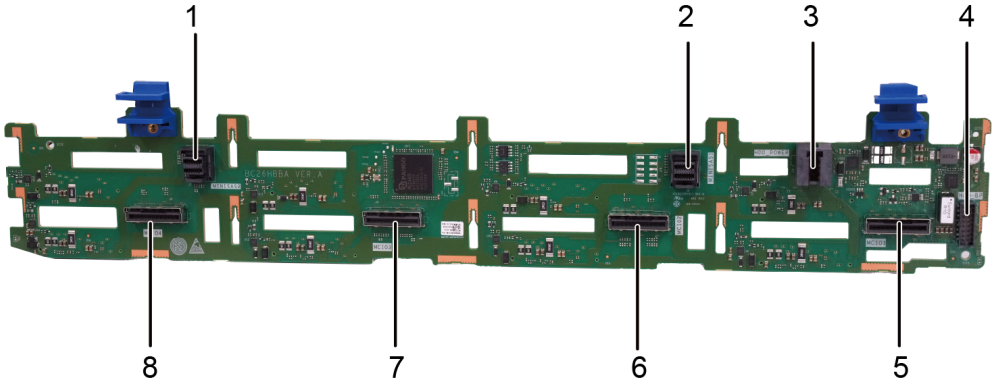
41	High-speed MCIO connector (MB 0-P0-0/ J152)	42	High-speed MCIO connector (MB 1-P3-1/J162)
43	Right mounting ear connector (R_EAR CONN/ J74)	44	Fan board signal connector (FAN BOARD/J15)
45	High-speed MCIO connector (MB 0-G3-1/ J166)	46	High-speed MCIO connector (MB 0-G3-0/J165)
47	Intrusion sensor connector (INTRUDER CONN/S1)	48	High-speed MCIO connector (MB 1-G1-1/J163)
49	High-speed MCIO connector (MB 1-G1-0/ J164)	50	Front-drive backplane signal connector (HDD CONN/J192)
51	Left mounting ear connector (L_EAR BOARD/ J39)	52	High-speed MCIO connector (MB 2-P4-0/J167)
53	High-speed MCIO connector (MB 1-P3-0/ J160)	54	CPU 2 UBC DD connector (MB 1-P2-0/J8)
55	High-speed MCIO connector (MB 1-P1-0/ J158)	56	High-speed MCIO connector (MB 1-P0-1/J157)

5.10.2 Drive Backplane

Front-Drive Backplane

- 8 x 3.5" SAS/SATA/NVMe pass-through drive backplane
  - All drive configurations in **5.5.1.2.2 8 x 3.5" Drive Pass-Through Configurations** support this backplane.
  - All drive configurations in **5.5.1.4.2 8 x 3.5" Drive Pass-Through Configurations** support this backplane.

Figure 5-55 8 x 3.5" SAS/SATA/NVMe pass-through drive backplane

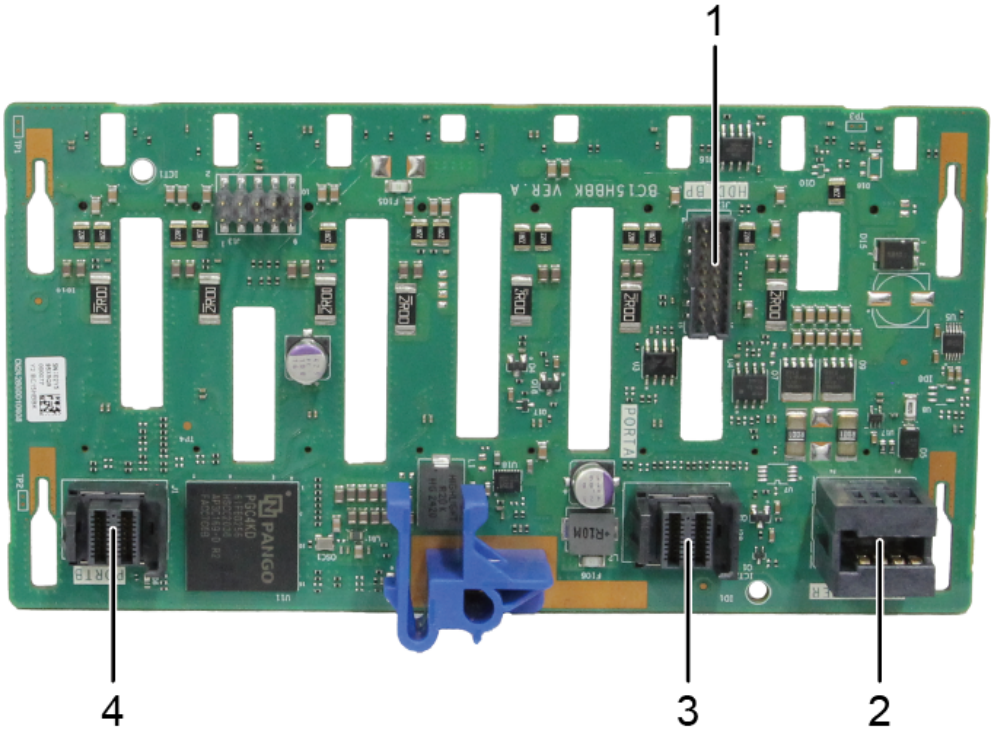


No.	Connector	Managed Drive Slot
1	mini-SAS HD connector (MINISAS2/J7)	SAS/SATA: Slot 4 to Slot 7
2	mini-SAS HD connector (MINISAS1/J6)	SAS/SATA: Slot 0 to Slot 3
3	Backplane power connector (HDD_POWER/J21)	-
4	Backplane signal cable connector (HDD_BP/ J20)	-
5	MCIO high-speed connector (MCIO1/J1)	NVMe: Slot0 to Slot1
6	MCIO high-speed connector (MCIO2/J2)	NVMe: Slot2 to Slot3
7	MCIO high-speed connector (MCIO3/J3)	NVMe: Slot 4 to Slot 5
8	MCIO high-speed connector (MCIO4/J4)	NVMe: Slot 6 to Slot 7

- 8 x 2.5" SAS/SATA pass-through drive backplane

  All configurations in **5.5.1.2.1 8 x 2.5" Drive Pass-Through Configurations** support this backplane.

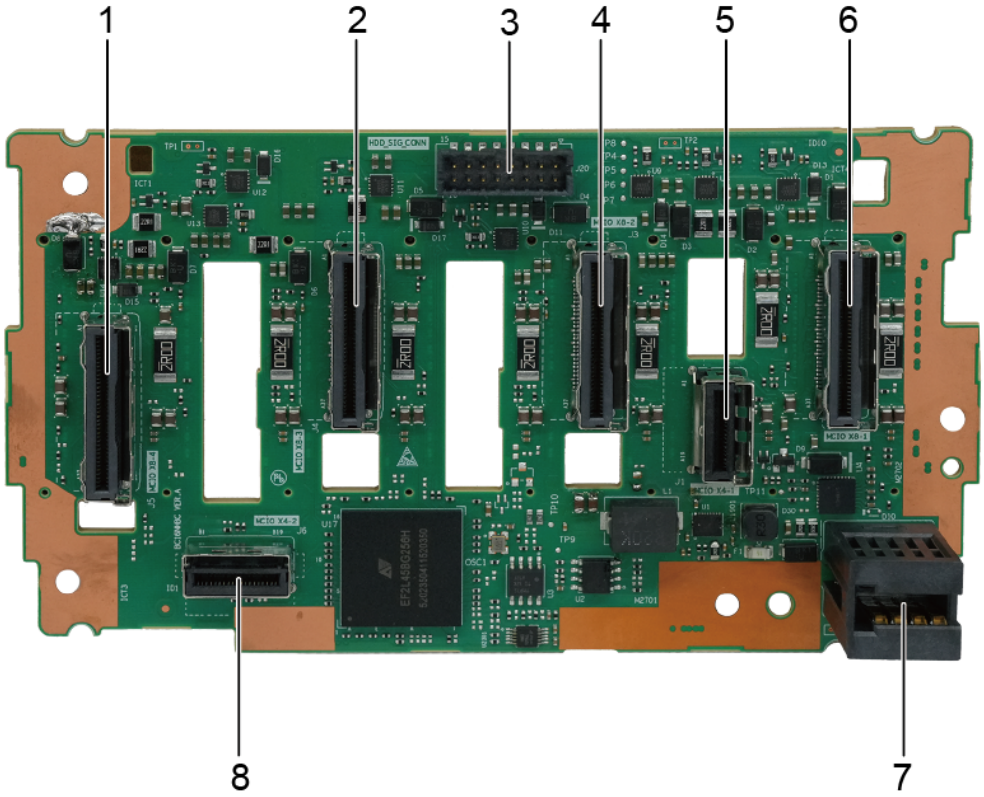
Figure 5-56 8 x 2.5" drive pass-through configuration backplane



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)	Slot0~Slot3
4	Mini-SAS HD connector (PORT B/J1)	Slot4~Slot7

- 8 x 2.5" SAS/SATA/NVMe 3cage drive backplane
  - All configurations in **5.5.1.3 SAS/SATA Chassis-Supporting 4 x GPU** support this backplane.
  - All configurations in **5.5.1.4.1 8 x 2.5" Drive Pass-Through Configurations** support this backplane.
  - All configurations in **5.5.1.4.3 16 x 2.5" Pass-Through Chassis** support this backplane.
  - All configurations in **5.5.1.4.4 24 x 2.5" Drive Pass-Through Configurations** support this backplane.

Figure 5-57 8 x 2.5" SAS/SATA/NVMe 3cage drive backplane

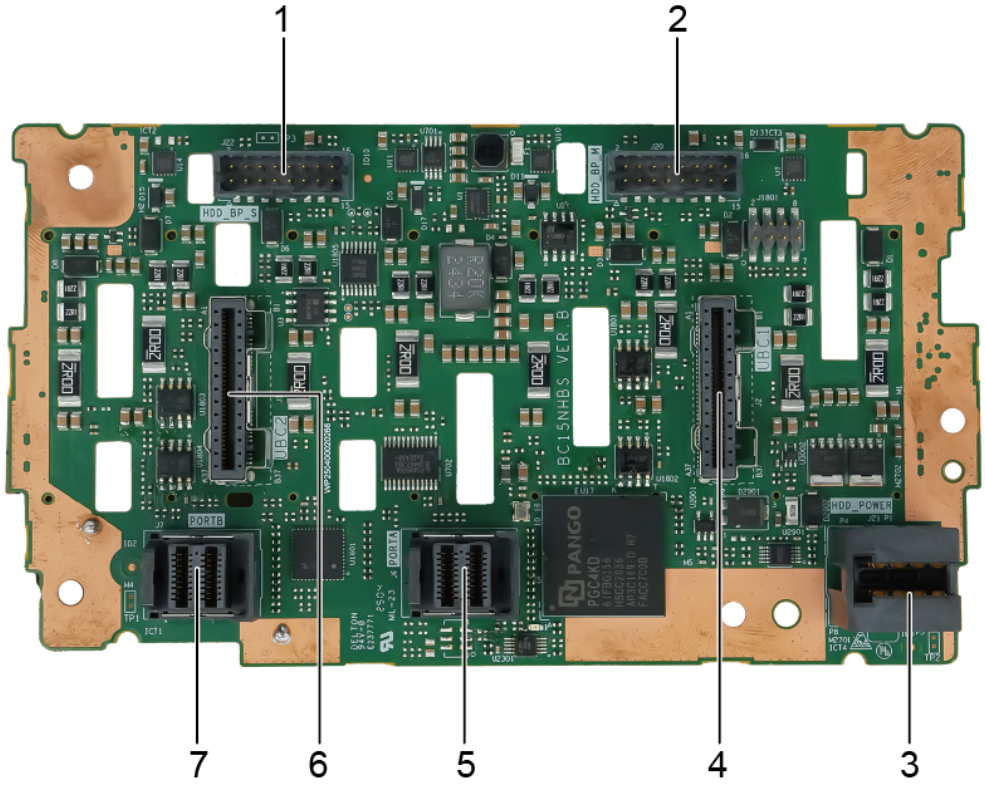


No.	Connector	Managed Drive Slot
1	MCIO x8 connector (MCIO x8_4/J5)	NVMe: Slot 6 and Slot 7
2	MCIO x8 connector (MCIO x8_3/J4)	NVMe: Slot 4 and Slot 5
3	Backplane signal cable connector (HDD_SIG_CONN/J20)	-
4	MCIO x8 connector (MCIO x8_2/J3)	NVMe: Slot 2 and Slot 3
5	MCIO x 4 connector (PORT A/J1)	SATA: Slot 0 to Slot 3
6	MCIO x8 connector (MCIO x8_1/J2)	NVMe: Slot 0 and Slot 1
7	Power connector (HDD_POWER/ J21)	-
8	MCIO x4 connector (PORT B/J6)	SATA: Slot 4 to Slot 7

- 8 x 2.5" SAS/SATA/NVMe backplane (supporting hardware RAID)

  All configurations in **5.5.1.5.1 8 x 2.5" Pass-Through Chassis** support this backplane.

Figure 5-58 8 x 2.5" SAS/SATA/NVMe backplane (supporting hardware RAID)

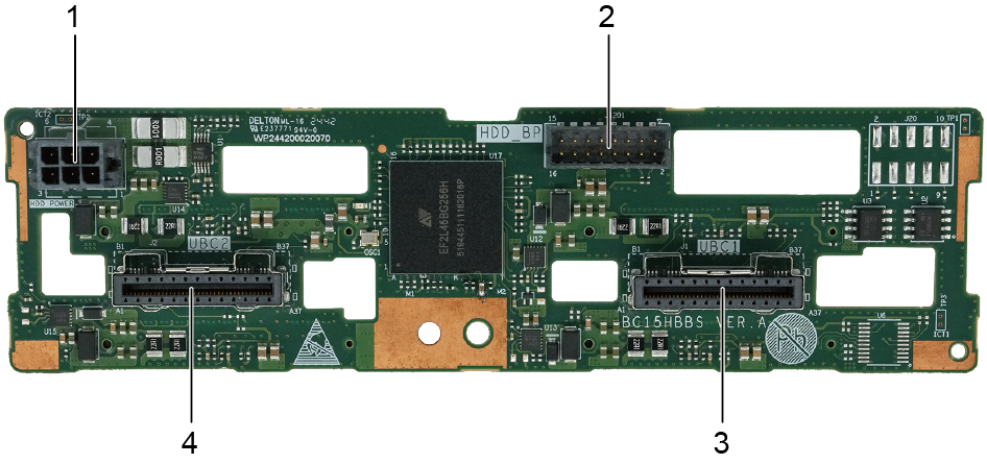


No.	Connector	Managed Drive Slot
1	Cascade backplane low-speed connector (HDD_BP_S/J22)	-
2	Backplane low-speed connector (HDD_BP_M/J20)	-
3	Power connector (HDD_POWER/J21)	-
4	UBC connector 1 (UBC1/J2)	NVMe: Slots 0 to 3
5	Mini-SAS HD connector (PORT A/J6)	SAS/SATA: Slots 0 to 3
6	UBC connector 2 (UBC2/J3)	NVMe: Slots 4 to 7
7	Mini-SAS HD connector (PORT B/J7)	SAS/SATA: Slots 4 to 7

Rear-Drive Backplane

- 4 x 2.5" NVMe drive backplane

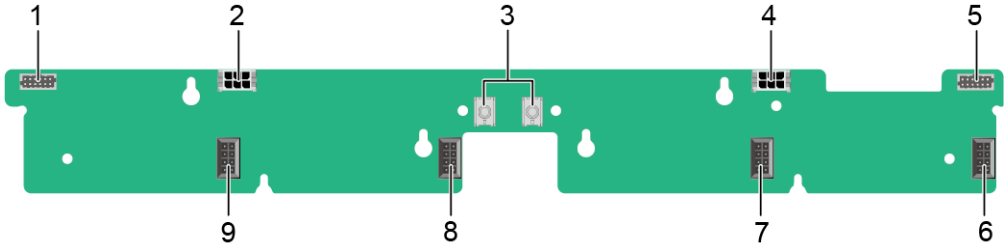
Figure 5-59 4x NVMe drive backplane



No.	Connector	Managed Drive Slot
1	Power connector (HDD_POWER/ J21)	-
2	Backplane signal cable connector (HDD BP/J1201)	-
3	UBC connector 1 (UBC1/J1)	Slot 44, Slot 45
4	UBC connector 2 (UBC2/J2)	Slot 46, Slot 47

5.10.3 Fan Board

Figure 5-60 Fan Board



1	Fan board signal connector (FAN_BOARD/J3)	2	Reserved and unavailable currently
3	Fan board power connector (J10 GND_BLACK/J11 POWER_RED)	4	Reserved and unavailable currently
5	Reserved and unavailable currently	6	Fan connector (FAN1/J7)

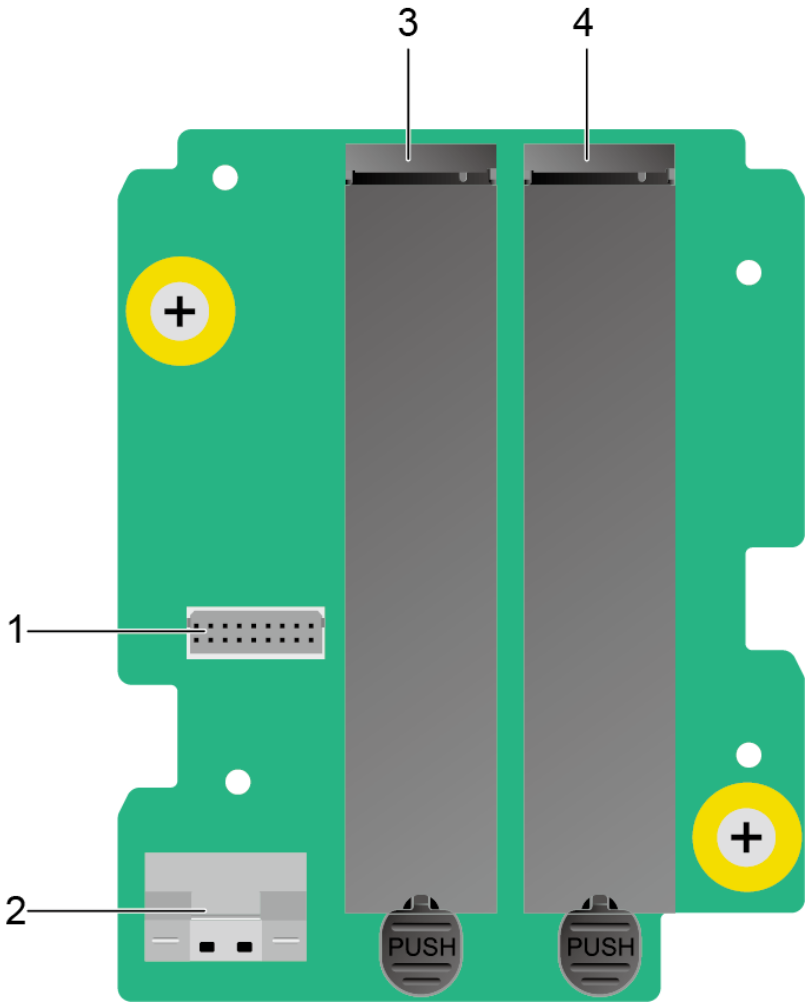
7	Fan connector (FAN2/J6)	8	Fan connector (FAN3/J5)
9	Fan connector (FAN4/J4)	-	-

5.10.4 Built-in M.2 Adapter Card

NOTE

- The built-in M.2 adapter card does not support RAID functionality.
- For the maximum bandwidth of the M.2 SSD, consult the local sales representative.

Figure 5-61 M.2 adapter card integrated in CPU



1	Signal connector (J1)	2	High-speed connector (J2)
3	M.2 slot (M.2 Conn A)	4	M.2 slot (M.2 Conn B)

6 Specifications

6.1 Technical Specifications

Table 6-1 Technical specifications

Component	Specifications
Form factor	2U 2-socket rack server
Processor	The server supports one or two processors. ● The server supports the 5th generation of AMD EPYC™ 9005 series processors (Turin). ● Built-in memory controller and 12 memory channels per processor ● Built-in PCIe controller, supporting PCIe 5.0 and 128 lanes per processor ● Up to 192 cores ● Max. 5 GHz turbo frequency ● Max. 512 MB L3 cache per CPU ● Max. 500 W thermal design power (TDP) **NOTE** The preceding information is for reference only. For details, see "Search Parts" in the compatibility list on the technical support website.

Component	Specifications
Memory	The server supports 24 DIMM slots. ● Up to 24 DDR5 DIMMs. – Supports RDIMM. – Max. 6400 MT/s memory speed – The DDR5 memory modules of different types and specifications (capacity, bit width, rank, and height) cannot be used together. – A server must use DDR5 memory modules of the same P/N code. **NOTE** The preceding information is for reference only. For details, see "Search Parts" in the compatibility list on the technical support website.
Storage	Supports a variety of drive configurations. For details, see **5.5.1 Drive Configuration and Drive Numbering**. ● Hot-swappable SAS/SATA/NVMe U.2 drives. ● A variety of RAID controller cards. For details, see "Search Parts" in the Compatibility List on the support website. – The RAID controller card supports RAID configuration, RAID level migration, and drive roaming. – The RAID controller card supports a supercapacitor for power-off protection to ensure user data security. – The RAID controller card occupies one standard PCIe slot. For details about the RAID controller card, see the server *RAID Controller Card User Guide*. **NOTE** If the BIOS is in legacy mode, the 4K drive cannot be used as the boot drive.
Network	The OCP 3.0 NICs provide network expansion capabilities. A variety of OCP 3.0 NICs. For details, see "Search Parts" in the compatibility list on the technical support website.

Component	Specifications
I/O expansion	Supports a maximum of ten tandard PCIe expansion slots, four of which are HHHL. Supports a maximum of eight FH standard PCIe expansion slots. ● Two FlexIO expansion slots dedicated for OCP 3.0 NICs and ten standard PCIe expansion slots. For details, see **5.7.2 PCIe Slots** and **5.7.3 PCIe Slot Description**. **NOTE** The preceding information is for reference only. For details, see "Search Parts" in the compatibility list on the technical support website.
Ports	A variety of ports. ● Ports on the front panel: – One USB Type-C iBMC direct connect management port – Two USB 3.0 ports ● Ports on the rear panel: – Two USB 3.0 ports – One DB15 VGA port – One RJ45 serial port – One RJ45 management network port **NOTE** You are not advised to install the OS on the USB storage media.
Graphics card	Supports an integrated graphics chip (SM750) on the mainboard, providing 32 MB video memory. The maximum resolution at 60 Hz with 16M colors is 1920 x 1200 pixels. **NOTE** The integrated graphics card can provide the maximum display resolution (1920 x 1200) only after the graphics card driver matching the OS version is installed. Otherwise, only the default resolution supported by the OS is provided.
System management	● UEFI ● iBMC ● NC-SI ● Integration with third-party management systems
Security feature	● Power-on password ● Administrator password ● TPM (for China and outside China) /TCM (only for China) ● Secure boot ● Front bezel (optional) ● Chassis cover intrusion detection

6.2 Environmental Specifications

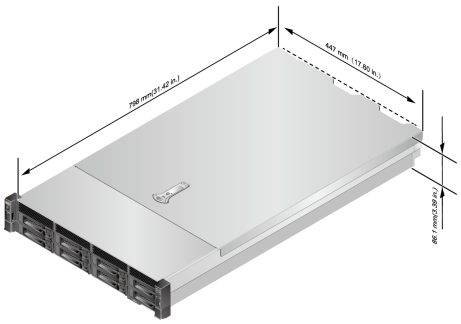
Table 6-2 Environmental specifications

Item	Specifications
Temperature	• Operating temperature: 5°C to 40°C (41°F to 104°F) (ASHRAE Classes A1 to A3 compliant) • Storage temperature (within three months): –30ºC to +60ºC (–22ºF to +140ºF) • Storage temperature (within six months): –15ºC to +45ºC (5ºF to 113ºF) • Storage temperature (within one year): -10ºC to +35ºC (14ºF to 95ºF) • Maximum temperature change rate: 20ºC (36ºF) per hour and 5ºC (9ºF) per 15 minutes **NOTE** The operating temperature limitation varies depending on the server configuration. For details, see **A.3 Operating Temperature Limitations**.
Relative humidity (RH, non-condensing)	• Operating humidity: 8% to 90% • Storage humidity (within three months): 8% to 85% • Storage humidity (within six months): 8% to 80% • Storage humidity (within one year): 20% to 75% • Maximum humidity change rate: 20% /hour • Operational climatic range category ASHRAE Class A3 8% RH with -12°C (10.4°F) minimum dew point to 90% RH with 24°C (75.2°F) maximum dew point (ASHRAE Classes A4 compliant)
Air volume	≥ 96 CFM
Operating altitude	≤ 3050 m (10006.56 ft) • When the configuration complies with ASHRAE Class A1 and A2, and the altitude is above 900 m (2952.76 ft), the operating temperature decreases by 1ºC (1.8 ºF) for every increase of 300 m (984.25 ft). • When the configuration complies with ASHRAE Class A3, and the altitude is above 900 m (2952.76 ft), the operating temperature decreases by 1ºC (1.8ºF) for every increase of 175 m (574.15 ft.). • HDDs cannot be used at an altitude of over 3050 m (10,006.56 ft).

Item	Specifications
Corrosive airborne contaminants	Maximum growth rate of the corrosion product thickness: ● Copper corrosion rate test: 300 Å/month (meeting level G1 requirements of the ANSI/ISA-71.04-2013 standard on gaseous corrosion) ● Silver corrosion rate test: 200 Å/month
Particle contaminant	● The equipment room environment meets the requirements of ISO 14664-1 Class 8. ● There is no explosive, conductive, magnetic, or corrosive dust in the equipment room. **NOTE** It is recommended that the particulate pollution in the equipment room be monitored by a professional organization.
Acoustic 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). ● Idle: – LWAd: 7.08 Bels – LpAm: 55.1dBA ● Operating: – LWAd: 7.11 Bels – LpAm: 55.2 dBA **NOTE** Actual sound levels generated during operation vary depending on the configuration, load, and ambient temperature.

6.3 Physical Specifications

Table 6-3 Physical specifications

Category	Description
Dimensions (H x W x D)	• Chassis with 3.5" drives: 86.1 mm × 447 mm × 798 mm (3.39 in. x 17.60 in. x 31.42 in.) • Chassis with 2.5" drives: 86.1 mm × 447 mm × 798 mm (3.39 in. x 17.60 in. x 31.42 in.) **Figure 6-1** Physical dimensions (example: a chassis with 3.5" drives)  **NOTE** • See **Figure 6-1** for methods of measuring physical dimensions of the chassis. • The method for measuring a chassis with 3.5" drives and that for measuring a chassis with 2.5" drives are the same. The chassis with 3.5" drives is used as an example.
Installation space	• Requirements for cabinet installation: Use a standard cabinet that complies with the International Electrotechnical Commission 297 (IEC 297) standard. – Cabinet width: 482.6 mm (19.00 in.) – Cabinet depth ≥ 1000 mm (39.37 in.) • Requirements for guide rail installation: – L-shaped guide rails: apply only to xFusion cabinets. – Ball bearing rail kit: applies to cabinets with a distance of 609 mm to 950 mm (23.98 in. to 37.40 in.) between the front and rear mounting bars.

Category	Description
Weight in full configuration	● Net weight: – Maximum weight for a server with a 8 x 2.5" pass-through chassis: 22.5 kg (49.6 lb) – Maximum weight for a server with a 8 x 3.5" pass-through chassis: 32 kg (70.55 lb) – Maximum weight for a server with a 16 x 2.5" pass-through chassis: 24.5 kg (54.01lb) – Maximum weight for a server with a 24 x 2.5" pass-through chassis: 25.5 kg (56.22 lb) – Configuration without drives: 20 kg (44.09 lb) ● Packaging materials: 6.0 kg (13.23 lb)
Power consumption	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.

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.

8 Safety Instructions

8.1 Security

General Statement

- Comply with local laws and regulations when installing equipment. These safety instructions are only a supplement.
- Observe the safety instructions that accompany all "DANGER", "WARNING", and "CAUTION" symbols in this document.
- Observe all safety instructions provided on device labels.
- Operators of special types of work (such as electricians, operators of electric forklifts, and so on.) must be certified or authorized by the local government or authority.

WARNING

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

Human Safety

- This device is not suitable for use in places where children may be present.
- Only certified or authorized personnel are allowed to install equipment.
- 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.
- Do not carry the weight that exceeds the maximum load per person allowed by local laws or regulations. Before moving a device, 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 Safety work wear

- Before touching a device, wear ESD clothing and gloves (or wrist strap), and remove any 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

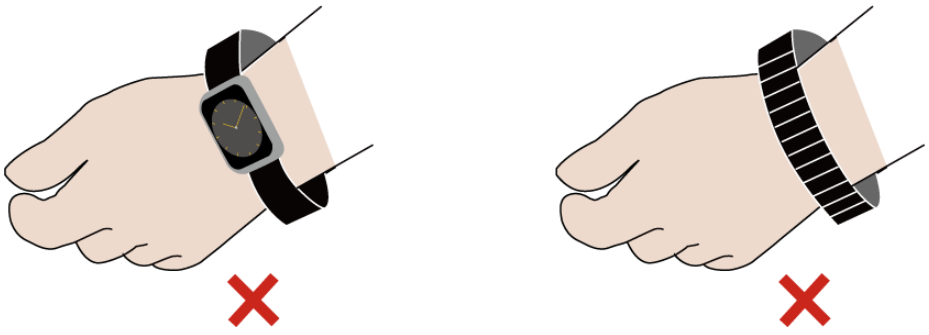


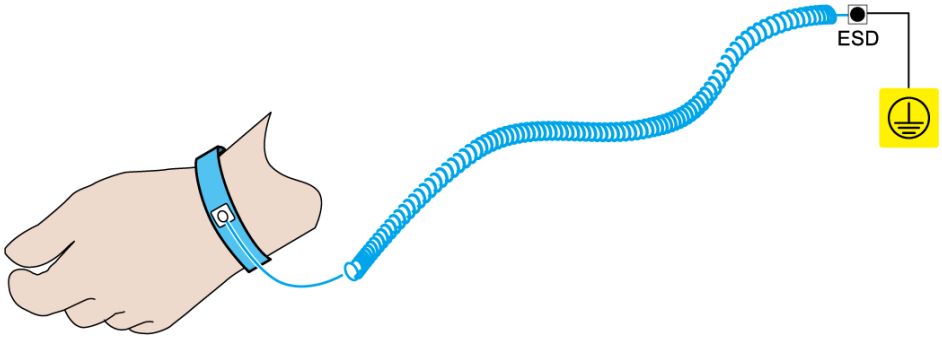
Figure 8-3 shows how to wear an ESD wrist strap.

a. Secure the ESD wrist strap around your wrist.

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.

Figure 8-3 Wearing an ESD wrist strap



- Exercise caution when using tools that could cause personal injury.
- 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 equipment 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.

Equipment Safety

- Use the recommended power cables at all times.
- Power cables are used only for dedicated servers. Do not use them for other devices.
- Before operating equipment, wear ESD clothes and gloves to prevent electrostatic-sensitive devices from being damaged by ESD.
- 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 equipment with care.
- Exercise caution when using tools that could cause damage to devices.
- Connect the primary and secondary power cables to different power distribution units (PDUs) to ensure reliable system operation.
- Ground a device before powering it on. Otherwise, high voltage leakage current may cause device damage.

Transportation Precautions

Improper transportation may damage equipment. 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 equipment 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.
- Power off all devices before transportation.

Maximum Weight Carried by a Person

CAUTION

The maximum weight allowed to be carried by a single 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 one 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 • Female: 10/22.05

For more information about security instructions, see the server *Safety Information*.

8.2 Maintenance and Warranty

For details about maintenance, visit the **Technical Support Website** > **Service Support Center** > **Customer Support Service**.

For details about warranty, visit the **Technical Support Website** > **Service Support Center** > **Warranty**.

9 System Management

This product integrates the new-generation iBMC, which complies with Intelligent Platform Management Interface (IPMI) 2.0 and provides highly reliable hardware monitoring and management.

The iBMC intelligent management system has the following features:

- Various management interfaces

  The BMC 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

  The CloudBMC detects hidden risks and ensures stable, uninterrupted 24/7 system operation by providing the following features:

  – 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 CloudBMC supports the reporting of alarms through syslog packets, trap packets, and emails, helping the upper-layer NMS platform to collect the fault information about the server.

- Security management methods

  – 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.
  – Multiple 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 improve RAID configuration efficiency and management capability.
  - Smart Provisioning implements DVD-free OS installation, RAID configuration, and upgrades to simplify server installation and configuration.
- Various network protocols
  - Supports NTP to improve the device time configuration capability and synchronizes the network time.
  - The iBMC supports domain management and directory services to simplify the server management network.
- Intelligent power management
  - Power capping technology helps you easily increase 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.

  The advanced edition of the iBMC provides the following features:
  - Deploy OS through the Redfish interface.
  - Collect the original data of intelligent diagnosis using Redfish.

10 Certifications

Country/Region	Certification	Standard
Europe	CE	Safety: EN 62368-1:2014+A11:2017 EMC: EN 55032:2015+A11:2020 EN IEC 61000-3-2:2019+A1:2021 EN 61000-3-3:2013+A2:2021 EN 55035:2017+A11:2020 CISPR 32:2015+A1:2019 CISPR 35:2016 ETSI EN 300 386 V2.2.1:2022 RoHS: EN IEC 63000:2018 ErP: Commission Regulation(EU) No 2019/424
Europe	REACH	(EC) No 1907/2006
Europe	POPs	(EU) 2019/1021
Europe	WEEE	2012/19/EU
Europe	Packaging and Packaging Waste	94/62/EC
China	RoHS	SJ/T-11364 GB/T 26572
Japan	VCCI	VCCI 32-1

11 Waste Product Recycling

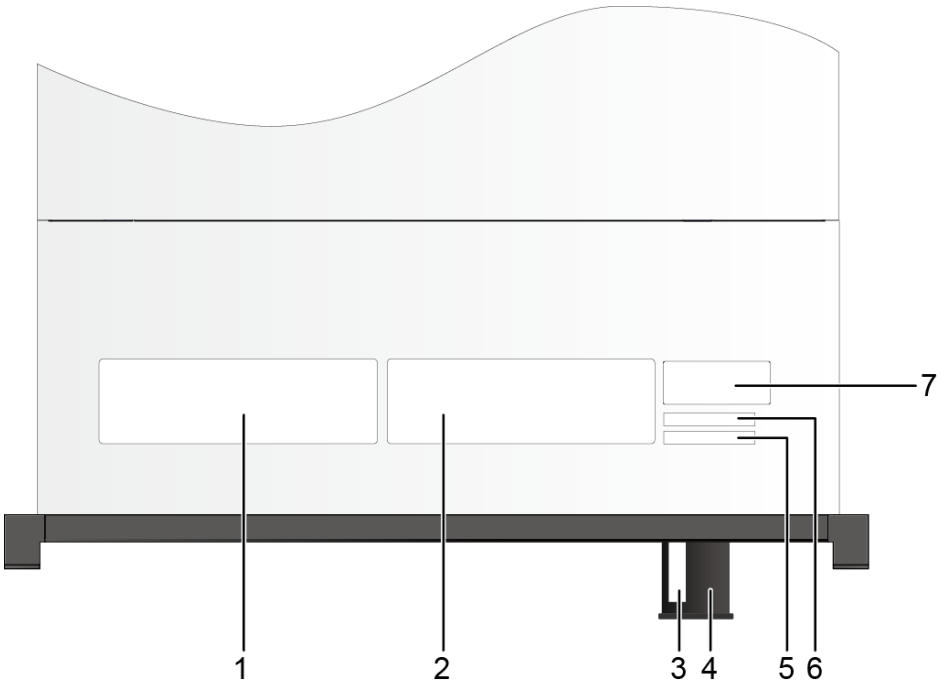
To obtain the product recycling service from xFusion after products are scrapped, contact 400-009-8999 for technical support.

A Appendix

A.1 Chassis Label Information

A.1.1 Chassis Head Label

Figure A-1 Chassis head label



1	Nameplate	2	Certificate and Quick Access Label

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

A.1.1.1 Nameplate

Figure A-2 Nameplate example

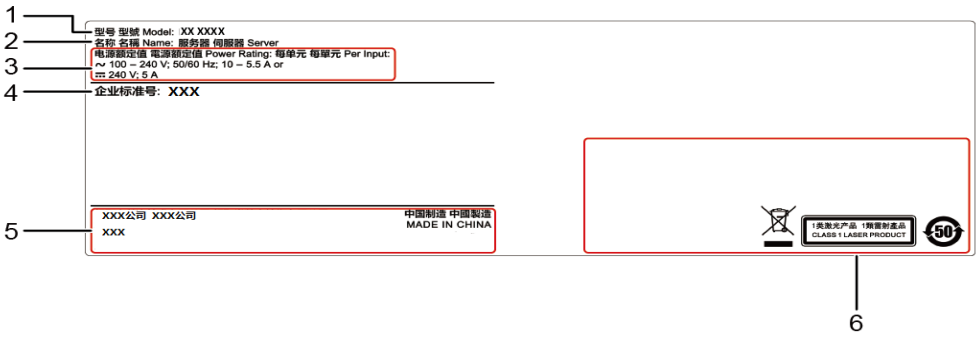


Table A-1 Nameplate description

No.	Description
1	Server model **NOTE** For details, see **A.4 Nameplate**.
2	Device name
3	Power supply requirements
4	Enterprise standard number
5	Vendor information
6	Certification marks

A.1.1.2 Certificate

Figure A-3 Certificate example

Table A-2 Certificate description

No.	Description
1	Order
2	No. **NOTE** 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

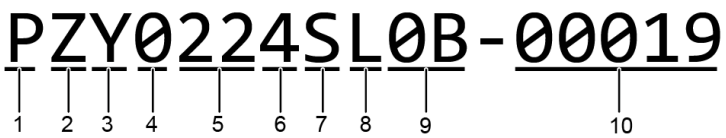


Table A-3 Certificate number description

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

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

A.1.2 Quick Access Label

Figure A-5 Quick access label example

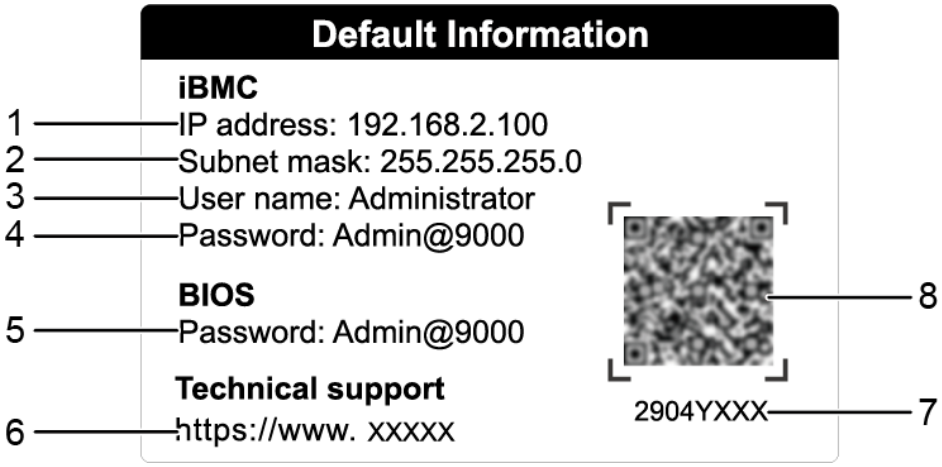
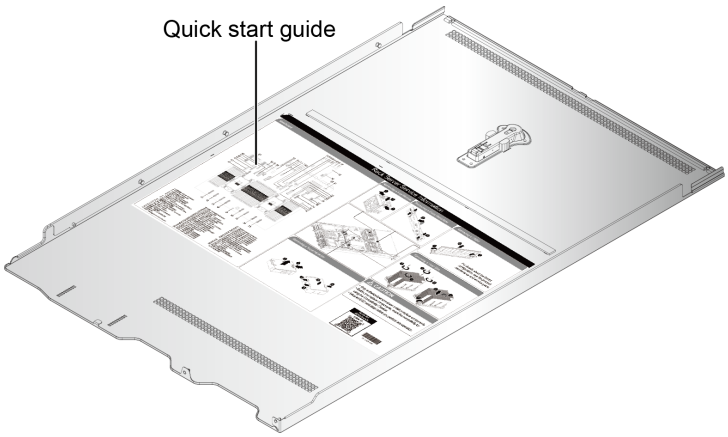


Table A-4 Quick access label description

No.	Description
1	IP address of the iBMC management network port
2	Subnet mask of the iBMC management network port
3	Default iBMC user name
4	Default iBMC password
5	Default BIOS password
6	Technical support website
7	P/N code
8	QR code **NOTE** Scan the QR code to obtain technical support resources.

A.1.3 Chassis Internal Label

Figure A-6 Chassis internal label

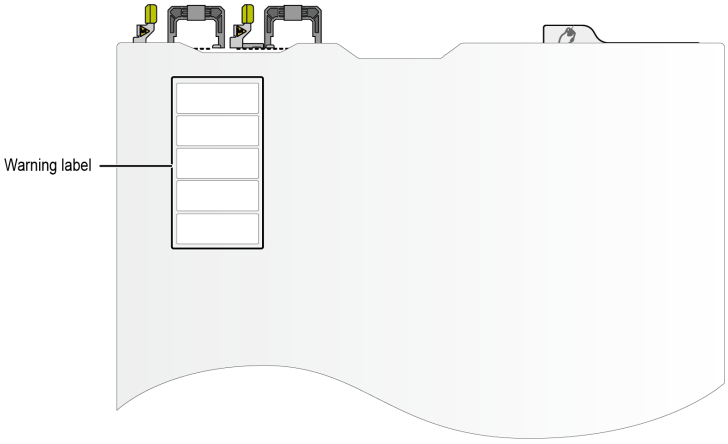


NOTE

- 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.

A.1.4 Chassis Tail Label

Figure A-7 Chassis tail label



NOTE

For details about the warning label, see the server *Safety Information*.

A.2 Product SN

The serial number (SN) on the label plate uniquely identifies a server. The SN is required when users contact xFusion technical support. SNs can be in three forms, as shown in **SN Sample 1**, **SN Sample 2**, and**SN Sample 3**.

- SN example 1

Figure A-8 SN example 1

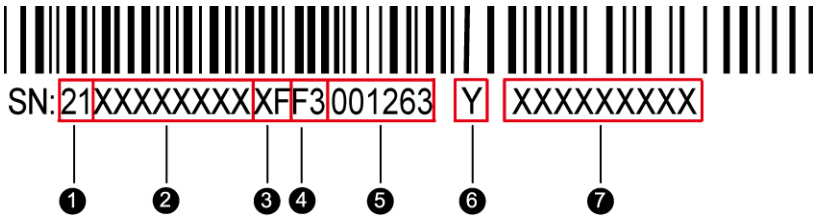


Table A-5 SN description

No.	Description
1	SN ID (two characters), which is **21**.
2	Material identification code (eight characters), that is, the processing code.
3	Vendor code (two characters), that is, the code of the processing place.

No.	Description
4	Year and month (two characters) ● The first character indicates the year. – Digits 1 to 9 indicate years 2001 to 2009 respectively. – Letters A to H indicate years 2010 to 2017 respectively. – Letters J to N indicate years 2018 to 2022 respectively. – Letters P to Y indicate years 2023 to 2032 respectively. **NOTE** 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. ● The second character indicates the month. – Digits 1 to 9 indicate January to September respectively. – Letters A to C indicate October to December respectively.
5	Serial number (six characters)
6	RoHS compliance status (one character). **Y** indicates RoHS compliant.
7	Internal model, that is, product name.

- SN example 2

Figure A-9 SN example 2

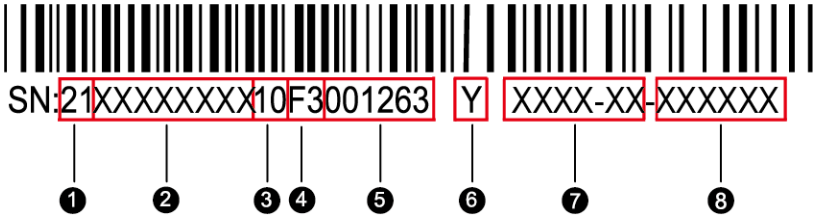


Table A-6 SN example 2

No.	Description
1	SN ID (two characters), which is **21**.
2	Material identification code (eight characters), that is, the processing code.
3	Vendor code (two characters), that is, the code of the processing place.

No.	Description
4	Year and month (two characters) ● The first character indicates the year. – Digits 1 to 9 indicate years 2001 to 2009 respectively. – Letters A to H indicate years 2010 to 2017 respectively. – Letters J to N indicate years 2018 to 2022 respectively. – Letters P to Y indicate years 2023 to 2032 respectively. **NOTE** 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. ● The second character indicates the month. – Digits 1 to 9 indicate January to September respectively. – Letters A to C indicate October to December respectively.
5	Serial number (six characters)
6	RoHS compliance status (one character). **Y** indicates RoHS compliant.
7	Nameplate (six characters).
8	Serial number. The number of digits depends on the actual product.

- SN example 3

Figure A-10 Label example

Table A-7 Label example description

No.	Description
1	QR code. For details, see **Figure A-12**.
2	BOM code (10 digits).
3	Product model (13 characters).
4	Product SN (12 characters). For details, see **Table A-8**.
5	RoHS compliance code (one character).

Figure A-11 SN example

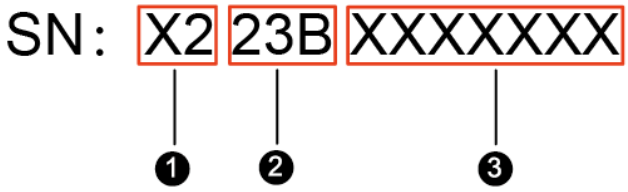


Table A-8 SN description

No.	Description
1	Manufacturer code (two characters).
2	Year and month (three characters). • The first and second characters indicate the year. **NOTE** A four-digit year is indicated by the last two digits of the year. For example, 23 indicates the year 2023. • The third character indicates the month. – Digits 1 to 9 indicate January to September respectively. – Letters A to C indicate October to December respectively.
3	Serial number (seven characters).

Figure A-12 QR code scanning result example

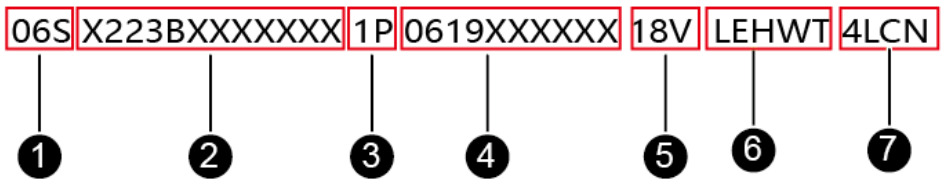


Table A-9 QR code scanning result example description

No.	Description
1	Fixed representation symbol (three characters).
2	Product SN (12 characters). For details, see **Table A-8**.
3	Data identifier for the material code (two characters).
4	BOM code (10 digits).

No.	Description
5	Data identifier of manufacturer (three characters).
6	Code of device manufacturer (five characters).
7	Data identifier of origin (four characters).

A.3 Operating Temperature Limitations

Table A-10 Operating temperature limitations

Configuration	Maximum Operating Temperature 30°C (86°F)	Maximum Operating Temperature 35°C (95°F)	Maximum Operating Temperature 40°C (104°F)
Chassis without drives	Unlimited conditions	Unlimited conditions	N/A
8 x 2.5" drive pass-through configuration	Unlimited conditions	Unlimited conditions	N/A
8 x 3.5" drive pass-through configuration	Unlimited conditions	Unlimited conditions	N/A
24 x 2.5" drive pass-through configuration	9175F/9275F CPUs are not supported.	9175F/9275F CPUs are not supported.	N/A
8 x 2.5" 4 x GPU configuration	Unlimited conditions	Unlimited conditions	N/A

NOTE

- When a single fan is faulty, the highest operating temperature is 5°C (41°F) lower than the rated value.
- When a single fan is faulty, the system performance may be affected.
- It is recommended that servers be deployed at an interval of 1U to reduce server noise and improve server energy efficiency.

A.4 Nameplate

Certified Model	Remarks
2258H V8	Global

A.5 Names and Content of Hazardous Substances

Table A-11 Names and Content of Hazardous Substances

Component		PCBA	Cables	Metal parts
Hazardous Substances	**Pb**	X	X	X
	Hg	O	O	O
	Cd	O	O	O
	Cr(VI)	O	O	O
	PBBS	O	O	O
	PBDES	O	O	O
	DBP	O	O	O
	DIBP	O	O	O
	BBP	O	O	O
	DEHP	O	O	O

- Note 1:
  - O: Indicate that the content of the hazardous substance contained in all of the homogenous materials in the component is within the limits of the national standard for hazardous substances in electric and electronic products.
  - X: Indicate that the content of the hazardous substance contained in at least one homogenous material exceeds the limits of the national standard for hazardous substances in electric and electronic products.
- Note 2: For components not listed above, their hazardous substance content is within the limits of national standard of hazardous substances in electrical and electronic products.

A.6 Sensor List

Sensor	Description	Component
Inlet Temp	Air inlet temperature	Right mounting ear
Outlet Temp	Air outlet temperature	BMC card
1711 Core Temp	Core temperature of the 1711 chip	BMC card

Sensor	Description	Component
CPU VRD 5 V	The 5 V voltage supplied by the mainboard to the components around the CPU	Mainboard
CPU*N* 1.8 V	Mainboard supply 1.8 V voltage to CPUN	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
CPU*N*MEM 12V	12 V power supply detection for CPU*N* DIMM slots	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
SSD Max Temp	Maximum SSD temperature (reported by BMA)	SSD
SSD$ Temp	SSD card temperature	SSD
CPU Power	Power consumption of CPU 1 in the power-on state	CPU
CPU Usage	CPU usage	CPU
CPU*N* 12V	12 V voltage that the mainboard supplies to CPU*N*	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* VCC 12 V	CPUN 12 V power detection for the PCIE resource of Riser 12 V	Mainboard *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* VDD11 S3	The power supply voltage for the CPU *N* DRAM IO interface	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* VDDIO	Power supply voltage of CPU*N* DRAM IO port	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* VDDCR SOC	Power supply voltage of CPU*N* FCH/Ethernet/ SATA, NBIO, SMU, and DDR	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.

Sensor	Description	Component
CPU*N* VDDCR0	Core voltage on the notched side at the top of CPU*N*	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* VDDCR1	Core voltage on the other notched side at the top of CPU*N*	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* Core Temp	CPU*N* core temperature	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* MEM Temp	Temperature of DIMMs mapping to CPU*N*	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* Memory	Memory module status	Memory module corresponding to CPU *N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* Prochot	CPU Prochot	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* Status	CPU*N* status detection	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
CPU*N* VRD Temp	CPU*N* VRD temperature	CPU*N* *N* indicates the CPU number. The value is **1** or **2**.
RCI VCC 5 V	Right hanging ear USB related VCC_5V0 voltage detection	Mainboard
STBY 5 V	Mainboard standby 5 V voltage	Mainboard

Sensor	Description	Component
SYS 3.3 V	The 3.3 V voltage supplied by the mainboard to the CLK BUFFER	Mainboard
PS$ VIN	Single PSU input voltage	PSU
PS$ IIn	PSU input current	PSU
PS$ IOut	Single PSU output current	PSU
PS$ POut	Single PSU output power	PSU
PS$ Temp	Maximum internal temperature of the PSU	PSU
PS$ Inlet Temp	PSU air inlet temperature	PSU
PS$ Status	Single PSU fault status	PSU
PS$ Fan Status	PSU fan fault status	PSU
PS Redundancy	Redundancy failure due to PSU removal	PSU
Power*N*	PSU input power	PSU *N* *N* indicates the PSU number which is 1 or 2.
FAN Power	Total memory power consumption when the server is powered on (available only for custom model)	Fan module
FAN *N* F Speed	Fan speed	Fan module *N* *N* indicates the fan module ID. The value ranges from **1** to **4**.
FAN *N* R Speed		
FAN*N* Status	Fan fault status	Fan module *N* *N* indicates the fan ID. The value ranges from **1** to **4**.
FAN *N* Presence	Fan presence	Fan module *N* N indicates the fan ID. The value ranges from **1** to **4**.
FAN 12 V	12 V voltage supplied by the mainboard to the fan board	Mainboard

Sensor	Description	Component
DIMM*N*	DIMM status	DIMM *N* *N* indicates the DIMM slot number.
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 dip status	Mainboard
PwrOn TimeOut	Power-on timeout	Mainboard
HDD BP Status	Drive backplane health status	Drive backplane
Disk Power	Total power consumption of product drives	Drive
Total Power	Total PSU input power	PSU
Riser 3.3 V	3.3 V voltage supplied by the mainboard to the riser card	Mainboard
Riser$ Temp	Riser card temperature	Riser card
Raid$ BBU Temp	Temperature of the RAID controller card backup PSUs	RAID controller card
DISK$	Drive status	Drive
Disks Temp	Maximum drive temperature	Drive
Disk BP$ Power	Drive backplane power output	Drive backplane
Disk BP$ Temp	Drive backplane temperature	Drive backplane
PCIE Status	PCIe status error	PCIe card
PCIe$ OP Temp	PCIe card optical module temperature	PCIe card

Sensor	Description	Component
PCIe$ Temp	PCIe card chip temperature	PCIe card
PCIe RAID$ Temp	Temperature of the PCIe RAID controller card	PCIe RAID controller card
PCIe$ Card BBU	BBU status of the PCIe RAID controller card	PCIe RAID controller card
PCIe NIC$ Temp	PCIe card chip temperature	PCIe card
PCIe FC$ Temp	PCIe card chip temperature	PCIe card
IB$ Temp	IB NIC temperature	IB card
M2 Adapter Temp	M.2 adapter card temperature	M.2 riser card
M2Disk1	Status of the M.2 drive on the riser card	M.2 riser card
M2Disk2	Status of the M.2 drive on the riser card	M.2 riser card
AreaIntrusion	Listening to the unpacking action	Mainboard
OCP$ OP Temp	OCP card optical module temperature	OCP 3.0 NIC
OCP$ Temp	OCP card chip temperature	OCP 3.0 NIC
EXP$ Temp	Expander drive backplane chip temperature	Drive backplane
System Notice	Hot restart reminder and fault diagnosis program information collection	N/A
System Error	System suspension or restart. Check the background logs.	
SysFWProgress	Software processes and system startup errors	
SysRestart	System restart causes	
ACPI State	ACPI status	
Boot Error	Boot error	
BMC Boot Up	BMC startup event	

Sensor	Description	Component
BMC Time Hopping	Time hopping	
Memory Usage	Memory usage	
MEM Power	Total memory power consumption when the server is powered on (available only for custom model)	
SEL Status	SEL full or events being cleared	
Critical INT	PCIe bus error status	
ProductID Status	Product identification status	

B Glossary

B.1 A-E

B

BMC	The baseboard management controller (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.

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 keyboard, video 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).
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. A PCI system can be transformed to a PCIe system by modifying the physical layer instead of software. PCIe delivers a faster speed and can replace almost all AGP and PCI buses.

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 12V Out (SV12)	Standby 12V output of the PSU.
system event log (SEL)	Event records stored in the system used for subsequent fault diagnosis and system recovery.

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. 1U = 44.45 mm (1.75 in).

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

D

DC	direct current
DDR5	Double Data Rate 5
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
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

G

GE	Gigabit Ethernet

GPIO	General Purpose Input/Output
GPU	graphics processing unit

H

HA	high availability
HBM	high bandwidth memory
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

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

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

V

VCCI	Voluntary Control Council for Interference by Information Technology Equipment
VGA	Video Graphics Array
VLAN	virtual local area network
VRD	voltage regulator-down

W

WEEE	waste electrical and electronic equipment
WSMAN	Web Service Management

