TaiShan 200 Server

White Paper (Model 2280)

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Contents

1 Overview

The TaiShan 200 server powered by Huawei Kunpeng 920 processors is dedicated for data centers. Its 2280 balanced model (2280 for short) is a 2U 2-socket rack server. It features high-performance computing, large-capacity storage, low power consumption, easy management, and easy deployment and is ideal for Internet, distributed storage, cloud computing, Big Data, and enterprise services.

Figure 1-1 shows the appearance of a server with 12 drives.

Figure 1-1 Appearance

2 Features

Performance and Scalability

The 2280 provides the following features to enhance performance and scalability:

- The server uses Huawei server-oriented 64-bit high-performance multicore Kunpeng 920 7260, 5250, 5240, 5230, 5220, or 3210 processor. Each processor integrates DDR4, PCIe 4.0, 25GE, 10GE, and GE ports and provides the system-on-chip (SOC) function.
- Each server supports up to two processors and 128 cores, maximizing the concurrent execution of multithreaded applications.
- Each Kunpeng 920 7260, 5250, 5240, or 5230 processor supports up to thirty-two 2933 Hz DDR4 ECC RDIMMs, which provide a maximum of 4096 GB memory capacity. Each Kunpeng 920 5220 or 3210 processor supports up to sixteen 2933 Hz DDR4 memory modules, which provide a maximum of 2048 GB memory capacity.

  📖 **NOTE**

   The memory speed is 2933 MHz for a 1-DPC memory module, and 2666 MHz for a 2-DPC memory module.

- Flexible drive configurations cater to a variety of business requirements and ensure high elasticity and scalability of storage resources.
- FlexIO cards provide multiple Ethernet ports.
- A maximum of eight PCIe 4.0 x8 slots are provided for easy expansion.

Availability and Serviceability

The 2280 provides the following features to improve availability and serviceability:

- The 2280 uses carrier-class components and follows the engineering process to dramatically improve system reliability.
- The 2280 is equipped with SAS/SATA/NVMe drives. SAS/SATA drives support RAID 0, 1, 10, 5, 50, 6, and 60, provides RAID cache, uses a supercapacitor for power-off data protection, and allows hot swap of data drives.
- The UID and HLY indicators on the panel and iBMC WebUI help technical support personnel promptly obtain the status of key components and locate failed or failing components. This simplifies maintenance, accelerates troubleshooting, and improves system availability.

- The Huawei intelligent baseboard management controller (iBMC) monitors system parameters in real time, triggers alarms, and performs recovery actions in case of failures. This helps minimize system downtime.

Manageability and Security

The 2280 provides the following features to ensure manageability and security:

- The iBMC monitors server operating status and provides remote management.
- The integrated industry-standard Unified Extensible Firmware Interface (UEFI) increases efficiency of setup, configuration, and update, and simplifies fault handling.
- The front bezel in the server chassis is locked to ensure local data security and reliability.

Energy Efficiency

The 2280 provides the following features to improve energy efficiency:

- The 2280 supports Platinum power supply units (PSUs), which provide 94% power efficiency at 50% load.
- The voltage regulator-down (VRD) PSUs reduce the energy loss in DC/DC power conversion.
- The server supports active/standby power supplies.
- The 2280 supports Proportional-Integral-Derivative (PID) intelligent fan speed adjustment, reducing power consumption.
- The improved thermal design with energy-efficient fan modules ensures optimal heat dissipation and reduces overall system power consumption.
- Drives can be powered on at different times to reduce startup power consumption.
- The 2280 supports SSDs. SSDs consume 80% less power than HDDs.

3 Logical Structure

Figure 3-1 shows the logical structure of the 2280 equipped with Kunpeng 920 7260, 5250, 5240, or 5230 processors.

Figure 3-1 Logical structure of the server with Kunpeng 920 7260, 5250, 5240, or 5230 processors
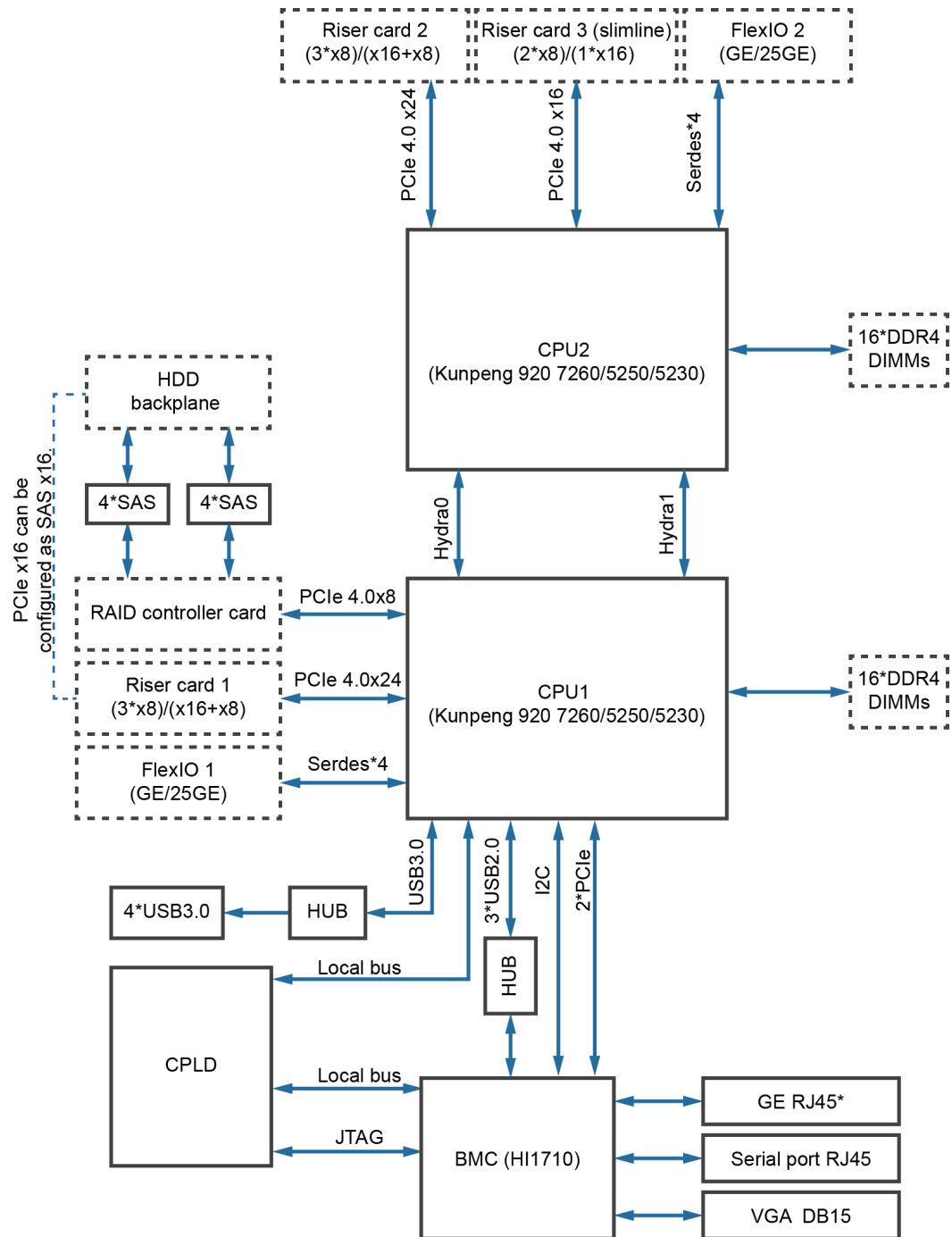
- The 2280 supports two Huawei Kunpeng 920 7260, 5250, 5240, or 5230 processors (CPUs). Each processor supports 16 DDR4 DIMMs.

- The server can come with an Ethernet FlexIO card with four GE or 25GE ports, which are connected to the processors through the high-speed SerDes interface.

- The screw-in RAID controller card connects to CPU 1 through PCIe buses, and to the drive backplanes through SAS signal cables. The server supports flexible drive configurations, depending on the drive backplanes used.

- The intelligent baseboard management controller (iBMC) uses the Huawei Hi1710 and provides a VGA port, management network port, and debugging serial port.

Figure 3-2 shows the logical structure of the 2280 equipped with Kunpeng 920 5220 or 3210 processors.

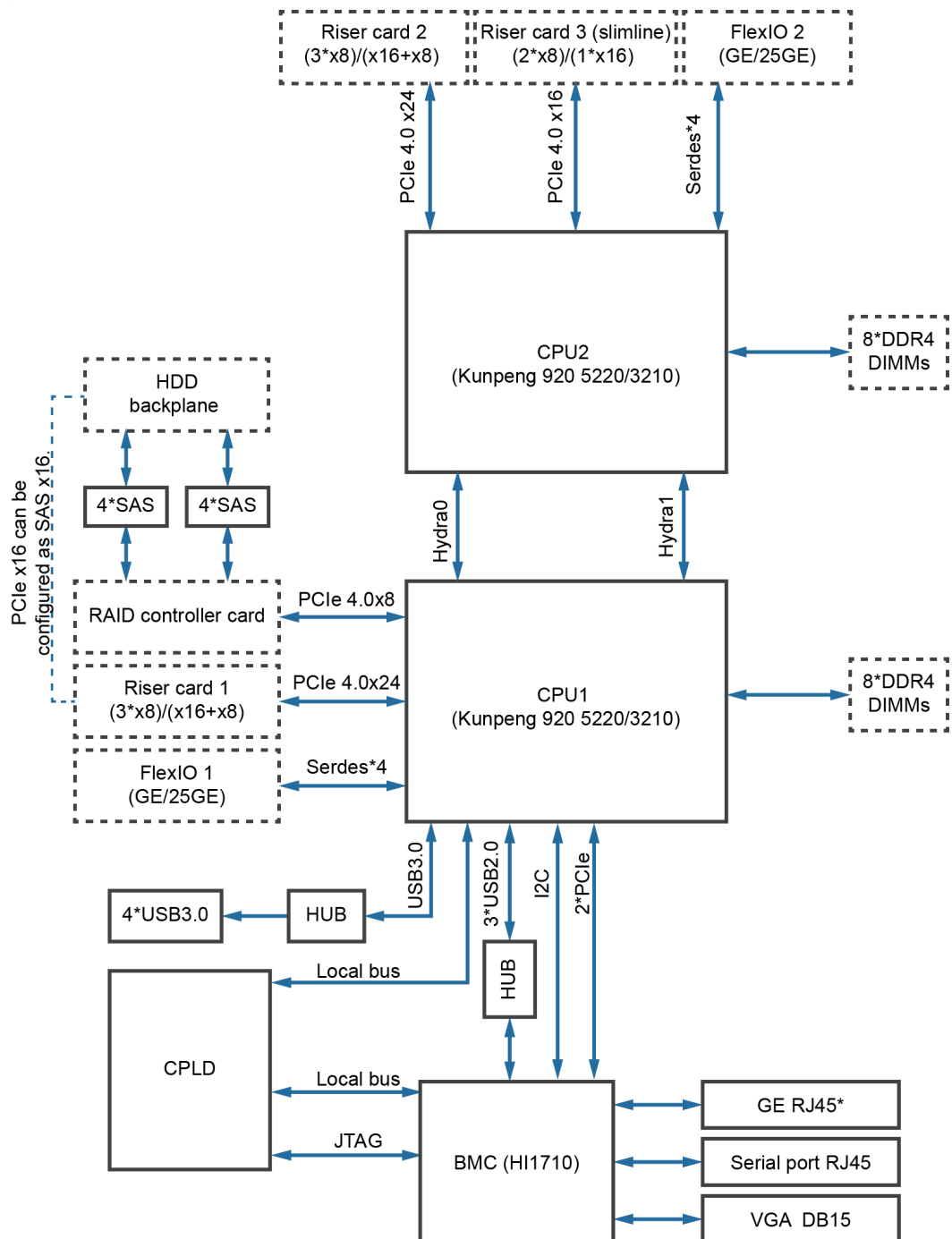**Figure 3-2** Logical structure of the server with Kunpeng 920 5220 or 3210 processors

- The 2280 supports two Huawei Kunpeng 920 5220 or 3210 processors. Each processor supports 8 DDR4 DIMMs.

- The server can come with an Ethernet FlexIO card with four GE or 25GE ports, which are connected to the processors through the high-speed SerDes interface.
- The screw-in RAID controller card connects to CPU 1 through PCIe buses, and to the drive backplanes through SAS signal cables. The server supports flexible drive configurations, depending on the drive backplanes used.
- The iBMC uses the Huawei Hi1710 and provides a VGA port, management network port, and debugging serial port.

4 Hardware Description

4.1 Appearance

Front Panel

- **Figure 4-1** shows the front panel of a 2280 server configured with 12 x 3.5-inch drives.

Figure 4-1 Front panel of a server with 12 x 3.5-inch drives
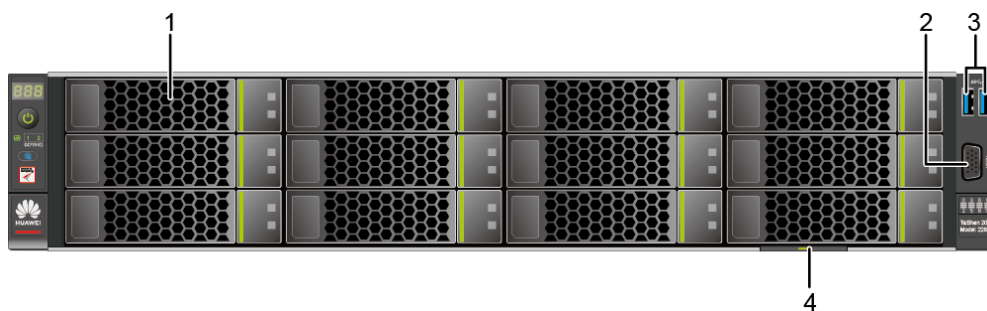
1	Drive	2	VGA port
3	USB 3.0 port	4	Label plate with an SN label

- **Figure 4-2** shows the front panel of a server configured with 25 x 2.5-inch drives.

Figure 4-2 Front panel of a server with 25 x 2.5-inch drives

1	Drive	2	VGA port
3	USB 3.0 port	4	Label plate with an SN label

- **Figure 4-3** shows the front panel of a server configured with 8 x 2.5-inch SAS/SATA drives and 12 x 2.5-inch NVMe SSDs.

Figure 4-3 Front panel of a server with 8 x 2.5-inch SAS/SATA drives and 12 x 2.5-inch NVMe SSDs
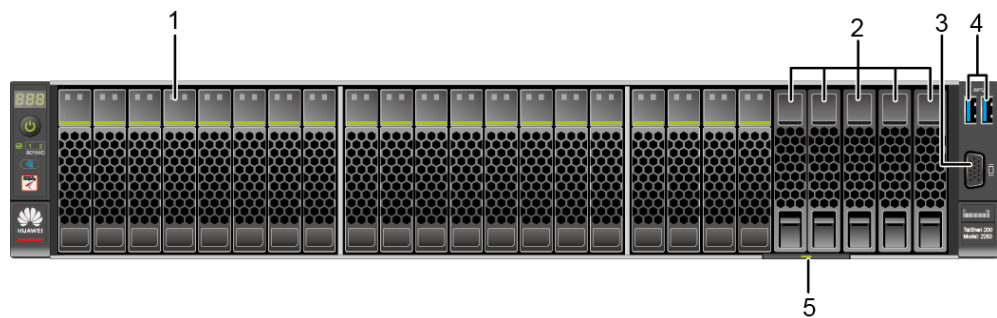
1	Drive	2	Filler panel
3	VGA port	4	USB 3.0 port
5	Label plate with an SN label	-	-

◯◯ NOTE

Slots 0 to 7 support only SAS/SATA drives. Slots 8 to 19 support only NVMe SSDs.

- **Figure 4-4** shows the front panel of a server configured with 24 x 2.5-inch SAS/SATA pass-through drives.

Figure 4-4 Front panel of a server with 24 x 2.5 SAS/SATA pass-through drives
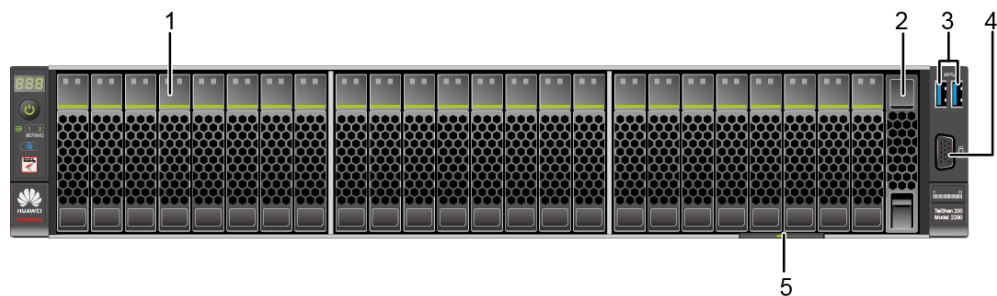
1	Drive	2	Filler panel
3	USB 3.0 port	4	VGA port
5	Label plate with an SN label	-	-

📖 **NOTE**

When powered by Kunpeng 920 5220 or 3210 processors, the server does not support 24 x 2.5 SAS/SATA pass-through drives.

Table 4-1 Description of ports on the front panel

Port	Type	Description
USB port	USB 3.0	The USB ports allow USB devices to be connected to a server. **NOTE** Before connecting an external USB device, check that the USB device functions properly. A server may operate abnormally if an abnormal USB device is connected.
VGA port	DB15	The VGA port is connected to a terminal, such as a monitor or physical KVM. **NOTE** The VGA port on the front panel does not have cable screws. The VGA cable is easy to fall off. You are advised to use the VGA port on the rear panel.

SN

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

Figure 4-5 shows the SN format.

Figure 4-5 SN example

Table 4-2 SN description

No.	Description
1	SN ID (two characters), which is **21**.
2	Material identification code (eight characters), that is, processing code.
3	Code of a processing factory (two characters). The value **10** indicates Huawei.
4	Year and month (two characters). ● The first character indicates the year. Digits 1 to 9 indicate 2001 to 2009, letters A to H indicate 2010 to 2017, letters J to N indicate 2018 to 2022, and letters P to Y indicate 2023 to 2032. **NOTE** The years from 2010 are represented by upper-case letters excluding I, O, and Z because the three letters are similar to 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.
5	Serial number (six characters).
6	RoHS compliance (one character). **Y** indicates environment-friendly processing.
7	Board model, that is, product name.

Rear Panel

Figure 4-6 shows the components on the rear panel of a server.

Figure 4-6 Rear panel components
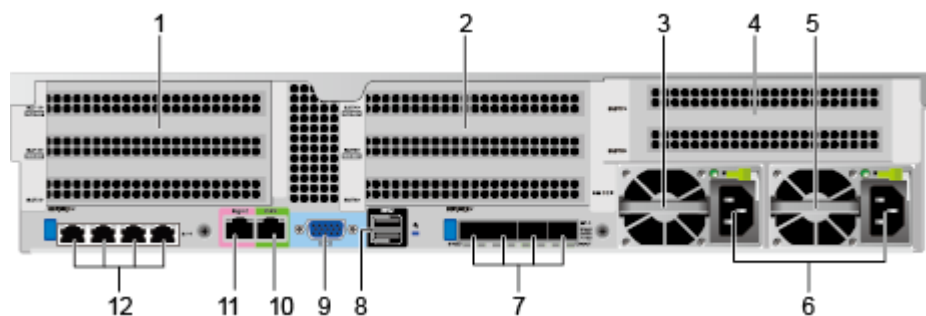
1	I/O module 1	2	I/O module 2
3	Power supply unit (PSU) 1	4	I/O module 3
5	PSU 2	6	PSU socket
7	FlexIO card 2	8	USB 3.0 port

| 9 | VGA port | 10 | Serial port |
| 11 | Management network port | 12 | FlexIO card 1 |

📖 **NOTE**

- I/O modules 1, 2, and 3 can be drive modules or riser modules. The preceding figure is for reference only.
- FlexIO card 1 or 2 can be a TM210 NIC, and only one TM280 NIC can be configured. The preceding figure is for reference only.
- FlexIO cards 1 and 2 are not hot-swappable. Power off the server before replacing them.

Table 4-3 Ports on the rear panel

Port	Type	Quantity	Description
VGA port	DB15	1	The VGA port is connected to a terminal, such as a monitor or physical KVM.
USB port	USB 3.0	2	The USB ports allow USB devices to be connected to a server. **NOTE** Before connecting an external USB device, check that the USB device functions properly. A server may operate abnormally if an abnormal USB device is connected.
Management network port	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.
Serial port	RJ45	1	The serial port is used as the system serial port by default. You can set it as the iBMC serial port by using the iBMC command. This port is used for debugging.
GE electrical port	RJ45	4/8	Each FlexIO card provides four GE electrical ports. Two FlexIO cards provide a maximum of eight GE electrical ports.
25GE optical port	SFP28	4	A FlexIO card provides a maximum of four 25GE optical ports. **NOTE** The 25GE optical ports support rate adaptation to 10GE, and optical modules of the corresponding rates are required.

Port	Type	Quantity	Description
PSU socket	-	1/2	Determine the number of PSUs based on actual requirements, but ensure that the rated power of the PSUs is greater than that of a server. You are advised to configure two PSUs to ensure reliable device operating. When one PSU is used, **Predicted PSU Status** cannot be set to **Active/Standby** on the iBMC WebUI.

4.2 Indicators and Buttons

Front Panel

- **Figure 4-7** shows the indicators and buttons on the front panel of a 2280 server with 12 x 3.5-inch drives.

  Figure 4-7 Indicators and buttons on the front panel of a server with 12 x 3.5-inch drives

1	UID button/indicator	2	Health indicator
3	Power button/indicator	4	Fault diagnostic LED
5	FlexIO card presence indicators (1 and 2)	-	-

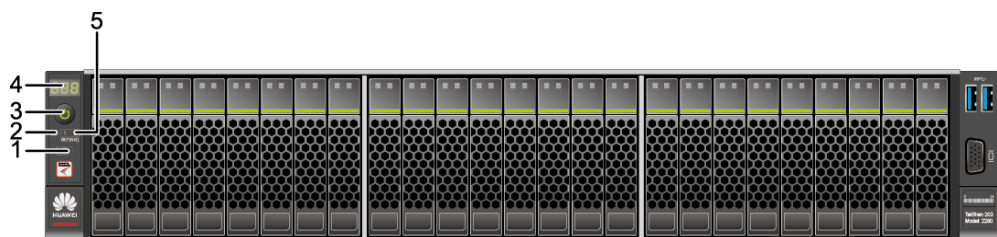- **Figure 4-8** shows the indicators and buttons on the front panel of a server with 25 x 2.5-inch drives.

  Figure 4-8 Indicators and buttons on the front panel of a server with 25 x 2.5-inch drives

1	UID button/indicator	2	Health indicator
3	Power button/indicator	4	Fault diagnostic LED
5	FlexIO card presence indicators (1 and 2)	-	-

- **Figure 4-9** shows the indicators and buttons on the front panel of a server with 8 x 2.5-inch SAS/SATA drives and 12 x 2.5-inch NVMe SSDs.

Figure 4-9 Indicators and buttons on the front panel of a server with 8 x 2.5-inch SAS/SATA drives and 12 x 2.5-inch NVMe SSDs

1	UID button/indicator	2	Health indicator
3	Power button/indicator	4	Fault diagnostic LED
5	FlexIO card presence indicators (1 and 2)	-	-

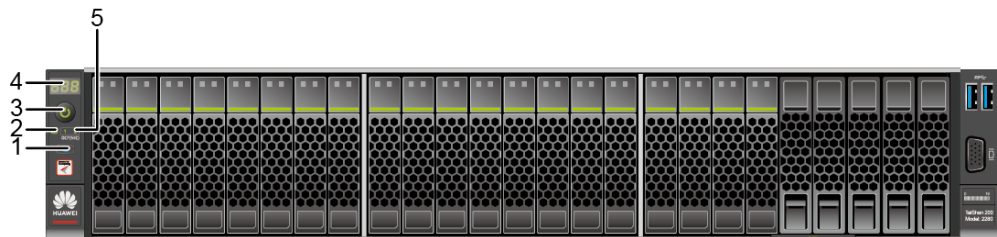- **Figure 4-10** shows the indicators and buttons on the front panel of a server with 24 x 2.5-inch SAS/SATA pass-through drives.

**Figure 4-10** Indicators and buttons on the front panel of a server 24 x 2.5 SAS/SATA pass-through drives
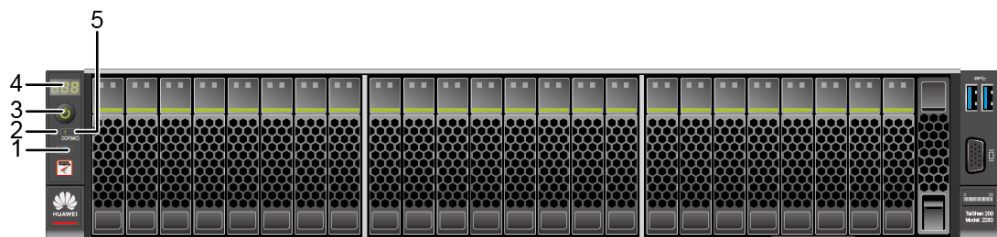
1	UID button/indicator	2	Health indicator
3	Power button/indicator	4	Fault diagnostic LED
5	FlexIO card presence indicators (1 and 2)	-	-

📖 **NOTE**

When powered by Kunpeng 920 5220 or 3210 processors, the server does not support 24 x 2.5 SAS/SATA pass-through drives.

Table 4-4 Indicators and buttons on the front panel

Silkscreen	Indicator/Button	State Description
🔲🔲🔲	Fault diagnostic LED	● ---: The server is operating normally. ● Error code: A server component is faulty. For details about error code, see the *TaiShan Rack Server iBMC Alarm Handling*.
⏻	Power button/ indicator	Power indicator ● Steady yellow: The server is in the standby state. ● Steady green: The server is properly powered on. ● Blinking yellow: The iBMC is starting. ● Off: The server is not connected to a power source. Power button ● When the server is powered on, you can press this button to shut down the OS. ● When the server is powered on, you can hold down this button for 6 seconds to force the server to power off. ● When the server is in the standby state, you can press this button to start the server.

Silkscreen	Indicator/Button	State Description
	UID button/indicator	The UID button/indicator helps identify and locate a device. UID indicator: ● Off: The device is not being located. ● Blinking blue (blinking 255 seconds): The device has been located and is differentiated from other devices that have also been located. ● Steady blue: The device is being located. UID button: ● You can turn on, turn off, or blink the UID indicator 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. ● You can press and hold down this button for about 5 seconds to reset the iBMC.
	Health 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.
	FlexIO card presence indicators (1 and 2)	● 1 and 2: respectively represent FlexIO cards 1 and 2. ● Steady green: The FlexIO card is installed and can be identified. ● Off: The FlexIO card is not installed or faulty.

Rear Panel

Figure 4-11 shows the indicators on the rear panel of the server.

Figure 4-11 Rear panel indicators
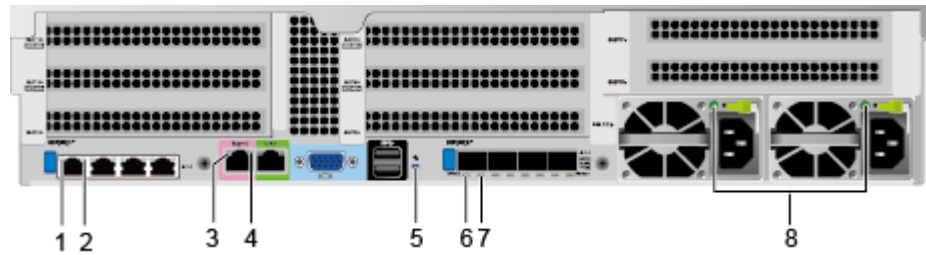
1 GE electrical port data transmission status indicator	2 GE electrical port connection status indicator
3 Management network port data transmission status indicator	4 Management network port connection status indicator
5 UID indicator	6 Optical port transmission rate indicator
7 Optical port connection status indicator/data transmission status indicator	8 PSU indicator

Table 4-5 Indicators on the rear panel

Indicator		State 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 port is properly connected. • Off: The network port is not connected.
UID indicator		The UID indicator helps identify and locate a device. • Off: The device is not being located. • Blinking blue (blinking 255 seconds): The device has been located and is differentiated from other devices that have also been located. • Steady blue: The device is being located. **NOTE** You can turn on, turn off, or blink the UID indicator by pressing the UID button or remotely running a command on the iBMC CLI.
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 port is not connected.

Indicator		State Description
	Connection status indicator/Data transmission status indicator	• Steady green: The network port is properly connected. • Blinking green: Data is being transmitted. • Off: The network port is not connected.

PSU indicator		• Steady green: The power input and output are normal.
		• Steady orange: The input is normal, but no power output is supplied 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, the server is standby.
		  – The input is overvoltage or undervoltage. For details, see *TaiShan Rack Server iBMC Alarm Handling*.
		• Blinking green at 4 Hz: under online PSU firmware upgrade.
		• Off: No power is supplied.

SAS/SATA Drive Indicators

Figure 4-12 shows the SAS/SATA drive indicators.

Figure 4-12 SAS/SATA drive indicators

— Drive fault indicator
— Drive activity indicator
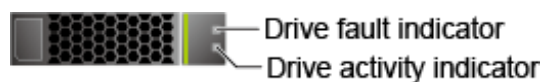
Table 4-6 Description of SAS/SATA drive indicators

Drive Activity Indicator (Green Indicator)	Drive Fault Indicator (Yellow Indicator)	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.

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

NVMe SSD Indicators

Figure 4-13 shows the NVMe SSD indicators.

Figure 4-13 NVMe SSD indicators

— Drive fault indicator
— Drive activity indicator
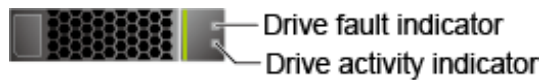
Table 4-7 NVMe SSD indicators

Drive Activity Indicator (Green Indicator)	Drive Fault Indicator (Yellow Indicator)	State Description
Off	Off	The NVMe SSD cannot be detected.
Steady green	Off	The NVMe SSD is detected and working properly.
Blinking green at 2 Hz	Off	Data is being read from or written to the NVMe SSD.
Off	Blinking yellow at 2 Hz	The NVMe SSD is being located by the OS or hot-swapped.
Off	Blinking yellow at 0.5 Hz	The NVMe SSD completes the hot removal process and is removable.
Steady green or off	Steady yellow	The NVMe SSD is faulty.

FlexIO Cards

For details about FlexIO cards supported by the server, see the **Intelligent Computing Compatibility Checker**. For details about the specifications and features of each FlexIO card, see the corresponding white paper.

The following figures show the indicators on the FlexIO cards.

Figure 4-14 TM210 four GE electrical ports
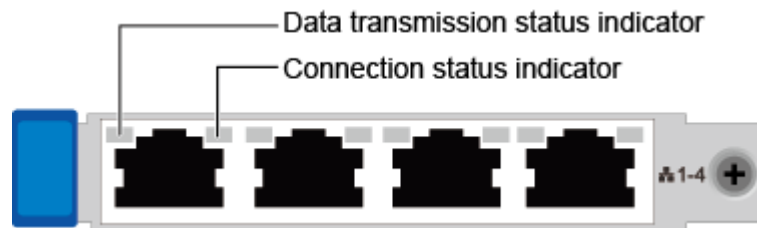
Figure 4-15 TM280 with four 25GE optical ports
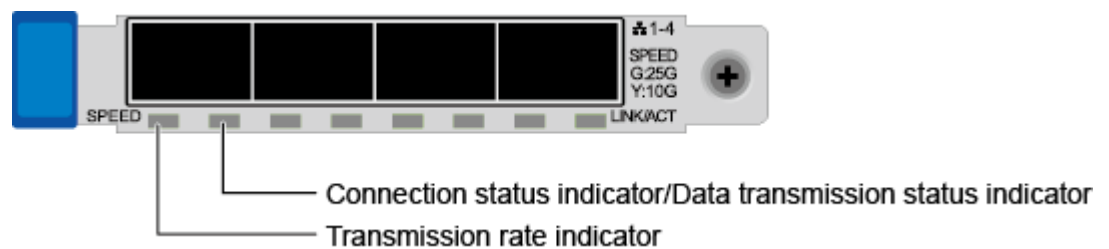
Table 4-8 FlexIO card indicators

NIC Type	Indicator	State Description
FlexIO card with four GE electrical ports	Data transmission status indicator	Blinking yellow: Data is being transmitted. Off: No data is being transmitted.
	Connection status indicator	Steady green: The network port is properly connected. Off: The network port is not connected.
FlexIO card with four 25GE optical ports	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 port is not connected.

NIC Type	Indicator	State Description
	Connection status indicator/Data transmission status indicator	Steady green: The network port is properly connected. Blinking green: Data is being transmitted. Off: The network port is not connected.

4.3 Riser Cards and PCIe Slots

Figure 4-16, **Figure 4-17**, **Figure 4-18**, **Figure 4-19**, and **Figure 4-20** show riser cards supported by I/O modules 1 and 2 in a 2280.

- The riser card shown in **Figure 4-16** can be installed in I/O module 1 or 2. If installed in I/O module 1, the riser card provides PCIe slots 1 to 3. If installed in I/O module 2, the riser card provides PCIe slots 4 to 6.

Figure 4-16 Riser card 1 (three x8 slots)
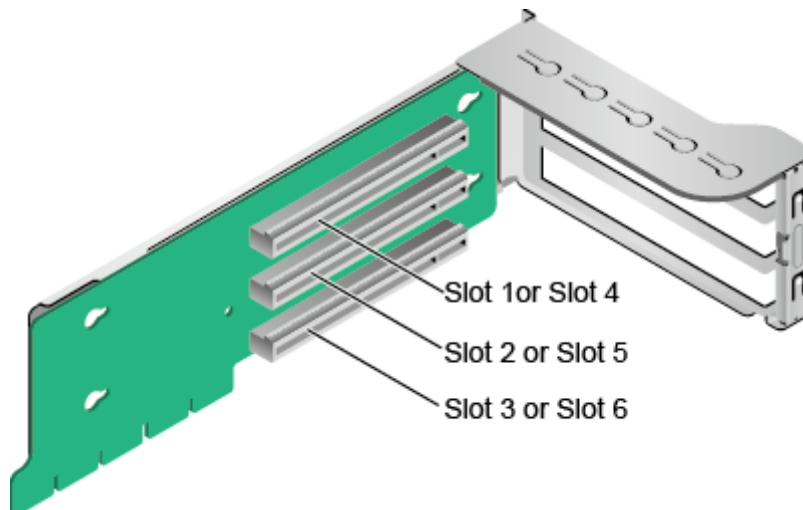
- The riser card shown in **Figure 4-17** supports full-height full-length dual-width GPUs. If installed in I/O module 1, the riser card provides PCIe slots 2 and 3. If installed in I/O module 2, the riser card provides PCIe slots 5 and 6.

☐ NOTE

- The card must be used together with the power cables delivered with the server. Do not use the power cables of other servers.
- Only slots 2 and 5 support full-height full-length dual-width GPUs.

Figure 4-17 Riser card 2 (one x8 slot and one x16 slot)
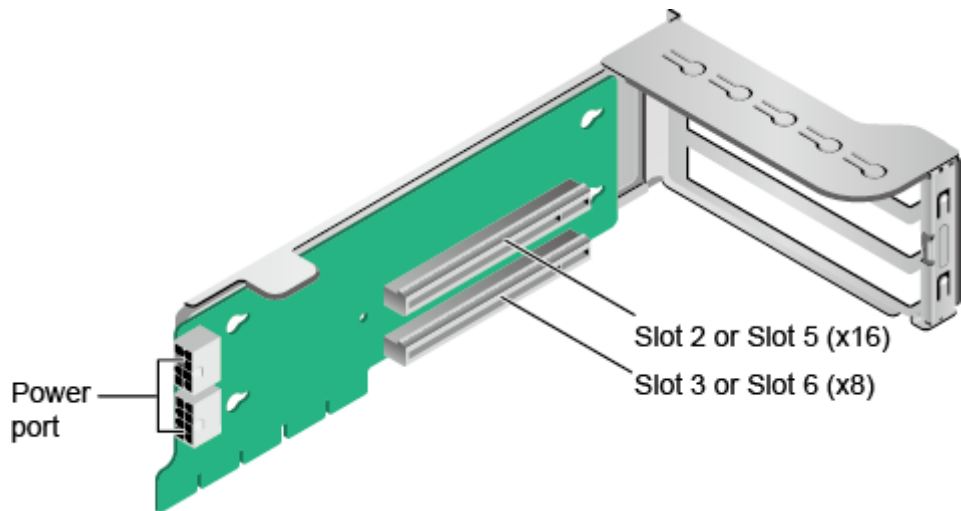
- For a server with eight 2.5-inch SAS/SATA drives and twelve 2.5-inch NVMe SSDs, I/O modules 1 and 2 must be configured with dedicated NVMe riser cards, as shown in **Figure 4-18**. PortA, PortB, and PortC are Slimline cable connectors.

Figure 4-18 Riser card 3 (dedicated for a server with 12 NVMe SSDs)
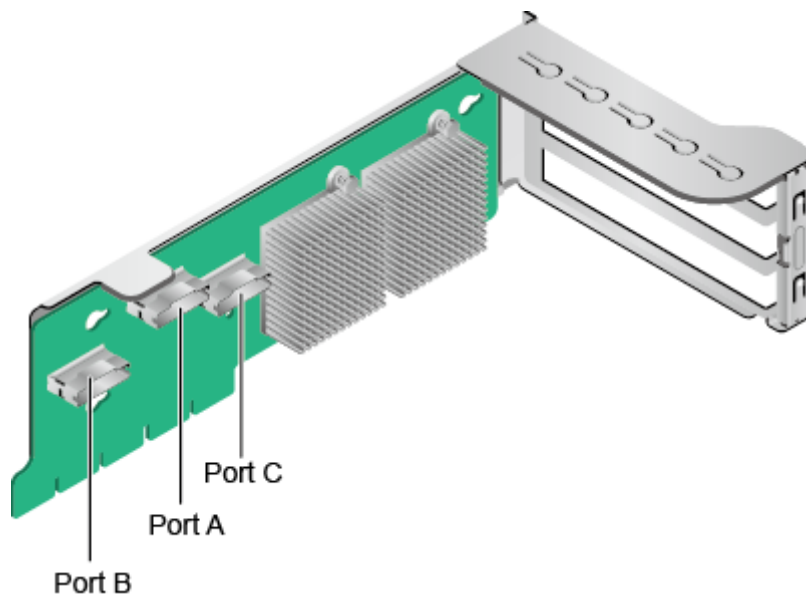
- If I/O modules 1 and 2 are configured with two 2.5-inch rear drives respectively, both I/O modules 1 and 2 support x16 riser cards, as shown in **Figure 4-19**. This riser card provides slot 3 when installed in I/O module 1, and slot 6 when installed in I/O module 2.

Figure 4-19 Riser card 4 (one x16 slot)

Slot 3 or Slot 6
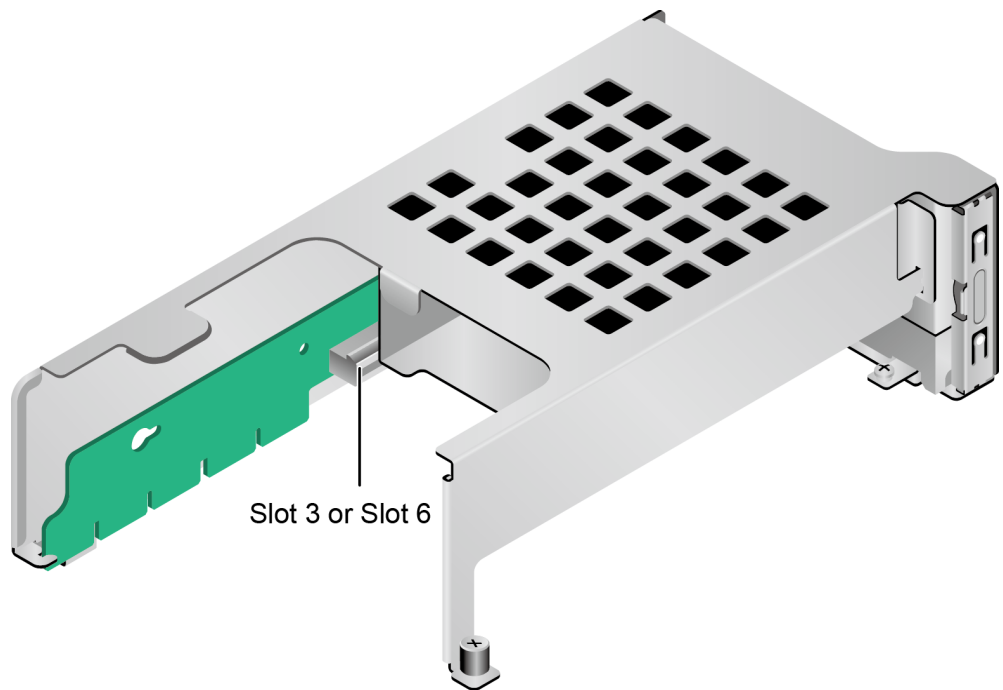
- If the server is configured with Kunpeng 920 7260, 5250, 5240, or 5230 processors, the riser card shown in **Figure 4-20** can be installed in I/O module 1 or 2. By default, the riser card is installed in I/O module 2. When installed in I/O module 1, it occupies PCIe slots 1 to 3 and only slot 3 (x8) is available. When installed in I/O module 2, it occupies PCIe slots 4 to 6 and only slot 6 (x8) is available. If the server is configured with Kunpeng 920 5220 or 3210 processors, the SAS riser card can be installed only in I/O module 2 and occupies PCIe slots 4 to 6. Slots 4 and 5 do not output signals, and slot 6 supports x8 signals.

Figure 4-20 Riser card 5 (SAS)

MiniSAS

Slot 3或Slot 6
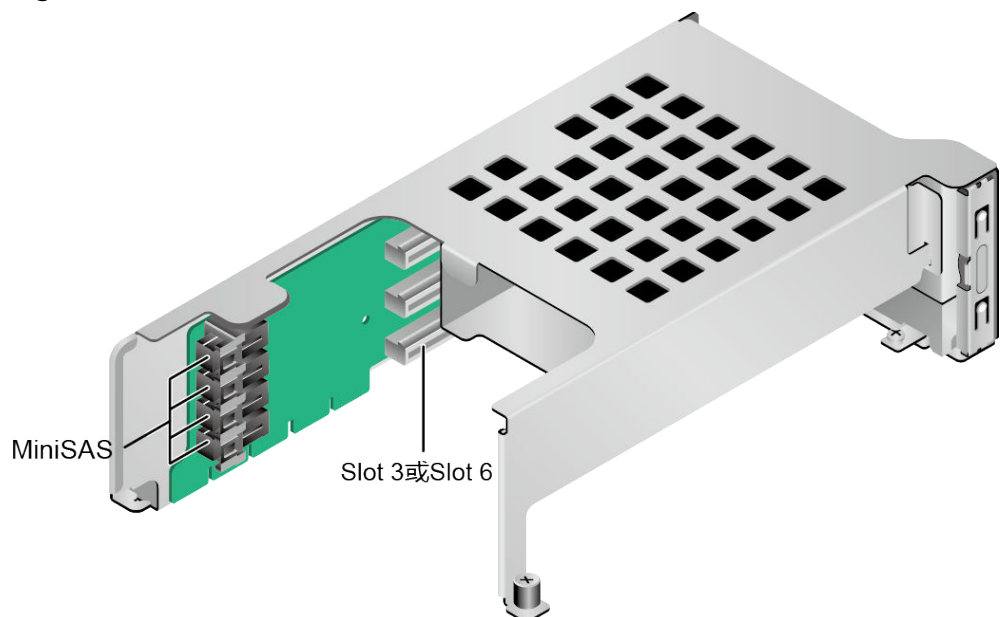
Figure 4-21 and **Figure 4-22** show riser cards supported by I/O module 3.

- If installed in I/O module 3, the riser card shown in **Figure 4-21** provides PCIe slots 7 and 8.

Figure 4-21 Riser card 6 (two x8 slots)
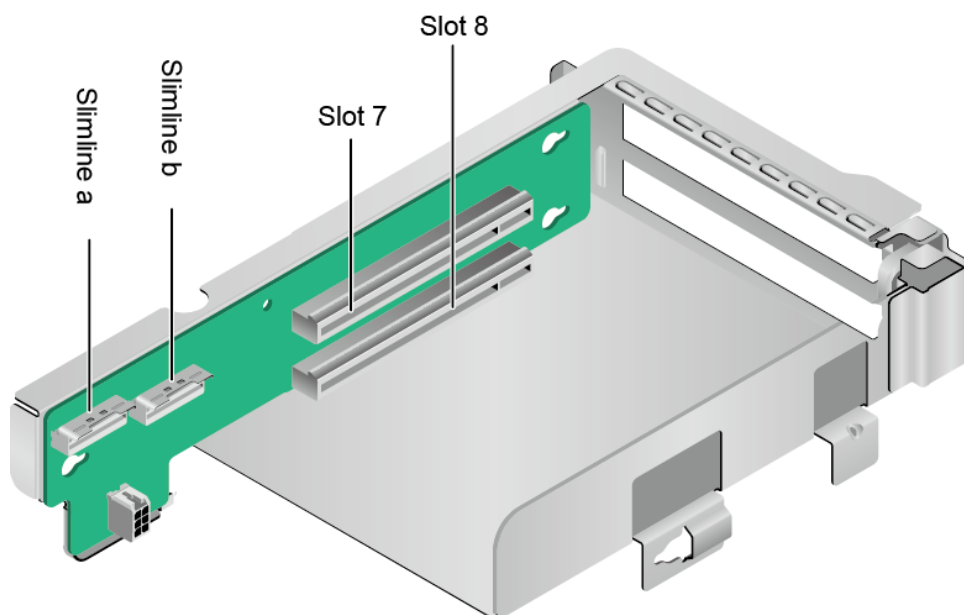
- If installed in I/O module 3, the riser card shown in **Figure 4-22** provides PCIe slot 8.

Figure 4-22 Riser card 7 (one x16 slot)
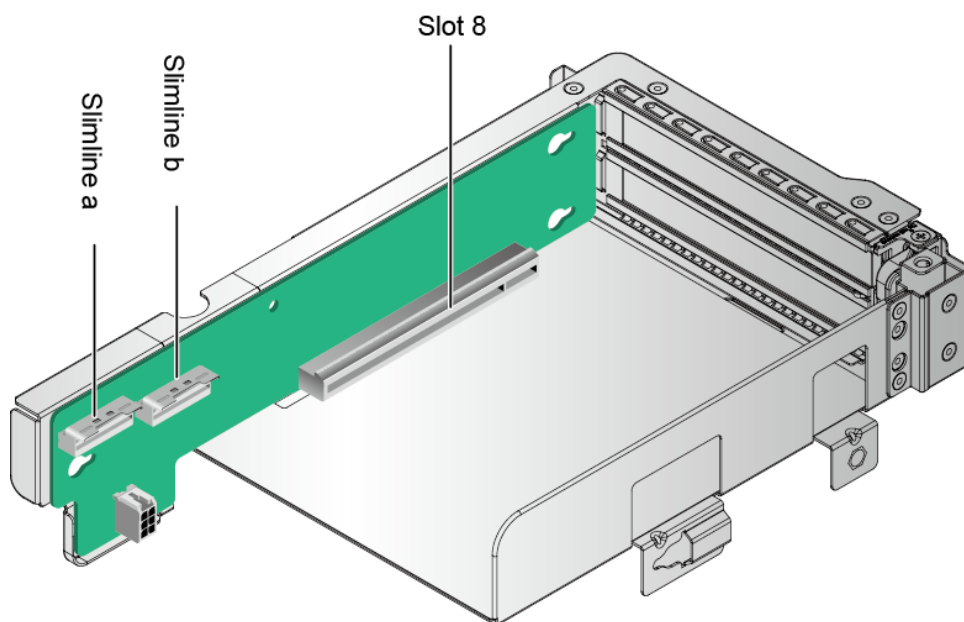
Figure 4-23 shows the rear view of the PCIe slots on the 2280 server.

Figure 4-23 PCIe slots
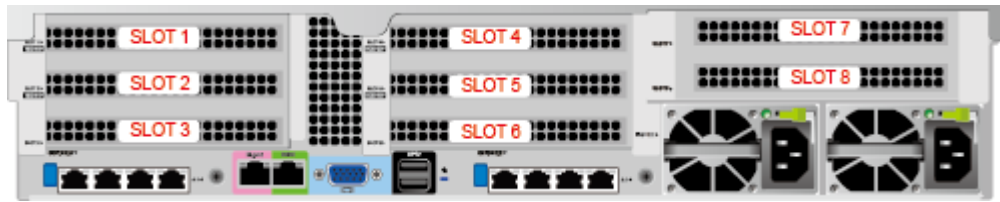
I/O module 1 provides slots 1 to 3, I/O module 2 provides slots 4 to 6, and I/O module 3 provides slots 7 and 8.

- If I/O module 1 uses a 2-slot PCIe riser module, slot 1 is unavailable.
- If I/O module 2 uses a 2-slot PCIe riser module, slot 4 is unavailable.
- If I/O module 3 uses a 1-slot PCIe riser module, slot 7 is unavailable.

Table 4-9 describes specifications of the PCIe slots.

Table 4-9 PCIe slot description

PCIe Slot	CPU	PCIe Standards	Connector Width	Bus Width	Port Number in the BIOS	Root Port (B/D/F)	Device (B/D/F)	Slot Size
Slot1	CPU1	PCIe 4.0	x16	• 3-slot PCIe riser module (PRM): x8 • 2-slot PRM: N/A	Port0	00/00/0	-	Full-height full-length
Slot2	CPU1	PCIe 4.0	x16	• 3-slot PRM: x8 • 2-slot PRM: x16	Port4	00/04/0	-	Full-height full-length
Slot3	CPU1	PCIe 4.0	x16	• Single-slot PRM: x16 • 2-slot PRM: x8 • 3-slot PRM: x8	Port12	00/0C/0	-	Full-height half-length

PCIe Slot	CPU	PCIe Standards	Connector Width	Bus Width	Port Number in the BIOS	Root Port (B/D/F)	Device (B/D/F)	Slot Size
Slot4	CPU2	PCIe 4.0	x16	• 3-slot PRM: x8 • 2-slot PRM: N/A • SAS PRM: N/A	Port0	80/00/0	-	Full-height full-length
Slot5	CPU2	PCIe 4.0	x16	• 3-slot PRM: x8 • 2-slot PRM: x16 • SAS PRM: N/A	Port4	80/04/0	-	Full-height full-length
Slot6	CPU2	PCIe 4.0	x16	• Single-slot PRM: x16 • 2-slot PRM: x8 • 3-slot PRM: x8 • SAS PRM: x8	Port16	80/10/0	-	Full-height half-length
Slot7	CPU2	PCIe 4.0	x16	• 2-slot PRM: x8 • Single-slot PRM: N/A	Port8	80/08/0	-	Full-height half-length
Slot8	CPU2	PCIe 4.0	x16	• 2-slot PRM: x8 • Single-slot PRM: x16	Port12	80/0C/0	-	Full-height half-length
RAID controller card	CPU1	PCIe 4.0	x8	x8	Port8	00/08/0	-	-

PCIe Slot	CPU	PCIe Standards	Connector Width	Bus Width	Port Number in the BIOS	Root Port (B/D/F)	Device (B/D/F)	Slot Size

NOTE

- A PCIe slot that supports a full-height full-length PCIe card is backward compatible with a full-height half-length or half-height half-length PCIe card. A PCIe slot that supports a full-height half-length PCIe card is backward compatible with a half-height half-length 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. For details about supported PCIe cards, use the **Intelligent Computing Compatibility Checker**. For PCIe cards not listed by the Intelligent Computing Compatibility Checker, contact the local Huawei sales personnel to submit a compatibility test requirement.

- When two 2.5-inch drives are installed in I/O module 1or 2, this module also supports a PCIe x16 riser card in slot 3 or 6.

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

- Root Port (B/D/F) indicates the B/D/F of a CPU internal PCIe root port. 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 B/D/F values may vary if 1) the server is not fully configured with PCIe cards; 2) the server is fully configured with PCIe cards of different models or in different slots; 3) a PCIe card with a PCI bridge is configured.

- A dedicated riser card must be used to support Atlas 300 C accelerator cards. Use the **Intelligent Computing Compatibility Checker** to obtain more specified information.

4.4 Physical Structure

The physical structure of the 2280 varies depending on the configuration of the processors and drives. The following uses the server with 12 drives as an example.

When configured with Kunpeng 920 7260, 5250, 5240, or 5230 processors, the server provides 32 memory slots. **Figure 4-24** shows the components of the server.

Figure 4-24 Components of the server powered by Kunpeng 920 7260, 5250, 5240, or 5230 processors
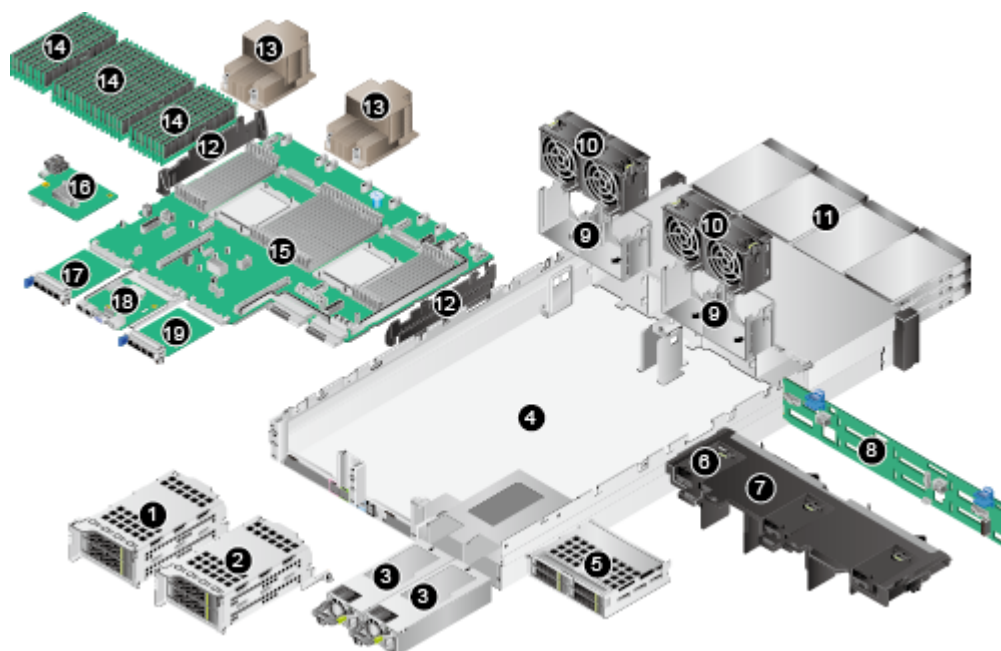
1	I/O module 1	2	I/O module 2
3	PSUs	4	Chassis
5	I/O module 3	6	Supercapacitor holder
7	Air duct	8	Front-drive backplane
9	Fan module brackets	10	Fan modules
11	Front drives	12	Cable organizers
13	Heat sinks	14	DIMMs
15	Mainboard	16	RAID controller card
17	FlexIO card 1	18	iBMC card
19	FlexIO card 2	-	-

When configured with Kunpeng 920 5220 or 3210 processors, the server provides 16 memory slots. **Figure 4-25** shows the components of the server.

Figure 4-25 Components of the server powered by Kunpeng 920 5220 or 3210 processors
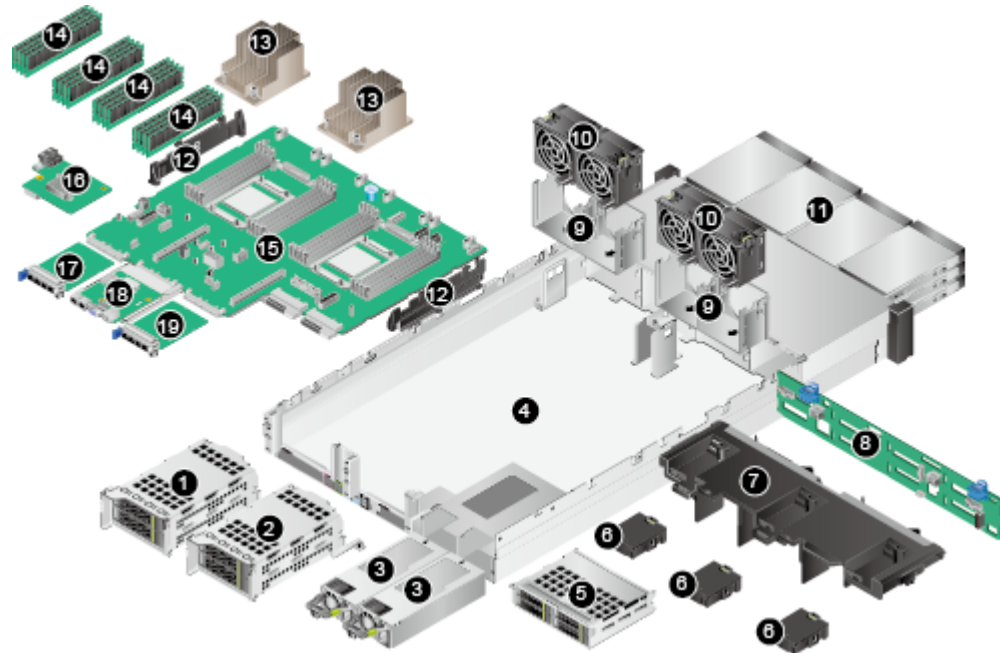
1	I/O module 1	2	I/O module 2
3	PSUs	4	Chassis
5	I/O module 3	6	Supercapacitor holders
7	Air duct	8	Front-drive backplane
9	Fan module brackets	10	Fan modules
11	Front drives	12	Cable organizers
13	Heat sinks	14	DIMMs
15	Mainboard	16	RAID controller card
17	FlexIO card 1	18	iBMC card
19	FlexIO card 2	-	-

◫ **NOTE**

- I/O modules 1, 2, and 3 can be drive modules or riser modules. The preceding figure is for reference only.
- CPUs are integrated on the mainboard and cannot be replaced independently.

5 Product Specifications

5.1 Technical Specifications

For details about the part numbers and compatibility, use the **Intelligent Computing Compatibility Checker**.

Table 5-1 Technical specifications

Item	Server Powered by Kunpeng 920 7260, 5250, 5240, or 5230 Processors	Server Powered by Kunpeng 920 5220 or 3210 Processors
Form factor	2U rack server	
Processor	• Number of processors: two 64-core, 48-core, 40-core, or 32-core processors with the frequency of 2.6 GHz • L3 cache capacity: up to 64 MB	• Number of processors: two 32-core or 24-core processors with the frequency of 2.6 GHz • L3 cache capacity: up to 32 MB

Item	Server Powered by Kunpeng 920 7260, 5250, 5240, or 5230 Processors	Server Powered by Kunpeng 920 5220 or 3210 Processors
Memory	- Maximum number of slots: 32 DDR4 slots supporting RDIMMs - Maximum memory speed: 2933 MT/s - Memory protection functions: ECC, SEC/DED, SDDC, and patrol scrubbing - Capacity of a single DIMM: 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 on one server must have the same part No.	- Maximum number of slots: 16 DDR4 slots supporting RDIMMs - Maximum memory speed: 2933 MT/s - Memory protection functions: ECC, SEC/DED, SDDC, and patrol scrubbing - Capacity of a single DIMM: 16 GB, 32 GB, 64 GB, or 128GB **NOTE** DIMMs of different specifications (such as the capacity, bit width, rank, and height) cannot be installed in one server. That is, all DIMMs on one server must have the same part No.
Storage	Drive: - Support for a variety of drive configurations. For details, see **Table 6-5**. - Hot swap of a single drive. RAID controller card: - Support for a variety of RAID controller cards. Use the **Intelligent Computing Compatibility Checker** to obtain information about the specific RAID controller cards supported. - Supercapacitor to protect cache data from power failures, and support for RAID level migration, drive roaming, self-diagnosis, and web-based configuration. For details about the RAID controller card, see the *RAID Controller Card User Guide (Kunpeng Processors)*.	
FlexIO card	A maximum of two FlexIO cards. A FlexIO card can provide either of the following network ports: - Four GE electrical ports, supporting PXE - Four 25GE/10GE optical ports, supporting PXE **NOTE** Different optical modules can be used to support 25GE or 10GE optical port rate.	

Item	Server Powered by Kunpeng 920 7260, 5250, 5240, or 5230 Processors	Server Powered by Kunpeng 920 5220 or 3210 Processors
PCIe slot	• A maximum of nine PCIe 4.0 slots: one for a RAID controller card and eight for PCIe cards. The specifications of PCIe 4.0 slots are as follows: I/O modules 1 and 2 provide the following PCIe slots: – Two standard full-height full-length PCIe 4.0 x16 slots (width: PCIe 4.0 x8) and one standard full-height half-length PCIe 4.0 x16 slot (width: PCIe 4.0 x8) – One standard full-height full-length PCIe 4.0 x16 slot and one standard full-height half-length PCIe 4.0 x16 slot (width: PCIe 4.0 x8) I/O module 3 provides the following PCIe slots: – Two standard half-height half-length PCIe 4.0 x16 slots (width: PCIe 4.0 x8) – One standard half-height half-length PCIe 4.0 x16 slot • The PCIe expansion slots fully support Huawei proprietary PCIe SSD cards, which bolster I/O performance for applications such as searching, caching, and download services. • The PCIe slots support Huawei-developed Atlas 300 AI accelerator cards to implement fast and efficient processing and inference, and image identification and processing. **NOTE** For details about the PCIe card models supported by the 2280, use the **Intelligent Computing Compatibility Checker**.	
Port	• Front panel: two USB 3.0 ports and one DB15 VGA port • Rear panel: two USB 3.0 ports, one DB15 VGA port, one RJ45 serial port, and one RJ45 management network port	
Fan module	Four hot-swappable fan modules, providing protection against single-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 Mbps RJ45 management network port.	
Security	• Administrator password • Front bezel (optional) **NOTE** The front bezel is installed on the front panel and comes with a security lock to prevent unauthorized operations on drives.	

Item	Server Powered by Kunpeng 920 7260, 5250, 5240, or 5230 Processors	Server Powered by Kunpeng 920 5220 or 3210 Processors
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 OS built-in driver is supported. ● If both the front and rear VGA ports are connected to monitors, only the monitor connected to the front VGA port is available.	

5.2 Environmental Specifications

Table 5-2 Environmental specifications

Category	Specifications
Temperature	● Operating temperature: 5°C to 40°C (41°F to 104°F) (ASHRAE Classes A2 and A3 compliant) ● Storage temperature (≤ 72 hours): –40°C to +65°C (–40°F to +149°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 configuration. For details, see **Table 5-3**.
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 change rate: 20%/h
Air volume	≥204CFM

Category	Specifications
Altitude	3050 m (10000 ft.) **NOTE** ASHRAE 2015 compliant: ● ASHRAE Class A1 and A2 compliant: For altitudes above 900 m (2952.72 ft.), the highest operating temperature decreases by 1°C (1.8°F) for every increase of 300 m (984.24 ft.) in altitude. ● ASHRAE Class A3 compliant: For altitudes above 900 m (2952.72 ft.), the highest operating temperature decreases by 1°C (1.8°F) for every increase of 175 m (574.15 ft.) in altitude. ● ASHRAE Class A4 compliant: For altitudes above 900 m (2952.72 ft.), the highest operating temperature decreases by 1°C (1.8°F) for every increase of 125 m (410.10 ft.) in altitude.
Corrosive gaseous contaminant	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).
	
	● Idle:
	  – LWAd: 5.64 Bels
	  – LpAm: 41 dBA
	
	● Operating:
	  – LWAd: 6.24 Bels
	  – LpAm: 46.6 dBA
	
	NOTE
	Actual sound levels generated during operation vary depending on server configuration, load, and ambient temperature.

Table 5-3 Operating temperature limitations

Model	Max. 30°C (86°F)	Max. 35°C (95°F) (ASHRAE Class A2 Compliant)	Max. 40°C (104°F) (ASHRAE Class A3 Compliant)
EXP model with 12 x 3.5-inch drives	Supports all configurations.	Supports all configurations.	• Does not support 64-core CPUs. • Does not support PCIe SSD cards • Does not support passive cooling GPUs (including DMINI cards). • Does not support rear drives
Pass-through model with 12 x 3.5-inch drives			
EXP model with 25 x 2.5-inch drives			
Pass-through model with 24 x 2.5-inch drives			
Server with 8 x 2.5-inch SAS/SATA drives and 12 x 2.5-inch NVMe SSDs	Supports all configurations.	Supports all configurations.	Not supported

NOTE

- If one fan fails, the highest operating temperature of the server is 5°C (9°F) lower than that in normal cases.
- When powered by Kunpeng 920 5220 or 3210 processors, the server does not support 24 x 2.5 SAS/SATA pass-through drives.

5.3 Physical Specifications

Table 5-4 Physical specifications

Item	Description
Dimensions (H x W x D)	Chassis with 3.5-inch drives: 86.1 mm (2U) x 447 mm x 790 mm (3.39 in. x 17.60 in. x 31.10 in.)
	Chassis with 2.5-inch drives: 86.1 mm (2U) x 447 mm x 790 mm (3.39 in. x 17.60 in. x 31.10 in.)

Item	Description
Installation space	Requirements for cabinet installation (cabinet compliant with the International Electrotechnical Commission (IEC) 297 standard): • Cabinet width: 482.6 mm (19 in.) • 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 a cabinet with a distance of 543.5 mm to 848.5 mm (21.40 in. to 33.41 in.) between the front and rear mounting bars.
Weight in full configuration	Net weight: • Server with 12 x 3.5-inch front drives + 4 x 3.5-inch rear drives + 4 x 2.5-inch rear drives: 32 kg (70.55 lb) • Server with 25 x 2.5-inch front drives + 2 x 3.5-inch rear drives + 4 x 2.5-inch rear drives: 25 kg (55.12 lb) • Server with 8 SAS front drives + 12 front NVMe SSDs + 4 x 2.5-inch rear drives: 24 kg (52.91 lb) • Server with 24 x 2.5-inch front drives + 4 x 2.5-inch rear drives: 24 kg (52.91 lb) Packaging materials: 5 kg (11.03 lb)
Power consumption	The power consumption parameters vary according to configurations (including the ErP standard configuration of the European Union). Use the **Intelligent Computing Product Power Calculator** to obtain the specific power consumption value.

6 Software and Hardware Compatibility

Use the **Intelligent Computing Compatibility Checker** to obtain information about the operating systems and hardware supported by the server.

> **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.

6.1 CPU

Each Kunpeng 920 processor provides the following features:

- Supports a maximum of 64 cores and 2.6 GHz frequency, allowing flexible configurations of the core quantity and frequency.
- Compatible with the ARMv8-A architecture and supports ARMv8.1 and ARMv8.2 extensions.
- Uses Huawei 64-bit TaiShan cores.
- Integrates a 64 KB L1 instruction cache, a 64 KB L1 data cache, and a 512 KB L2 cache.
- Supports an L3 cache up to 64 MB with a Kunpeng 920 7260, 5250, 5240, or 5230 processor, and an L3 cache of up to 32 MB with a Kunpeng 920 5220 or 3210 processor.
- Supports superscalar, variable-length, and out-of-order pipelines.
- Supports one-bit error checking and correction (ECC) and two-bit error reporting.

- Uses the high-speed Hydra interface with a channel rate of up to 30 Gbit/s for inter-chip communication.

- Supports up to eight DDR controllers.

- Supports up to eight physical Ethernet ports.

- Supports three 4.0 (16 Gbit/s) controllers, which are also backwards compatible.

- Uses the IMU maintenance engine to collect CPU status information.

6.2 Memory

Memory Capacity Configuration Guidelines

The 2280 supports up to 32 DIMMs. Each Kunpeng 920 7260, 5250, 5240, or 5230 processor supports eight memory channels. Each Kunpeng 920 5220 or 3210 processor supports four memory channels. Each memory channel supports a maximum of 2 DIMMs.

Table 6-1 RDIMM configuration guidelines of the server with Kunpeng 920 7260, 5250, 5240, or 5230 processors

Item		RDIMM
Number of ranks		Dual rank
Rated speed (MT/s)		2933
Rated voltage (V)		1.2
Operating voltage (V)		1.2
Maximum number of DDR4 DIMMs in a server		32
Maximum capacity per DIMM (GB)		128
Maximum total memory capacity (GB)		4096
Maximum total memory capacity at maximum operating speed (GB)		2048
Maximum operating speed (MT/s)	One DIMM per channel	2933
	Two DIMMs per channel	2666

Table 6-2 RDIMM configuration guidelines of the server with Kunpeng 920 5220 or 3210 processors

Item	RDIMM
Number of ranks	Dual rank

Item	RDIMM
Rated speed (MT/s)	2933
Rated voltage (V)	1.2
Operating voltage (V)	1.2
Maximum number of DDR4 DIMMs in a server	16
Maximum capacity per DIMM (GB)	128
Maximum total memory capacity (GB)	2048
Maximum total memory capacity at maximum operating speed (GB)	1024
Maximum operating speed (MT/s)	One DIMM per channel	2933
	Two DIMMs per channel	2666

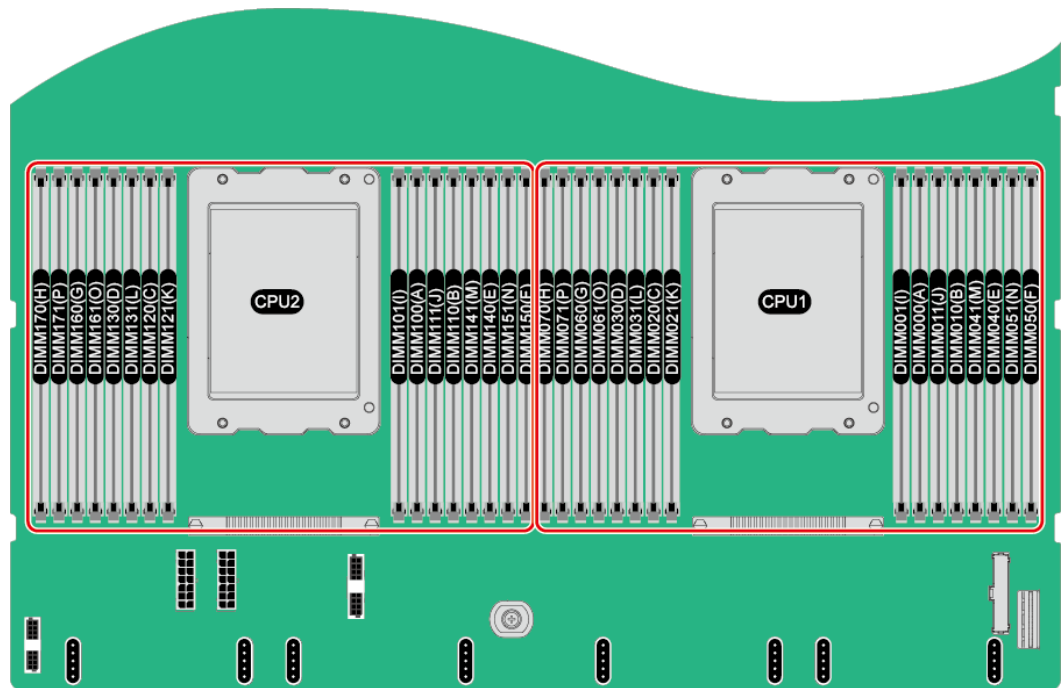## DIMM Slot Configuration Guidelines (Kunpeng 920 7260, 5250, 5240, or 5230 Processors)

- The 2280 supports a maximum of thirty-two 2933 MHz DDR4 ECC DIMMs. Each processor integrates eight memory channels. RDIMMs are supported.

- The 2280 supports DIMMs of 16 GB, 32 GB, 64 GB, and 128 GB. When the 2280 is fully configured with DIMMs, the maximum memory capacity is 4096 GB.

- Each processor provides 16 DDR4 DIMM slots and integrates eight memory channels. **Table 6-3** shows the memory channels.

- **Figure 6-1** shows the DIMM installation positions.

- DIMMs of different specifications (such as the capacity, bit width, rank, and height) cannot be installed in one server. That is, a server must use DIMMs of the same part No.

- DIMMs in same memory channel (for example, 000 and 001) must be provided by the same vendor and have the same specifications. DIMMs of different specifications cannot be installed in the same memory channel.

- The server does not support mixed use of RDIMMs and LRDIMMs.

Table 6-3 Memory channels (server powered by Kunpeng 920 7260, 5250, 5240, or 5230 processors)

CPU	Channel	DIMM
CPU1	TB_A	DIMM060(G)
		DIMM061(O)
	TB_B	DIMM020(C)

CPU	Channel	DIMM
		DIMM021(K)
	TB_C	DIMM040(E)
		DIMM041(M)
	TB_D	DIMM000(A)
		DIMM001(I)
	TA_A	DIMM030(D)
		DIMM031(L)
	TA_B	DIMM070(H)
		DIMM071(P)
	TA_C	DIMM010(B)
		DIMM011(J)
	TA_D	DIMM050(F)
		DIMM051(N)
CPU2	TB_A	DIMM160(G)
		DIMM161(O)
	TB_B	DIMM120(C)
		DIMM121(K)
	TB_C	DIMM140(E)
		DIMM141(M)
	TB_D	DIMM100(A)
		DIMM101(I)
	TA_A	DIMM130(D)
		DIMM131(L)
	TA_B	DIMM170(H)
		DIMM171(P)
	TA_C	DIMM110(B)
		DIMM111(J)
	TA_D	DIMM150(F)
		DIMM151(N)

Figure 6-1 DIMM installation (server powered by Kunpeng 920 7260, 5250, 5240, or 5230 processors)

## DIMM Slot Configuration Guidelines (Kunpeng 920 5220 or 3210 Processors)

- The server supports a maximum of sixteen 2933 MHz DDR4 ECC DIMMs. Each processor integrates four memory channels. RDIMMs are supported.

- The server supports DIMMs of 16 GB, 32 GB, or 64 GB. When the server is fully configured with DIMMs, the maximum memory capacity is 1024 GB.

- Each processor provides 8 DDR4 DIMM slots and integrates four memory channels. **Table 6-4** shows the memory channels.

- **Figure 6-2** shows the DIMM installation positions.

- DIMMs of different specifications (such as the capacity, bit width, rank, and height) cannot be installed in one server. That is, a server must use DIMMs of the same part No.

- DIMMs in same memory channel (for example, 000 and 001) must be provided by the same vendor and have the same specifications. DIMMs of different specifications cannot be installed in the same memory channel.

- The server does not support mixed use of RDIMMs and LRDIMMs.

Table 6-4 Memory channels (server powered by Kunpeng 920 5220 or 3210 processors)

CPU	Channel	DIMM
CPU1	TB_A	DIMM030(D)
		DIMM031(H)
	TB_B	DIMM020(C)

CPU	Channel	DIMM
		DIMM021(G)
	TB_C	DIMM011(F)
		DIMM010(B)
	TB_D	DIMM001(E)
		DIMM000(A)
CPU2	TB_A	DIMM130(D)
		DIMM131(H)
	TB_B	DIMM120(C)
		DIMM121(G)
	TB_C	DIMM111(F)
		DIMM110(B)
	TB_D	DIMM101(E)
		DIMM100(A)

Figure 6-2 DIMM installation (server powered by Kunpeng 920 5220 or 3210 processors)
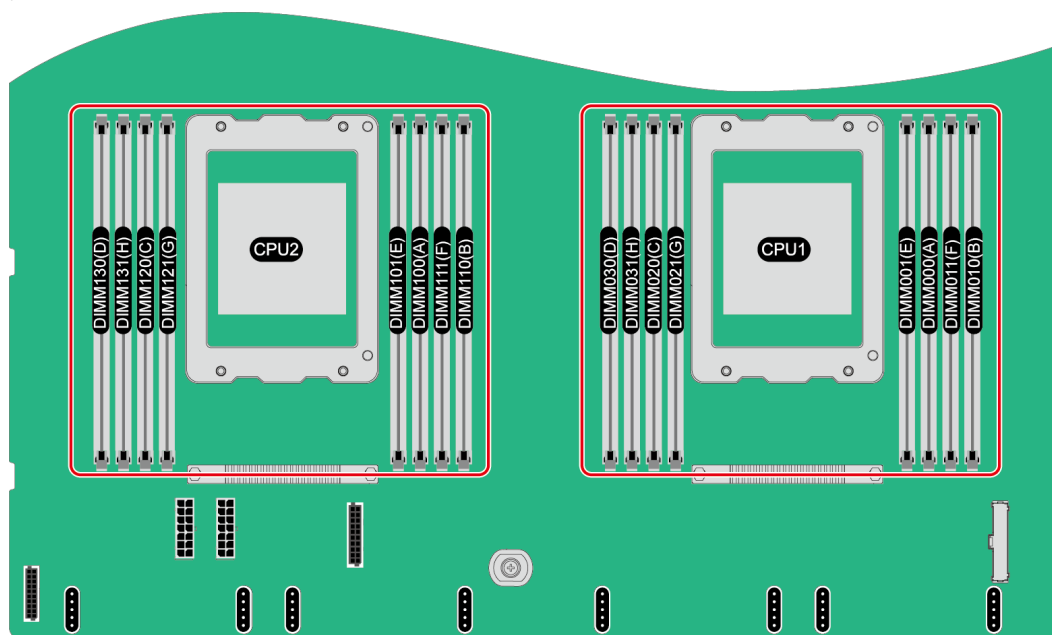
DIMM Installation Guidelines

> **NOTICE**
>
> At least one DIMM must be configured in slots supported by CPU 1.

Optimal memory performance can be achieved if the processors in a server are configured with the same number of DIMMs and the DIMMs are evenly distributed among the memory channels. Unbalanced configuration reduces memory performance and is not recommended.

In unbalanced DIMM configuration, DIMMs are not evenly configured for memory channels or processors.

- If a processor is configured with 3, 5, 7, 9, 10, 11, 12, 13, 14 or 15 DIMMs, the DIMMs are not evenly configured for memory channels.
- If the processors in a server are configured with different number of DIMMs, the DIMMs are not evenly configured for processors.

Memory configuration must comply with the DIMM installation rules. For details, see the **Huawei Server Product Memory Configuration Assistant**. Install dummy DIMMs in vacant DIMM slots of the server with Kunpeng 920 7260, 5250, 5240, or 5230 processors.

Memory Protection

The server supports the following memory protection technologies:

- ECC
- SEC/DED
- SDDC
- Patrol scrubbing

Supported DIMMs

> **NOTE**
>
> - For details about component options, consult your local Huawei sales representative.
> - DIMMs on one server must be of the same model, type (RDIMM or LRDIMM), and specifications (capacity, bit width, number of ranks, and height).

6.3 Storage

The 2280 supports SAS/SATA SSDs and HDDs, and NVMe SSD.

Table 6-5 Drive configurations

Configuration	Maximum Front Drives	Maximum Rear Drives	Maximum Extended PCIe Drives	Drive Management Mode
Server with 25 x 2.5-inch drives in Expander mode[1]	25 (SAS/SATA drives)	1. I/O module 1: 2 (SAS/SATA drives) 2. I/O module 3[2]: 4 (NVMe SSDs)	1. I/O module 1: 3 (PCIe SSD drives) 2. I/O module 2: 3 (PCIe SSD drives)	One RAID controller card
Server with 12 x 3.5-inch drives in Expander mode	12 (SAS/SATA drives)	1. I/O module 1: 2 (SAS/SATA drives) 2. I/O module 2: 2 (SAS/SATA drives) 3. I/O module 3[2]: 4 (NVMe SSDs)	1. I/O module 1: 3 (PCIe SSD drives) 2. I/O module 2: 3 (PCIe SSD drives)	One RAID controller card
Server with 12 x 3.5-inch drives in pass-through mode [3]	12 (SAS/SATA drives)	1. I/O module 2: 2 (SAS/SATA drives) 2. I/O module 3[2]: 4 (NVMe SSDs)	1. I/O module 1: 3 (PCIe SSD drives) 2. I/O module 2: 3 (PCIe SSD drives)	CPU over SAS

Configuration	Maximum Front Drives	Maximum Rear Drives	Maximum Extended PCIe Drives	Drive Management Mode
Server with 8 x 2.5-inch SAS/SATA drives and 12 x 2.5-inch NVMe SSDs[1]	20 1. Slots 0 to 7 support only SAS/SATA drives. 2. Slots 8 to 19 support only NVMe SSDs.[4]	I/O module 3[2]: 4 (NVMe SSDs)	-	One RAID controller card
Server with 24 x 2.5-inch drives in pass-through mode[5]	24 (SAS/SATA drives)	1. I/O module 3[2]: 4 (NVMe SSDs)	1. I/O module 1: 3 (PCIe SSD drives) 2. I/O module 2: 3 (PCIe SSD drives)	CPU over SAS

- [1]: The front drives in a server with 25 x 2.5-inch drives in Expander mode or a server with 8 x 2.5-inch SAS/SATA + 12 x 2.5-inch NVMe SSDs can only be 2.5-inch drives, and the front drives in a server with 12 x 3.5-inch drives in Expander mode or a server with 12 x 3.5-inch drives in pass-through mode can only be 3.5-inch drives.
- [2]: I/O module 3 supports 2.5-inch NVMe drives through the PCIe signals directly from CPU 2. I/O modules 1 and 2 support 2.5-inch and 3.5-inch drives.
- [3]: CPU SAS pass-through requires a SAS riser card. By default, it is installed on I/O module 2.
- [4]: The NVMe drives in slots 8 to 19 of the server configured with 8 x 2.5 SAS/SATA + 12 x 2.5 NVMe drives support only PCIe 3.0.
- [5]: When powered by Kunpeng 920 5220 or 3210 processors, the server does not support 24 x 2.5 SAS/SATA pass-through drives.

Table 6-6 provides the comparison between RAID levels in performance, minimum number of drives, and drive usage.

Table 6-6 RAID level comparison

RAID Level	Reliability	Read Performance	Write Performance	Drive Usage
RAID 0	Low	High	High	100%
RAID 1	High	High	Medium	50%
RAID 5	Better than medium	High	Medium	(N - 1)/N
RAID 6	Better than medium	High	Medium	(N - 2)/N
RAID 10	High	High	Medium	50%
RAID 50	High	High	Better than medium	(N - M)/N
RAID 60	High	High	Better than medium	(N-M*2)/N
Note: N indicates the number of member drives in a RAID array, and M indicates the number of spans in a RAID array.				

The following figures show the drive slot numbers for these configurations.

- **Figure 6-3** shows the configuration of a server with 12 x 3.5-inch drives in Expander mode.

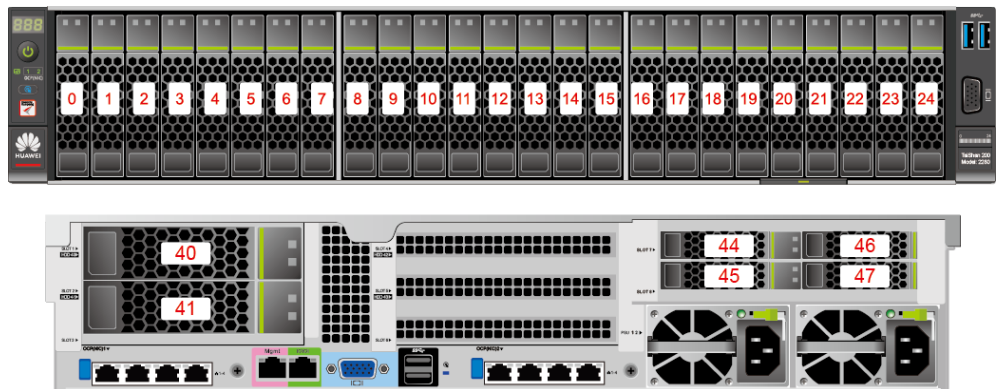**Figure 6-3** Server with 12 x 3.5-inch drives in Expander mode
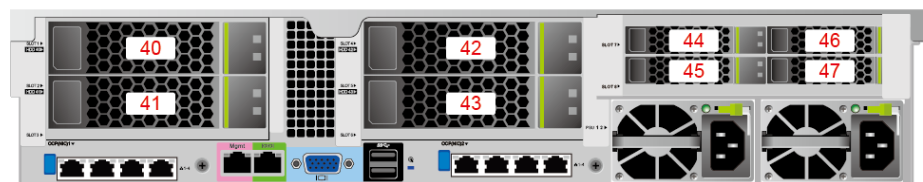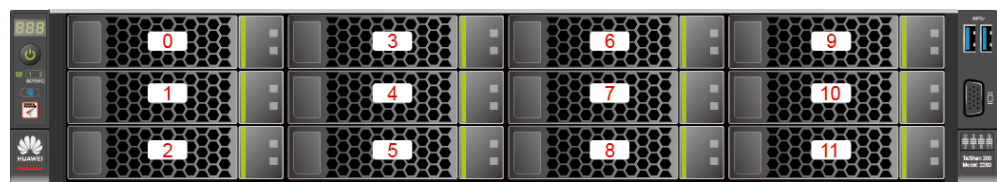
- **Figure 6-4** shows the configuration of a server with 12 x 3.5-inch drives in pass-through mode.

Figure 6-4 Server with 12 x 3.5-inch drives in pass-through mode
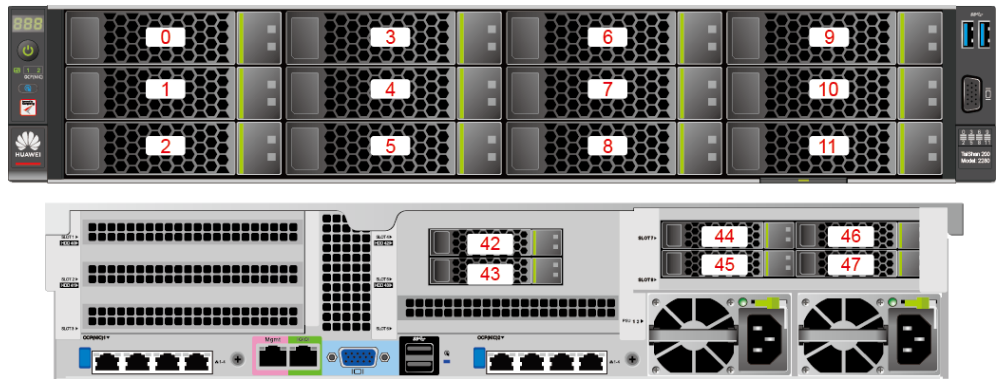
- **Figure 6-5** shows the configuration of a server with 25 x 2.5-inch drives in Expander mode.

Figure 6-5 Server with 25 x 2.5-inch drives in Expander mode

- **Figure 6-6** shows the configuration of a server with 8 x 2.5-inch SAS/SATA drives and 12 x 2.5-inch NVMe SSDs.

Figure 6-6 Server with 8 x 2.5-inch SAS/SATA drives and 12 x 2.5-inch NVMe SSDs
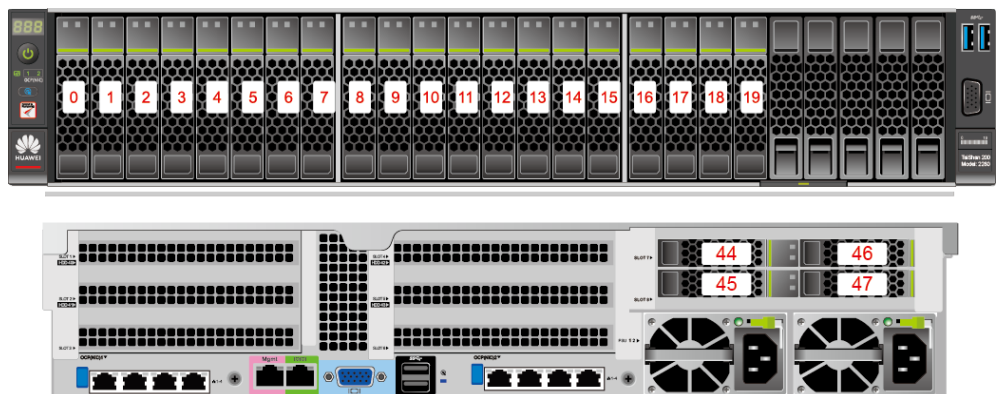
- **Figure 6-7** shows the configuration of a server with 24 x 2.5-inch SAS/SATA pass-through drives.

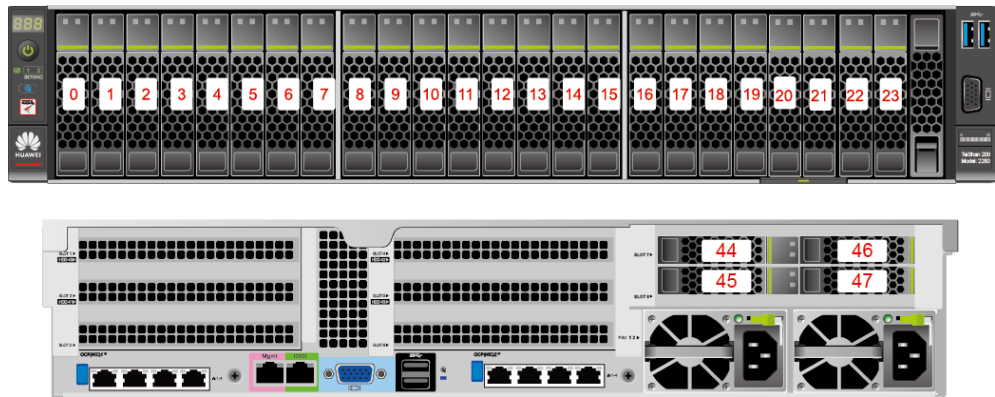**Figure 6-7** Server with 24 x 2.5-inch SAS/SATA pass-through drives

6.4 I/O Expansion

The 2280 supports a wide variety of PCIe cards. You can select the following PCIe cards based on the card type and rate:

- Ethernet card
- Fiber Channel (FC) host bus adapter (HBA)
- InfiniBand (IB) expansion card
- SSD card

☐ NOTE

For details about component options, consult your local Huawei sales representative.

6.5 PSU

Table 6-7 lists the PSUs supported by the 2280.

☐ NOTE

- **Table 6-7** is for reference only. For details about the PSUs available, contact local Huawei sales representatives.
- The recommended current specifications for the external power circuit breaker connected to the server are as follows:
  - AC power supply: 32 A
  - DC power supply: 63 A
- The PSUs are hot-swappable and work in 1+1 redundancy mode.
- 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.
- If the input voltage ranges from 200 V to 220 V AC, the output power of the 2000 W AC platinum PSU decreases to 1800 W.

Table 6-7 Supported PSUs

PSU Model	Rated Power	Rated Input voltage
900 W AC Platinum PSU	900W	AC voltage: 100 V to 240 V HVDC voltage: 180 V to 300 V
2000 W AC Platinum PSU	2000 W ● 1800 W (input voltage: 200 V AC to 220 V AC) ● 2000 W (input voltage: 220 V AC to 240 V AC) ● 1800 W (input voltage: 180 V DC to 200 V DC) ● 2000 W (input voltage: 200 V DC to 300 V DC)	AC voltage: 200 V to 240 V HVDC voltage: 180 V to 300 V
1200 W (–48 V) DC PSU	1200 W	DC voltage: –48 V DC to –60 V DC
1500 W HVDC PSU	1500 W	HVDC: 260 V to 400 V

7 System Management

The 2280 uses Huawei's proprietary intelligent baseboard management controller (iBMC) for remote server management. The iBMC complies with IPMI V2.0 standards and provides reliable hardware monitoring and management.

The iBMC supports the following features and protocols:

- KVM and text console redirection
- Remote virtual media
- IPMI
- Simple Network Management Protocol (SNMP)
- Login using a web browser

Table 7-1 describes the iBMC specifications.

Table 7-1 iBMC specifications

Item	Specifications
Management interface	Integrates with any standard management system through the following interfaces: - IPMIV2.0 - CLI - HTTPS - SNMPv3
Fault detection	Detects faults and accurately locates faults in hardware, for example, a field replaceable unit (FRU).
Alarm management	Supports alarm management and reports alarms using the SNMP trap, Simple Mail Transfer Protocol (SMTP), and syslog service to ensure 24/7 continuous operation.
Integrated virtual KVM	Provides remote maintenance measures for troubleshooting the system, and supports a maximum resolution of 1920 x 1200.

Item	Specifications
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), which simplifies users' configuration and query operations.
Screen snapshots and videos	Allows you to view screen snapshots and videos without login, which facilitates preventive maintenance inspection.
Domain name service (DNS) and directory service	Supports the DNS and directory service, significantly simplifying network and configuration management.
Dual-image backup	Starts software from a backup image if the software fails.
Asset management	Provides intelligent asset management.
IPv6	Supports IPv6 to ensure sufficient IP addresses.

8 Maintenance and Warranty

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

9 Certifications

No.	Country/Region	Certification	Standard
1	China	CCC	GB4943.1-2011 GB9254-2008 (Class A) GB17625.1-2012
2	China	CQC	CQC3135-2011
3	China	Air Transport of Goods	IATA DGR 60th, 2019

No.	Country/Region	Certification	Standard
4	Europe	CE	Safety: IEC 60950-1:2005(2nd Edition)+A1:2009 and/or EN 60950-1:2006+A11:2009+A1:2010+A12:2011 EMC: EN 55022:2010 CISPR 22:2008 EN 55024:2010 CISPR 24:2010 ETSI EN 300 386 V1.6.1:2012 ETSI ES 201 468 V1.3.1:2005 IEC 61000-3-2:2005+A1:2008+A2:2009/EN 61000-3-2:2006+A1:2009+A2:2009 IEC 61000-3-3:2008/EN 61000-3-3:2008 IEC 61000-6-2:2005/EN 61000-6-2:2005 IEC 61000-6-4:2006+A1:2010/EN 61000-6-4:2007+A1:2011 RoHS: 2002/95/EC, 2011/65/EU, EN 50581: 2012 REACH: EC NO. 1907/2006 WEEE: 2002/96/EC, 2012/19/EU
5	America	FCC	FCC CFR47 Part 15:2005 Class A
6	America	NRTL	UL 60950-1:2007 Ed.2+R:14Oct2014 CSA C22.2#60950-1:2007 Ed.2 +A1;A2
7	Canada	IC	ICES-003:2004 Class A
8	Australia	RCM	EN 55032:2012/AC:2013 EN 55032:2015/AC:2016
9	Japan	VCCI	VCCI V-3:2012
10	India	BIS	2010/ IEC 60950-1:2005
11	-	EAC	Refer to the product certification certificate.
12	-	Commodity inspection	Refer to the product certification certificate.
13	-	CB	IEC 60950-1:2005 + A1:2009 + A2:2013