

TaiShan 200 Server

# White Paper (Model 2180)

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# 1 Overview

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The TaiShan 200 server powered by Huawei Kunpeng 920 processors is dedicated for data centers. Its 2180 balanced model (2180 for short) is a 2U single-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 the 2180.

**Figure 1-1** Appearance



# 2 Features

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## Performance and Scalability

The 2180 provides the following features to enhance performance and scalability:

- Uses one HiSilicon server-oriented 64-bit high-performance multicore Kunpeng 920 CPU, which integrates DDR4, PCIe 4.0, 25GE, 10GE, and GE ports and provide the system-on-chip (SOC) function.
- A maximum of one CPU and 64 cores, which maximizes the concurrent execution of multithreaded applications.
- A maximum of sixteen DDR4 ECC RDIMMs. The server provides a maximum of 2048 GB memory capacity.

### NOTE

The memory speed of 1DPC is 2933 MHz, and the memory speed of 2DPC memory is 2666 MHz.

- Flexible drive configurations cater to a variety of business requirements and ensure high elasticity and scalability of storage resources.
- FlexIOs provide multiple Ethernet ports.
- A maximum of three PCIe 4.0 x8 slots.

## Availability and Serviceability

The 2180 provides the following features to improve availability and serviceability:

- The 2180 uses carrier-class components and follows the engineering process to dramatically improve system reliability.
- The 2180 is equipped with SAS/SATA 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 2180 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

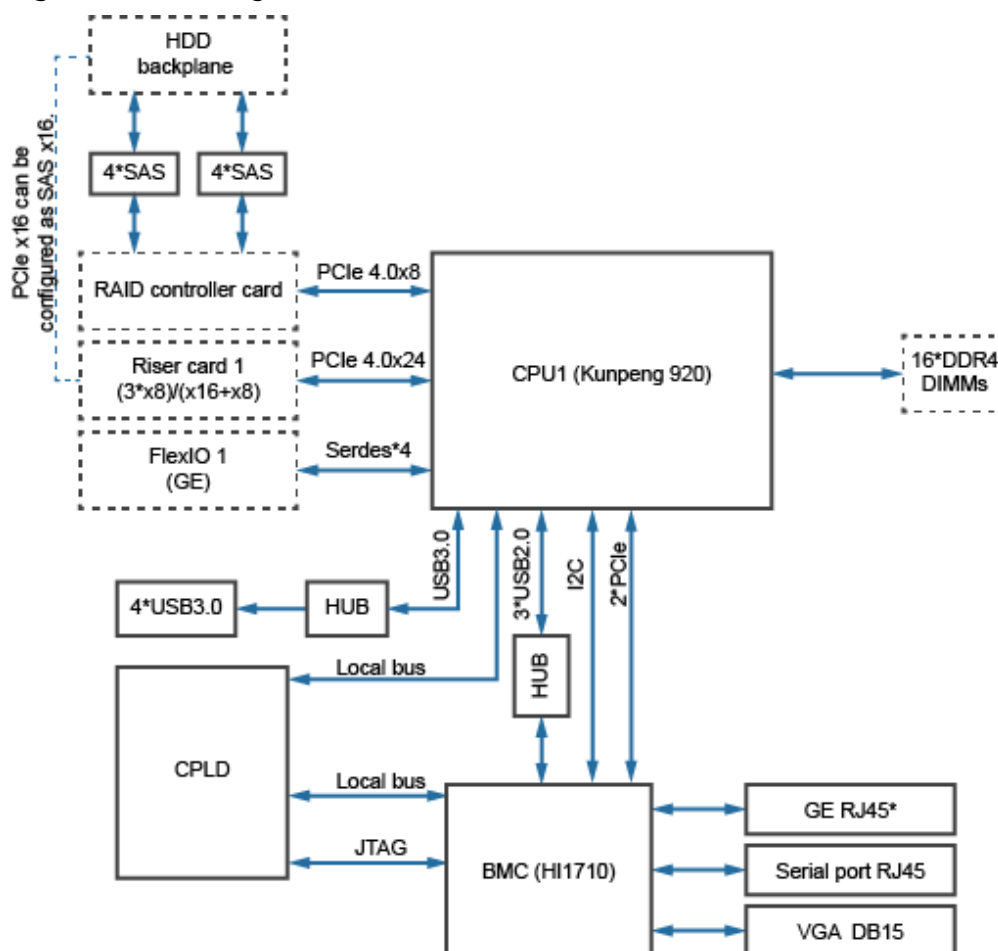
The 2180 provides the following features to improve energy efficiency:

- The 2180 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 2180 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 2180 supports SSDs. SSDs consume 80% less power than HDDs.

# 3 Logical Structure

Figure 3-1 shows the logical structure of the 2180.

Figure 3-1 2180 logical structure



- The 2180 uses one Huawei-developed Kunpeng 920 processor, each supporting 16 DDR4 DIMMs.
- The Ethernet FlexIO can only be cards with four GE ports, and are connected to CPU through high-speed SerDes interfaces.

- The screw-in RAID controller card connects to the CPU through PCIe buses, and to the drive backplanes through SAS signal cables.
- The iBMC is based on the Huawei Hi1710 management chip and provides a VGA port, management network port, and debugging serial port.



# 4 Hardware Description

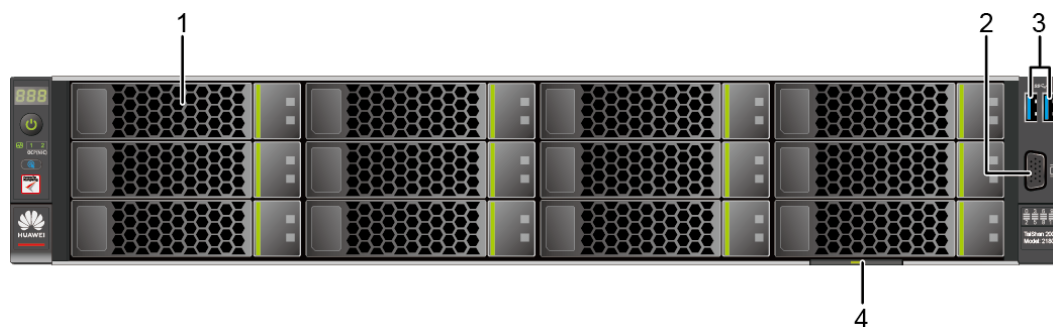
- 4.1 Appearance
- 4.2 Indicators and Buttons
- 4.3 Riser Cards and PCIe Slots
- 4.4 Physical Structure

## 4.1 Appearance

### Front Panel

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

**Figure 4-1** Components on the 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 |

**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 the server. <b>NOTE</b> 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. <b>NOTE</b> 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 4-2** shows the SN format.

**Figure 4-2** SN example



**Table 4-2** SN description

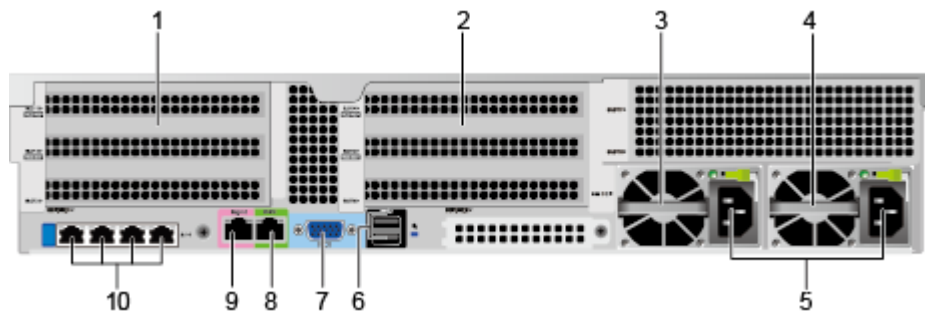
No.	Description
1	SN ID (two characters), which is <b>21</b> .
2	Material identification code (eight characters), that is, processing code.
3	Code of a processing factory (two characters). The value <b>10</b> indicates Huawei.

No.	Description
4	<p>Year and month (two characters).</p> <ul style="list-style-type: none"> <li>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.</li> </ul> <p><b>NOTE</b> 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.</p> <ul style="list-style-type: none"> <li>The second character indicates the month. Digits 1 to 9 indicate January to September, and letters A to C indicate October to December.</li> </ul>
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 4-3 shows the components on the rear panel of the server.

Figure 4-3 Rear panel components



1	I/O module 1	2	I/O module 2
3	Power supply unit (PSU) 1	4	PSU 2
5	PSU socket	6	USB 3.0 port
7	VGA port	8	Serial port
9	Management network port	10	FlexIO

 **NOTE**

- I/O module 1 can be configured with a rear drive module with two 2.5-inch drives or a PCIe riser module (PRM). I/O module 2 can be configured with a rear drive module with two 2.5- or 3.5-inch drives. I/O module 3 cannot be used. The preceding figure is for reference only.
- FlexIO can be a TM210 NIC.
- FlexIO is not hot-swappable. If you need to replace it, power off the server.

**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 the server. <b>NOTE</b> 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	This 1000 Mbps Ethernet port is used for server management, and supports 10/100/1000 Mbps auto-negotiation.
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	One FlexIO provides four GE electrical ports.
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 the server. You are advised to configure two PSUs to ensure reliable device operating. When one PSU is used, <b>Predicted PSU Status</b> cannot be set to <b>Active/Standby</b> on the iBMC WebUI.

## 4.2 Indicators and Buttons

### Front Panel

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



**Figure 4-4** 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 presence indicators (1 and 2)	-	-

**Table 4-4** Indicators and buttons on the front panel

Silkscreen	Indicator/Button	State Description
---	Fault diagnostic LED	<ul style="list-style-type: none"> <li>---: The server is operating normally.</li> <li>Error code: A server component is faulty.</li> </ul> <p>For details about error code, see the <a href="#">TaiShan Rack Server iBMC Alarm Handling</a>.</p>

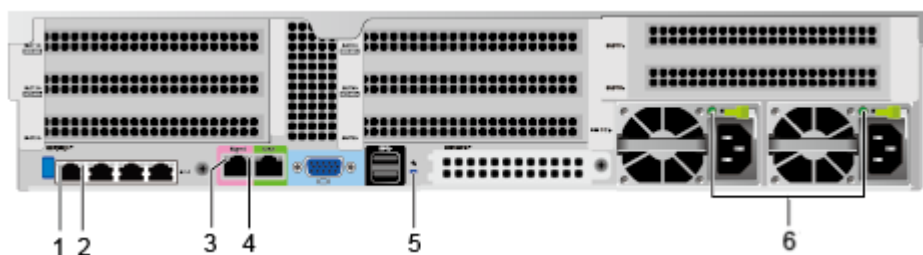
Silkscreen	Indicator/Button	State Description
	Power button/ indicator	<p>Power indicator</p> <ul style="list-style-type: none"> <li>Steady yellow: The server is in the standby state.</li> <li>Steady green: The server is properly powered on.</li> <li>Blinking yellow: The iBMC is starting.</li> <li>Off: The server is not connected to a power source.</li> </ul> <p>Power button</p> <ul style="list-style-type: none"> <li>When the server is powered on, you can press this button to shut down the OS.</li> <li>When the server is powered on, you can hold down this button for 6 seconds to force the server to power off.</li> <li>When the server is in the standby state, you can press this button to start the server.</li> </ul>
	UID button/ indicator	<p>The UID button/indicator helps identify and locate a device.</p> <p>UID indicator:</p> <ul style="list-style-type: none"> <li>Off: The device is not being located.</li> <li>Blinking blue (blinking 255 seconds): The device has been located and is differentiated from other devices that have also been located.</li> <li>Steady blue: The device is being located.</li> </ul> <p>UID button:</p> <ul style="list-style-type: none"> <li>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.</li> <li>You can press this button to turn on or off the UID indicator.</li> <li>You can press and hold down this button for about 5 seconds to reset the iBMC.</li> </ul>

Silkscreen	Indicator/Button	State Description
	Health indicator	<ul style="list-style-type: none"> <li>Steady green: The server is operating properly.</li> <li>Blinking red at 1 Hz: A major alarm has been generated on the server.</li> <li>Blinking red at 5 Hz: A critical alarm has been generated on the server.</li> </ul>
	FlexIO presence indicators (1 and 2)	<ul style="list-style-type: none"> <li>1 and 2: The numbers 1 represents FlexIO 1. The numbers 2 is unavailable.</li> <li>Steady green: The FlexIO card is installed and can be identified.</li> <li>Off: The FlexIO card is not installed or faulty.</li> </ul>

## Rear Panel

Figure 4-5 shows the indicators on the rear panel of the server.

Figure 4-5 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 PSU indicator                                       |

Table 4-5 Indicators on the rear panel

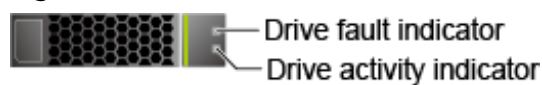
Indicator		State Description
GE electrical port/ Management	Data transmission status indicator	<ul style="list-style-type: none"> <li>Blinking yellow: Data is being transmitted.</li> <li>Off: No data is being transmitted.</li> </ul>

Indicator		State Description
network port	Connection status indicator	<ul style="list-style-type: none"> <li>Steady green: The network port is properly connected.</li> <li>Off: The network port is not connected.</li> </ul>
UID indicator		<p>The UID indicator helps identify and locate a device.</p> <ul style="list-style-type: none"> <li>Off: The device is not being located.</li> <li>Blinking blue (blinking 255 seconds): The device has been located and is differentiated from other devices that have also been located.</li> <li>Steady blue: The device is being located.</li> </ul> <p><b>NOTE</b> 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.</p>
PSU indicator		<ul style="list-style-type: none"> <li>Steady green: The power input and output are normal.</li> <li>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.</li> <li>Blinking green at 1 Hz: <ul style="list-style-type: none"> <li>The input is normal, the server is standby.</li> <li>The input is overvoltage or undervoltage. For details, see <a href="#">TaiShan Rack Server iBMC Alarm Handling</a>.</li> </ul> </li> <li>Blinking green at 4 Hz: under online PSU firmware upgrade.</li> <li>Off: No power is supplied.</li> </ul>

## SAS/SATA Drive Indicators

Figure 4-6 shows the SAS/SATA drive indicators.

Figure 4-6 SAS/SATA drive indicators





**Table 4-6** Description of SAS/SATA drive indicators

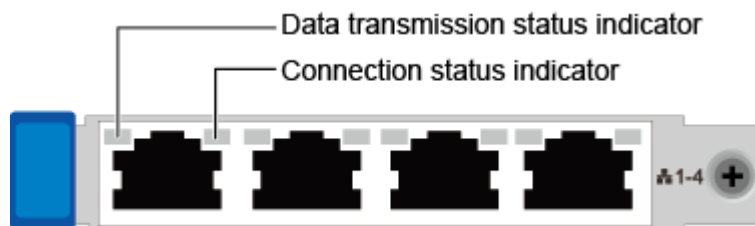
Drive Activity Indicator (Green Indicator)	Drive Fault Indicator (Yellow Indicator)	Description
Steady on	Off	The drive is in position.
Blinking at 4 Hz	Off	Data is being read or written normally, or data on the primary drive is being rebuilt.
Steady on	Blinking at 1 Hz	The drive is being located by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

## FlexIO

For details about FlexIOs supported by the server, see the [Intelligent Computing Compatibility Checker](#).

The following figure shows the indicators on the FlexIO.

**Figure 4-7** TM210 four GE electrical ports



**Table 4-7** FlexIO indicators

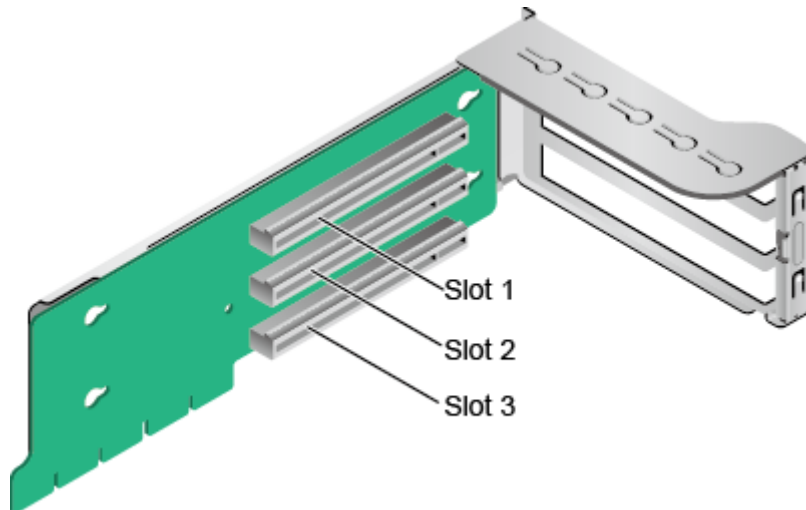
NIC Type	Indicator	State Description
FlexIO with four GE electrical ports	Data transmission status indicator	<ul style="list-style-type: none"> <li>Blinking yellow: Data is being transmitted.</li> <li>Off: No data is being transmitted.</li> </ul>
	Connection status indicator	<ul style="list-style-type: none"> <li>Steady green: The network port is properly connected.</li> <li>Off: The network port is not connected.</li> </ul>

## 4.3 Riser Cards and PCIe Slots

Only I/O module 1 supports riser cards. [Figure 4-8](#), [Figure 4-9](#), and [Figure 4-10](#) show the riser cards supported.

- The riser card provides PCIe slots 1 to 3, as shown in [Figure 4-8](#).

**Figure 4-8** Riser card 1 (three x8 slots)

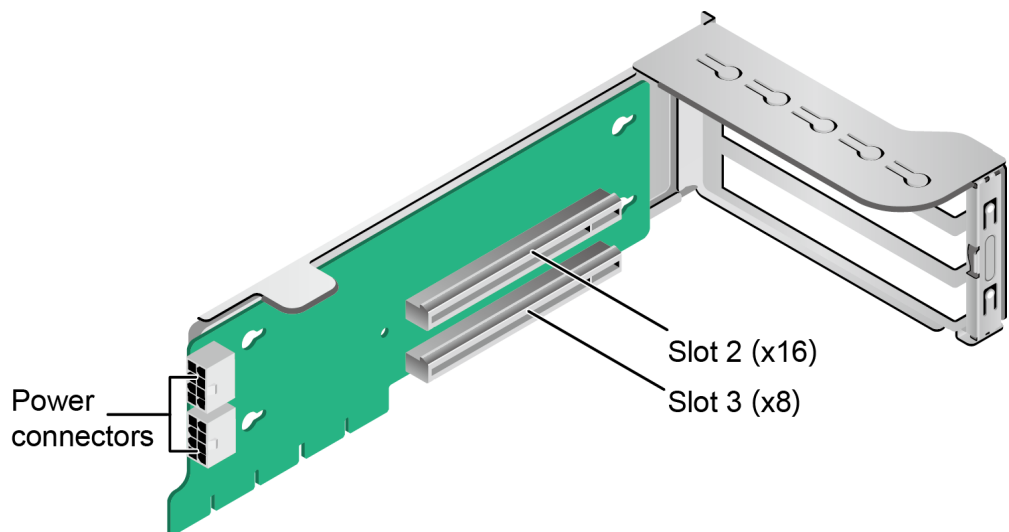


- The riser card shown in [Figure 4-9](#) supports full-height full-length dual-width GPUs. It provides PCIe slots 2 and 3 when installed in I/O module 1.

### NOTE

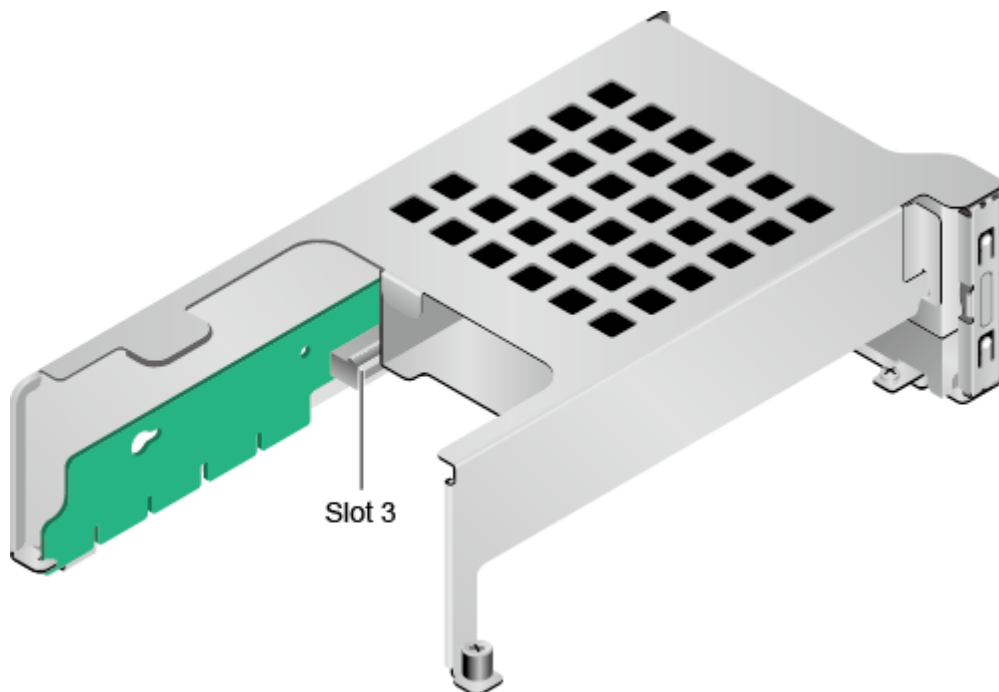
- The card must be used together with the power cables delivered with the server. Do not use the power cables of other servers.
- Only slots 2 supports full-height full-length dual-width GPUs.

**Figure 4-9** Riser card 2 (one x8 slot and one x16 slot)



- When two 2.5-inch drives are installed in I/O module 1, the module also supports a PCIe x16 riser card, as shown in [Figure 4-10](#). This riser card provides slot 3 when installed in I/O module 1.

**Figure 4-10** Riser card 3 (one x16 slot)



[Figure 4-11](#) shows the rear PCIe slots of the 2180.

**Figure 4-11** PCIe slots



I/O module 1 provides slots 1 to 3.

- When a two-slot PRM is installed in I/O module 1, slot 1 cannot be used.
- When one-slot PRM is installed in I/O module 1, slots 1 and 2 cannot be used.

[Table 4-8](#) describes specifications of the PCIe slots.

**Table 4-8** PCIe slot description

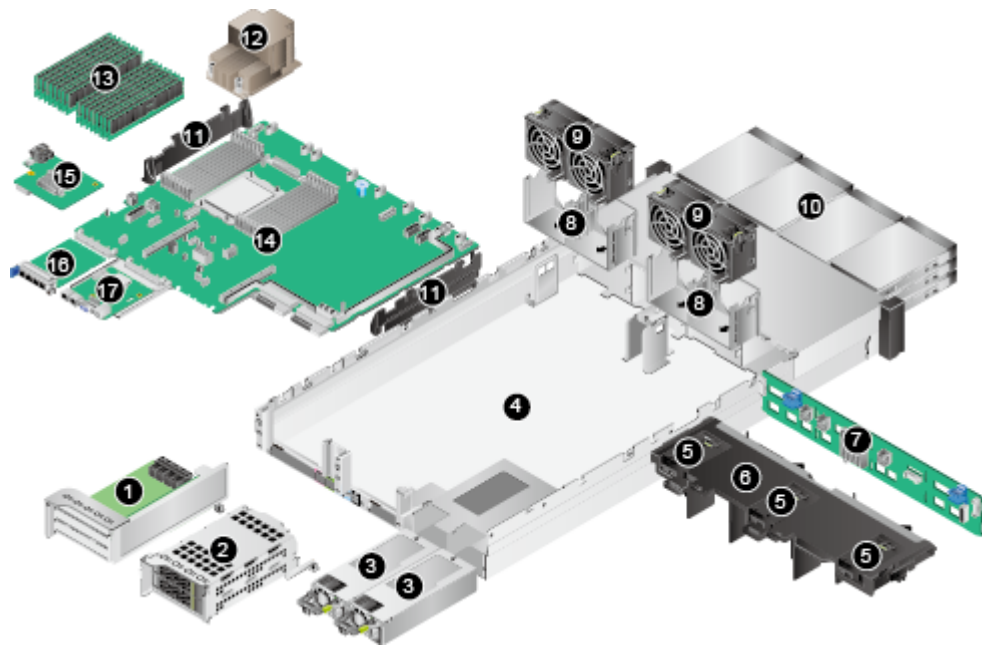
PCIe Slot	CPU	PCIe Standards	Connect or Width	Bus Width	Port Number in the BIOS	ROOT PORT (B/D/F)	Device (B/D/F)	Slot Size
Slot 1	CPU 1	PCIe 4.0	x16	<ul style="list-style-type: none"> <li>2-slot PRM: N/A</li> <li>3-slot PRM: x8</li> </ul>	Port 0	00/00/0	01/00/0	Full-height full-length
Slot 2	CPU 1	PCIe 4.0	x16	<ul style="list-style-type: none"> <li>2-slot PRM: x16</li> <li>3-slot PRM: x8</li> </ul>	Port 4	00/04/0	02/00/0	Full-height full-length
Slot 3	CPU 1	PCIe 4.0	x16	<ul style="list-style-type: none"> <li>Single-slot PRM: x16</li> <li>2-slot PRM: x8</li> <li>3-slot PRM: x8</li> </ul>	Port 12	00/0C/0	04/00/0	Full-height half-length
RAID controller card	CPU 1	PCIe 4.0	x8	x8	Port 8	00/08/0	03/00/0	-

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
<p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• 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 <a href="#">Intelligent Computing Compatibility Checker</a>. For PCIe cards not listed by the Intelligent Computing Compatibility Checker, contact the local Huawei sales personnel to submit the compatibility test requirements.</li> <li>• When two 2.5-inch drives are installed in I/O module 1, this module also supports a PCIe x16 riser card in slot 3.</li> <li>• B/D/F indicates Bus/Device/Function Number.</li> <li>• 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.</li> <li>• The values of B/D/F listed in this table are default ones. If PCIe cards are not fully configured or a PCIe card with a PCI bridge is configured, the values of B/D/F may differ.</li> <li>• Atlas 300 accelerator cards are supported and dedicated riser cards are required. For details, see <a href="#">Intelligent Computing Compatibility Checker</a>.</li> </ul>								

## 4.4 Physical Structure

[Figure 4-12](#) shows the components of the 2180.

**Figure 4-12** Components



1	I/O module 1	2	I/O module 2
3	PSUs	4	Chassis
5	Supercapacitor bracket	6	Air duct
7	Front drive backplane	8	Fan module brackets
9	Fan modules	10	Front drives
11	Cable organizers	12	Heat sinks
13	DIMMs	14	Mainboard
15	RAID controller card	16	FlexIO
17	iBMC card	-	-

**NOTE**

- I/O module 1 can be configured with a rear drive module with two 2.5-inch drives or a PCIe riser module (PRM). I/O module 2 can be configured with a rear drive module with two 2.5- or 3.5-inch drives. I/O module 3 cannot be used.
- The FlexIO can be configured with a TM210 NIC.
- CPU is integrated on the mainboard and cannot be replaced independently.

# 5 Product Specifications

[5.1 Technical Specifications](#)

[5.2 Environmental Specifications](#)

[5.3 Physical Specifications](#)

## 5.1 Technical Specifications

For details about the part numbers and compatibility, use the [Intelligent Computing Compatibility Checker](#).

**Table 5-1** 2180 technical specifications

Item	Specifications
Form factor	2U rack server
Processor	<ul style="list-style-type: none"> <li>One Kunpeng 920 processor with 64 cores, 48 cores, or 32 cores at a frequency of 2.6 GHz.</li> <li>An L3 cache of up to 64 MB.</li> </ul>
Memory	<ul style="list-style-type: none"> <li>Up to 16 DDR4 DIMM slots, supporting RDIMMs.</li> <li>A maximum memory speed of 2933 MT/s.</li> <li>Memory protection functions of ECC, SEC/DED, SDDC, and Patrol scrubbing.</li> <li>The capacity of a single DIMM can be 16 GB, 32 GB, 64 GB, and 128 GB.</li> </ul> <p><b>NOTE</b> DIMMs of different specifications (such as the capacity, bit width, rank, and height) cannot be installed on one server. That is, all DIMMs on one server must have the same Part No..</p>

Item	Specifications
Storage	<p>Drive:</p> <ul style="list-style-type: none"> <li>• 12 front drives. For details, see <a href="#">Table 6-3</a>.</li> <li>• Hot-swappable drives.</li> </ul> <p>RAID controller card:</p> <ul style="list-style-type: none"> <li>• Supports a variety of RAID controller cards. Use the <a href="#">Intelligent Computing Compatibility Checker</a> to obtain information about the specific RAID controller cards supported.</li> <li>• Provides a supercapacitor to protect cache data from power failures, and supports RAID level migration, drive roaming, self-diagnosis, and web-based configuration. For details about the RAID controller card, see <a href="#">TaiShan Server RAID Controller Card User Guide</a>.</li> </ul>
FlexIO	One FlexIO that provides 4 ports and supports PXE.
PCIe slot	<ul style="list-style-type: none"> <li>• A maximum of four PCIe 4.0 slots, among which one is a PCIe slot dedicated for a screw-in RAID controller card, and the other three are for PCIe cards. The specifications of PCIe 4.0 slots are as follows: I/O modules 1 provide the following PCIe slots: <ul style="list-style-type: none"> <li>- 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)</li> <li>- 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)</li> <li>- One full-height half-length PCIe 4.0 x16 slot</li> </ul> </li> <li>• The PCIe slots support Huawei-developed Atlas 300 AI accelerator cards to implement fast and efficient processing and reasoning, and image identification and processing.</li> </ul> <p><b>NOTE</b> For details about the PCIe card models supported by the 2180, use the <a href="#">Intelligent Computing Compatibility Checker</a>.</p>
Port	<ul style="list-style-type: none"> <li>• Two USB 3.0 ports and one VGA port on the front panel</li> <li>• Two USB 3.0 ports, one DB15 VGA port, one RJ45 serial port, and one RJ45 management network port on the rear panel</li> </ul>
Fan module	<p>Four hot-swappable fan modules, providing protection against single-fan failure</p> <p><b>NOTE</b> Fan modules on the same server must have the same Part No..</p>
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.



Item	Specifications
Security	<ul style="list-style-type: none"> <li>• Administrator password</li> <li>• Secure boot and trusted boot</li> <li>• TPM (available in and out of China)/TCM (available only in China)</li> <li>• (Optional) Front bezel</li> </ul> <p><b>NOTE</b> The front bezel is installed on the front panel and comes with a security lock to prevent unauthorized operations on drives.</p>
Graphics card	<p>The mainboard integrates an SM750 graphics card, providing 32 MB memory and supporting a maximum resolution of 1920 x 1080 at 60 Hz with 16 M colors.</p> <p><b>NOTE</b></p> <ul style="list-style-type: none"> <li>• The maximum resolution 1920 x 1080 is supported only after the video card driver that corresponds to the server OS version is installed. Otherwise, only the default resolution of the OS is supported.</li> <li>• If both the front and rear VGA ports are connected to monitors, only the monitor connected to the front VGA port is available.</li> </ul>

## 5.2 Environmental Specifications

**Table 5-2** Environmental specifications

Category	Specifications
Temperature	<ul style="list-style-type: none"> <li>• Operating temperature: 5°C to 40°C (41°F to 104°F) (ASHRAE Classes A2 and A3 compliant)</li> <li>• Storage temperature (<math>\leq 72</math> hours): -40°C to +65°C (-40°F to +149°F)</li> <li>• Long-term storage temperature (<math>&gt; 72</math> hours): 21°C to 27°C (69.8°F to 80.6°F)</li> <li>• Maximum temperature change rate: 20°C/h (36°F/h)</li> </ul> <p><b>NOTE</b> The highest operating temperature varies depending on the configuration. For details, see <a href="#">Table 5-3</a>.</p>
Relative humidity (RH, non-condensing)	<ul style="list-style-type: none"> <li>• Operating humidity: 8% to 90%</li> <li>• Storage humidity (<math>\leq 72</math> hours): 5% to 95%</li> <li>• Long-term storage humidity (<math>&gt; 72</math> hours): 30% to 69%</li> <li>• Maximum change rate: 20%/h</li> </ul>
Air volume	$\geq 204$ cubic feet per minute (CFM)

Category	Specifications
Altitude	<p>3050 m (10000 ft.)</p> <p><b>NOTE</b> ASHRAE 2015 compliant:</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> <li>• 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.</li> </ul>
Corrosive gaseous contaminant	<p>Maximum corrosion product thickness growth rate:</p> <ul style="list-style-type: none"> <li>• Copper corrosion rate test: 300 Å/month (meeting level G1 requirements of the ANSI/ISA-71.04-2013 standard on gaseous corrosion)</li> <li>• Silver corrosion rate test: 200 Å/month</li> </ul>
Particle contaminant	<ul style="list-style-type: none"> <li>• The equipment room environment meets the requirements of ISO 14664-1 Class 8.</li> <li>• There is no explosive, conductive, magnetic, or corrosive dust in the equipment room.</li> </ul> <p><b>NOTE</b> It is recommended that the particulate pollutants in the equipment room be monitored by a professional organization.</p>
Acoustic noise	<p>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).</p> <ul style="list-style-type: none"> <li>• Idle: <ul style="list-style-type: none"> <li>- LWAd: 6.08 Bels</li> <li>- LpAm: 45.2 dBA</li> </ul> </li> <li>• Operating: <ul style="list-style-type: none"> <li>- LWAd: 7.0 Bels</li> <li>- LpAm: 53 dBA</li> </ul> </li> </ul> <p><b>NOTE</b> Actual sound levels generated during operation vary depending on server configuration, load, and ambient temperature.</p>

**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.	<ul style="list-style-type: none"> <li>Does not support 64-core CPUs.</li> <li>Does not support PCIe SSD cards</li> <li>Does not support passive cooling GPUs (including DMINI cards).</li> <li>Does not support rear drives</li> </ul>
<p><b>NOTE</b> If one fan fails, the highest operating temperature of the server is 5°C (9°F) lower than that in normal cases.</p>			

## 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.)
Installation on space	<p>Requirements for cabinet installation (cabinet compliant with the International Electrotechnical Commission (IEC) 297 standard):</p> <ul style="list-style-type: none"> <li>Cabinet width: 482.6 mm (19 in.)</li> <li>Cabinet depth: ≥ 1000 mm (39.37 in.)</li> </ul> <p>Requirements for guide rail installation:</p> <ul style="list-style-type: none"> <li>L-shaped guide rails: apply only to Huawei cabinets.</li> <li>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.</li> </ul>
Weight in full configuration	<p>Net weight:</p> <p>Server with 12 x 3.5-inch front drives + 2 x 3.5-inch rear drives + 2 x 2.5-inch rear drives: 30 kg (66.15 lb)</p> <p>Packaging materials: 5 kg (11.03 lb)</p>

Item	Description
Power consumption	The power consumption parameters vary according to configurations (including the ErP standard configuration of the European Union). Use the <a href="#">Intelligent Computing Product Power Calculator</a> to obtain the specific power consumption value.

# 6 Software and Hardware Compatibility

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Use the [Intelligent Computing Compatibility Checker](#) to obtain information about the operating systems and hardware supported by the server.

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## 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.

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[6.1 CPU](#)

[6.2 Memory](#)

[6.3 Storage](#)

[6.4 I/O Expansion](#)

[6.5 PSU](#)

## 6.1 CPU

The Kunpeng 920 processors are ARM CPU chips developed by HiSilicon. Its main features are as follows:

- A maximum of 64 cores and 2.6 GHz frequency. Multiple choices for the core quantity and frequency.
- Compatible with the ARMv8-A architecture and supports ARMv8.1 and ARMv8.2 extensions.
- Huawei-developed 64-bit TaiShan cores.
- Each core integrates 64 KB L1 instruction cache, 64 KB L1 data cache, and 512 KB L2 cache.
- An L3 cache of up to 64 MB.
- Superscalar, variable-length, and out-of-order pipelines.
- One-bit and two-bit ECC error correction.

- Supports eight DDR controllers.
- A maximum of four physical Ethernet ports.
- Three PCIe controllers, which support PCIe 4.0 (16 Gbit/s) and are backwards compatible.
- IMU maintenance engine for collecting the CPU status.

## 6.2 Memory

### Memory Capacity Configuration Rules

The 2180 supports up to 16 DIMMs. Each CPU supports eight memory channels, and each memory channel supports up to two DIMMs.

**Table 6-1** RDIMM configuration rules

Item		RDIMM
Rank		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		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

### Memory Slot Configuration Rules

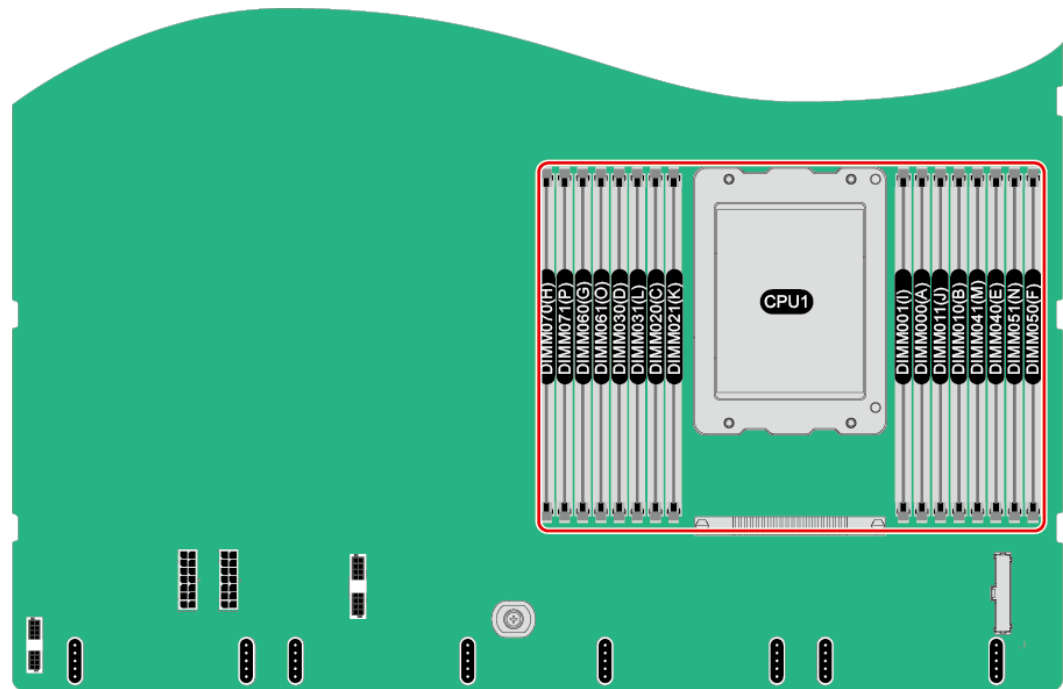
- The 2180 supports a maximum of sixteen DDR4 ECC DIMMs. Each processor integrates eight memory channels. RDIMMs are supported.
- The 2180 supports DIMMs of 16 GB, 32 GB, 64 GB, and 128 GB. When the 2180 is fully configured with DIMMs, the maximum memory capacity is 2048 GB.
- In the 2180, the CPU has sixteen DDR4 DIMM slots, integrating eight memory channels. [Table 6-2](#) describes the composition of each channel. [Figure 6-1](#) shows the DIMM installation positions.
- DIMMs of different specifications (such as capacity, bit width, rank, and height) cannot be mixed on 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.
- DIMMs of different types (such as RDIMMs and LRDIMMs) cannot be installed in one server.

**Table 6-2** Channels

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

Figure 6-1 DIMM installation positions



## DIMM Installation Rules

### 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. 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.

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.

## 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 2180 supports SAS/SATA SSDs and HDDs.

**Table 6-3** Drive configurations

Configuration	Maximum Front Drives	Maximum Rear Drives	Drive Management Mode
Server with 12 x 3.5-inch drives in Expander mode <sup>[1]</sup>	12 (SAS/SATA drives)	1. I/O module 1 <sup>[2]</sup> : 2 (SAS/SATA drives) 2. I/O module 2 <sup>[2]</sup> : 2 (SAS/SATA drives)	One RAID controller card
<ul style="list-style-type: none"> <li>• [1]: The front drives in a server with 12 x 3.5-inch drives in Expander mode can only be 3.5-inch drives.</li> <li>• [2]: I/O module 1 supports only 2.5-inch drives, and I/O module 2 supports 2.5-inch and 3.5-inch drives.</li> </ul>			

**Table 6-4** provides the comparison between RAID levels in performance, minimum number of drives, and drive usage.

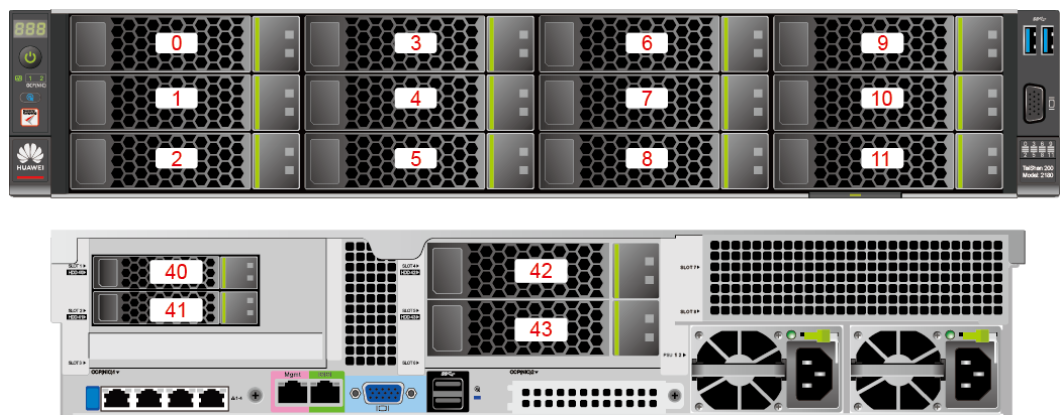
**Table 6-4** RAID level comparison

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 Level	Reliability	Read Performance	Write Performance	Drive Usage
RAID 60	High	High	Better than medium	$(N - M \times 2)/N$
Note: N indicates the number of member drives in a RAID array, and M indicates the number of spans in a RAID array.				

Figure 6-2 shows the drive slot numbers for the configuration of a server with 12 x 3.5-inch drives in Expander mode.

Figure 6-2 Server with 12 x 3.5-inch drives in Expander mode



The rear drives are optional. The preceding figure shows the maximum configuration.

## 6.4 I/O Expansion

The 2180 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

- The PSUs are hot-swappable and work in 1+1 redundancy mode.
- For details about supported PSUs, use the [Intelligent Computing Compatibility Checker](#).

- 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
- 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.

# 7 System Management

The 2180 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: <ul style="list-style-type: none"> <li>• IPMIV2.0</li> <li>• CLI</li> <li>• HTTPS</li> <li>• SNMPv3</li> </ul>
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

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For details, see [Maintenance & Warranty](#).

# 9 Certifications

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No.	Country/ Region	Certification	Standard
1	China	CCC	GB4943.1-2011 GB9254-2008 (Class A) GB17625.1-2012
2	China	CQC	CQC3135-2011