TaiShan 200 Server

White Paper (Model 5290)

Issue   01

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About This Document

Purpose

This document describes the structure, components, specifications, and compatibility of the TaiShan 200 server model 5290.

Intended Audience

This document is intended for:

- Huawei presales engineers
- Channel partner presales engineers
- Enterprise presales engineers

Symbol Conventions

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

Symbol	Description
⚠ DANGER	Indicates a hazard with a high level of risk which, if not avoided, will result in death or serious injury.
⚠ WARNING	Indicates a hazard with a medium level of risk which, if not avoided, could result in death or serious injury.
⚠ CAUTION	Indicates a hazard with a low level of risk which, if not avoided, could result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. **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.

Change History

Issue	Release Date	Description
01	2020-06-05	This issue is the first official release.

Contents

1 Overview

The TaiShan 200 servers are data center servers powered by Huawei Kunpeng 920 processors. The 5290 model (5290 for short) is a 4U 2-socket rack server. It combines high performance computing with large storage capacity, low power consumption, easy management, and easy deployment, and is ideal for storage services.

Figure 1-1 Appearance
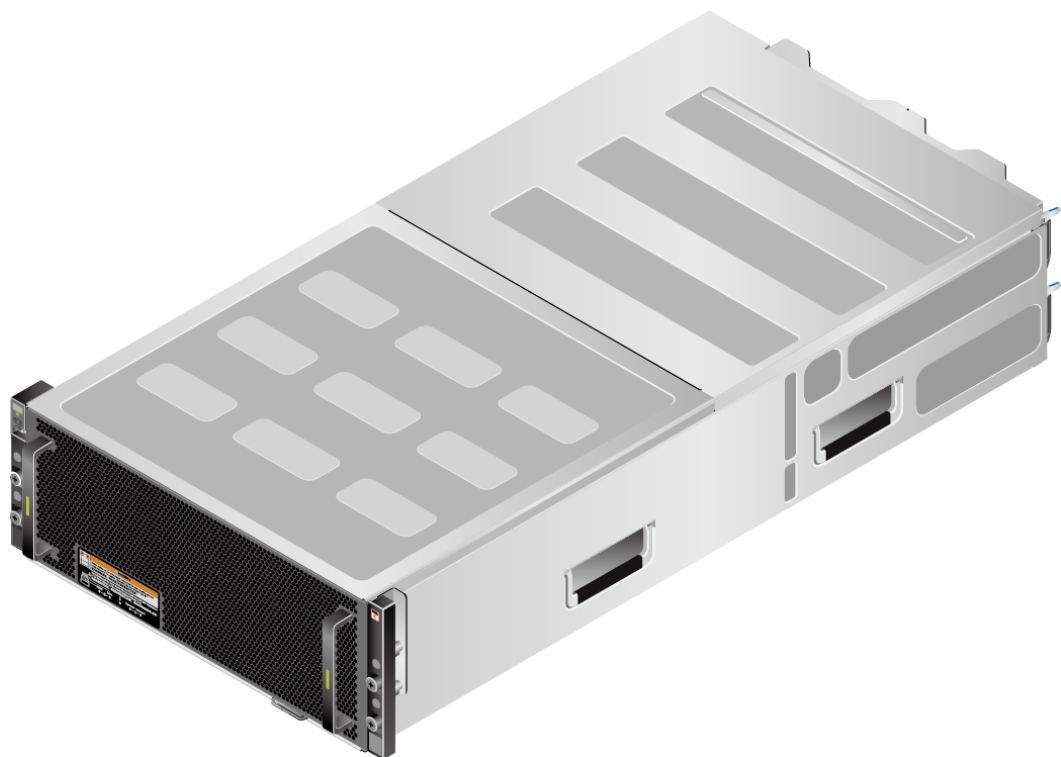
1.1 Physical Structure

1.2 Logical Structure

1.1 Physical Structure

Server

Figure 1-2 shows the components of the 5290 server.

Figure 1-2 Server components
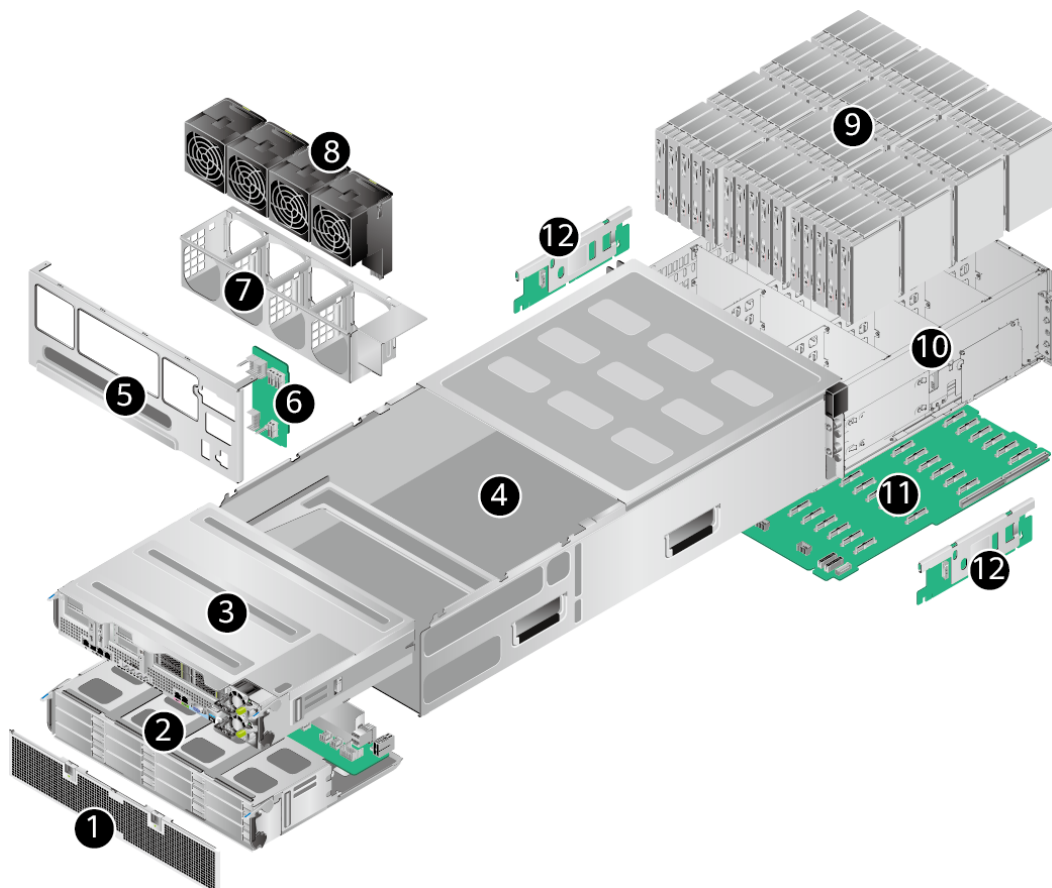
1	Shielding bezel	2	Storage node
3	Compute node	4	Chassis
5	Partition board	6	Middle backplane
7	Fan module bracket	8	Fan modules
9	Drives	10	Drive drawer
11	Drawer drive backplane	12	Expander board

Storage Node

Figure 1-3 Storage node components
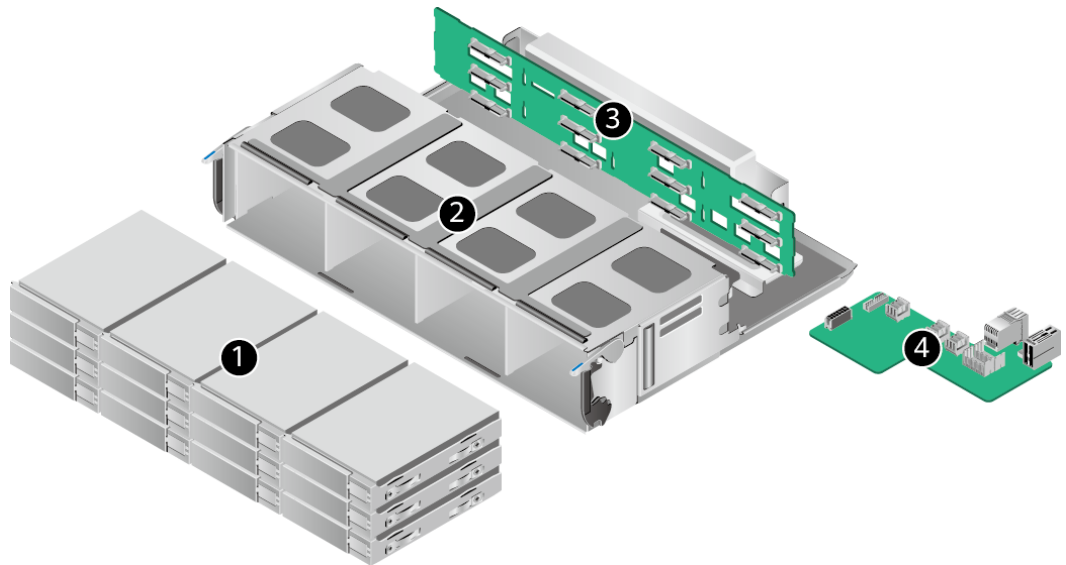
1	12 x 3.5-inch rear drives	2	12 x 3.5-inch rear drive enclosure
3	12 x 3.5-inch rear-drive backplane	4	Drive-mezzanine adapter

Compute Node

Figure 1-4 Compute node components
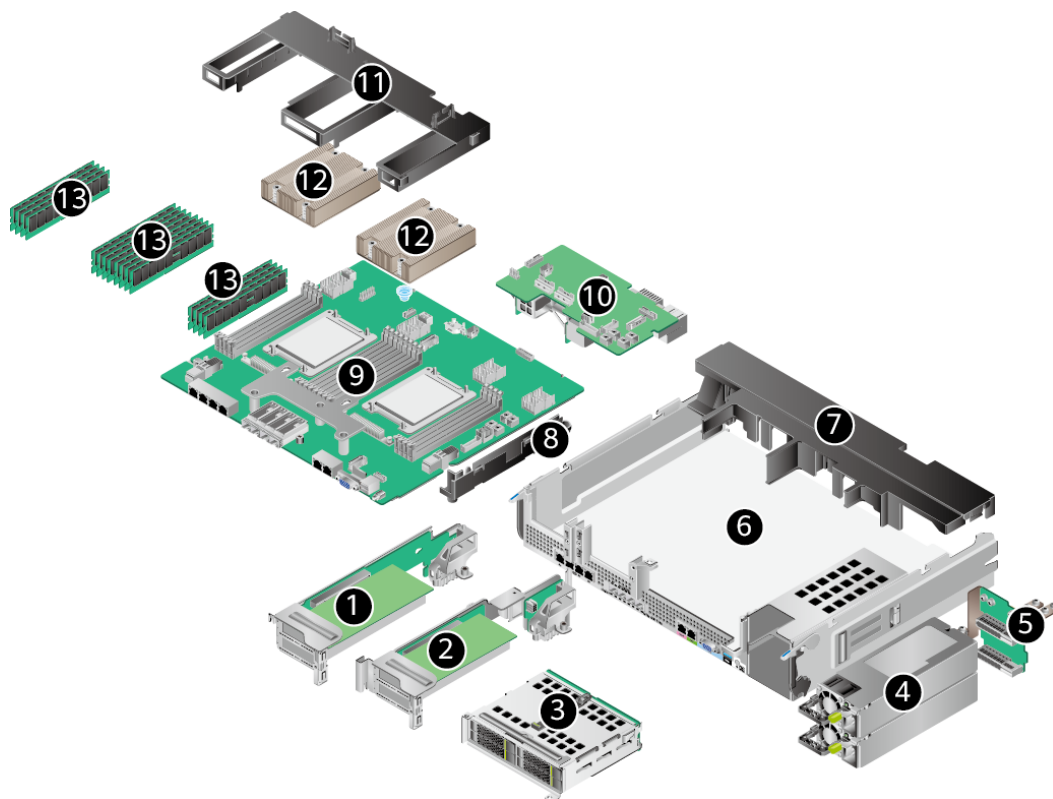
1	I/O module 1	2	I/O module 2
3	I/O module 3	4	Power supply units (PSUs)
5	PSU backplane	6	Computing node enclosure
7	Air duct 1	8	Cable organizers
9	Mainboard + I/O expansion card	10	Mezzanine card
11	Air duct 2	12	Heat sinks
13	DIMMs	-	-

         □□ NOTE

- I/O module 1 supports only riser cards.
- If I/O module 2 is configured with a riser card, I/O module 3 can be configured with a rear drive module or riser card. If I/O module 2 is configured with a rear drive module, I/O module 3 can be configured with a rear drive module only. The figure is for reference only.
- The CPUs are integrated on the mainboard and cannot be replaced independently.
- The I/O expansion card must be replaced together with the mainboard.

1.2 Logical Structure

Figure 1-5 shows the logical structure of the server.

Figure 1-5 Logical structure
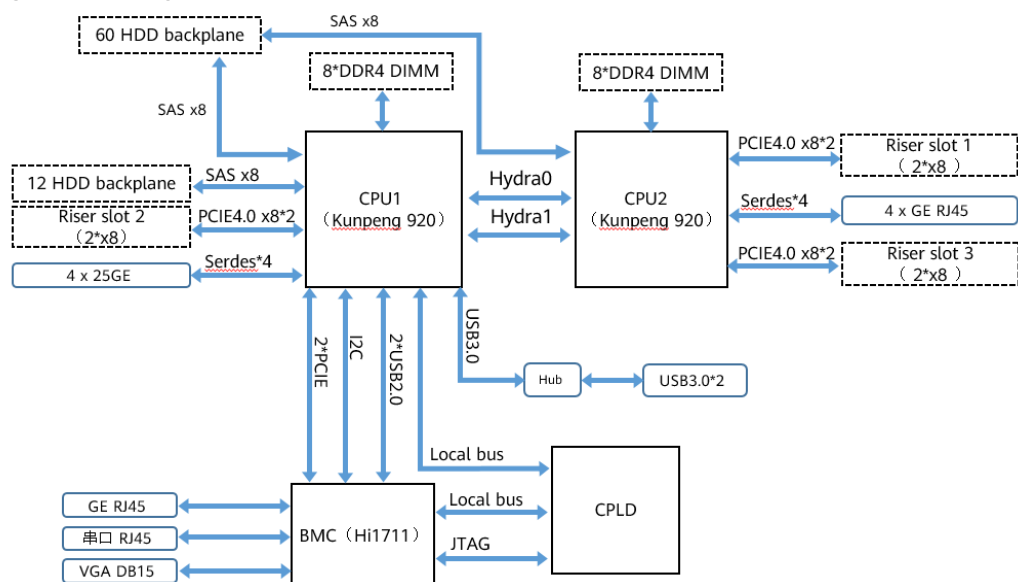
- The server uses two Huawei Kunpeng 920 processors, and each processor supports 8 DDR4 DIMMs.
- The two CPUs are interconnected through two Hydra buses, which provide a maximum transmission rate of 30 Gbit/s.
- The server has two types of LAN on motherboards (LOMs), which are implemented through the high-speed SerDes interfaces provided by the CPUs. The two LOMs provide 4 x GE ports and 4 x 10GE or 25GE ports.
- The BMC uses Huawei Hi1711 management chip and provides a video graphics array (VGA) port, management network port, and debugging serial port.

2 Components

2.1 Components on the Front Panel

☐☐ NOTE

> For details about the drive numbers and types of the 5290 server, see **2.6.1 Drive Numbering**.

Figure 2-1 shows the components on the front panel.

Figure 2-1 Front panel
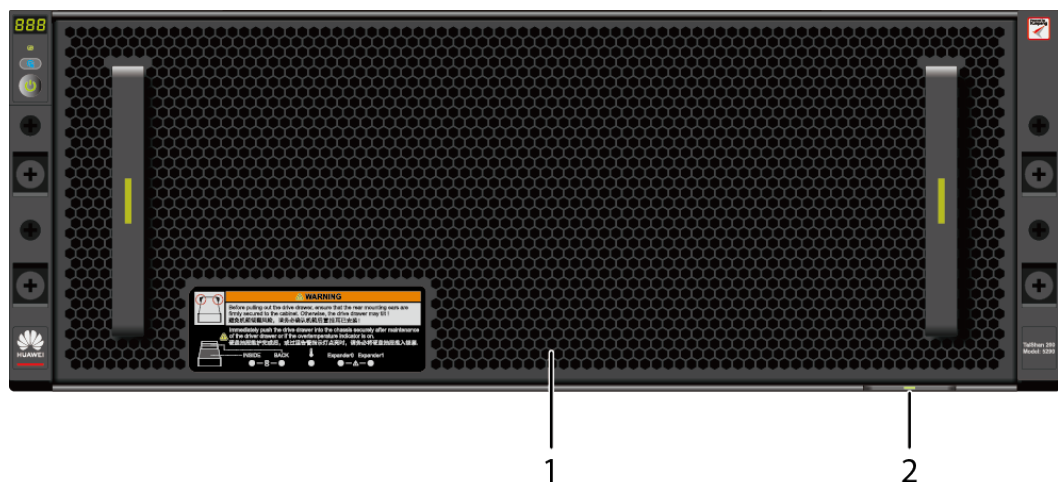
| 1 | Drive drawer bezel | 2 | Slide-out label plate (with an SN label) |

SN

A serial number (SN) on the label is uniquely identifies a server. The SN is required when you contact Huawei technical support.

Figure 2-2 shows an SN example.

Figure 2-2 SN example

Table 2-1 SN description

Callout	Description
1	SN ID (two characters), which is **21**.
2	Material identification code (8 characters), that is, the processing code.
3	Vendor code (two characters). The value **10** indicates Huawei.

4	Year and month (two characters).
	● The first character indicates the year. The digits 1 to 9 indicate 2001 to 2009, the letters A to H indicate 2010 to 2017, the letters J to N indicate 2018 to 2022, and the letters P to Y indicate 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, and letters A to C indicate October to December, respectively.

5	Sequence number (six characters).
6	RoHS compliance (one character). **Y** indicates RoHS compliant.
7	Internal model, that is, product name.

2.2 Front Indicators and Buttons

Figure 2-3 shows the indicators and buttons on the 5290 front panel.

Figure 2-3 Indicators and buttons on the front panel
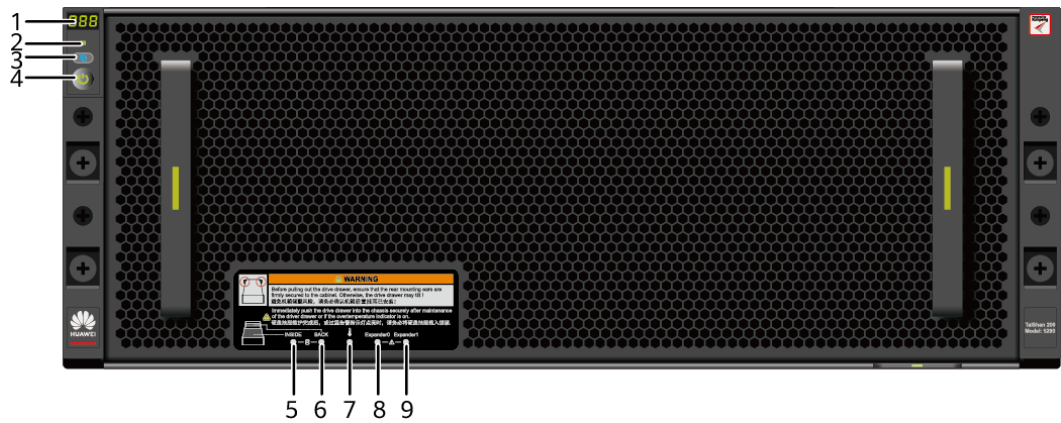
1	Fault diagnosis LED	2	Health status indicator
3	UID button/indicator	4	Power button/indicator
5	Drawer drive (INSIDE) fault indicator	6	Storage node drive (BACK) status indicator
7	Server overtemperature indicator	8	Expander 0 fault indicator
9	Expander 1 fault indicator	-	-

Table 2-2 Description of the indicators and buttons on the front panel

Silkscreen	Indicator and Button	Description
⊞⊞⊞	Fault diagnosis LED	---: The server is operating properly. - Error code: A server component is faulty. For details about error codes, see the ***TaiShan Rack Server iBMC Alarm Handling***.

Silkscreen	Indicator and Button	Description
⏻	Power button/ indicator	Power indicator: ● Steady yellow: The server is in standby state (ready to be powered on). ● Steady green: The server is properly powered on. ● Blinking yellow: The iBMC is starting. ● Off: The server is not powered on. Power button: ● When the server is powered on, you can press this button to shut down the operating system gracefully. ● When the server is powered on, holding down this button for 6 seconds will power off the server forcibly. ● When the server is in standby state (power indicator is steady yellow), you can press this button to power on the server.
◉	UID button/ indicator	The UID indicator helps identify and locate a server. UID indicator: ● Off: The server is not being located. ● Blinking blue (for 255 seconds): distinguishes the server from multiple servers that have also been located. ● Steady blue: The server is being located. UID button: ● You can set the UID indicator state by pressing the UID button on the panel or by using the iBMC CLI or WebUI. ● You can press this button to turn on or off the UID indicator. ● Pressing and holding down this button for 5 seconds will reset the iBMC.
〽	Health status indicator	● Steady green: The server is operating properly. ● Blinking red at 1 Hz: A major alarm has been generated on the server. ● Blinking red at 5 Hz: A critical alarm has been generated on the server.
-	Drawer drive (INSIDE) fault indicator	● Steady orange: The drive is faulty. ● Off: The drive is working properly.

Silkscr een	Indicator and Button	Description
-	Storage node drive (BACK) status indicator	• Steady orange: The drive is faulty. • Off: The drive is working properly.
-	Server overtempe rature indicator	• Steady orange: The operating temperature of the server is too high. • Off: The operating temperature of the server is in normal range.
-	Expander 0 fault indicator	• Steady orange: The expander board in the left side of the chassis is faulty. • Off: The expander board in the left side of the chassis is running properly.
-	Expander 1 fault indicator	• Steady orange: The expander board in the right side of the chassis is faulty. • Off: The expander board in the right side of the chassis is running properly.

2.3 Components on the Rear Panel

Figure 2-4 shows the components on the 5290 rear panel.

Figure 2-4 Components on the rear panel

1	Ejector levers of the compute node	2	I/O module 1 (CPU 2)
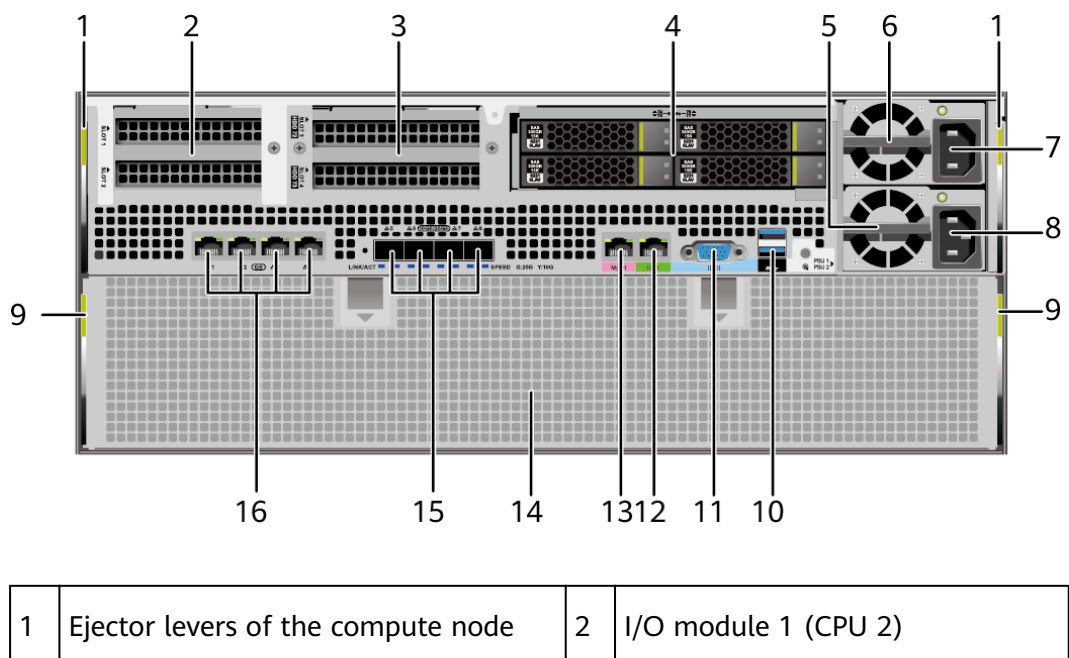
3	I/O module 2 (CPU 1)	4	I/O module 3 (CPU 2)
5	PSU 2	6	PSU 1
7	PSU socket 1	8	PSU socket 2
9	Ejector levers of the storage node	10	USB 3.0 port (CPU 1)
11	VGA port (BMC)	12	Debugging serial port
13	Management network port (BMC)	14	Shielding bezel
15	LOM 10GE/25GE optical ports (numbered 5 to 8 from left to right, CPU 1)	16	LOM GE electrical ports (numbered 1 to 4 from left to right, CPU 2)

 NOTE

- I/O modules 2 and 3 can be configured with drive modules or riser cards. The figure is for reference only. The actual configuration may vary.
- The LOM 10GE/25GE optical ports must be configured with optical modules and AOC cables of the same part No.

Table 2-3 Description of the ports on the rear panel

Port	Type	Quantity	Description
VGA port	DB15	1	Used to connect to a monitor or a keyboard, video, and mouse (KVM).
USB port	USB 3.0	2	Connects USB devices to the server. **NOTE** Before connecting a USB device, check that the USB device operates properly. The server may fail if it is connected to an abnormal USB device.
Management network port (Mgmt)	RJ45	1	Provides a 1000 Mbit/s Ethernet port and supports 10/100/1000 Mbit/s auto-negotiation. You can manage a server through this port.
Debugging serial port	RJ45	1	System serial port by default. You can also set the iBMC serial port as the system debug port by using the iBMC command. This port is used for debugging.

Port	Type	Quantity	Description
GE electrical port	RJ45	4	For details about the features and rate modes of GE electrical ports, see **2.5.1 GE LOM Ports**.
10GE/25GE optical port	SFP28	4	The 25GE optical ports support speed autonegotiation to 10GE. Optical modules of different rates are used. For details about the features and rate modes of 10/25GE optical ports, see **2.5.2 10GE/25GE LOM Optical Ports**.
PSU socket	-	1/2	The PSUs can be configured based on service requirements. However, the rated power of the PSUs must be greater than that of the server. Two PSUs are recommended for reliability purposes. If one PSU is used, **Predicted PSU Status** cannot be set to **Active/Standby** on the iBMC WebUI.

2.4 Rear Indicators

Figure 2-5 shows the indicators on the 5290 rear panel.

Figure 2-5 Indicators on the rear panel
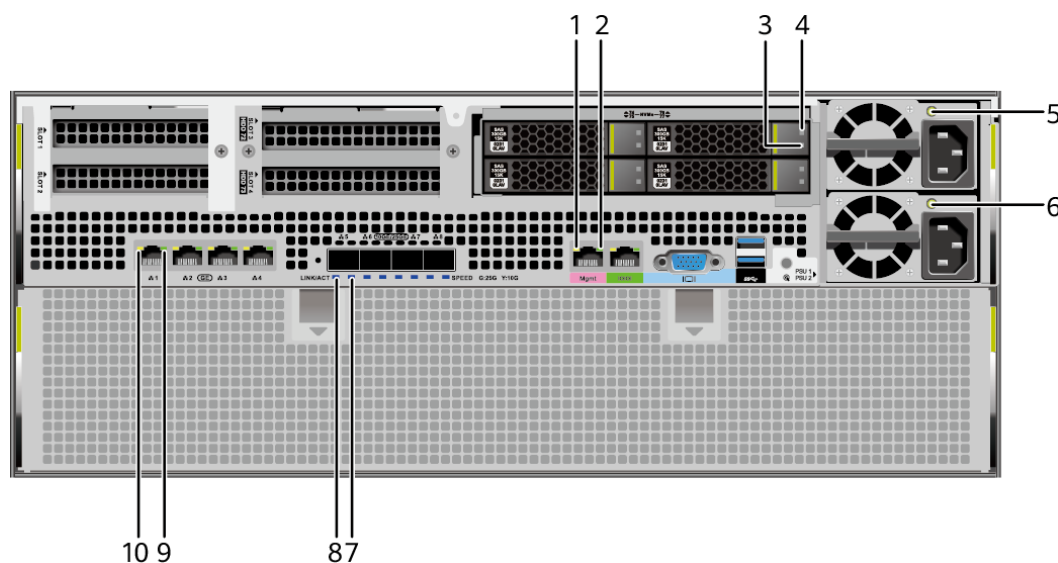
1	Data transmission status indicator of the management network port	2	Connection status indicator of the management network port
3	Drive activity indicator (green)	4	Drive fault indicator (yellow)
5	Indicator of PSU 1	6	Indicator of PSU 2
7	LINK/ACT indicator of a 10GE/25GE optical port	8	Transmission rate indicator of a 10GE/25GE optical port
9	Connection status indicator of a GE electrical port	10	Data transmission status indicator of a GE electrical port

Table 2-4 Description of indicators on the rear panel

Indicator		Description
GE electrical port/ Management network port	Data transmission status indicator	- Blinking yellow: Data is being transmitted. - Off: No data is being transmitted.
	Connection status indicator	- Steady green: The network connection is normal. - Off: The network is disconnected.
10GE/25GE optical port	Transmission rate indicator	- Steady green: The data transmission rate is 25 Gbit/s. - Steady yellow: The data transmission rate is 10 Gbit/s. - Off: The network is disconnected.
	Connection status indicator/Data transmission status indicator	- Steady green: The network connection is normal. - Blinking green: Data is being transmitted. - Off: The network is disconnected.

Indicator	Description

PSU indicator	- Steady green: The power input and output are normal.
	- Steady orange: The input is normal, but no power is output due to overheat protection, overcurrent protection, short circuit protection, output overvoltage protection, or some component failures.
	- Blinking green at 1 Hz:
	  – The input is normal, and the server is in standby state.
	  – The input is overvoltage or undervoltage. For details, see the *TaiShan Rack Server iBMC Alarm Handling*.
	- Blinking green at 4 Hz: Online firmware upgrade is being performed.
	- Off: There is no power supply.

2.5 LOMs

2.5.1 GE LOM Ports

Feature list

The onboard GE electrical ports support the following functions:

- MAC VLAN table. The GE ports use the unicast/multicast (U/M) VLAN table to forward and filter packets based on MAC+VLAN or MAC.
- VLAN table. A group of members are defined for each VLAN to provide functions such as filtering, broadcasting, and flooding in a VLAN domain.
- Flow table to filter and forward packets.
- Flow control to prevent packet loss.
- Maximum transmission unit (MTU) and 9.5 KB jumbo frames.
- Promiscuous mode.
- Generic receive offload (GRO), which enables small packets to be encapsulated into large packets before being transferred to the protocol stack.
- VLAN.
- Virtual Extensible LAN (VXLAN), which creates Layer 2 logical networks and encapsulates them into standard Layer 3 IP data packets.
- TCP segment offload (TSO).
- Receive side scaling (RSS).
- NIC queue configuration.

- NIC checksum function.
- NIC indicator lighting.
- Single-root I/O virtualization (SR-IOV).
- Preboot execution environment (PXE).
- IPv4 and IPv6.

Working Mode and Rate

Table 2-5 Working mode and rate

Rate Negotiation Mode	Supported Rate	Rates Not Supported
Auto-negotiation 1000 Mbit/s (full duplex)	1000 Mbit/s	100 Mbit/s and 10 Mbit/s
Auto-negotiation 100 Mbit/s (full duplex/half duplex)	100 Mbit/s	10 Mbit/s
Auto-negotiation 10 Mbit/s (full duplex/half duplex)	10 Mbit/s	–

2.5.2 10GE/25GE LOM Optical Ports

Feature list

The onboard 10GE/25GE optical ports support the following functions:

- MAC VLAN table. The 10GE/25GE optical ports use the U/M VLAN table to forward and filter packets based on MAC+VLAN or MAC.
- VLAN table. A group of members are defined for each VLAN to provide functions such as filtering, broadcasting, and flooding in a VLAN domain.
- Flow table to filter and forward packets.
- Flow control to prevent packet loss.
- MTU and 9.5 KB jumbo frames.
- Promiscuous mode.
- GRO, which enables small packets to be encapsulated into large packets before being transferred to the protocol stack.
- VLAN.
- VXLAN, which creates Layer 2 logical networks and encapsulates them into standard Layer 3 IP data packets.
- Interrupts to improve system efficiency.
- TSO.
- RSS.
- NIC queue configuration.

- NIC checksum function.
- NIC indicator lighting.
- SR-IOV.
- PXE.
- IPv4 and IPv6.

Working Mode and Rate

Table 2-6 Working mode and rate

Rate Negotiation Mode	Supported Rate	Rates Not Supported
Auto-negotiation 25000 Mbit/s (full duplex)	25000 Mbit/s	10000 Mbit/s, 1000 Mbit/s, 100 Mbit/s, and 10 Mbit/s
Auto-negotiation 10000 Mbit/s (full duplex)	10000M	1000 Mbit/s, 100 Mbit/s, and 10 Mbit/s

◫ NOTE

When a 10GE or 25GE LOM optical port is connected to a switch, ensure that the value of **Link Speed and FEC** on the BIOS is the same as the port rate and FEC mode of the connected switch. Otherwise, the network connection between the server and the switch cannot be established. For a details about **Link Speed and FEC**, see the *BIOS Parameter Reference (Kunpeng 920 Processor)*.

2.6 Drives and Indicators

2.6.1 Drive Numbering

Figure 2-6 and **Figure 2-7** show the drive numbers of the 5290 server.

Figure 2-6 Numbers of the drives in the drive drawer
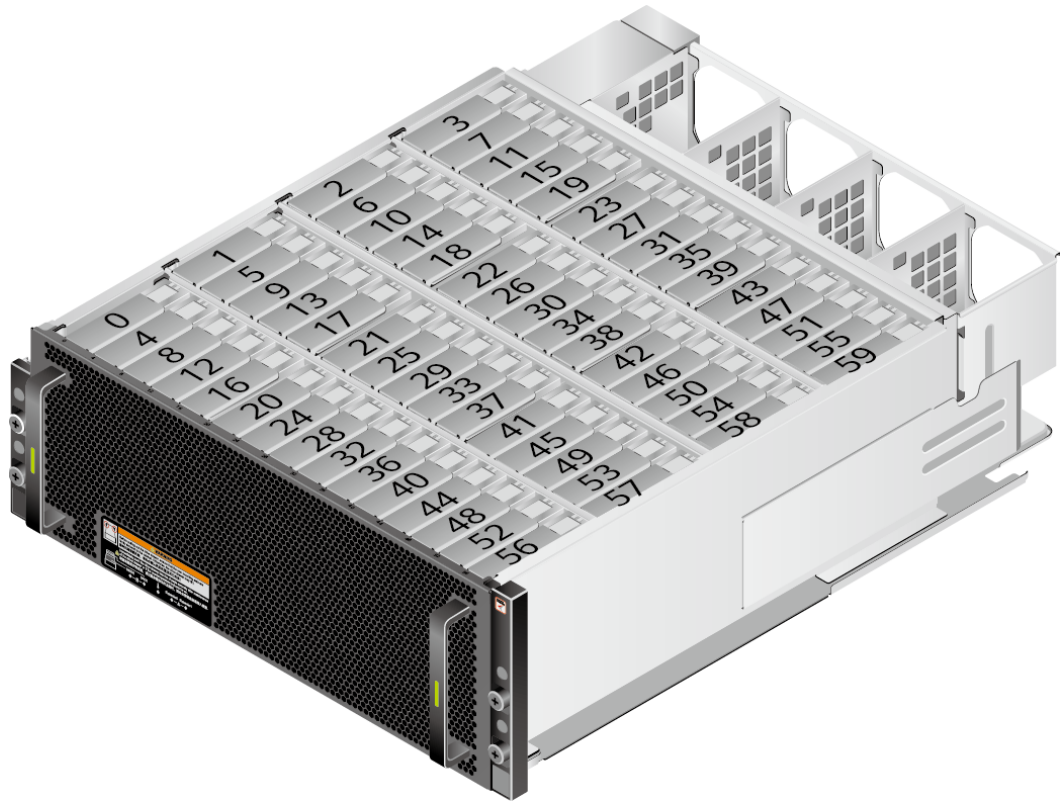
Figure 2-7 Numbers of the rear drives
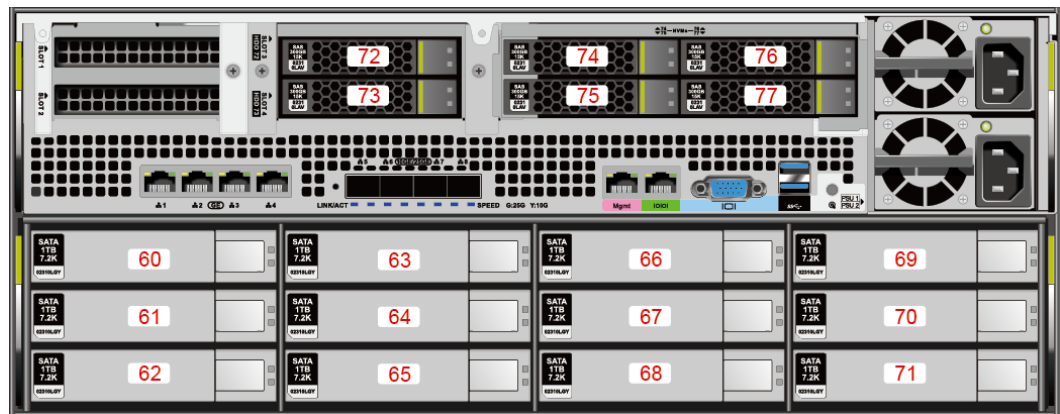
Table 2-7 Drive configuration

Configuration	Maximum Front Drives	Maximum Rear Drives	Drive Management Mode
Passthrough	60	• I/O module 2: 2 • I/O module 3: 4 • Storage node: 12	Passthrough

Configuration	Maximum Front Drives	Maximum Rear Drives	Drive Management Mode
NOTE ● The drive drawer supports 2.5-inch and 3.5-inch SAS/SATA HDDs. If 2.5-inch drives are used, a 3.5-inch drive tray is required for each drive. ● Storage nodes support 3.5-inch SAS/SATA HDDs and 2.5-inch SAS/SATA HDDs or SSDs. If 2.5-inch drives are used, a 3.5-inch drive tray is required for each drive. ● When holding two 2.5-inch drive modules, I/O module 2 supports only SATA HDDs or SSDs. ● When holding four 2.5-inch drive modules, I/O module 3 supports only NVMe PCIe SSDs.			

2.6.2 SAS/SATA Drive Indicators

Figure 2-8 shows the indicators on an SAS or SATA drive.

Figure 2-8 Indicators of a 2.5-inch SAS/SATA drive

Figure 2-9 Indicators of a 3.5-inch SAS/SATA drive

Table 2-8 Description of SAS or SATA drive indicators

Drive Activity Indicator (Green)	Drive Fault Indicator (Yellow)	Description
Steady on	Off	The drive is in position.
Blinking at 4 Hz	Off	Data is being read or written normally, or data on the primary drive is being rebuilt.
Steady on	Blinking at 1 Hz	The drive is being located by the RAID controller card.
Blinking at 1 Hz	Blinking at 1 Hz	The data on the secondary drive is being rebuilt.
Off	Steady on	A drive in a RAID array is removed.

Drive Activity Indicator (Green)	Drive Fault Indicator (Yellow)	Description
Steady on	Steady on	A drive in a RAID array is faulty.

2.6.3 NVMe Drive Indicators

Figure 2-10 shows the indicators on an NVMe drive.

Figure 2-10 NVMe drive indicators

Table 2-9 Description of NVMe drive indicators

Drive Activity Indicator (Green)	Drive Fault Indicator (Yellow)	Description
Off	Off	The NVMe SSD is not detected or the PCIe link is disconnected.
Steady green	Off	The NVMe drive is operating properly.
Blinking green at 2 Hz	Off	Data is being read from or written to the NVMe drive.
Off	Blinking yellow at 2 Hz	The NVMe drive is being located by the OS or hot-swapped.
Off	Blinking yellow at 0.5 Hz	The hot removal process is complete, and the NVMe drive is removable.
Steady green or off	Steady yellow	The NVMe drive is faulty.

2.7 Riser Cards and PCIe Slots

Figure 2-11, **Figure 2-12**, **Figure 2-13**, and **Figure 2-14** show the riser cards supported by I/O modules 1, 2, and 3, respectively.

- The riser card shown in **Figure 2-11** fits into I/O module 1. It provides PCIe slots 1 and 2 for two half-height half-length (HHHL) PCIe x8 cards.

Figure 2-11 Riser 1 (2 PCIe x8 slots)
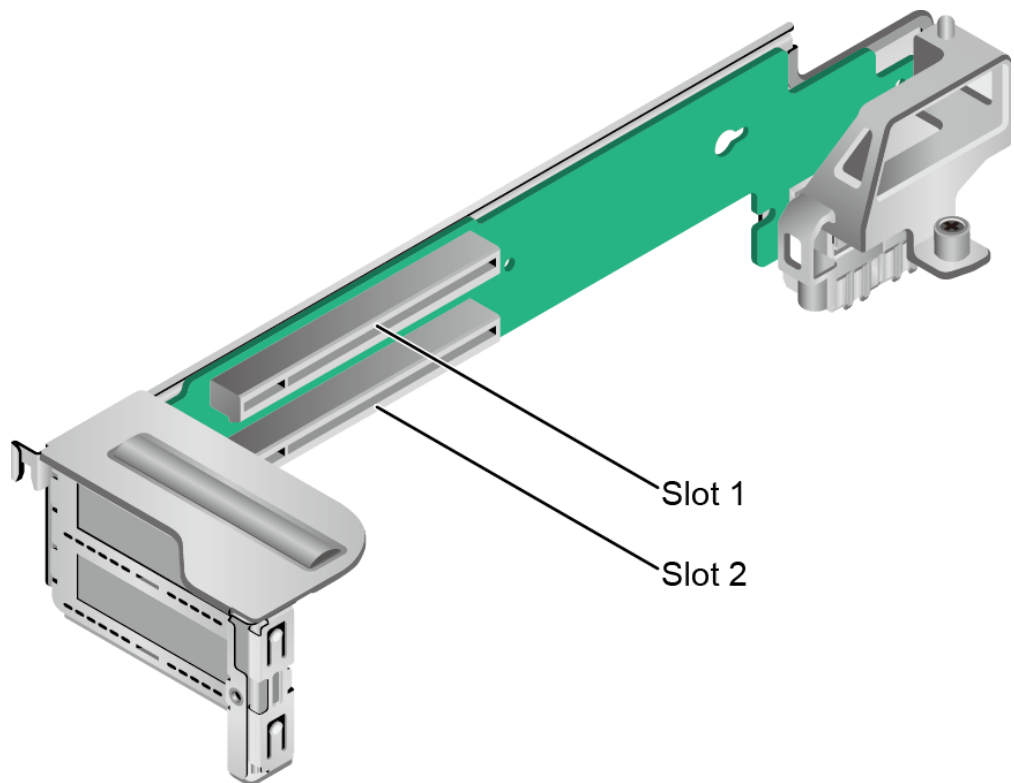
- The riser card shown in **Figure 2-12** fits into I/O module 1. It provides PCIe slot 2 for an HHHL PCIe x16 card.

Figure 2-12 Riser 1 (1 PCIe x16 slot)
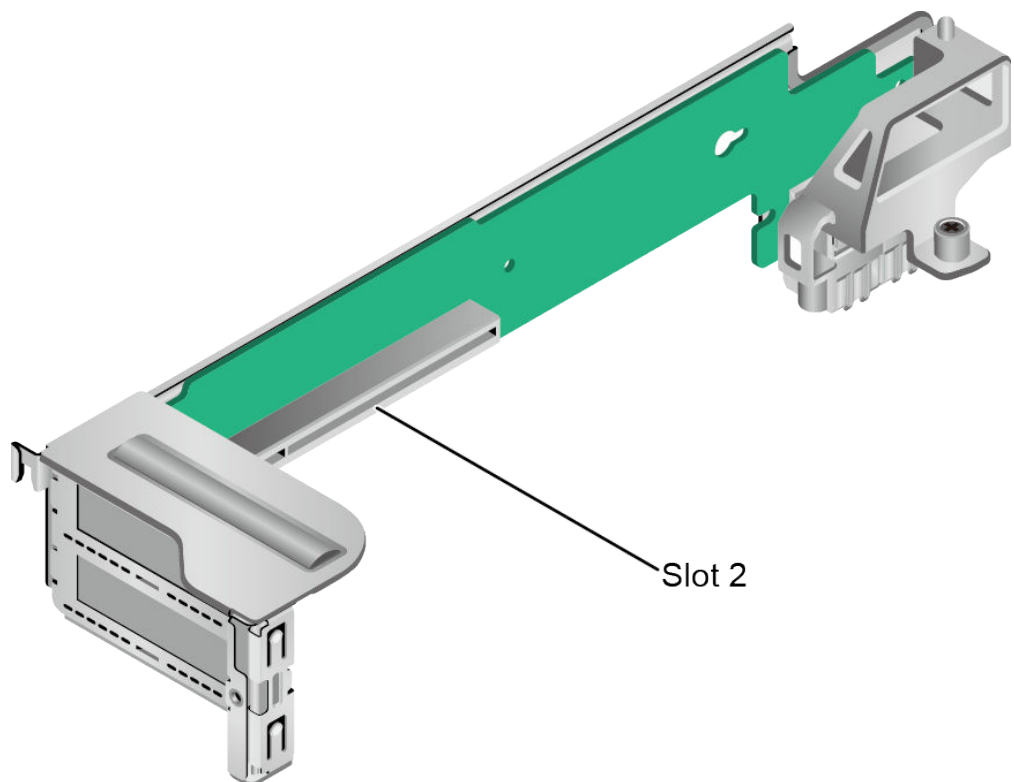
The only difference between **Figure 2-11** and **Figure 2-12** lies in the PCIe slots. In this document, riser card 1 shown in **Figure 2-11** is used as an example. The actual configuration may vary.

- The riser card shown in **Figure 2-13** fits into I/O module 2. It provides PCIe slots 3 and 4 for two HHHL PCIe x8 cards.

Figure 2-13 Riser 2 (2 PCIe x8 slots)
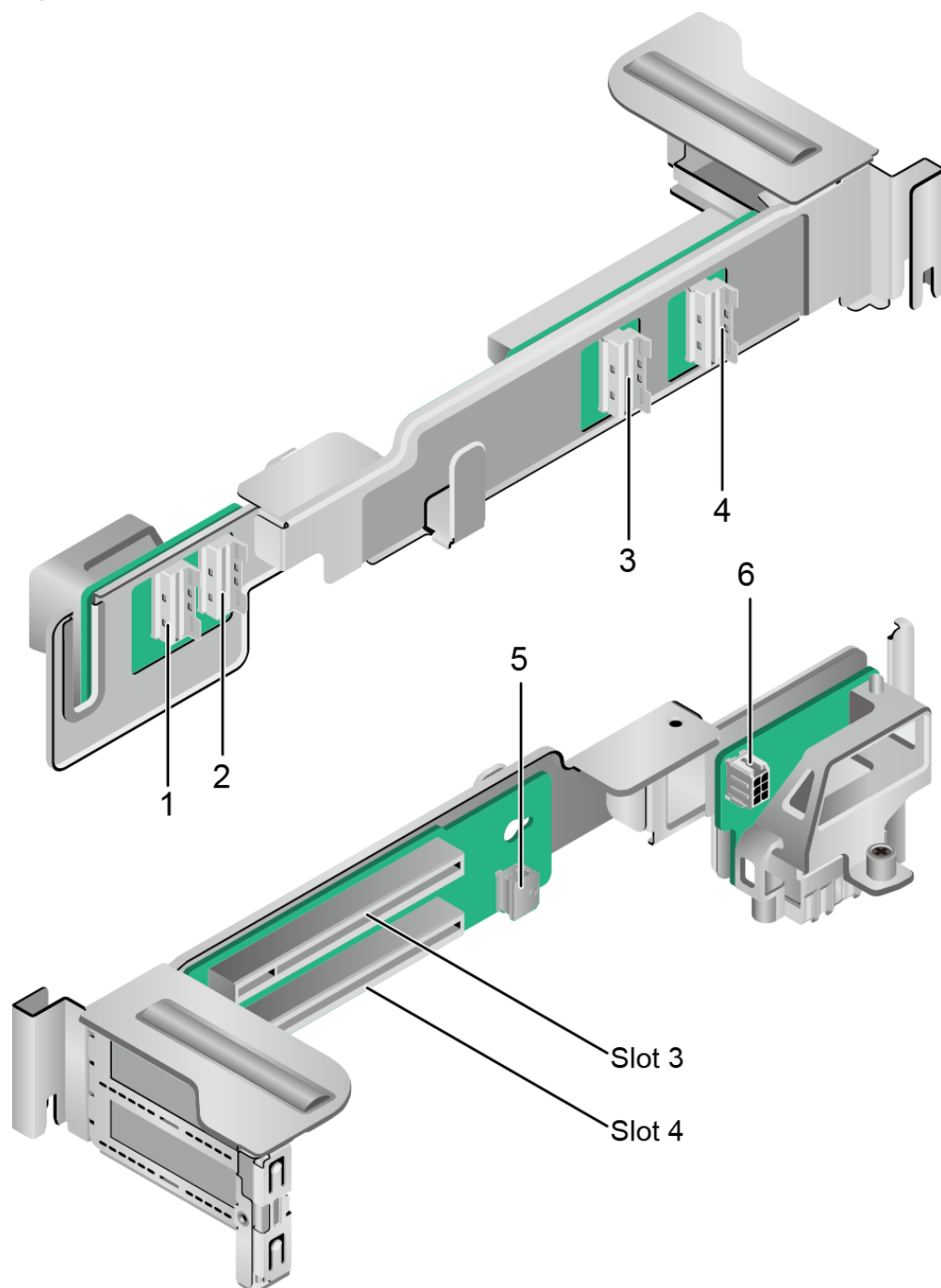
1	Slimline x8 connector (SLIMLINE A/J3)	2	Slimline x8 connector (SLIMLINE B/J4)
3	Slimline x8 connector (SLIMLINE B/J5)	4	Slimline x8 connector (SLIMLINE A/J6)
5	Power connector (RISER PWR/J10)	6	Power connector (no silkscreen/J6)

- The riser card shown in **Figure 2-14** fits into I/O module 3. It provides PCIe slots 5 and 6 for two full-height half-length (FHHL) PCIe x8 cards.

Figure 2-14 Riser 3 (2 PCIe x8 slots)
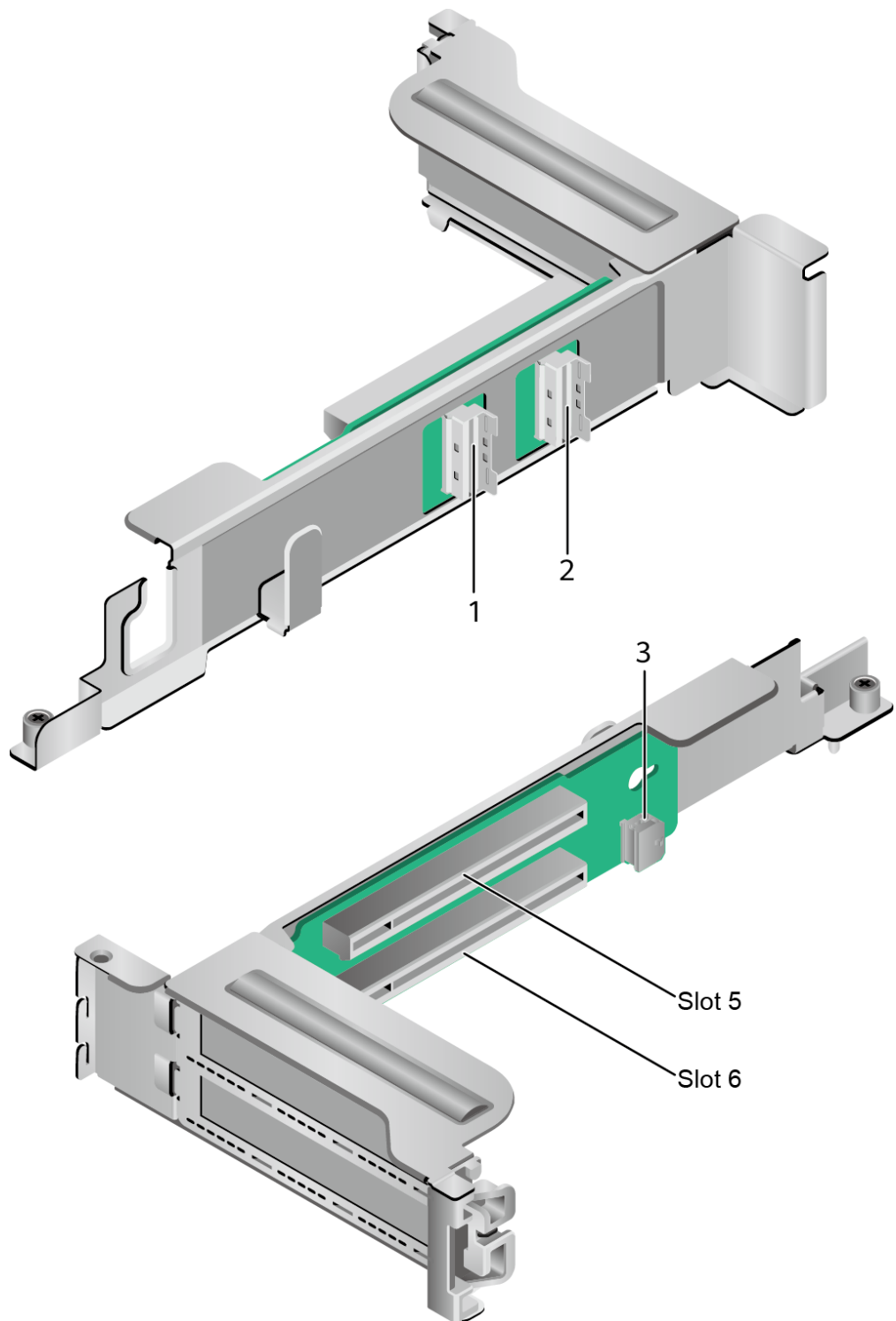
1	Slimline x8 connector (SLIMLINE B/J5)	2	Slimline x8 connector (SLIMLINE A/J6)
3	Power connector (RISER PWR/J10)	-	-

Figure 2-15 shows the PCIe slots of the 5290 server.

Figure 2-15 PCIe slots
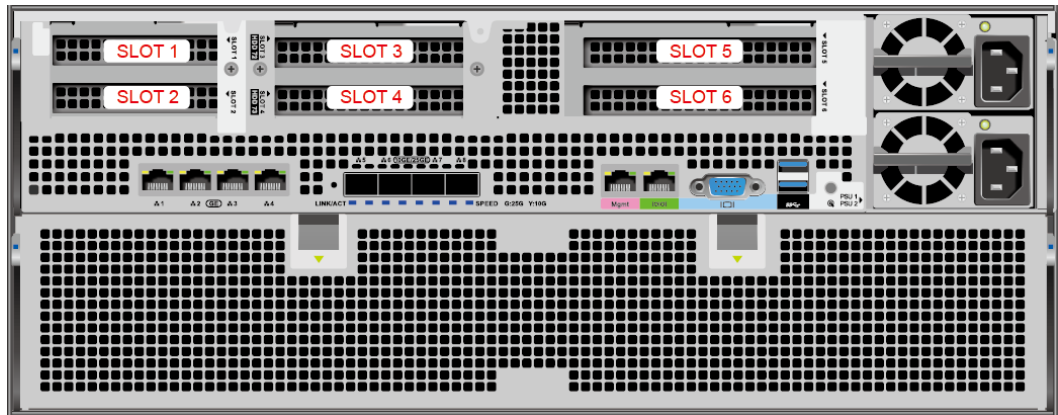
I/O module 1 provides slots 1 to 2, I/O module 2 provides slots 3 to 4, and I/O module 3 provides slots 5 and 6.

Table 2-10 lists the specifications of the PCIe slots.

Table 2-10 PCIe slot description

PCIe Slot	CPU Connected	PCIe Standards	Connector Width	Bus Width	Port No. on the BIOS	Root Port (B/D/F)	Device (B/D/F)	Slot Size
Slot 1	CPU 2	PCIe 4.0	x16	x8	Port8	80/08/0	-	HHHL
Slot 2	CPU 2	PCIe 4.0	x16	● Slot 2 on **riser card 1 (2 x 8)**: x8 ● Slot 2 on **riser card 1 (1 x 16)**: x16	Port8 /12	80/0C/0	-	HHHL
Slot 3	CPU 1	PCIe 4.0	x16	x8	Port 8	00/08/0	-	HHHL
Slot 4	CPU 1	PCIe 4.0	x16	x8	Port 12	00/0C/0	-	HHHL
Slot 5	CPU 2	PCIe 4.0	x16	x8	Port16	80/10/0	-	FHHL
Slot 6	CPU 2	PCIe 4.0	x16	x8	Port0	80/00/0	-	FHHL

PCIe Slot	CPU Connected	PCIe Standards	Connector Width	Bus Width	Port No. on the BIOS	Root Port (B/D/F)	Device (B/D/F)	Slot Size

NOTE

- A PCIe slot that supports an FHFL PCIe card also supports an FHHL or HHHL PCIe card. A PCIe slot that supports an FHHL PCIe card also supports an HHHL PCIe card.

- A PCIe slot that supports a PCIe x16 card is backward compatible with a PCIe x8, x4, or x2 card. A PCIe slot that supports a PCIe x8 card is backward compatible with a PCIe x4 or x2 card.

- All slots support PCIe cards of up to 75 W. The power of a PCIe card varies depending on its model. Use the **Intelligent Computing Compatibility Checker** to obtain information about the PCIe cards supported by the server. For the PCIe cards that are not listed in the compatibility list, contact your local Huawei sales representative for a compatibility test.

- B/D/F indicates Bus/Device/Function Number.

- Root port (B/D/F) indicates the B/D/F of an internal PCIe root port of the CPU. Device (B/D/F) indicates the B/D/F (displayed on the OS) of an onboard or external PCIe port.

- The B/D/F values in this table are default values. The values may vary with the quantity, model, or installation slots of the PCIe cards, or if the PCIe cards come with a PCI bridge.

- A dedicated riser card is required when the Atlas 300 AI accelerator card (model 3000) is configured. Use the **Intelligent Computing Compatibility Checker** to obtain specific information.

2.8 Fans

The server uses fan modules that support intelligent speed adjustment. In normal cases, the fans run at the minimum speed. If the server temperature or the air inlet temperature increases, the fans will run faster to ensure optimal heat dissipation.

The model of the fan module is 8080. **Figure 2-16** shows the position of the fan modules.

Figure 2-16 Fan module positions
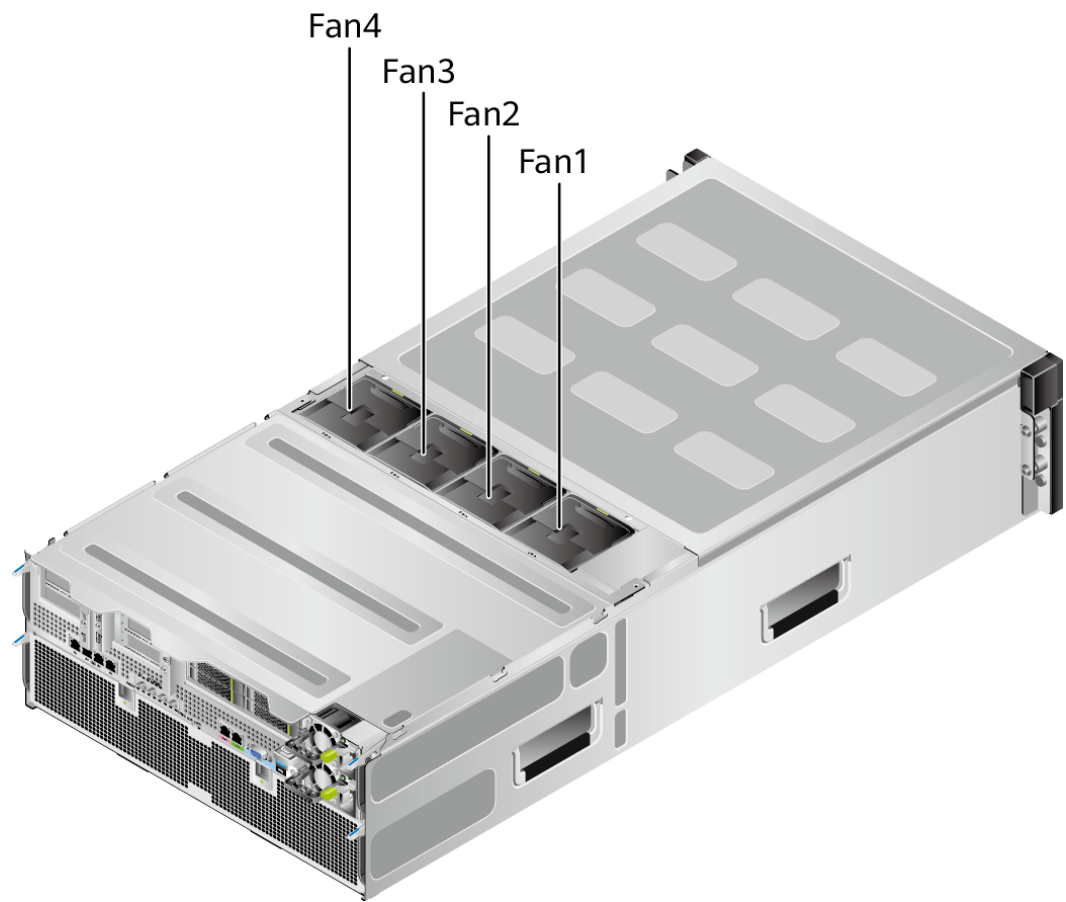
3 Product Specifications

3.1 Technical Specifications

Table 3-1 Technical specifications

Item	Specifications
Form factor	4U rack server
Processors	• Two Huawei Kunpeng 920 32-core or 48-core processors at a frequency of 2.6 GHz • Two Hydra buses between CPUs, each of which provides a maximum speed of 30 Gbit/s • An L3 cache of up to 48 MB **NOTE** Use the **Intelligent Computing Compatibility Checker** to obtain information about the components to be used.
Memory	• Up to 16 DDR4 RDIMMs • Maximum memory speed up to 2933 MT/s • Protected with ECC, SEC/DED, SDDC, and patrol scrubbing • Single DIMM capacity of 16 GB, 32 GB, 64 GB, or 128 GB **NOTE** DIMMs of different specifications (such as the capacity, bit width, rank, and height) cannot be installed in one server. That is, all DIMMs in a server must have the same part No. Use the **Intelligent Computing Compatibility Checker** to obtain information about the components to be used.

Item	Specifications
Storage	• Supports a variety of drive configurations. For details, see **Table 2-7**. • Supports hot-swap of a single drive.

LOMs	The LOMs support the following network ports:
	• Four GE electrical ports supporting PXE
	• Four 10GE or 25GE optical ports supporting PXE
	NOTE
	   • Different optical modules can be used to implement autonegotiation between 25GE and 10GE.
	   • The LOM 10GE/25GE optical ports must be configured with optical modules and AOC cables of the same part No.

PCIe expansion	• Up to six standard PCIe 4.0 slots are supported. The specifications of the standard PCIe 4.0 slots are as follows:
	  – I/O modules 1 and 2: supports two HHHL PCIe 4.0 x16 slots each (x16 size @ x8 speed)
	  – I/O module 3: supports two FHHL PCIe 4.0 x16 slots (x16 size @ x8 speed)
	• Supports Huawei PCIe SSD cards to bolster I/O performance for applications such as searching, caching, and download services.
	• Supports Huawei Atlas 300 AI accelerator cards (model 3000) to implement fast and efficient processing and inference, and image identification and processing.
	NOTE
	Use the **Intelligent Computing Compatibility Checker** to obtain information about the components to be used.

Ports	• 4 rear GE LOM electrical ports (chip model: CPU Intergration) • 4 x 10GE/25GE LOM optical ports (chip model: CPU Intergration) • 2 USB 3.0 ports • 1 DB15 VGA port • 1 RJ45 serial port • 1 RJ45 system management port
Fans	Four hot-swappable 8080 fan modules, accommodating one-fan failure. **NOTE** Fan modules of the same part No. must be used in a server.
System management	Huawei iBMC supports Intelligent Platform Management Interface (IPMI), Serial over LAN (SOL), KVM over IP, and virtual media, and provides one 10/100/1000 Mbit/s RJ45 management network port.
Security	Administrator password

Item	Specifications
Video card	The video card chip SM750 is integrated in the iBMC management chip. It provides 32 MB video memory and supports the maximum display resolution of 1920 x 1080 at 60 Hz with 16 M colors. **NOTE** Only the maximum resolution supported by the built-in driver of the OS is supported.

3.2 Environmental Specifications

Table 3-2 Environmental specifications

Item	Specifications
Temperature	• Operating temperature: 5°C to 35°C (41°F to 95°F) (ASHRAE Class A2 compliant) • Storage temperature (≤ 72 hours): –40°C to +70°C (–40°F to +158°F) • Long-term storage temperature (> 72 hours): 21°C to 27°C (69.8°F to 80.6°F) • Maximum temperature change rate: 20°C/h (36°F/h) **NOTE** The highest operating temperature varies depending on the server configuration. For details, see **Table 3-3**.
Relative humidity (RH, non-condensing)	• Operating humidity: 8% to 90% • Storage humidity (≤ 72 hours): 5% to 95% • Long-term storage humidity (> 72 hours): 30% to 69% • Maximum humidity change rate: 20%/h
Air volume	≥ 204 CFM
Maximum altitude	Operating altitude: ≤ 3000 m (9842.4 ft) **NOTE** According to the ASHRAE 2015 standard: • When the server complying with ASHRAE Classes A1 and A2 is used in the altitude of above 900 m (2952.76 ft), the highest operating temperature decreases by 1°C (1.8°F) for every increase of 300 m (984.25 ft). • When the server complying with ASHRAE Class A3 is used in the altitude of above 900 m (2952.76 ft), the highest operating temperature decreases by 1°C (1.8°F) for every increase of 175 m (574.15 ft). • When the server complying with ASHRAE Class A4 is used in the altitude is above 900 m (2952.76 ft), the highest operating temperature decreases by 1°C (1.8°F) for every increase of 125 m (410.10 ft).

Item	Specifications
Corrosive airborne contaminants	Maximum corrosion product thickness growth rate: ● 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 pollutants 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 23°C (73.4°F) in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). Operating: ● LWAd: 7.78 Bels ● LpAm: 61.9 dBA **NOTE** The actual sound levels generated during server operating vary depending on the server configuration, load, and ambient temperature.

Table 3-3 Operating temperature specifications

Configuration	Max. 30°C (86°F)	Max. 35°C (95°F) (ASHRAE Class A2 Compliant)
72 x 3.5-inch drive pass-through configuration	All options supported	The 64-core CPUs are not supported.
NOTE When a single fan fails, the highest operating temperature is 5°C (41°F) lower than the rated value.		

3.3 Physical Specifications

Table 3-4 Physical specifications

Item	Specifications
Dimensions (H x W x D)	175 mm (4 U) x 447 mm x 900 mm (6.89 in. x 17.60 in. x 35.43 in.)
Installation space	The server fits into a standard cabinet complying with the IEC 297 standard: ● Cabinet width: 19 inches ● Cabinet depth ≥ 1000 mm (39.37 in.) Requirements for guide rail installation: ● L-shaped guide rails: apply only to Huawei cabinets. ● Adjustable guide rails: apply to cabinets with a distance of 594.5 mm to 919 mm (23.41 in. to 36.18 in.) between the front and rear mounting bars.
Weight in full configuration	● Maximum weight of a server fully configured with drives: 110 kg (242.51 lb) ● Packaging materials: Packing materials only: 6.86 kg (1.51 lb) Packing materials and pallet: 18 kg (3.97 lb)
Power consumption	The power consumption parameters vary with server configurations, including the configurations complying with EU energy-related products (ErP) requirements. Use the **Intelligent Computing Product Power Calculator** to obtain specific information.

3.4 Power Supply Specifications

● The PSUs are hot-swappable and work in 1+1 redundancy mode.

● Use the **Intelligent Computing Compatibility Checker** to obtain specific PSU specifications.

● The recommended current specifications of the circuit breakers connected to the server are as follows:

  – AC: 32 A

  – DC: 63 A

● A server must use PSUs of the same model.

● The PSUs provide short-circuit protection. The PSUs that support dual input live wires provide double-pole fuse.

- When the input voltage is 200 V AC to 220 V AC, the output power of the 2000 W AC platinum PSU decreases to 1800 W.

4 Hardware and Software Compatibility

Use the **Intelligent Computing Compatibility Checker** to obtain information about the supported OS and hardware types.

> **NOTICE**
>
> Do not use incompatible components. Otherwise, the server may fail to work properly. The technical support and warranty do not cover faults caused by incompatible components.

5 System Management

The 5290 uses Huawei proprietary intelligent Baseboard Management Controller (iBMC) to implement remote server management. The iBMC complies with IPMI 2.0 and provides highly reliable hardware monitoring and management.

The iBMC provides the following features:

- KVM and text console redirection
- Remote virtual media
- IPMI
- SNMP
- Browser-based login

Table 5-1 describes the features of the iBMC.

Table 5-1 iBMC features

Feature	Description
Management interface	Integrates with any standard management system through the following interfaces or protocols: - IPMI 2.0 - CLI - HTTPS - SNMPv3
Fault detection	Detects and accurately locates faults in a field replaceable unit (FRU).
Alarm management	Supports alarm management and reports alarms using the SNMP trap, SMTP, and syslog service to ensure 24/7 operating.
Integrated virtual KVM	Provides remote maintenance measures for troubleshooting. The maximum resolution is 1920 x 1200.

Feature	Description
Integrated virtual media	Virtualizes local media devices, images, and folders into media devices on a remote server, simplifying OS installation. (The virtual DVD drive supports a maximum transmission rate of 8 MB/s.)
WebUI	Provides a user-friendly graphical user interface (GUI), simplifying user configuration and query operations.
Screen snapshots and videos	Allows users to view screen snapshots and videos without login, which facilitates preventive maintenance inspection (PMI).
Domain Name Service (DNS)/Active Directory (AD) service	Supports domain management and directory services, which significantly simplify network and configuration management.
Dual-image backup	Allows a boot from the backup image when the active software crashes.
Asset management	Supports intelligent asset management.
IPv6	Supports IPv6 to ensure sufficient IP addresses.

6 Maintenance and Warranty

For details, see **Maintenance & Warranty**.

7 Certifications

No.	Country/Region	Certification	Standards
1	China	CCC	GB4943.1-2011 GB/T9254-2008 (Class A) GB17625.1-2012
2	China	Air transport verification	IATA DGR 61st, 2020
3	Europe	CE	Safety: EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013 EN 62368-1:2014+A11:2017 EMC: EN 55032:2012/AC:2013 CISPR 32:2012 EN 55032:2015/AC:2016 CISPR 32:2015 EN 55035:2017 CISPR 35:2016 EN 61000-3-2:2014 EN 61000-3-3:2013 EN 61000-6-2:2005 EN 61000-6-4:2007+A1:2011 ERP: Commission Regulation (EU) 2019/424 RoHS: EN50581: 2012
4	America	FCC	FCC CFR47 Part 15 Subpart B:2018

No.	Country/ Region	Certification	Standards
5	Canada	IC	ICES-003 Issue 6: 2016 (updated April 2019) ICES Gen Issue 1:2018 ANSI C63.4:2014+A1:2017
6	Australia	RCM	EN 55032:2012/AC:2013 EN 55032:2015/AC:2016 AS/NZS CISPR 32:2015
7	Japan	VCCI	VCCI 32-1
8	-	Multi-country commodity inspection	See the product certification.
9	Europe	REACH	Regulation (EC) No 1907/2006 (EU REACH)
10	Europe	WEEE	2012/19/EU

A Appendix

A.1 BIOS

The basic input/output system (BIOS) is the most basic software loaded to a computer hardware system. It provides an abstraction layer between the computer hardware and the OS. It is used to perform hardware initialization during the boot process and provide runtime services for the OS and programs. **Figure A-1** shows the BIOS position in the system.

The BIOS data is stored on the Serial Peripheral Interface (SPI) flash memory. The BIOS performs a power-on self-test (POST), initializes CPU and memory, checks the I/O and boot device, and finally boots the OS. The BIOS also supports the advanced configuration and power interface (ACPI) and hot swap setting.

The BIOS of the Huawei Kunpeng 920 platform server is a patented BIOS product with independent intellectual property rights. It supports customization and provides a variety of in-band and out-of-band configuration functions as well as high scalability.

Figure A-1 BIOS in the system
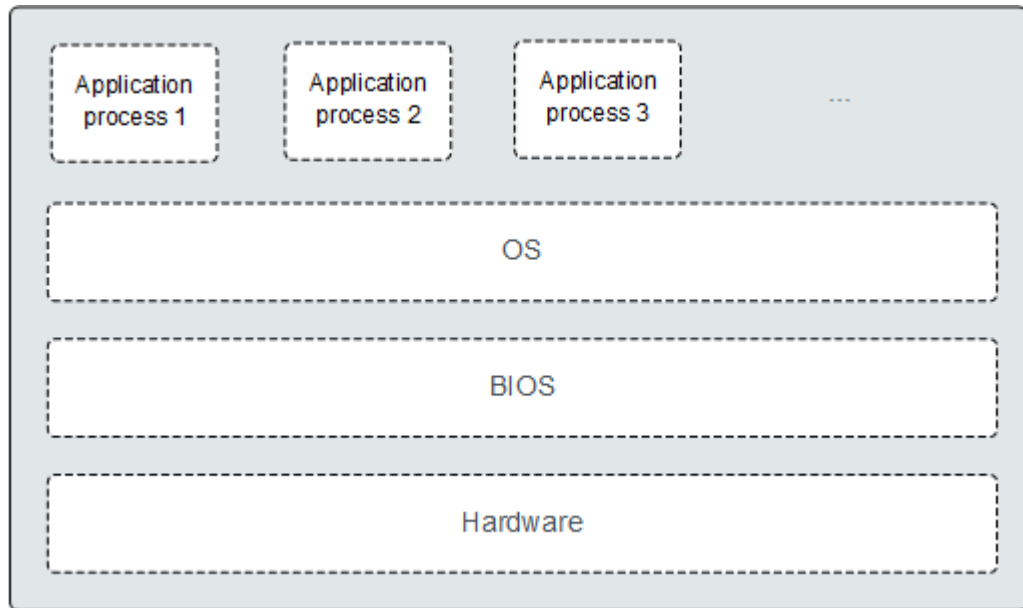
For details, see the *BIOS Parameter Reference (Kunpeng 920 Processor)*.

A.2 iBMC

The iBMC is a Huawei proprietary intelligent management system that remotely manages servers.

The iBMC complies with Intelligent Platform Management Interface (IPMI) standards. It provides various functions, including keyboard, video, and mouse (KVM) redirection, text console redirection, remote virtual media, and reliable hardware monitoring and management.

The iBMC provides the following features:

- Multiple management interfaces for system integration

  The iBMC provides IPMI, CLI, Data Center Manageability Interface (DCMI), Redfish interfaces, Hypertext Transfer Protocol Secure (HTTPS), and SNMP.

- Fault detection and alarm management

  The iBMC implements fault detection and alarm management, ensuring stable, uninterrupted 24/7 system operation.

- Virtual KVM and virtual media

  The iBMC provides virtual KVM and virtual media, facilitating remote maintenance.

- WebUI

  The iBMC provides a web-based UI for setting and querying device information.

- System breakdown screenshots and video playback

  The iBMC allows screenshots and videos to be created when the system breaks down. The screenshots and videos help to identify the cause of system breakdown.

- Screen snapshots and videos

  The iBMC offers screen snapshots and videos, which simplify routine preventive maintenance, recording, and auditing.

- Support for DNS and LDAP

  The iBMC supports domain name system (DNS) and Lightweight Directory Application Protocol (LDAP) to implement domain management and directory service.

- Active/standby backup

  The iBMC works in active/standby mode to ensure system reliability. If the active iBMC is faulty, the standby iBMC takes over services immediately.

For more information about the iBMC, see the *TaiShan Rack Server iBMC User Guide*.

A.3 Glossary

B

BMC   baseboard management controller

The BMC complies with the Intelligent Platform Management Interface (IPMI) standard, responsible for collecting, processing, and storing sensor signals, and monitoring the operating status of each component. The BMC provides the hardware status and alarm information about the managed objects for the management module, so that the management module can manage the objects.

E

Ethernet   A baseband local area network (LAN) architecture developed by Xerox Corporation in cooperation with DEC and Intel. Ethernet uses Carrier Sense Multiple Access/Collision Detection (CSMA/CD) and supports a data transfer rate of 10 Mbps on multiple cables. The Ethernet specification is the basis for the IEEE 802.3 standard.

G

Generic Routing Encapsulation (GRE)   Generic Routing Encapsulation is an internet based term applied to the encapsulation of IP datagrams tunneled through the internet. Generic Routing Encapsulation (GRE) is a mechanism for encapsulating any network layer protocol over any other network. GRE serves as a Layer 3 tunneling protocol, and provides a tunnel for transparently transmitting data packets.

H

hot swap   In a running system, insertion or removal of a component does not affect normal running of the system.

K

KVM	keyboard, video, and mouse

M

mezzanine card	A card connected to the mainboard through the connector, level to the mainboard. It is used on a device which has high requirement for space usage.

P

panel	The front-most or rear most element of a server, which serves to mount components, such as handles, indicators, and ports, and also seals the front of the chassis for airflow and electromagnetic compatibility (EMC).
PCIe	A computer expansion bus standard based on the existing PCI programming and communication standards and a faster serial communication system. Intel is a major contributor to this standard. PCIe is used only for interconnection between applications. A PCI system can be turned into a PCIe one by modifying the physical layer instead of software. PCIe delivers a faster speed and can replace almost all existing bus standards including AGP and PCI.

R

RAID	redundant array of independent disks

A storage technology that combines multiple drives into a logical unit in several ways called "RAID levels", providing redundancy and delivering higher storage performance than a single disk. |
| **redundancy** | The ability of a system to keep functioning normally in the event of a device failure by having a backup device automatically replace the faulty one. |

S

system event log (SEL)	A non-volatile storage area and associated interfaces for storing system platform events for later retrieval.
server	A special computer that provides various services for clients over a network.

U

U	A unit defined in International Electrotechnical Commission (IEC) 60297-1 to measure the height of a cabinet, chassis, or subrack. 1 U = 44.45 mm = 1.75 in.

A.4 Acronyms and Abbreviations

A

AC   alternating current

B

BIOS   Basic Input/Output System

BMC   Baseboard Management Controller

C

CLI   command-line interface

D

DC   direct current

DDR4   Double Date Rate 4

DIMM   dual in-line memory module

E

ECC   Error Checking and Correcting

F

FC   Fibre Channel

FCC   Federal Communications Commission

G

GE   Gigabit Ethernet

H

HDD   hard disk drive

HTTP   Hypertext Transfer Protocol

HTTPS   Hypertext Transfer Protocol Secure

I

iBMC   Intelligent Baseboard Management Controller

IEC   International Electrotechnical Commission

IP   Internet Protocol

IPMB   Intelligent Platform Management Bus

IPMI	Intelligent Platform Management Interface
K	
KVM	keyboard, video, and mouse
L	
LED	light emitting diode
LOM	LAN on motherboard
M	
MAC	Media Access Control
N	
NC-SI	Network Controller Sideband Interface
P	
PCIe	Peripheral Component Interconnect Express
PXE	Preboot Execution Environment
R	
RAID	redundant array of independent disks
RAS	Reliability, Availability and Serviceability
RDIMM	registered dual in-line memory module
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
SNMP	Simple Network Management Protocol
SOL	Serial Over LAN
SSD	solid-state drive
T	
TDP	Thermal Design Power
U	

UEFI	Unified Extensible Firmware Interface	
UID	unit identification light	
USB	universal serial bus	
V		
VGA	Video Graphics Array	
VLAN	virtual local area network	