Huawei KunLun 9008 V5 White Paper

Issue 06

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Huawei Technologies Co., Ltd.

Address: Huawei Industrial Base
Bantian, Longgang
Shenzhen 518129
People's Republic of China

Website: http://www.huawei.com

Email: support@huawei.com

About This Document

Overview

This document describes the Huawei KunLun 9008 V5 mission critical server in terms of the system architecture, hardware structure, features, ports, technical specifications, standards, and certifications. You can obtain comprehensive information about the server by reading this document.

Intended Audience

This document is intended for:

- Marketing engineers
- Technical support engineers
- Maintenance engineers

Symbol Conventions

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

Symbol	Description
	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury.
	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. This symbol does not indicate personal injury.

Symbol	Description
NOTE	Calls attention to important information, best practices, and tips. NOTE is used to address information not related to personal injury, equipment damage, and environment deterioration.

Change History

Changes between document issues are cumulative. The latest document issue contains all the changes made in earlier issues.

Issue 06 (2018-11-06)

This issue is the sixth official release.

Issue 05 (2018-10-25)

This issue is the fifth official release.

Issue 04 (2018-09-14)

This issue is the fourth official release.

Issue 03 (2018-08-09)

This issue is the third official release.

Issue 02 (2018-07-23)

This issue is the second official release.

Issue 01 (2018-06-08)

This issue is the first official release.

Contents

1 Product Overview

1.1 Functions

The KunLun 9008 V5 is a new-generation mission critical server developed by Huawei based on the Intel® Xeon® Skylake series CPUs and the latest Intel Purley platform.

The KunLun 9008 V5 is suited for mission critical enterprise applications, such as large OLTP and OLAP databases, large HANA in-memory databases, large Enterprise Resource Planning (ERP) and Cluster Resource Management (CRM) systems, mission critical service application integration, and High-Performance Computing (HPC) fat nodes. It features high computing performance, large memory capacity, excellent scalability, high reliability, easy management, and elastic deployment.

The KunLun 9008 V5 can be configured based on customer's application scenarios to reduce CAPEX. In a basic configuration, the server consists of only a system compute enclosure (SCE) and supports features such as physical partitioning, fault diagnosis & management (FDM), and proactive failure analysis engine (PFAE). In an advanced configuration, the server can be equipped with a resource expansion enclosure (REE) and a central management enclosure (CME), in addition to an SCE, delivering enhanced expansion capabilities and advanced features such as logical partitioning (L-Par).

The 9008 V5 supports three working modes: single-system working mode, physical partitioning mode, and logical partitioning mode.

- In single-system mode, the 9008 V5 operates as a whole system and supports two, four, six, or eight CPUs.
- In dual-system mode, the 9008 V5 uses the Huawei KPar technology to implement the physical partitioning function. By using this technology, the 9008 V5 can be used as two independent systems.

  The partitions are electrically isolated from each other. Services in different partitions can run independently. Compared with the partition based on virtualization software or firmware, the reliability of the physical partitioning is higher.
- Compared with the physical partitioning technology, Huawei's L-Par technology is more flexible and has a finer granularity. It delivers higher performance and reliability than traditional virtual machines (VMs), such as VMware VMs.

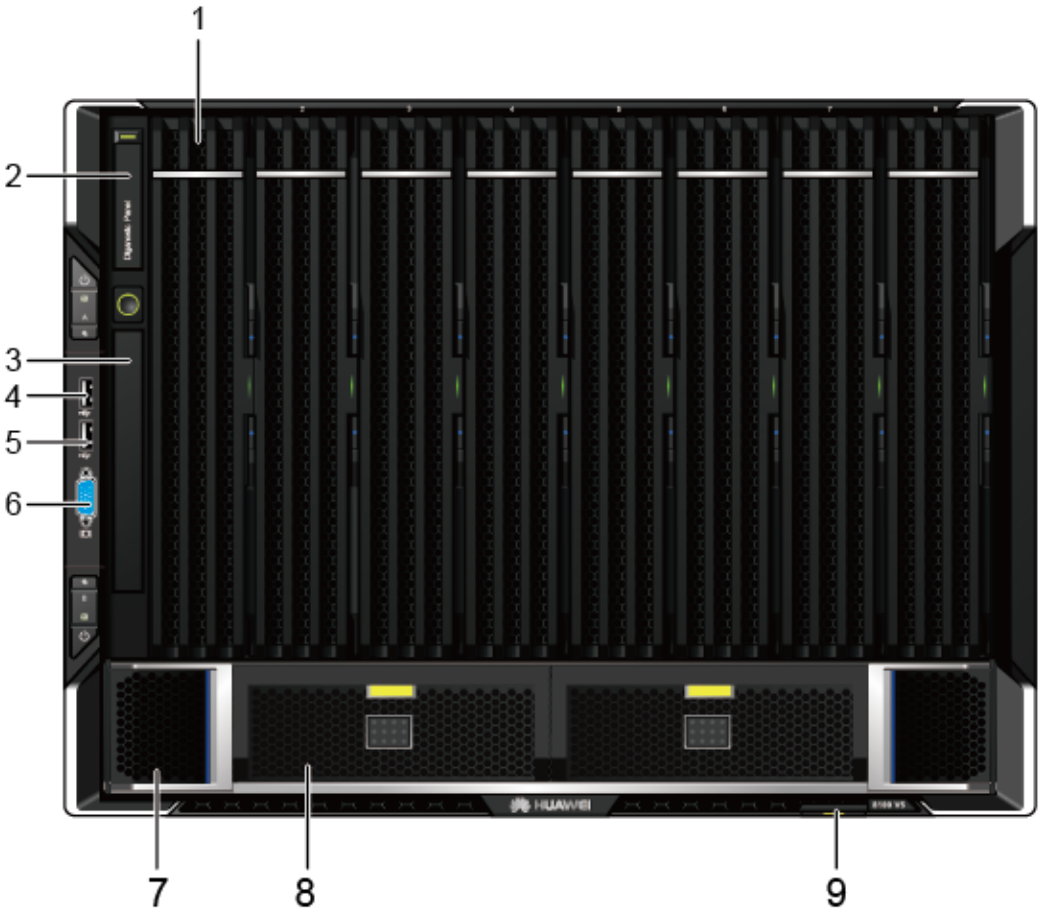
1.2 Appearance and Ports

1.2.1 SCE

Front Panel Components

Figure 1-1 shows the front view of the SCE.

Figure 1-1 Front view of an SCE that is configured with FIO-B and does not support an REE



1	SCMs (numbered 1 to 8 from left to right)	2	LCD (optional)
3	DVD drive (optional)	4	USB port 1
5	USB port 2	6	VGA port
7	FIO-B	8	Disk enclosure
9	Label plate with an SN label	-	-

Ports on the front panel

Name	Type	Quantity	Description
VGA port	DB15	1	Connects a monitor to the server. In dual-system mode, the VGA port is for system A by default. You can switch the VGA between system A and system B on the iBMC WebUI or LCD.
USB port	USB 2.0	2	Connects USB devices to the server. In dual-system mode, the USB ports are for system A by default. You can switch the USB ports between system A and system B on the iBMC WebUI or LCD.

NOTE

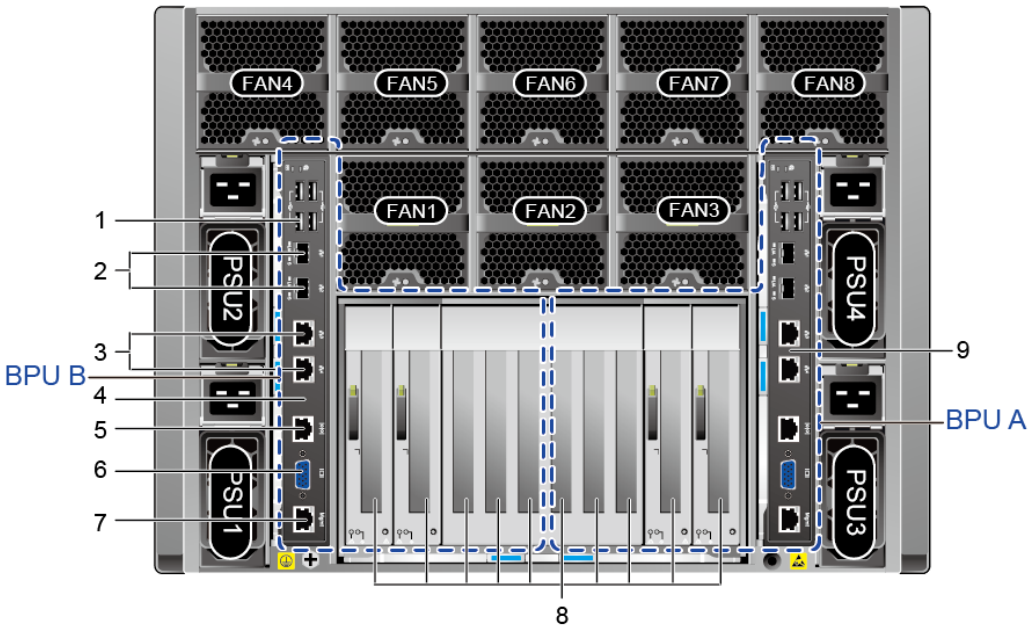
When the 9008 V5 is equipped with a CME, the SCE is not configured with an LCD or DVD drive, and a filler module is installed in the slot.

Rear Panel Components

The SCE rear panels are classified into two types. One supports a CME, and the other does not support a CME. The two types of SCEs have different management boards. To support a CME, the SCE must be equipped with a management board that provides a partition interconnect port (PIP).

Figure 1-2 shows the rear view of an SCE that does not support a CME.

Figure 1-2 SCE rear view



SCE components at the rear

1	USB port	2	10GE optical ports
3	GE electrical ports	4	Local partition management module-1 (LPM-1)
5	RJ45 serial port	6	VGA port
7	iBMC management network port	8	PCIe slots (numbered 1 to 10 from left to right)
9	LPM-2	-	-

The ports on the rear panel of the 9008 V5 are located on two LPMs, LPM-1 and LPM-2.

Ports on LPM-1 of the rear panel

Port	Type	Quantity	Single-System Mode	Dual-System Mode	Description
VGA port	DB15	1	Unavailable	Available	Connects a monitor to the server.
USB port	USB 3.0	4	Unavailable	Available	Connects USB devices to the server.

Port	Type	Quantity	Single-System Mode	Dual-System Mode	Description
iBMC management network port	RJ45	1	Unavailable	Available	Provides a GE Ethernet port to manage the server.
Serial port	RJ45	1	Unavailable	Available	In dual-system mode, this port is used as the system serial port by default. You can set it as the iBMC serial port on the iBMC CLI. In single-system mode, this port is unavailable.
GE electrical port	Electrical port	2	Unavailable	Available	Each LPM provides two GE electrical ports and two 10GE optical ports, which are all LOM ports. **NOTE** ● 10GE optical ports do not support 1000 Mbit/s forced rate or 10 Mbit/s and 100 Mbit/s networks. ● GE electrical ports do not support 10 Mbit/s and 100 Mbit/s networks or forced rate.
10GE optical port	Optical port	2			

Ports on LPM-2 of the rear panel

Port	Type	Quantity	Single-System Mode	Dual-System Mode	Description
VGA port	DB15	1	Available	Available	Connects a monitor to the server.
USB port	USB 3.0	2	Available	Available	Connects USB devices to the server.
iBMC management network port	RJ45	1	Available	Available	Provides a GE Ethernet port to manage the server.

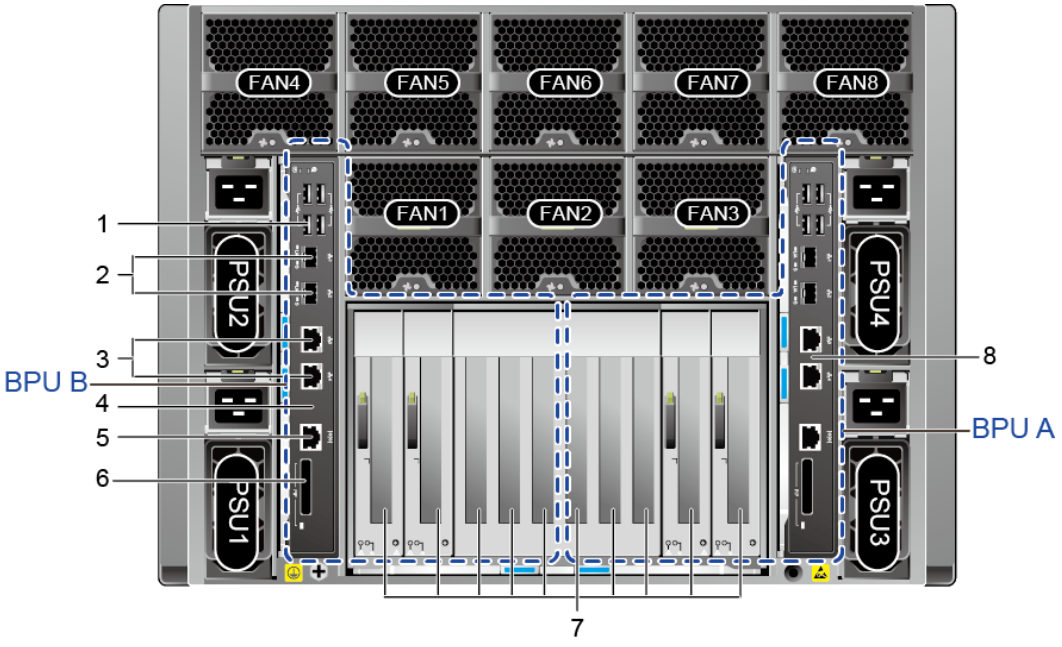
Port	Type	Quantity	Single-System Mode	Dual-System Mode	Description
Serial port	RJ45	1	Available	Available	This port is used as the system serial port by default. You can set it as the iBMC serial port on the iBMC CLI.
GE electrical port	Electrical port	2	Available	Available	Each LPM provides two GE electrical ports and two 10GE optical ports, which are all LOM ports. **NOTE** ● 10GE optical ports do not support 1000 Mbit/s forced rate or 10 Mbit/s and 100 Mbit/s networks. ● GE electrical ports do not support forced rates or 10 Mbit/s and 100 Mbit/s networks.
10GE optical port	Optical port	2			

NOTE

In single-system mode, only the GE and 10GE ports on LPM-2 provide the NC-SI function.

Figure 1-3 shows the rear panel that supports a CME.

Figure 1-3 Rear panel components (with a CME)



1	USB port	2	10GE optical ports
3	GE electrical ports	4	LPM 1
5	RJ45 serial port	6	Partition interconnect port (PIP)
7	PCIe slots (numbered 1 to 10 from left to right)	8	LPM-2

Table 1-1 Ports on LPM-1 and LPM-2 of the rear panel

No.	Name	Type	Quantity	Single-System Mode	Dual-System Mode	Description
2	10GE optical ports	Optical port	2	Unavailable **NOTE** The ports on LPM-2 are available.	Available	Each LPM provides two GE electrical ports and two 10GE optical ports, which are all LOM ports. **NOTE** ● 10GE optical ports do not support 1000 Mbit/s forced rate or 10 Mbit/s and 100 Mbit/s networks. ● GE electrical ports do not support forced rates or 10 Mbit/s and 100 Mbit/s networks. ● 10GE optical ports and GE electrical ports do not support NCSI.
3	GE electrical ports	Electrical port	2			
5	Serial port	RJ45	1	Unavailable **NOTE** The ports on LPM-2 are available.	Available	In dual-system mode, this port is used as the system serial port by default. You can log in to the iBMC CLI by using the CMC SOL function and set it as the iBMC serial port. In single-system mode, this port is unavailable.

No.	Name	Type	Quantity	Single-System Mode	Dual-System Mode	Description
6	PIP	External PCIe 1.0 connector	1	Available	Available	A PIP connects a CPI and an LPM. Each SCE has two LPMs. Each LPM has one PIP, and each SCE has two PIPs in active/standby mode. By default, the PIP in LPM 2 is active, and the PIP in LPM 1 is standby. A PIP manages and controls the two BPUs in an SCE. To be specific, a PIP controls physical partitions, manages hardware resources in the SCE, and delivers the system working clock from the CME to the SCE.

1.2.2 CME

Appearance

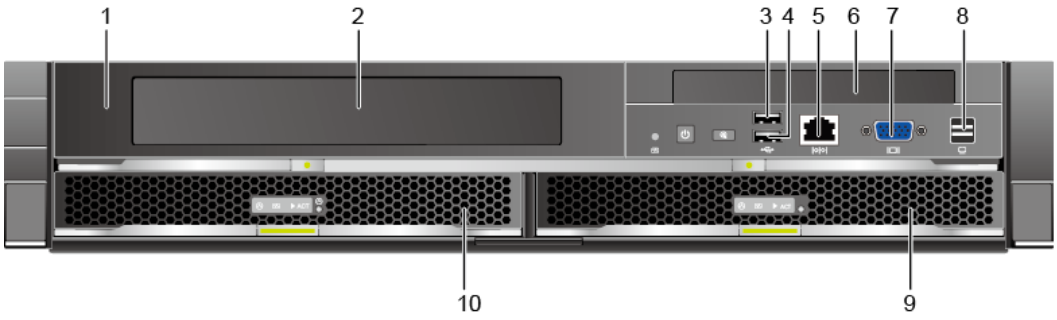
Figure 1-4 shows a CME.

Figure 1-4 CME

Front View

Figure 1-5 shows the front view of a CME. Figure 1-5 describes the CME components at the front.

Figure 1-5 CME front view



1	Central interface module (CIM)	2	LCD filler panel (LCD optional)
3	USB1	4	USB2
5	Serial port	6	DVD
7	VGA port	8	LCD connector
9	Central management console (CMC) 2	10	CMC1

Table 1-2 Port description

No.	Name	Connector	Quantity	Single-System Mode	Physical Partition Mode	Function
2	USB port 1	USB2.0-A Male	1	Available	Available	The USB ports allow USB devices (for example, a USB mouse and keyboard) to connect to the single system or a physical partition.
3	USB port 2	USB2.0-A Male	1			

No.	Name	Connector	Quantity	Single-System Mode	Physical Partition Mode	Function
4	Serial port	RJ45	1	Available	Available	This port is used for serial port redirection. By default, the serial port UI of the active CMC is displayed. By using the serial port redirection function, you can access the serial port UIs of all systems and boards in the cabinet.
6	VGA port	DB15	1	Available	Available	The VGA port allows a monitor to connect to the single system or a physical partition.
7	LCD connector	External standard miniSAS 4X port	1	Available	Available	This port connects the LCD on the front acoustic door to the active CMC over the GE network. The LCD displays device information and allows users to perform system management.

NOTE

- CMC stands for central management console.
- CIM stands for central interface module.

Rear View

Figure 1-6 shows the rear view of a CME. Table 1-3 describes the CME components at the rear.

Figure 1-6 CME rear view

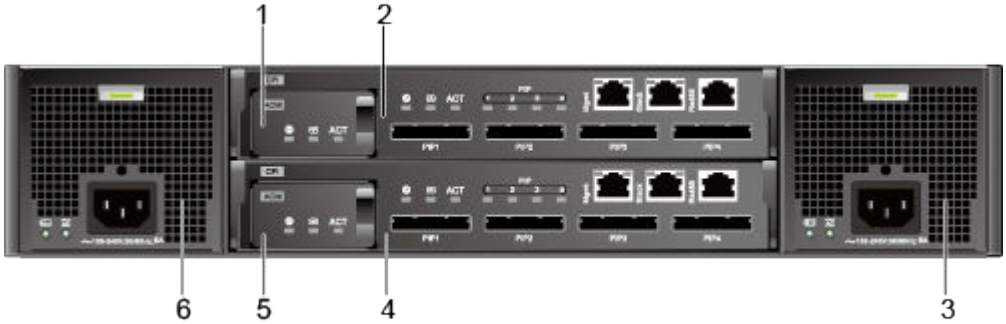


Table 1-3 CME components (rear)

No.	Component	No.	Component
1	ACM 2	2	CPI 2
3	PFM 2	4	CPI 1
5	ACM 1	6	PFM 1

NOTE

- ACM stands for advanced clock module.
- CPI stands for central partition interconnect module.
- PFM stands for power and fan integrity module.

CME Ports

Figure 1-7 shows the ports on the CME front panel. Table 1-4 describes the ports.

Figure 1-7 Ports on the CME front panel

Table 1-4 Ports on the CME front panel

No.	Name	Connector	Quantity	Single-system mode	Physical Partition Mode	Description
1	USB port	USB 2.0 - A Male	2	Available	Available	The USB ports allow USB devices (for example, a USB mouse and keyboard) to connect to the single system or a physical partition.
2	Serial port	RJ45	1	Available	Available	The serial port is used for console redirection. By default, the serial port enables console redirection to the CLI of the active CMC. The port can also be used to access the CLI of a physical partition or board in the server cabinet.

No.	Name	Connector	Quantity	Single-system mode	Physical Partition Mode	Description
3	VGA port	DB15	1	Available	Available	The VGA port allows a monitor to connect to the single system or a physical partition.
4	LCD connector	External standard miniSAS HD 4x port	1	Available	Available	This port connects the LCD on the front acoustic door to the active CMC over the GE network. The LCD displays device information and allows users to perform system management.

Figure 1-8 shows the ports on the CME rear panel. **Table 1-5** describes the ports.

Figure 1-8 Ports on the CME rear panel

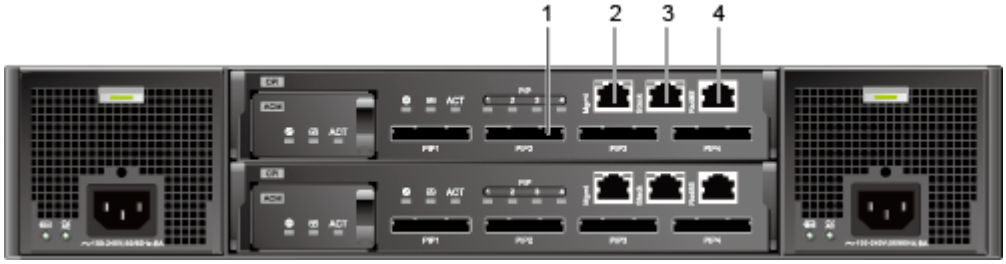


Table 1-5 Ports on the CME rear panel

No.	Name	Connector	Quantity	Single-system mode	Physical Partition Mode	Description
1	PIP	PCIe 1.0	8	Available	Available	A PIP connects a CPI and an LPM. Each CPI has four PIPs. The 9008 V5 uses PIP 1. A PIP manages and controls the two BPUs in an SCE. To be specific, a PIP controls physical partitions, manages hardware resources in the SCE, and delivers the system working clock from the CME to the SCE.

No.	Name	Connector	Quantity	Single-system mode	Physical Partition Mode	Description
2	Management network port MGMT	RJ45	2	Available	Available	This port is a standard GE port, which supports 10/100/1000BASE-T auto-negotiation. The cable type is UTP5. This port is used to manage devices in a single cabinet.
3	Stacking port STACK	RJ45	2	Available	Available	This port is a standard GE port, which supports 10/100/1000BASE-T auto-negotiation. The cable type is UTP5. This port is used to cascade multiple cabinets. The cascading network is described as follows: 1. Connect the STACK ports on the two CPIs in the first cabinet to the MGMT ports on the two CPIs in the second cabinet respectively. There is no restriction for the mapping between the CPIs in the two cabinets. 2. Connect the STACK ports on the two CPIs in the second cabinet to the MGMT ports on the two CPIs in the third cabinet respectively. There is no restriction for the mapping between the CPIs in the two cabinets. 3. Use the same cascading method to cascade the other cabinets.
4	RS485 serial port	RJ45	2	Unavailable	Unavailable	This serial port is reserved.

1.2.3 REE

Appearance

Figure 1-9 shows an REE.

Figure 1-9 Appearance of an REE

Front View

Figure 1-10 shows the front view of an REE. **Table 1-6** describes the REE components at the front.

Figure 1-10 Front view of an REE

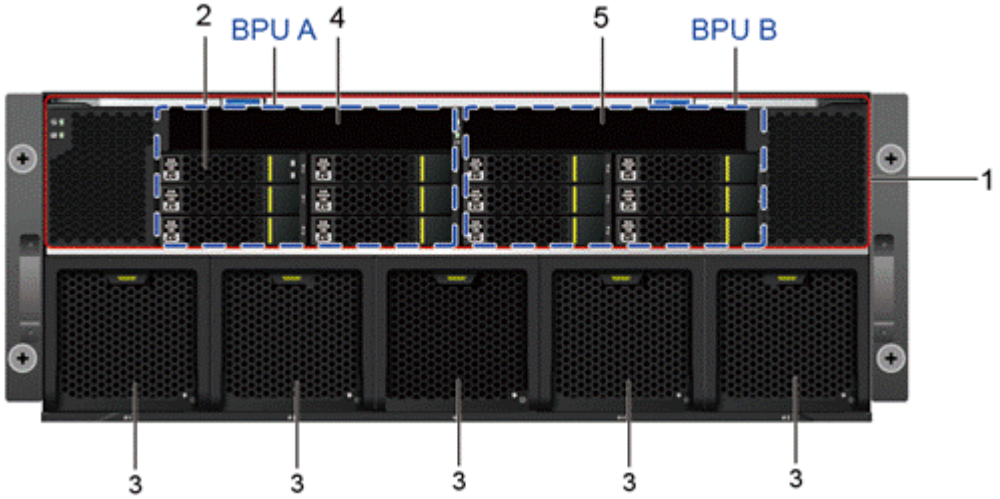


Table 1-6 REE components at the front

No.	Component	No.	Component
1	Switch module	2	Hard disk

No.	Component	No.	Component
3	Fan module	4	FPC 1
5	FPC 2		

Each REE provides 12 hard disk slots and five fan slots. **Table 1-7** provides the hard disk slot layout from left to right and **Table 1-8** provides the fan slot layout from left to right.

Table 1-7 Hard disk slot layout

HDD0	HDD3	HDD6	HDD9
HDD1	HDD4	HDD7	HDD10
HDD2	HDD5	HDD8	HDD11

Table 1-8 Fan slot layout

Fan1	Fan2	Fan3	Fan4	Fan5

Rear View

The back I/O module (BIO) groups in an REE are classified into the following types:

- Non-hot-swappable BIO group that supports 15 non-hot-swappable PCIe cards: consists of one BIO-C that supports eight standard half-height non-hot-swappable PCIe 3.0 x4 slots and one BIO-D that supports seven standard half-height non-hot-swappable PCIe 3.0 x8 slots. The two BIOs can be installed in slots BIO 1 and BIO 2 or slots BIO 3 and BIO 4 in the REE.
- Hot-swappable BIO group that supports five hot-swappable PCIe slots: consists of one BIO-E that supports two standard full-height hot-swappable PCIe 3.0 x16 slots and three standard full-height hot-swappable PCIe 3.0 x8 slots. This BIO can be installed in slot BIO 1 or BIO 3 in the REE.

The REE supports two BIO groups, which can be flexibly configured with non-hot-swappable and hot-swappable BIOs. There are four optional combinations, as shown in **Figure 1-11**, **Figure 1-12**, **Figure 1-13** and **Figure 1-14**.

Figure 1-11 REE rear view (with two hot-swappable BIO groups)

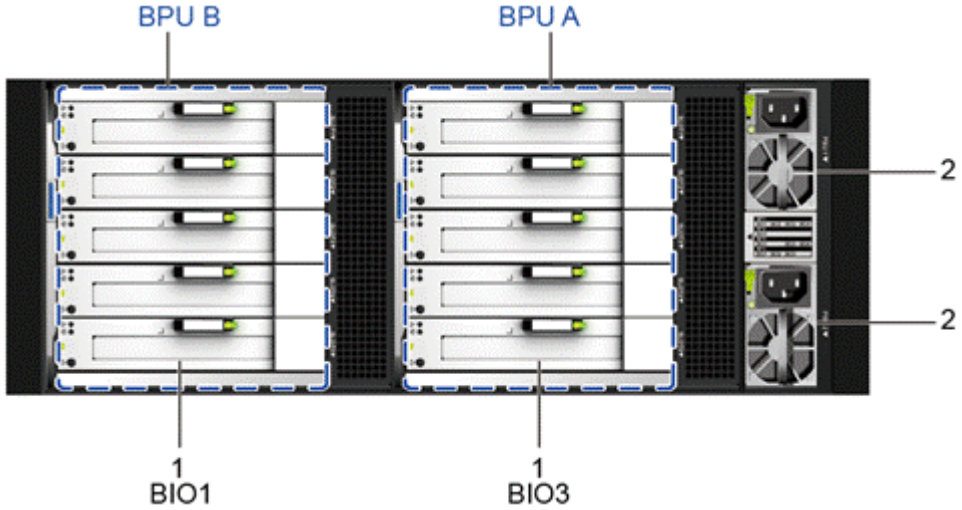


Table 1-9 REE components at the rear (with two hot-swappable BIO groups)

No.	Component	No.	Component
1	BIO-E	2	PSU

Table 1-10 BIO slot layout (with two hot-swappable BIO groups)

BIO1	BIO3
Slot 1, PCIe 3.0 x16	Slot 1, PCIe 3.0 x16
Slot 2, PCIe 3.0 x16	Slot 2, PCIe 3.0 x16
Slot 3, PCIe 3.0 x8	Slot 3, PCIe 3.0 x8
Slot 4, PCIe 3.0 x8	Slot 4, PCIe 3.0 x8
Slot 5, PCIe 3.0 x8	Slot 5, PCIe 3.0 x8

Figure 1-12 REE rear view (with two non-hot-swappable BIO groups)

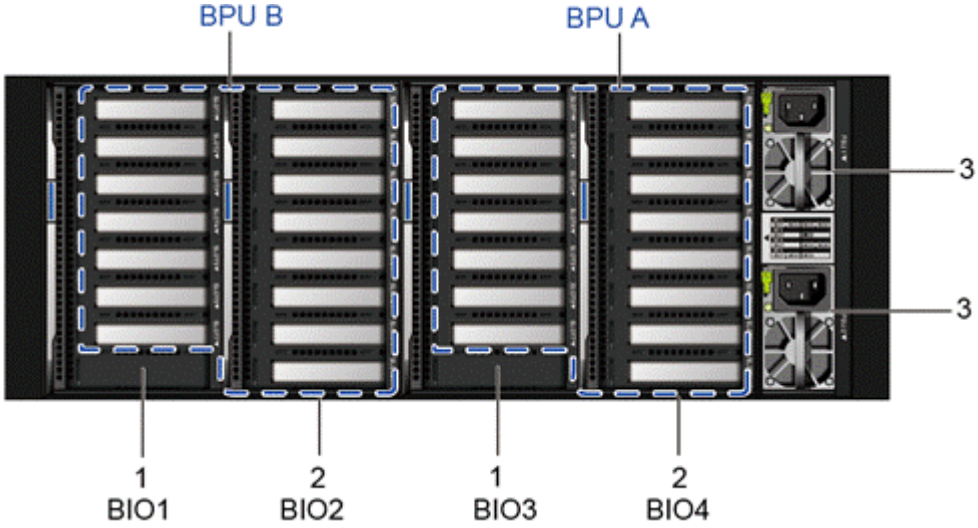


Table 1-11 REE components at the rear (with two non-hot-swappable BIO groups)

No.	Component	No.	Component
1	BIO-D (seven slots)	2	BIO-C (eight slots)
3	PSU		

Table 1-12 provides the slot layout from left to right.

Table 1-12 BIO slot layout (with two non-hot-swappable BIO groups)

BIO1	BIO2	BIO3	BIO4
Slot 1, PCIe 3.0 x8	Slot 1, PCIe 3.0 x4	Slot 1, PCIe 3.0 x8	Slot 1, PCIe 3.0 x4
Slot 2, PCIe 3.0 x8	Slot 2, PCIe 3.0 x4	Slot 2, PCIe 3.0 x8	Slot 2, PCIe 3.0 x4
Slot 3, PCIe 3.0 x8	Slot 3, PCIe 3.0 x4	Slot 3, PCIe 3.0 x8	Slot 3, PCIe 3.0 x4
Slot 4, PCIe 3.0 x8	Slot 4, PCIe3.0 x4	Slot 4, PCIe3.0 x8	Slot 4, PCIe3.0 x4
Slot 5, PCIe3.0 x8	Slot 5, PCIe3.0 x4	Slot 5, PCIe3.0 x8	Slot 5, PCIe3.0 x4
Slot 6, PCIe3.0 x8	Slot 6, PCIe3.0 x4	Slot 6, PCIe3.0 x8	Slot 6, PCIe3.0 x4
Slot 7, PCIe3.0 x8	Slot 7, PCIe3.0 x4	Slot 7, PCIe3.0 x8	Slot 7, PCIe 3.0 x4
	Slot 8, PCIe 3.0 x4		Slot 8, PCIe 3.0 x4

Figure 1-13 Rear view of an REE with one hot-swappable BIO group and one non-hot-swappable BIO group

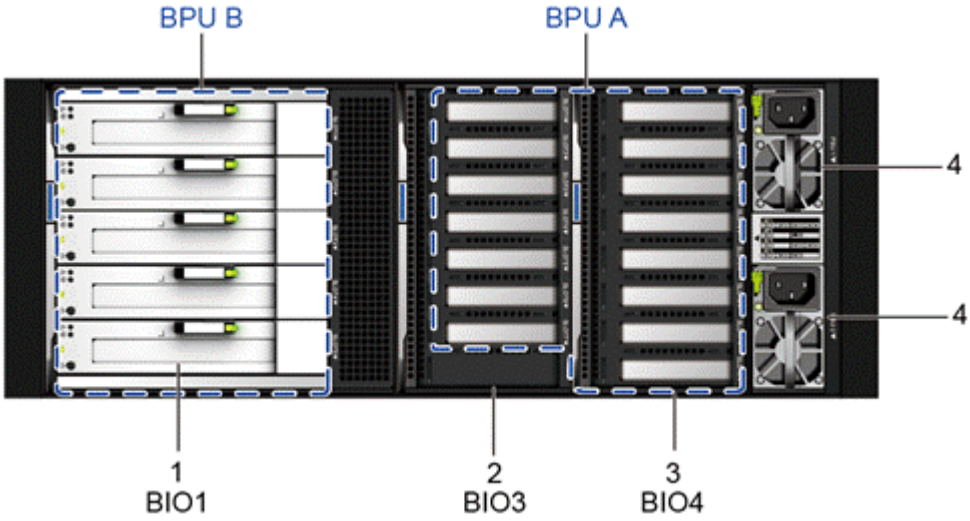


Table 1-13 Components at the rear of an REE with one hot-swappable BIO group and one non-hot-swappable BIO group

No.	Component	No.	Component
1	BIO-E	2	BIO-D (seven slots)
3	BIO-C (eight slots)	4	PSU

Table 1-14 BIO slot layout (with one hot-swappable BIO group and one non-hot-swappable BIO group)

BIO1	BIO3	BIO4
Slot 1, PCIe 3.0 x16	Slot 1, PCIe 3.0 x8	Slot 1, PCIe 3.0 x4
Slot 2, PCIe 3.0 x16	Slot 2, PCIe 3.0 x8	Slot 2, PCIe 3.0 x4
Slot 3, PCIe 3.0 x8	Slot 3, PCIe 3.0 x8	Slot 3, PCIe 3.0 x4
Slot 4, PCIe 3.0 x8	Slot 4, PCIe 3.0 x8	Slot 4, PCIe 3.0 x4
Slot 5, PCIe 3.0 x8	Slot 5, PCIe 3.0 x8	Slot 5, PCIe 3.0 x4
	Slot 6, PCIe 3.0 x8	Slot 6, PCIe 3.0 x4
	Slot 7, PCIe 3.0 x8	Slot 7, PCIe 3.0 x4
		Slot 8, PCIe 3.0 x4

Figure 1-14 Rear view of an REE with one non-hot-swappable BIO group and one hot-swappable BIO group

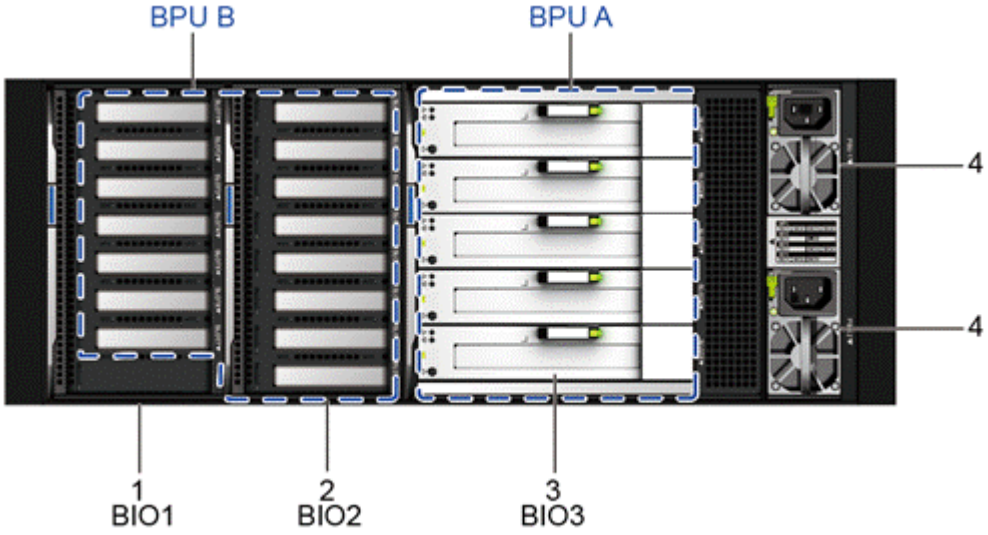


Table 1-15 Components at the rear of an REE with one non-hot-swappable BIO group and one hot-swappable BIO group

No.	Component	No.	Component
1	BIO-D (seven slots)	2	BIO-C (eight slots)
3	BIO-E	4	PSU

Table 1-16 BIO slot layout (with one non-hot-swappable BIO group and one hot-swappable BIO group)

BIO1	BIO2	BIO3
Slot 1, PCIe 3.0 x8	Slot 1, PCIe 3.0 x4	Slot 1, PCIe 3.0 x16
Slot 2, PCIe 3.0 x8	Slot 2, PCIe 3.0 x4	Slot 2, PCIe 3.0 x16
Slot 3, PCIe 3.0 x8	Slot 3, PCIe 3.0 x4	Slot 3, PCIe 3.0 x8
Slot 4, PCIe 3.0 x8	Slot 4, PCIe 3.0 x4	Slot 4, PCIe 3.0 x8
Slot 5, PCIe 3.0 x8	Slot 5, PCIe 3.0 x4	Slot 5, PCIe 3.0 x8
Slot 6, PCIe 3.0 x8	Slot 6, PCIe 3.0 x4	
Slot 7, PCIe 3.0 x8	Slot 7, PCIe 3.0 x4	
	Slot 8, PCIe 3.0 x4	

NOTE

1. When a 9008 V5-2P is configured with an REE, the PCIe slots of BIO 1 and BIO 2 in the REE are unavailable.

2. When an SCE is configured with an REE, the logical resources of a BPU also include the hard disks and I/O resources in the REE. BPU A consists of six front HDD slots 0 to 5 and PCIe slots in BIO 3 and BIO 4. BPU B consists of six front HDD slots 6 to 11 and PCIe slots in BIO 1 and BIO 2.

1.2.4 Acoustic Doors

Appearance

Figure 1-15 shows a front acoustic door.

Figure 1-15 Front acoustic door

Front and Rear Acoustic Doors

Figure 1-16 shows front and rear acoustic doors. Table 1-17 describes the components.

Figure 1-16 Front and rear acoustic doors

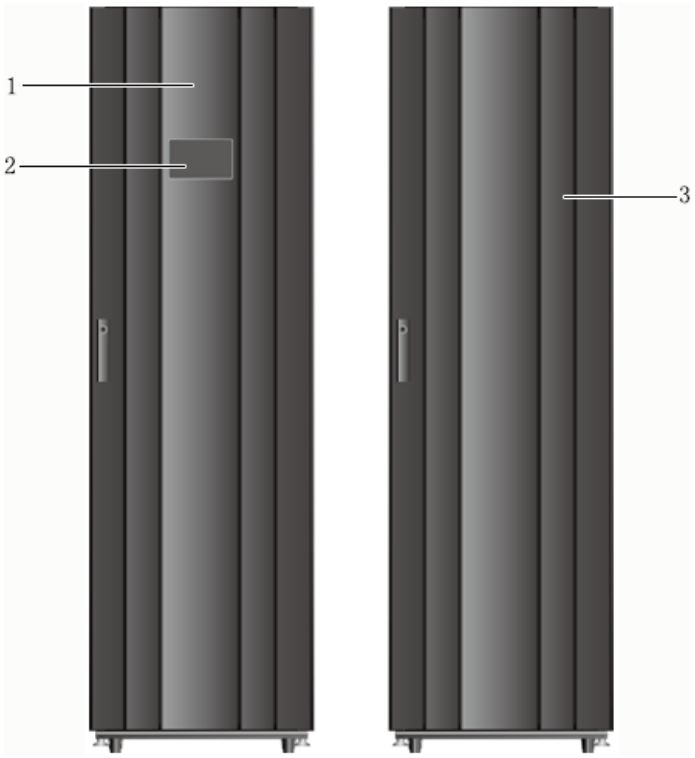


Table 1-17 Components of front and rear acoustic doors

No.	Component	No.	Component
1	Front acoustic door	2	8-inch LCD
3	Rear acoustic door	-	-

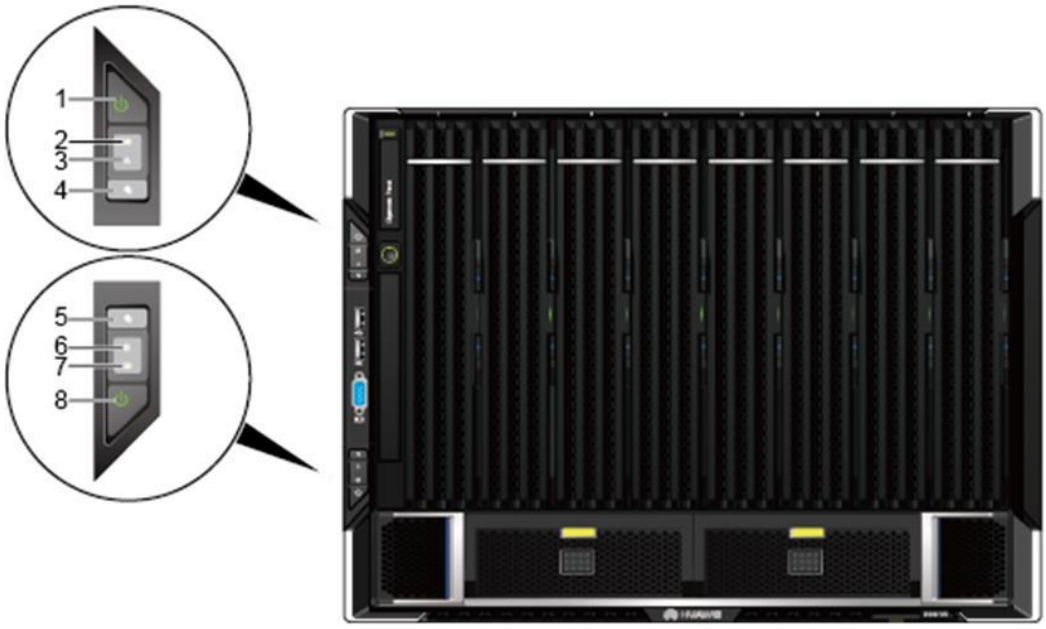
1.3 Indicators and Buttons

You can observe the indicators to determine server status.

1.3.1 SCE Indicators and Buttons

Figure 1-17 shows the indicators and buttons on the front panel of an SCE. **Table 1-18** describes the indicators and buttons.

Figure 1-17 Indicators and buttons on the SCE front panel



1	Primary power button/indicator	2	Primary health indicator
3	Primary VGA indicator	4	Primary UID button/indicator
5	Secondary UID button/indicator	6	Secondary VGA indicator
7	Secondary health indicator	8	Secondary power button/ indicator

Table 1-18 Indicators and buttons on the SCE front panel

No.	Silkscreen	Location	Name	Color	Description
1		Left mounting ear	Power button / indicator for BPU A	Yellow and green	● **Single-System Mode** Only the power button and indicator on SCE 1 function. – Off: There is no power supply to components in the cabinet. – Blinking yellow: The power supply to the service system is locked temporarily. Therefore, the service system cannot be powered on. In this state, the power button does not function. – Steady yellow: The service system is ready to be powered on. In this state, the power button functions. – Steady green: The service system has been powered on. In this state, the power button functions. – Pressing the power button for 1 to 3 seconds: – The service system is powered on. – Pressing and holding down the power button for 1 to 3 seconds during BIOS startup will power off the service system. – Pressing and holding down the power button for longer than 4 seconds will forcibly power off the service system. – The power button functions only once within 10 seconds. ● **Physical Partition Mode** The power button controls the power status of the physical partition, and the indicator indicates the power status of the physical partition. The button and indicator will function only if BPUA is the primary BPU. If BPU A is the secondary BPU, this indicator and button do not function. – Off: There is no power supply to components in the cabinet. – Blinking yellow: The power supply to the physical partition is locked temporarily. Therefore, the physical partition cannot be powered on. In this state, the power button does not function. Generally, the power supply to the service system is automatically unlocked after the CMC starts, completes

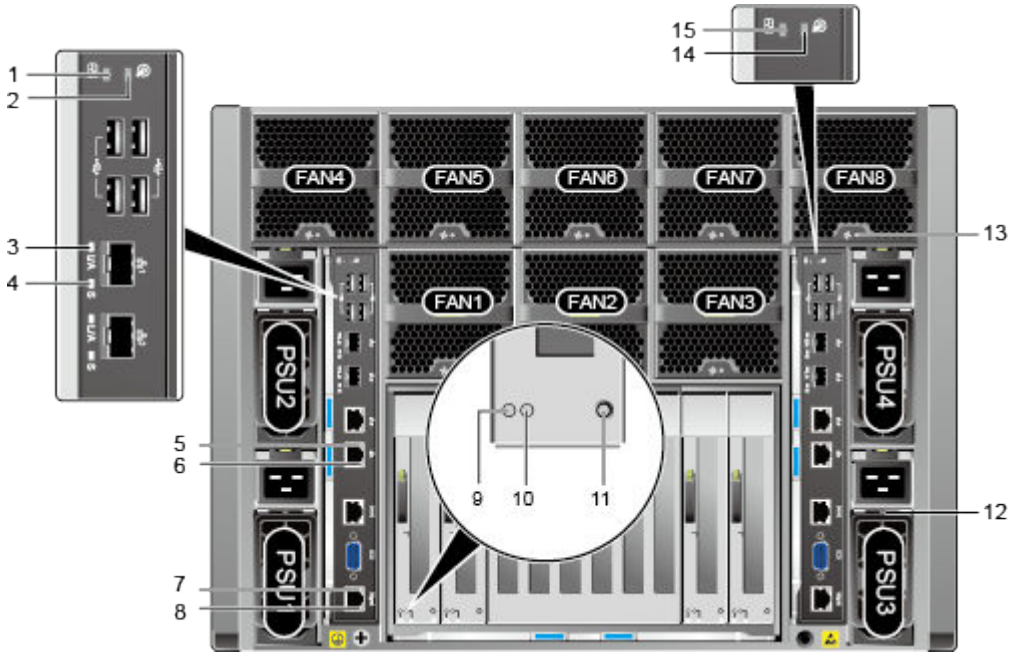
No.	Silkscreen	Location	Name	Color	Description
					system self-check and configuration, and delivers partition information. - Steady yellow: The physical partition is ready to be powered on. In this state, the power button functions. - Steady green: The physical partition has been powered on. In this state, the power button functions. - Pressing the power button for 1 to 3 seconds: - The physical partition is powered on. - Pressing and holding down the power button for 1 to 3 seconds during BIOS startup will power off the physical partition. - Pressing and holding down the power button for longer than 4 seconds will forcibly power off the physical partition. - The power button functions only once within 10 seconds.
2		Left mounting ear	Health indicator for BPU A	Red and green	The health indicator indicates the health status of BPU A in an SCE, regardless of the working mode and partition mode. ● Steady green: The devices in the BPU are operating properly. ● Blinking red at 1 Hz: A major alarm has been generated for a component in the BPU. ● Blinking red at 5 Hz: A critical alarm has been generated for a component in the BPU.
3	A	Left mounting ear	BPU A VGA indicator	White	The VGA indicator indicates whether the VGA and USB 2.0 ports on the front panel are used by the system. Steady white: The system is using the VGA and USB 2.0 ports on the front panel. Off: The system is not using the VGA and USB 2.0 ports on the front panel.

No.	Silkscreen	Location	Name	Color	Description
4		Left mounting ear	UID button / indicator for BPU A	Blue	The UID button/indicator helps identify and locate BPU A in an SCE, regardless of the working mode and partition mode. (SCMs 1 to 4 belong to BPU A.) ● Steady on: The UID button on the SCE front panel has been pressed to locate BPU A. ● Off: BPU A is not being located. **NOTE** You can hold down the UID button for 6 seconds to reset the BMC on LPM 2.
5		Left mounting ear	UID button / indicator for BPU B	Blue	The UID button/indicator helps identify and locate BPU B in an SCE, regardless of the working mode and partition mode. ● Steady on: The UID button has been pressed on the SCE front panel or clicked on the CMC WebUI to locate BPU B. ● Off: BPU A is not being located. **NOTE** You can hold down the UID button for 4 seconds to reset the BMC on LPM 1.
6		Left mounting ear	Health indicator for BPU B	Red and green	This indicator indicates the health status of BPU B in an SCE, regardless of the working mode and partition mode. (SCMs 5 to 8 belong to BPU B.) ● Steady green: The components in the BPU are operating properly. ● Blinking red at 1 Hz: A major alarm has been generated for a component in the BPU. ● Blinking red at 5 Hz: A critical alarm has been generated for a component in the BPU.
7	B	Left mounting ear	BPU B VGA indicator	White	The VGA indicator indicates whether the VGA and USB 2.0 ports on the front panel are used by the system. Steady white: The system is using the VGA and USB 2.0 ports on the front panel. Off: The system is not using the VGA and USB 2.0 ports on the front panel.

No.	Silkscreen	Location	Name	Color	Description
8		Left mounting ear	Power button / indicator for BPU B	Yellow and green	• **Single-System Mode** This button and indicator are unavailable. That is, the indicator is off and the button is unavailable. • **Physical Partition Mode** This button controls the power status of the physical partition, and this indicator indicates the power status of the physical partition. This button and indicator function only if BPU B is the primary BPU. – Off: There is no power supply to components in the cabinet. – Blinking yellow: The power supply to the physical partition is locked temporarily. Therefore, the physical partition cannot be powered on. In this state, the power button does not function. Generally, the power supply to the service system is automatically unlocked after the CMC starts, completes system self-check and configuration, and delivers partition information. – Steady yellow: The physical partition is ready to be powered on. In this state, the power button functions. – Steady green: The physical partition has been powered on. In this state, the power button functions. – Pressing the power button for 1 to 3 seconds: – The physical partition is powered on. – Powers off the physical partition when the BIOS Setup utility has started but the OS is not powered on. – Pressing and holding down the power button for longer than 4 seconds will forcibly power off the physical partition. – The power button functions only once within 10 seconds.

The SCE rear panels are classified into two types. One supports a CME, and the other does not support a CME. The two types of SCEs have different management boards. To support a CME, the SCE must be equipped with a management board that provides a PIP.

Figure 1-18 Indicators and buttons on the SCE rear panel that does not support a CME



1	Secondary health indicator	2	Secondary UID indicator
3	Connection status indicator and data transmission status indicator for a 10GE optical port	4	Data transmission rate indicator for a 10GE optical port
5	Data transmission status indicator for a GE electrical port	6	Connection status indicator for a GE electrical port
7	Data transmission status indicator for the iBMC management network port	8	Connection status indicator on the iBMC management port
9	PCIe card status indicator	10	PCIe card power indicator
11	PCIe card hot swap button	12	PSU status indicator
13	Fan module status indicator	14	Primary UID indicator
15	Primary health indicator	-	-

Relationship between the indicators on LPM-1 and LPM-2:

- The health status indicator on LPM-2 is the primary health indicator.
- The UID indicator on LPM-2 is the primary UID indicator.

Table 1-19 Indicators and buttons on the SCE rear panel

Silkscreen	Indicator	Color	Single-System Mode	Dual-System Mode
	Primary health indicator	Red and green	● Steady green: The server is operating properly. ● Blinking red at 1 Hz: A major alarm has been generated on the server. ● Blinking red at 2 Hz: A critical alarm has been generated on the server.	● Steady green: System A is operating properly. ● Blinking red at 1 Hz: A major alarm is generated for system A. ● Blinking red at 2 Hz: A critical alarm is generated for system A.
	Secondary health indicator	Red and green	● Steady red: LPM-1 is installed and LPM-2 is not installed. ● Off: LPM-1 is not installed and LPM-2 is installed.	● Steady green: System B is operating properly. ● Blinking red at 1 Hz: A major alarm is generated for system B. ● Blinking red at 2 Hz: A critical alarm is generated for system B.
	Primary UID indicator	Blue	The UID button/indicator helps identify and locate a server in a cabinet. You can turn on or off the UID indicator by running a command on the iBMC CLI. ● Steady on: The server is located. ● Off: The server is not located.	The UID indicator helps identify and locate a system in a cabinet. You can turn on or off the UID indicator by running a command on the iBMC CLI. ● Steady on: System A is located. ● Off: System A is not located.
	Secondary UID indicator	Blue	This indicator is invalid. That is, the indicator is off.	The UID indicator helps identify and locate a system in a cabinet. You can turn on or off the UID indicator by running a command on the iBMC CLI. ● Steady on: System B is located. ● Off: System B is not located.

Silkscreen	Indicator	Color	Single-System Mode	Dual-System Mode
-	Data transmission status indicator on the management port	Yellow	● Blinking yellow: Data is being transmitted. ● Off: No data is being transmitted.	● Blinking yellow: Data is being transmitted. ● Off: No data is being transmitted.
-	Connection status indicator on the management port	Green	● Steady green: The network port is properly connected. ● Off: The network port is not connected.	● Steady green: The network port is properly connected. ● Off: The network port is not connected.
-	Data transmission status indicator for a GE electrical port	Yellow	● Blinking yellow: Data is being transmitted. ● Off: No data is being transmitted.	● Blinking yellow: Data is being transmitted. ● Off: No data is being transmitted.
-	Connection status indicator for a GE electrical port	Green	● Steady green: The network port is properly connected. ● Off: The network port is not connected.	● Steady green: The network port is properly connected. ● Off: The network port is not connected.

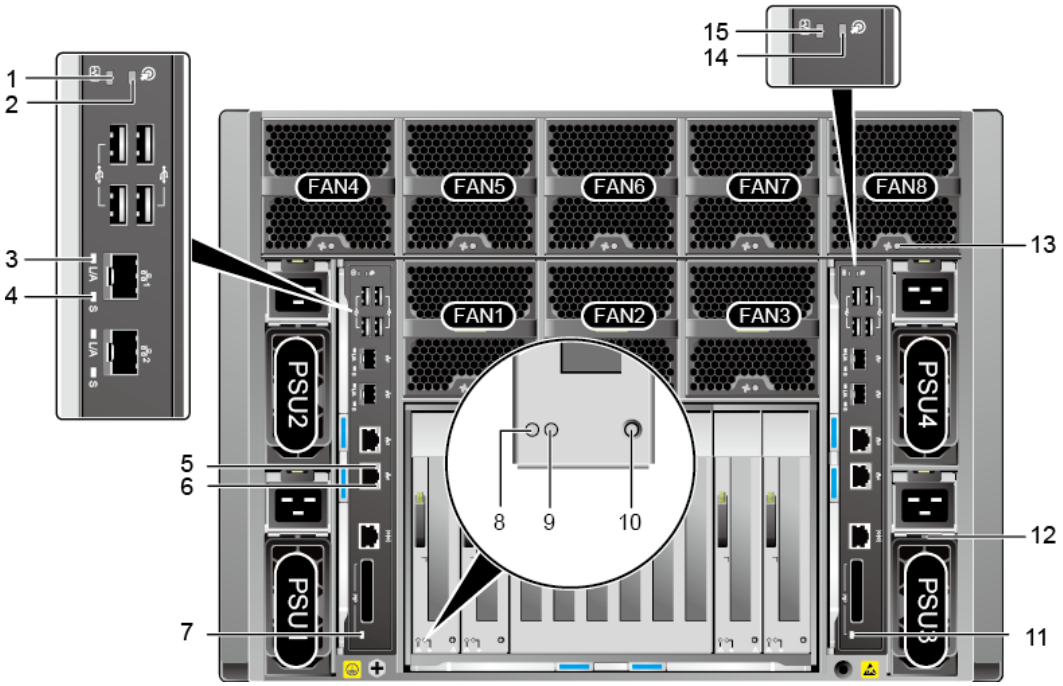
Silkscreen	Indicator	Color	Single-System Mode	Dual-System Mode
-	Connection status indicator and data transmission status indicator for a 10GE optical port	Green	● Steady green: The network port is properly connected. ● Blinking green: Data is being transmitted. ● Off: The network port is not connected.	● Steady green: The network port is properly connected. ● Blinking green: Data is being transmitted. ● Off: The network port is not connected.
-	Data transmission rate indicator for a 10GE optical port	Yellow and green	● Steady green: The data transmission rate is 10 Gbit/s. ● Steady yellow: The data transmission rate is lower than 10 Gbit/s. ● Off: The network port is not connected.	● Steady green: The data transmission rate is 10 Gbit/s. ● Steady yellow: The data transmission rate is lower than 10 Gbit/s. ● Off: The network port is not connected.

Silkscreen	Indicator	Color	Single-System Mode	Dual-System Mode
	Fan module status indicator	Red and green	● Off: There is no power supply to components in the cabinet. ● Blinking red at 0.5 Hz: An alarm is generated for the fan module, but whether to repair it is uncertain. ● Steady red: The fan module or the fan module board is faulty and needs to be repaired. ● Steady green: The fan module board is faulty or under online upgrade. (An online upgrade takes about 3 minutes. If the indicator is steady green for a long time, the upgrade fails.) ● Blinking green at 0.5 Hz: The fan module is properly communicating with the iBMC. ● Blinking green at 4 Hz: The fan module fails to communicate with the iBMC.	● Off: There is no power supply to components in the cabinet. ● Blinking red at 0.5 Hz: An alarm is generated for the fan module, but whether to repair it is uncertain. ● Steady red: The fan module or the fan module board is faulty and needs to be repaired. ● Steady green: The fan module board is faulty or under online upgrade. (An online upgrade takes about 3 minutes. If the indicator is steady green for a long time, the upgrade fails.) ● Blinking green at 0.5 Hz: The fan module is properly communicating with the iBMC. ● Blinking green at 4 Hz: The fan module fails to communicate with the iBMC.
-	PSU status indicator	Red and green	● Steady green: The PSU is operating properly. ● Blinking green at 0.5 Hz: The PSU is in the hibernation state (no 12 V output). ● Steady red: A fault alarm is generated for the PSU.	● Steady green: The PSU is operating properly. ● Blinking green at 0.5 Hz: The PSU is in the hibernation state (no 12 V output). ● Steady red: A fault alarm is generated for the PSU.

Silkscreen	Indicator	Color	Single-System Mode	Dual-System Mode
	PCIe card status indicator	Yellow	● On: The PCIe card is abnormal, or the server is in the power-on self-test (POST) phase. ● Off: The PCIe card is operating properly. ● Blinking yellow: The PCIe card is waiting to cancel the hot swap operation.	● On: The PCIe card is abnormal, or the server is in the POST phase. ● Off: The PCIe card is operating properly. ● Blinking yellow: The PCIe card is waiting to cancel the hot swap operation.
	PCIe card power indicator	Green	● Steady green: The PCIe card power supply is normal. ● Blinking green: The PCIe card is in the power-on or power-off process. ● Off: The PCIe card is powered off.	● Steady green: The PCIe card power supply is normal. ● Blinking green: The PCIe card is in the power-on or power-off process. ● Off: The PCIe card is powered off.
	PCIe card hot swap button	-	You can hot-swap the PCIe card when the system is operating properly. ● Press this button when the PCIe card is operating properly. The PCIe card is removable 10 seconds after the PWR indicator turns off. ● Press this button after you install a PCIe card. The PCIe card is operating properly 10 seconds later after the PWR indicator becomes steady green.	You can hot-swap the PCIe card when the system is operating properly. ● Press this button when the PCIe card is operating properly. The PCIe card is removable 10 seconds after the PWR indicator turns off. ● Press this button after you install a PCIe card. The PCIe card is operating properly 10 seconds later after the PWR indicator becomes steady green.

Figure 1-19 shows the indicators on the rear panel of the 9008 V5 (with a CME).

Figure 1-19 Indicators on the rear panel (with a CME)



1	Secondary health indicator	2	Secondary UID indicator
3	Connection status indicator and data transmission status indicator for a 10GE optical port	4	Data transmission rate indicator for a 10GE optical port
5	Data transmission status indicator for a GE electrical port	6	Connection status indicator for a GE electrical port
7	PIC installation status/health indicator	8	PCIe card status indicator
9	PCIe card power indicator	10	PCIe card hot swap button
11	PIC installation status/health indicator	12	PSU status indicator
13	Fan module status indicator	14	Primary UID indicator
15	Primary health indicator	-	-

Relationship between the indicators on LPM-1 and LPM-2:

- The health status indicator on LPM-2 is the primary health indicator.
- The UID indicator on LPM-2 is the primary UID indicator.

Table 1-20 Indicators and buttons on the rear panel

No.	Silkscreen	Name	Color	Single-System Mode	Dual-System Mode
1		Secondary health indicator	Red and green	● Steady red: LPM-1 is installed and LPM-2 is not installed. ● Off: LPM-1 is not installed and LPM-2 is installed.	● Steady green: BPU B is operating properly. ● Blinking red at 1 Hz: A major alarm has been generated on BPU B. ● Blinking red at 2 Hz: A critical alarm has been generated on BPU B.
2		Secondary UID indicator	Blue	This indicator is invalid. That is, the indicator is off.	The UID indicator helps identify and locate a system in a cabinet. You can turn on or off the UID indicator by running a command on the iBMC CLI. ● Steady on or blinking: BPU B is located. ● Off: BPU B is not located.
3	-	Connection status indicator and data transmission status indicator for a 10GE optical port	Green	● Steady green: The network port is properly connected. ● Blinking green: Data is being transmitted. ● Off: The network port is not connected.	● Steady green: The network port is properly connected. ● Blinking green: Data is being transmitted. ● Off: The network port is not connected.

No.	Silkscreen	Name	Color	Single-System Mode	Dual-System Mode
4	-	Data transmission rate indicator for a 10GE optical port	Yellow and green	● Steady green: The data transmission rate is 10 Gbit/s. ● Steady yellow: The data transmission rate is lower than 10 Gbit/s. ● Off: The network port is not connected.	● Steady green: The data transmission rate is 10 Gbit/s. ● Steady yellow: The data transmission rate is lower than 10 Gbit/s. ● Off: The network port is not connected.
5	-	Data transmission status indicator for a GE electrical port	Yellow	● Blinking yellow: Data is being transmitted. ● Off: No data is being transmitted.	● Blinking yellow: Data is being transmitted. ● Off: No data is being transmitted.
6	-	Connection status indicator for a GE electrical port	Green	● Steady green: The network port is properly connected. ● Off: The network port is not connected.	● Steady green: The network port is properly connected. ● Off: The network port is not connected.

No.	Silkscreen	Name	Color	Single-System Mode	Dual-System Mode
7	-	PIC installation status / health indicator	Red and green	● Off: The PIC cannot be detected or the port is not in use. ● Steady green: The PIC can be detected and the cable channel between LPM 1 and the CME is working properly. ● Steady red: The PIC can be detected and the cable channel between LPM 1 and the CME is working abnormally.	● Off: The PIC cannot be detected or the port is not in use. ● Steady green: The PIC can be detected and the cable channel between LPM 1 and the CME is working properly. ● Steady red: The PIC can be detected and the cable channel between LPM 1 and the CME is working abnormally.
8		PCIe card status indicator	Yellow	● On: The PCIe card is abnormal, or the server is in the POST phase. ● Off: The PCIe card is operating properly. ● Blinking yellow: The PCIe card is waiting to cancel the hot swap operation.	● On: The PCIe card is abnormal, or the server is in the POST phase. ● Off: The PCIe card is operating properly. ● Blinking yellow: The PCIe card is waiting to cancel the hot swap operation.
9		PCIe card power indicator	Green	● Steady green: The PCIe card power supply is normal. ● Blinking green: The PCIe card is in the power-on or power-off process. ● Off: The PCIe card is powered off.	● Steady green: The PCIe card power supply is normal. ● Blinking green: The PCIe card is in the power-on or power-off process. ● Off: The PCIe card is powered off.

No.	Silkscreen	Name	Color	Single-System Mode	Dual-System Mode
10		PCIe card hot swap button	-	You can hot-swap the PCIe card when the system is operating properly. ● Press this button when the PCIe card is operating properly. The PCIe card is removable 10 seconds after the PWR indicator turns off. ● When the PCIe card status indicator blinks, you can press this button to cancel hot swap. The PCIe card continues to work properly. (RHEL 7.3/7.4 and SLES 12.2 do not support this function.) ● Press this button after you install a PCIe card. The PCIe card is operating properly 10 seconds later after the PWR indicator becomes steady green.	You can hot-swap the PCIe card when the system is operating properly. ● Press this button when the PCIe card is operating properly. The PCIe card is removable 10 seconds after the PWR indicator turns off. ● When the PCIe card status indicator blinks, you can press this button to cancel hot swap. The PCIe card continues to work properly. (RHEL 7.3/7.4 and SLES 12.2 do not support this function.) ● Press this button after you install a PCIe card. The PCIe card is operating properly 10 seconds later after the PWR indicator becomes steady green.
11	-	PIC installation status / health indicator	Red and green	● Off: The PIC cannot be detected or the port is not in use. ● Steady green: The PIC can be detected and the cable channel between LPM 2 and the CME is working properly. ● Steady red: The PIC can be detected and the cable channel between LPM 2 and the CME is working abnormally.	● Off: The PIC cannot be detected or the port is not in use. ● Steady green: The PIC can be detected and the cable channel between LPM 2 and the CME is working properly. ● Steady red: The PIC can be detected and the cable channel between LPM 2 and the CME is working abnormally.

No.	Silkscreen	Name	Color	Single-System Mode	Dual-System Mode
12	-	PSU status indicator	Red and green	● Steady green: The PSU is operating properly. ● Blinking green at 0.5 Hz: The PSU is in the hibernation state (no 12 V output). ● Steady red: A fault alarm is generated for the PSU. ● Off: There is no power supply.	● Steady green: The PSU is operating properly. ● Blinking green at 0.5 Hz: The PSU is in the hibernation state (no 12 V output). ● Steady red: A fault alarm is generated for the PSU. ● Off: There is no power supply.
13		Fan module status indicator	Red and green	● Off: There is no power supply to components in the cabinet. ● Blinking red at 0.5 Hz: An alarm is generated for the fan module, but whether to repair it is uncertain. ● Steady red: The fan module or the fan module board is faulty and needs to be repaired. ● Steady green: The fan module board is faulty or under online upgrade. (An online upgrade takes about 3 minutes. If the indicator is steady green for a long time, the upgrade fails.) ● Blinking green at 0.5 Hz: The fan module is properly communicating with the iBMC. ● Blinking green at 4 Hz: The fan module fails to communicate with the iBMC.	● Off: There is no power supply to components in the cabinet. ● Blinking red at 0.5 Hz: An alarm is generated for the fan module, but whether to repair it is uncertain. ● Steady red: The fan module or the fan module board is faulty and needs to be repaired. ● Steady green: The fan module board is faulty or under online upgrade. (An online upgrade takes about 3 minutes. If the indicator is steady green for a long time, the upgrade fails.) ● Blinking green at 0.5 Hz: The fan module is properly communicating with the iBMC. ● Blinking green at 4 Hz: The fan module fails to communicate with the iBMC.

No.	Silkscreen	Name	Color	Single-System Mode	Dual-System Mode
14		Primary UID indicator	Blue	The UID button/indicator helps identify and locate a server in a cabinet. You can turn on or off the UID indicator by running a command on the iBMC CLI. ● Steady or blinking: The server is being located. ● Off: The server is not located.	The UID indicator helps identify and locate a system in a cabinet. You can turn on or off the UID indicator by running a command on the iBMC CLI. ● Steady on or blinking: BPU A is located. ● Off: BPU A is not located.
15		Primary health indicator	Red and green	● Steady green: The server is operating properly. ● Blinking red at 1 Hz: A major alarm has been generated on the server. ● Blinking red at 2 Hz: A critical alarm has been generated on the server.	● Steady green: BPU A is operating properly. ● Blinking red at 1 Hz: A major alarm has been generated on BPU A. ● Blinking red at 2 Hz: A critical alarm has been generated on BPU A.

1.3.2 CME Indicators and Buttons

Figure 1-20 shows the indicators and buttons on the CME front panel. Table 1-21 describes the indicators and buttons.

Figure 1-20 Indicators and buttons on the CME front panel

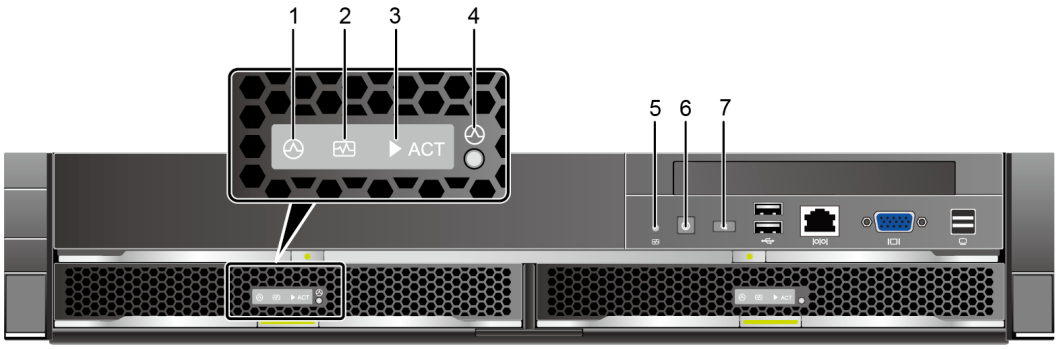


Table 1-21 Indicators and buttons on the CME front panel

No.	Silkscreen	Location	Name	Color	Single-System Mode	Physical Partition Mode
1		CMC	CMC power-on indicator	Green	● Off: The CMC is not powered on. ● Blinking green: The CMC is being powered on. ● Steady green: The CMC is powered on.	The status of this indicator is the same as that in single-system mode.
2		CMC	CMC health indicator	Red and green	● Off: The CMC is not powered on. ● Steady green: The CMC is operating properly. ● Blinking red at 1 Hz: A major alarm is generated for the CMC. ● Blinking red at 4 Hz: A critical alarm is generated for the CMC.	The status of this indicator is the same as that in single-system mode.
3	ACT	CMC	CMC active/ standby indicator	Green	● Off: The CMC is standby. ● Steady green: The CMC is active.	The status of this indicator is the same as that in single-system mode.
4		CMC	CMC reset button	NA	Pressing this button resets the CMC.	The status of this indicator is the same as that in single-system mode.

No.	Silkscreen	Location	Name	Color	Single-System Mode	Physical Partition Mode
5		CIM	System health indicator	Red and green	● Off: The system is not powered on. ● Steady green: The system is operating properly. ● Blinking red at 1 Hz: A major alarm is generated for the system. ● Blinking red at 4 Hz: A critical alarm is generated for the system.	The status of this indicator is the same as that in single-system mode.
6		CIM	System power button/ indicator	Yellow Green	● Off: There is no power supply to components in the cabinet. ● Blinking yellow: The power supply to the service system is locked temporarily. Therefore, the service system cannot be powered on. In this state, the power button does not function. Generally, the power supply to the service system is automatically unlocked after the CMC starts, completes system self-check and configuration, and delivers partition information. ● Steady yellow: The service system is ready to be powered on. In this state, the power button functions. ● Steady green: The service system is powered on. In this state, the power button functions. ● Pressing the power button for 1 second powers on the service system or powers off the service system during BIOS startup. ● Holding down the power button for longer than 4 seconds forcibly powers off the service system. **NOTE** The power button functions only once within 10 seconds.	This indicator and button do not function.

No.	Silkscreen	Location	Name	Color	Single-System Mode	Physical Partition Mode
7		CIM	System UID button/ indicator	Blue	● Steady on: The system UID button has been pressed on the CME front panel or clicked on the CMC WebUI to locate the entire cabinet. ● Off: The system UID button is not triggered.	The status of this indicator is the same as that in single-system mode.

Figure 1-21 shows the indicators and buttons on the CME rear panel. **Table 1-22** describes the indicators and buttons.

Figure 1-21 Indicators and buttons on the CME rear panel

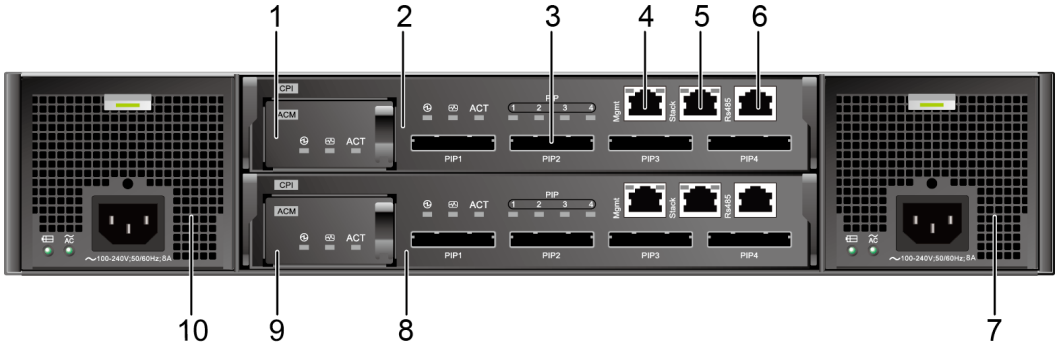


Table 1-22 Indicators and buttons on the CME rear panel

No.	Silkscreen	Location	Name	Color	Single-System Mode	Physical Partition Mode
1		ACM	Startup indicator	Green	● Off: The ACM is not powered on. ● Blinking green: The ACM is being powered on, the clock chip is not configured, or the clock is not delivered. ● Steady green: The ACM is powered on, the clock chip is configured, and the clock is delivered. The ACM is then ready to be powered on.	The status of this indicator is the same as that in single-system mode.

No.	Silkscreen	Location	Name	Color	Single-System Mode	Physical Partition Mode
2		ACM	Health indicator	Red and green	● Off: The ACM is not powered on. ● Steady green: The ACM is operating properly. ● Steady red: The ACM is operating abnormally.	The status of this indicator is the same as that in single-system mode.
3	ACT	ACM	Active / Standby indicator	Green	● Off: The ACM is standby. ● Steady green: The ACM is active.	The status of this indicator is the same as that in single-system mode.
4		CPI	Startup indicator	Green	● Off: The CPI is not powered on after it is inserted, or is powered off and removable after a hot swap operation is triggered. ● Blinking green: The CPI is being powered on after it is inserted. ● Steady green: The CPI is powered on and system configuration is delivered. That is, the CPI is ready for power-on.	The status of this indicator is the same as that in single-system mode.
5		CPI	Health indicator	Red and green	● Off: The CPI is not powered on after it is inserted, or is powered off and removable after a hot swap operation is triggered. ● Steady green: The CPI is operating properly. ● Steady red: The CPI is operating abnormally.	The status of this indicator is the same as that in single-system mode.

No.	Silkscreen	Location	Name	Color	Single-System Mode	Physical Partition Mode
6	ACT	CPI	Active/Standby indicator	Green	● Off: The CPI is standby. ● Steady green: The CPI is active.	The status of this indicator is the same as that in single-system mode.
7	-	CPI	PIC installation status/health indicator	Red and green	● Off: The PIC cannot be detected. ● Steady green: The PIC can be detected and the cable channel between the LPM and CME is working properly. ● Steady red: The PIC can be detected, but the cable channel between the LPM and CME is working abnormally.	The status of this indicator is the same as that in single-system mode.
8		PFM	PFM status indicator	Red and green	● Off: There is no power supply. ● Steady green: The PFM is operating properly. ● Blinking green at 1 Hz: The management software has not started and has not managed the PFM. ● Steady red: A fault alarm is generated for the PFM.	The status of this indicator is the same as that in single-system mode.
9		PFM	Battery backup unit (BBU) status indicator	Red and green	This indicator is reserved.	The status of this indicator is the same as that in single-system mode.

1.3.3 REE Indicators and Buttons

Figure 1-22 shows the indicators and buttons on the REE front panel. Table 1-23 describes the indicators and buttons.

Figure 1-22 Indicators and buttons on the REE front panel

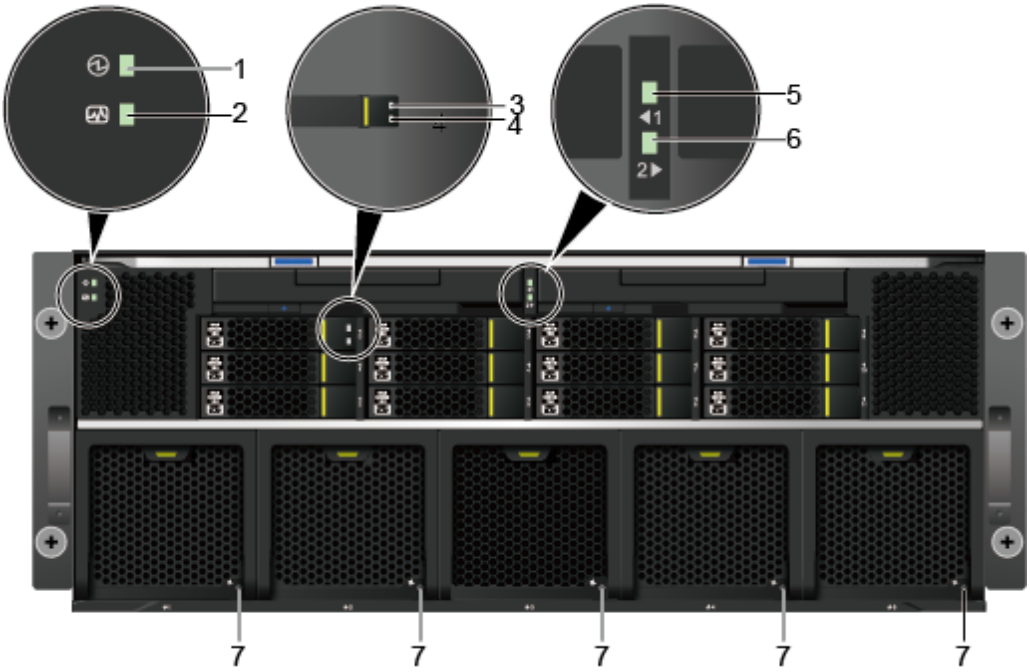


Table 1-23 Indicators and buttons on the REE front panel

No.	Silkscreen	Location	Name	Color	Description
1		Switch module panel	Switch module power indicator	Green	● Off: The switch module is not powered on. ● Steady green: The switch module is operating properly
2		Switch module panel	Switch module health indicator	Red and green	● Off: The CPU board module is not powered on. ● Steady green: The switch module is operating properly. ● Blinking red at 1 Hz: A major alarm is generated. ● Blinking red at 5 Hz: A critical alarm is generated.

No.	Silkscreen	Location	Name	Color	Description
3	-	Hard disk panel	Hard disk fault indicator	Yellow	● Off: The hard disk is operating properly or cannot be detected in a RAID array. ● Blinking yellow: The hard disk is being located, or RAID is being rebuilt. ● Steady yellow: The hard disk is faulty or cannot be detected.
4	-	Hard disk panel	Hard disk activity indicator	Green	● Off: The hard disk is faulty or cannot be detected. ● Blinking green: Data is being read from or written to the hard disk, or synchronized between hard disks. ● Steady green: The hard disk is inactive.
5	-	Near the switch module FPC slot	FPC 1 health indicator	Red and green	● Off: The FIO-G is not powered on. ● Steady green: The FPC is operating properly. ● Steady red: The FPC is not installed, is not properly installed, or is unhealthy.
6	-	Near the switch module FPC slot	FPC 2 health indicator	Red and green	● Off: The FIO-G is not powered on. ● Steady green: The FPC is operating properly. ● Steady red: The FPC is not installed, is not properly installed, or is unhealthy.

No.	Silkscreen	Location	Name	Color	Description
7		Fan module	Fan module status indicator	Red and green	• Off: The device is not powered on. • Blinking red at 0.5 Hz: An alarm is generated for the server, but the system cannot determine whether the server needs repair. • Steady red: A fan module is faulty and needs repair. • Steady green: The fan module is faulty or is in the online upgrade state. (An online upgrade takes about 3 minutes.) • Blinking green at 0.5 Hz: The fan module is properly communicating with the iBMC. • Blinking green at 4 Hz: The fan module fails to communicate with the iBMC.

Figure 1-23 shows the indicators and buttons on the rear panel of an REE. **Table 1-24** describes the indicators and buttons.

Figure 1-23 Indicators and buttons on the REE rear panel

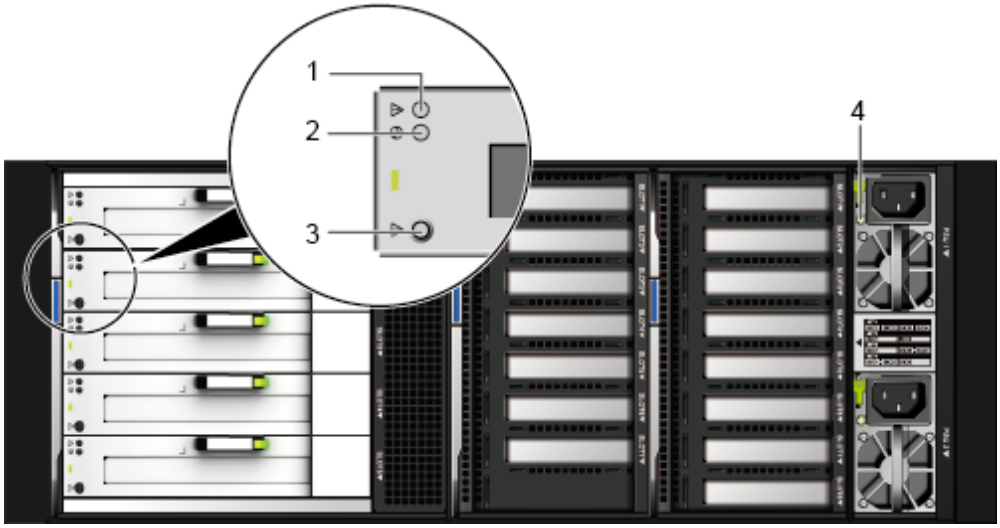


Table 1-24 Indicators and buttons on the REE rear panel

No.	Silkscreen	Location	Name	Color	Description
1		Each PCIe hot-swappable slot in a full-height hot-swappable back I/O module (BIO)	PCIe card status indicator	Yellow	● On: The PCIe card is abnormal, or the server is in the POST phase. ● Off: The PCIe card is operating properly.
2		Each PCIe hot-swappable slot in a full-height hot-swappable BIO	PCIe card power indicator	Green	● Steady green: The power supply to the PCIe card is normal. ● Blinking green: The PCIe card is in the power-on or power-off process. ● Off: The PCIe card is powered off.
3		Each PCIe hot-swappable slot in a full-height hot-swappable BIO	PCIe card hot swap button	-	● You can hot-swap the PCIe card when the system is operating properly. ● Press this button when the PCIe card is operating properly. The PCIe card is removable 10 seconds after the PWR indicator turns off. ● Press this button after you install a PCIe card. The PCIe card is operating properly 10 seconds later after the PWR indicator becomes steady green.
4	-	PSU	PSU status indicator	Green and orange	● Steady green: The PSU is operating properly. ● Blinking green at 1 Hz: The power input is normal, but the power output is stopped due to PSON or Present#. An input overvoltage or undervoltage fault occurs. ● Blinking green at 4 Hz: under online upgrade. ● 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. ● Off: There is no AC input.

1.4 Physical Structure

1.4.1 Cabinet

Figure 1-24 shows the physical structure. Table 1-25 describes the components of the 9008 V5.

Figure 1-24 Main components

9008 V5 (with a cabinet and acoustic doors)

NOTE

A cabinet and acoustic doors are optional. The 9008 V5 does not support shipment with cabinet. The cabinet and acoustic doors can be installed onsite.

Table 1-25 Component description

No.	Name	Function
1	Front acoustic door	The door is used for reducing server noise.
2	LCD	Displays the installation status and running status of server components.
4	SCE	An SCE consists of the backplane, indicator board, fan modules, and enclosure. As the basic component of the 9008 V5, an SCE houses and interconnects various components, and provides power supply and cooling channels for the system.
5	CME	The CME provides centralized management of intra-cabinet devices, partition-based management, LCD-based management, and redundant system clocks.
6	Cabinet	The cabinet is 2000 mm (78.74 in.) high and made of structural steel, with four rollers at the bottom.
7	Rear acoustic door	The door is used for reducing server noise.

Figure 1-25 shows the physical structures of 9008 V5 that support REEs, and **Table 1-26** describes the components.

Figure 1-25 Main components

Table 1-26 Component description

No.	Name	Function
1	Front acoustic door	The door is used for reducing server noise.
2	LCD	The LCD displays the installation status and running status of server components.
3	REE	An REE contains the switching module, RAID controller card, hard disk, BIO, fan module, and PSU components. The REE increases the number of standard PCIe slots and supports RAID controller cards and hard disks.

No.	Name	Function
4	FPC	An FPC connects an SCE to an REE and leads the PCIe and control resources of the SCE to the REE, facilitating PCIe resource extension and REE management.
5	SCE	An SCE consists of the backplane, indicator board, fan modules, and enclosure. As the basic component, the SCE houses and interconnects various components, and provides power supply and cooling channels for the system.
6	CME	The CME implements centralized management of intra-cabinet devices, partition management, and LCD-based management, and provides redundant advanced clock modules (ACMs), central management consoles (CMCs), and central partition interconnect modules (CPIs).
7	Cabinet	The cabinet is 2000 mm (78.74 in.) high and made of structural steel, with four rollers at the bottom.
8	Rear acoustic door	The door is used for reducing server noise.

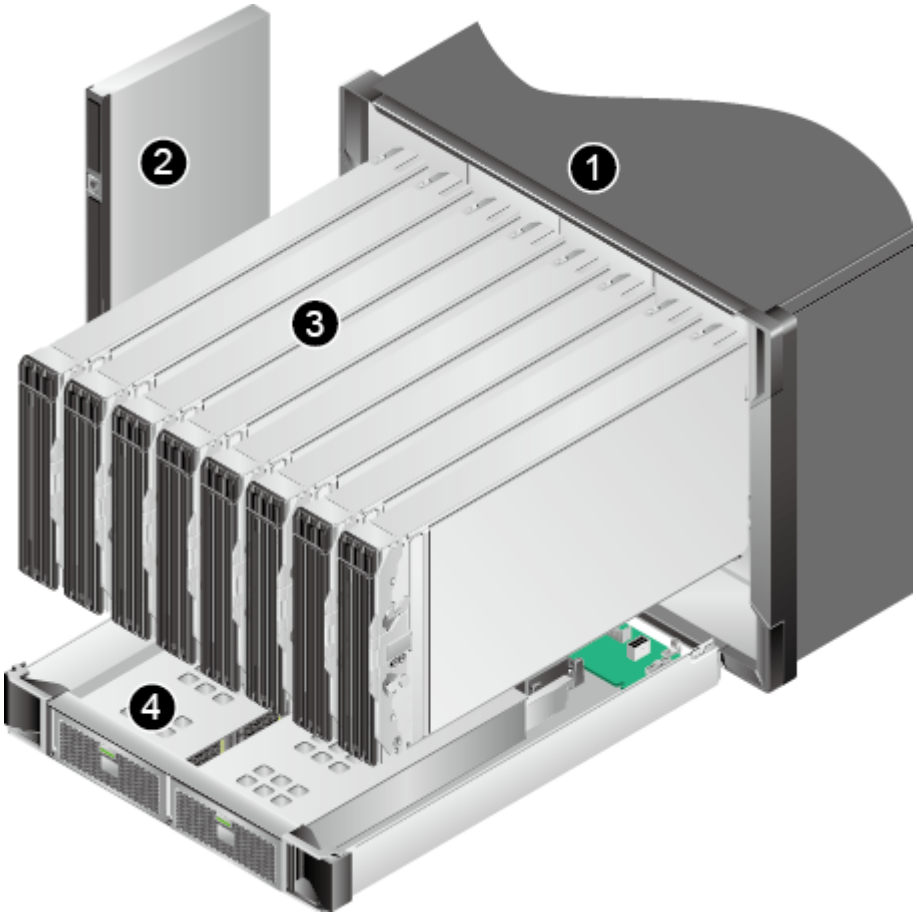
NOTE

A cabinet and acoustic doors are optional. The 9008 V5 does not support shipment with cabinet. The cabinet and acoustic doors can be installed onsite.

1.4.2 SCE Physical Structure

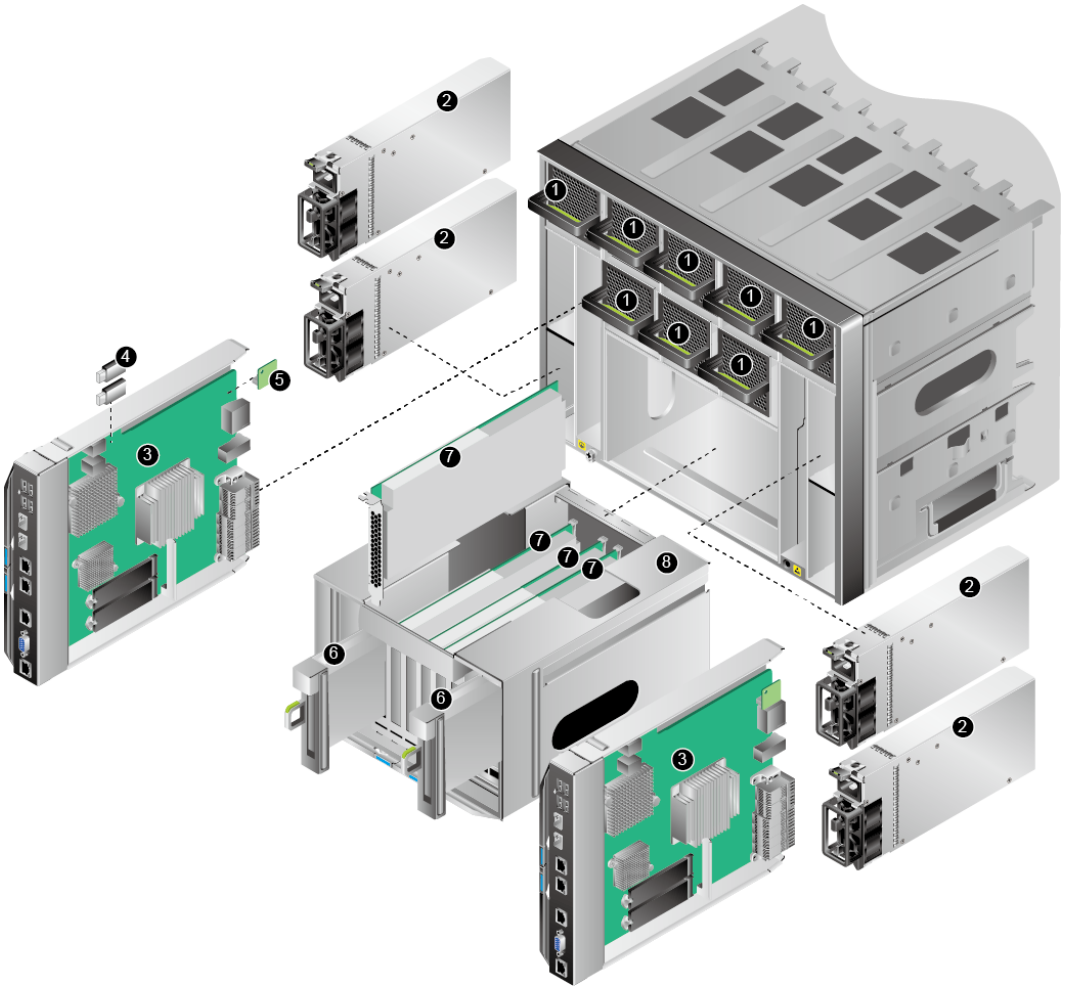
Figure 1-26 and **Figure 1-27** show the components of the 9008 V5.

Figure 1-26 9008 V5 components (front view)



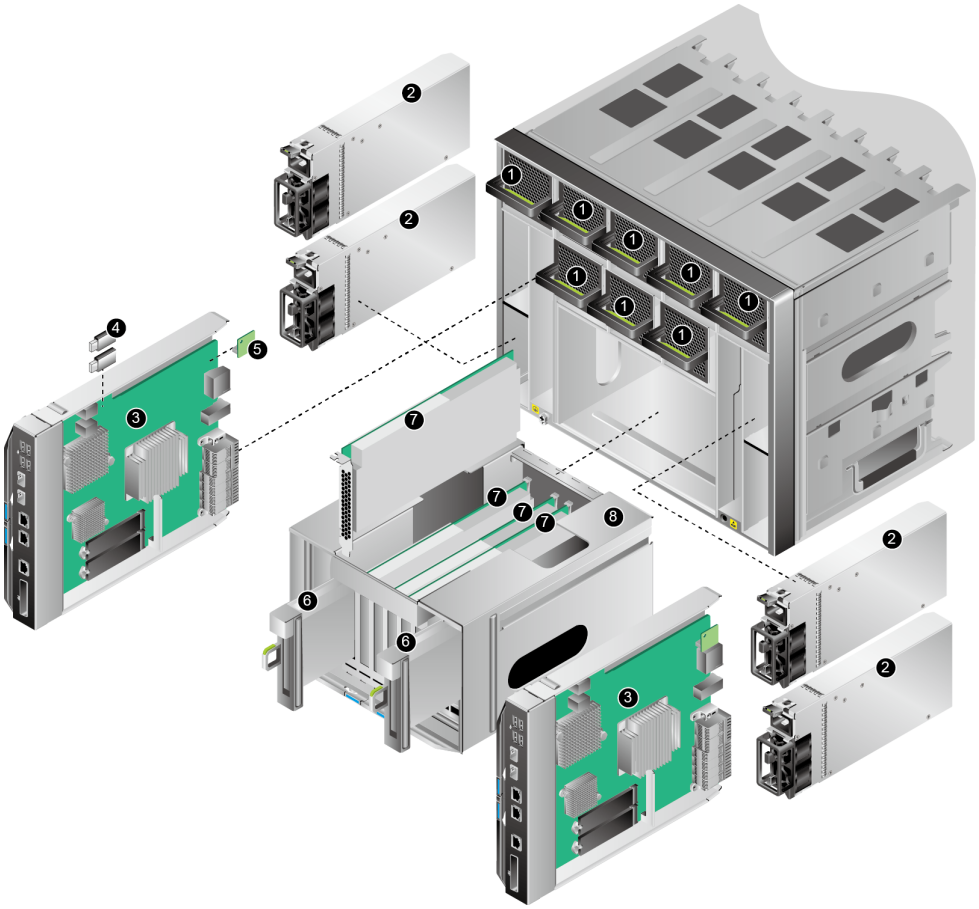
1	Chassis	2	DVD drive+LCD module
3	SCM (SCM-A used as an example)	4	FIO (FIO-B used as an example)

Figure 1-27 9008 V5 components (rear view, not supporting a CME)



1	Fan modules	2	PSUs
3	Local partition management modules (LPMs)	4	USB flash drives
5	TPM/TCM	6	Hot-swappable PCIe cards
7	Non-hot-swappable PCIe cards	8	Back I/O module (BIO)

Figure 1-28 9008 V5 components (rear view, supporting a CME)



1	Fan modules	2	PSUs
3	Local partition management module (LPM)	4	USB flash drives
5	TPM/TSCM	6	Hot-swappable PCIe cards
7	Non-hot-swappable PCIe cards	8	Back I/O module (BIO)

1.4.3 SCM

The 9008 V5 supports three types of system compute modules (SCMs): SCM-A, SCM-B, and SCM-C. **Table 1-27** shows the comparisons between the three types of SCMs.

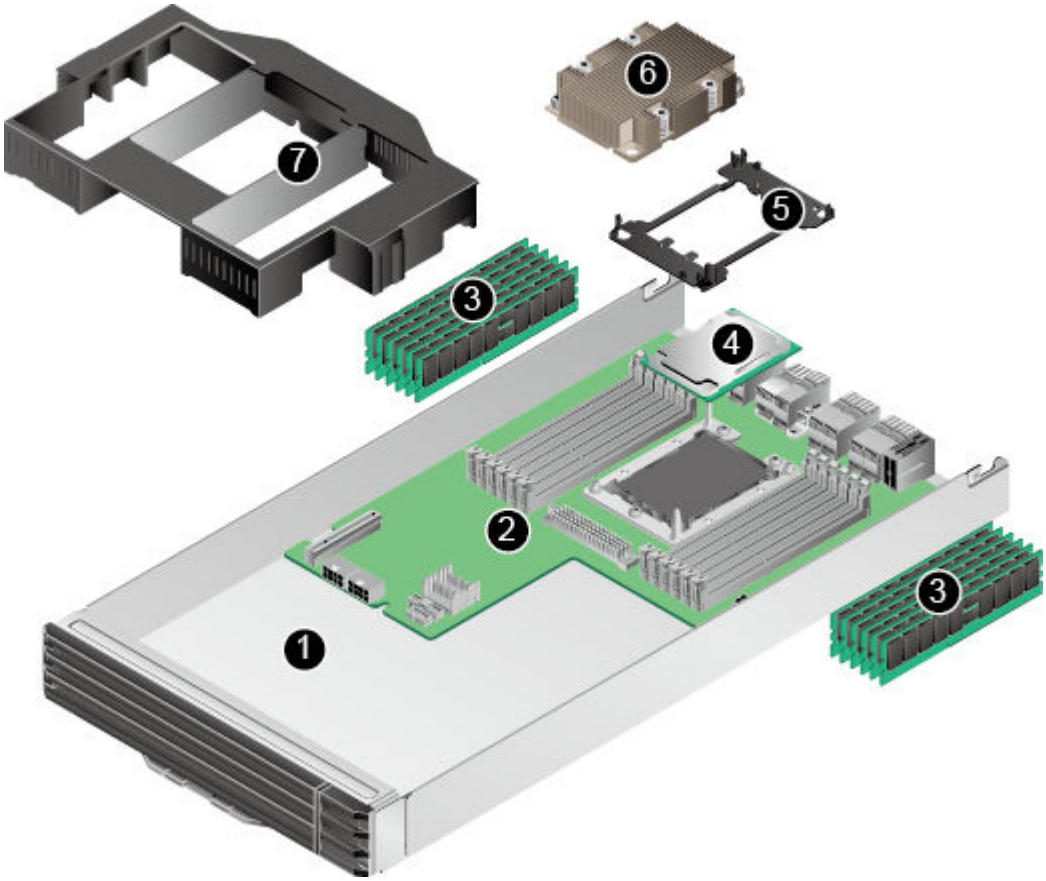
Table 1-27 Comparisons between the three types of SCMs

Item	SCM-A	SCM-B	SCM-C
CPU	One CPU	One CPU	One CPU
Memory	12 DDR4 DIMMs	12 DDR4 DIMMs	12 DDR4 DIMMs

Item	SCM-A	SCM-B	SCM-C
SAS or SATA hard disks	Not supported	Four	Not supported
NVMe SSD	Not supported	Not supported	Four
RAID controller card slot	Not supported	One	Not supported
CPU board	One	One	One
PCIe riser card	Not supported	Not supported	One

1.4.3.1 Physical Structure

Figure 1-29 Physical structure of SCM-A

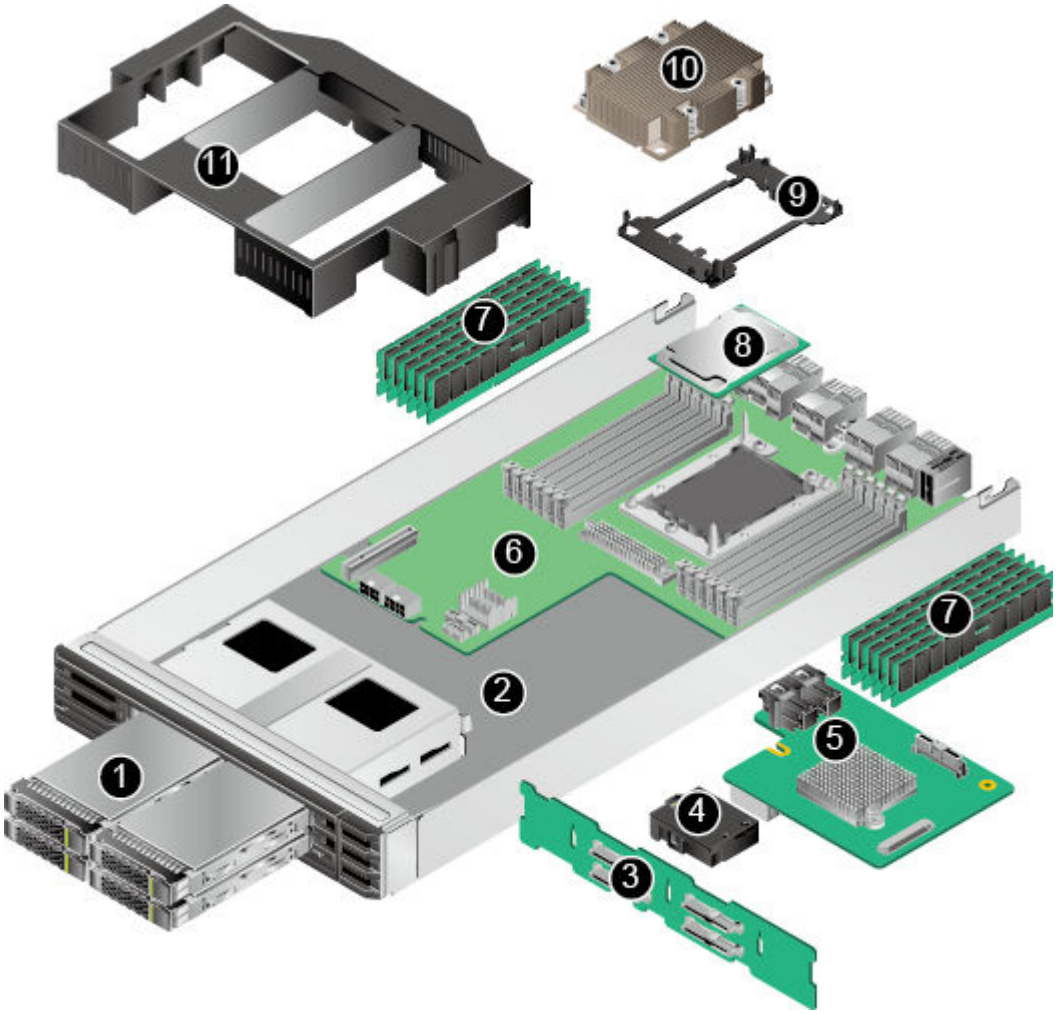


1	SCM	2	CPU board
3	DIMM	4	CPU
5	CPU carrier	6	Heat sink
7	Air duct		

NOTE

Whether the CME is supported or not, the SCM-A is supported.

Figure 1-30 Physical structure of SCM-B

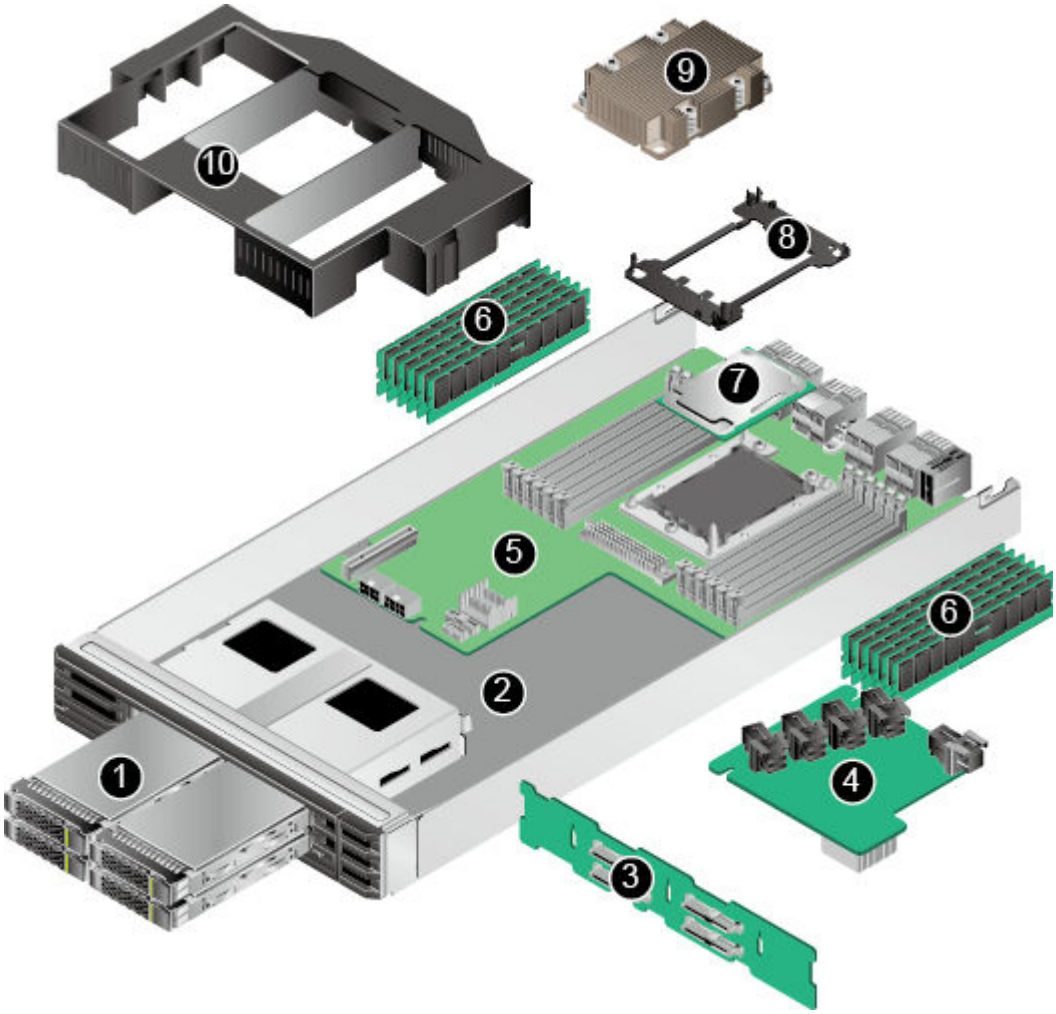


1	SAS or SATA hard disk	2	SCM
3	Hard disk backplane	4	Supercapacitor
5	RAID controller card	6	CPU board
7	DIMM	8	CPU
9	CPU carrier	10	Heat sink
11	Air duct		

NOTE

If the CME is supported, the SCM-B is not supported.

Figure 1-31 Physical structure of SCM-C



1	NVMe SSD	2	SCM
3	Hard disk backplane	4	PCIe riser card
5	CPU board	6	DIMM
7	CPU	8	CPU carrier
9	Heat sink	10	Air duct

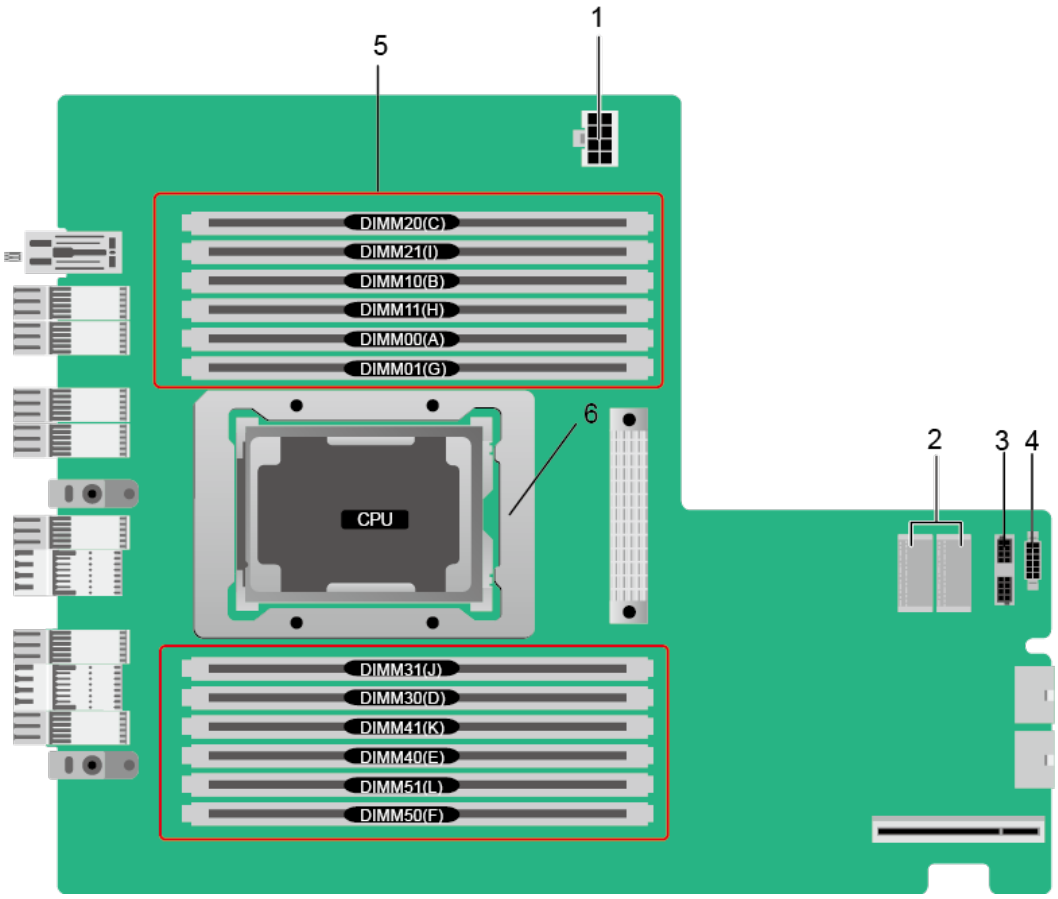
NOTE

If the CME is supported, the SCM-B is not supported.

1.4.3.2 CPU Board

Figure 1-32 shows the CPU board layout, which is the same on SCMs of different types of the 9008 V5.

Figure 1-32 CPU board layout

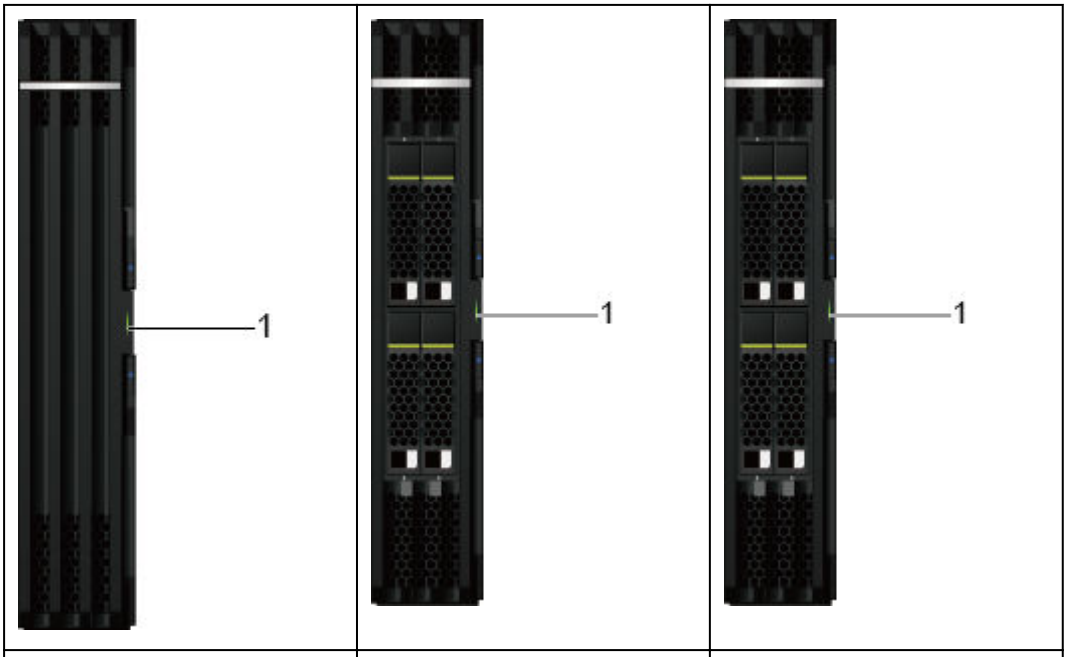


1	Power connector	2	PCIe riser card connectors (J19 and J20)/ RAID controller card connector (J19)
3	Control signal connector 1 (J25)	4	Control signal connector 2 (J15)
5	12 DDR4 DIMMs	6	CPU socket

1.4.3.3 Indicators

Figure 1-33 shows the indicators on the front panel of different SCMs. Table 1-28 describes these indicators. For details about hard disk indicators on SCM-B and SCM-C, see **1.4.7 Hard Disk Slot Numbers and Indicators**.

Figure 1-33 SCM indicators



SCM-A	SCM-B	SCM-C

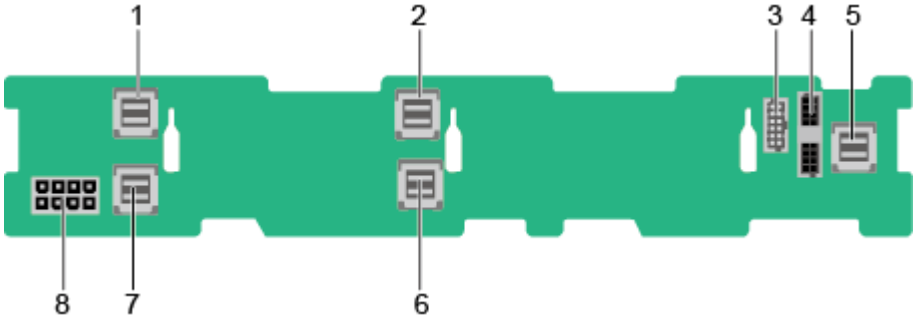
Table 1-28 SCM indicators

Silkscreen	Meaning	Color	State Description
	SCM status indicator	Red and green	● Off: The SCM is not powered on. ● Steady green: The SCM is operating properly. ● Blinking red at 1 Hz: The SCM is faulty. ● Blinking red at 5 Hz: The SCM is not securely installed.

1.4.3.4 Hard Disk Backplane

SCM-B and SCM-C use the same 4-bay hard disk backplane.

Figure 1-34 Hard disk backplane for SCM-B and SCM-C

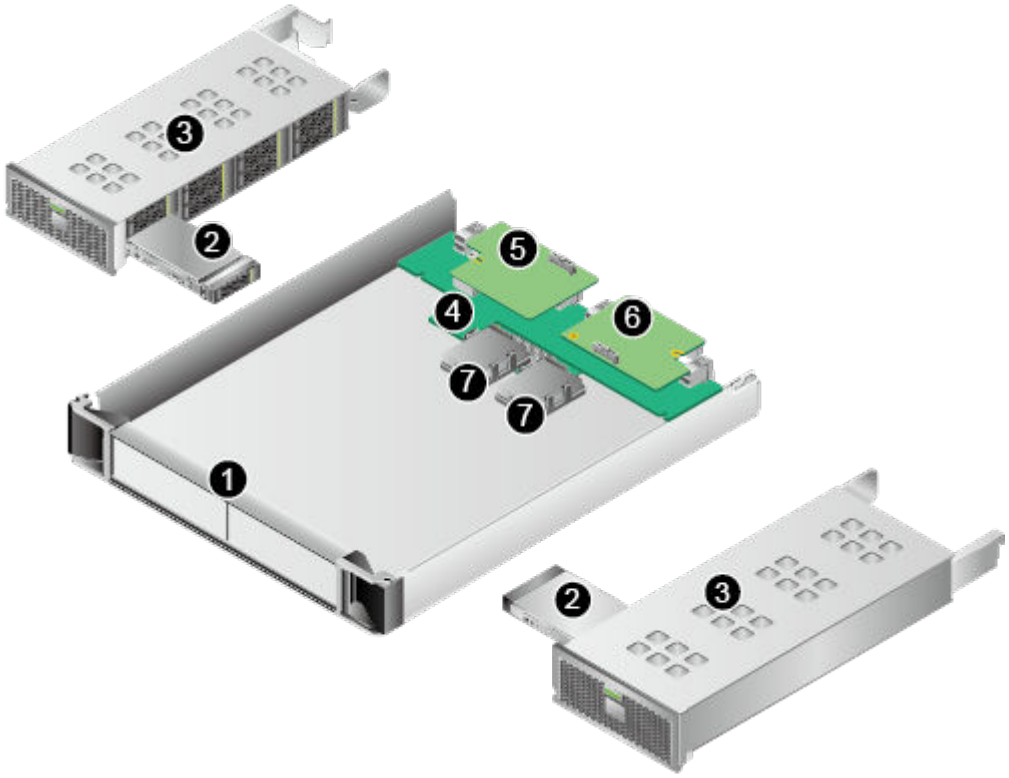


1	PCIe signal connector (PORT0/J3)	2	PCIe signal connector (PORT1/J4)
3	Mainboard MISC signal connector (J7)	4	Mainboard MISC signal connector (J8)
5	SAS cable connector (J26)	6	PCIe signal connector (PORT3/J6)
7	PCIe signal connector (PORT2/J5)	8	Power connector (J1)

1.4.4 FIO-B

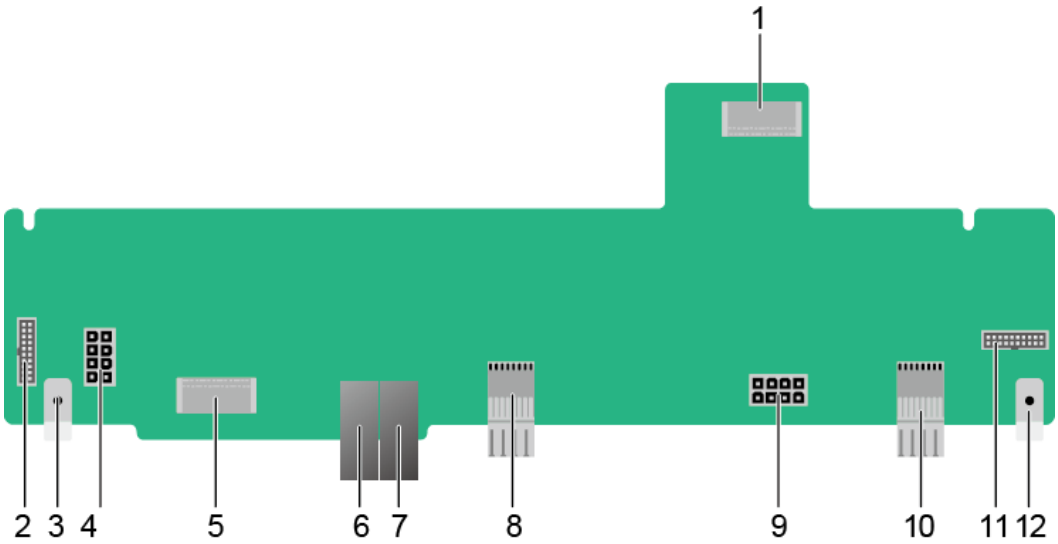
FIO-B supports a maximum of 24 SAS/SATA hard disks and two RAID controller cards.

Figure 1-35 Physical structure of FIO-B



1	FIO-B	2	SAS or SATA hard disk
3	Hard disk enclosure	4	I/O board
5	RAID controller card 1 (RAID-1)	6	RAID controller card 2 (RAID-2)
7	Supercapacitor (optional)	-	-

Figure 1-36 FIO-B



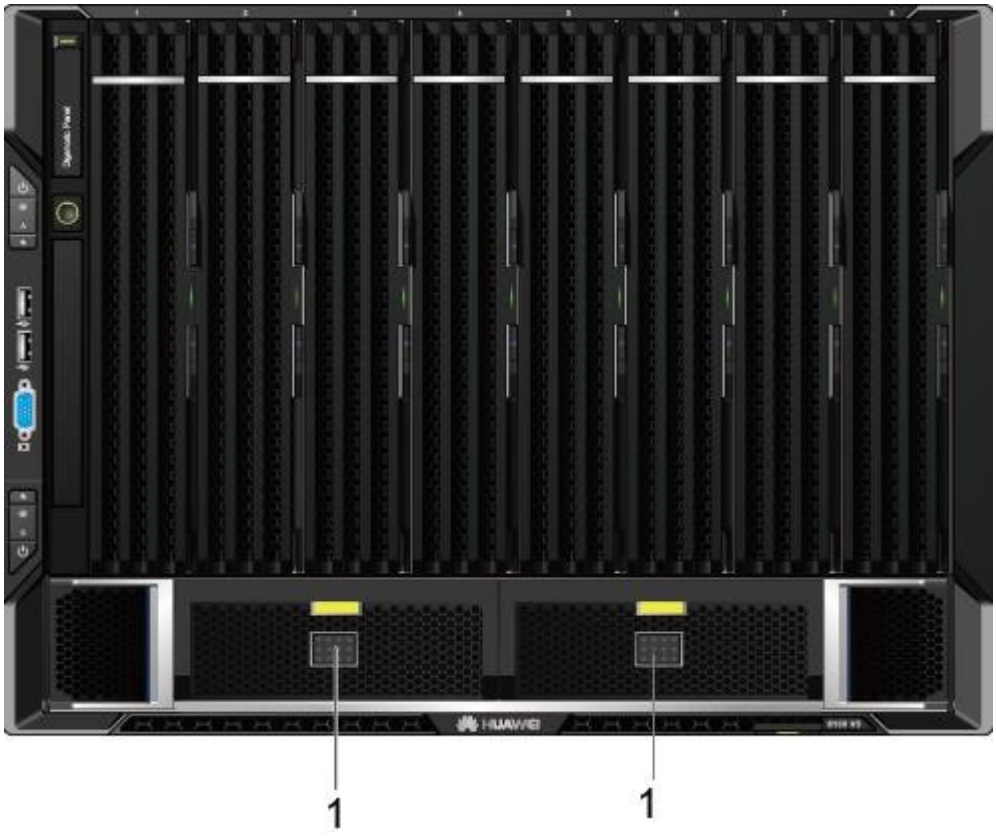
1	RAID controller card 1 connector	2	Signal cable connector (20-pin)
3	Guide sleeve	4	Power connector (8-pin)
5	RAID controller card 2 connector	6	Backplane power connector
7	Backplane power connector	8	Backplane signal connector
9	Power connector (8-pin)	10	Backplane signal connector
11	Signal cable connector (20-pin)	12	Guide sleeve

Figure 1-37 FIO-B hard disk backplane

1	Indicator board port (J49)	2	Hard disk signal connector
3	Power socket connector (J25)	4	Signal cable connector (J50)
5	SAS cable connector (J47/PORTA)	6	SAS cable connector (J48/PORTB)

Figure 1-38 shows the indicators on FIO-B. For details about hard disk indicators, see **1.4.7 Hard Disk Slot Numbers and Indicators**.

Figure 1-38 FIO-B indicators



1	Hard disk indicator board (with 12 hard disk status indicators)	-	-

Table 1-29 FIO-B indicators

Silkscreen	Indicator	Color	State Description
0 to 23	Hard disk status indicator	Red and green	● Off: The hard disk is not installed or not in a RAID array. ● Steady green: The hard disk is detected and inactive. ● Blinking green at 4 Hz: Data access is being performed on the disk or the primary disk in a RAID array is synchronizing data from the secondary disk. ● Blinking green at 1 Hz: The secondary disk in a RAID array is synchronizing data from the primary disk. ● Blinking red at 1 Hz: The hard disk is being located. ● Blinking red at 4 Hz: The hard disk in a RAID array cannot be detected. ● Steady red: The hard disk is faulty.

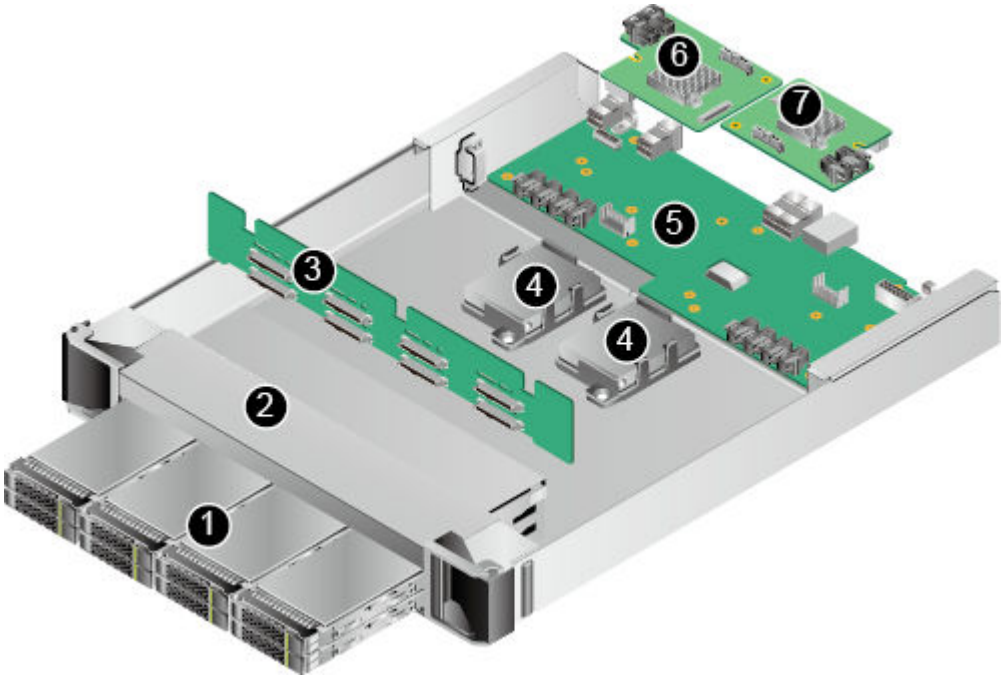
NOTE

The FIO-B, FIO-D, and FIO-G cannot be installed in the SCE at the same time. You can install one of them or do not install any FIO. If no FIO is installed, install a filler module in the vacant slot.

1.4.5 FIO-D

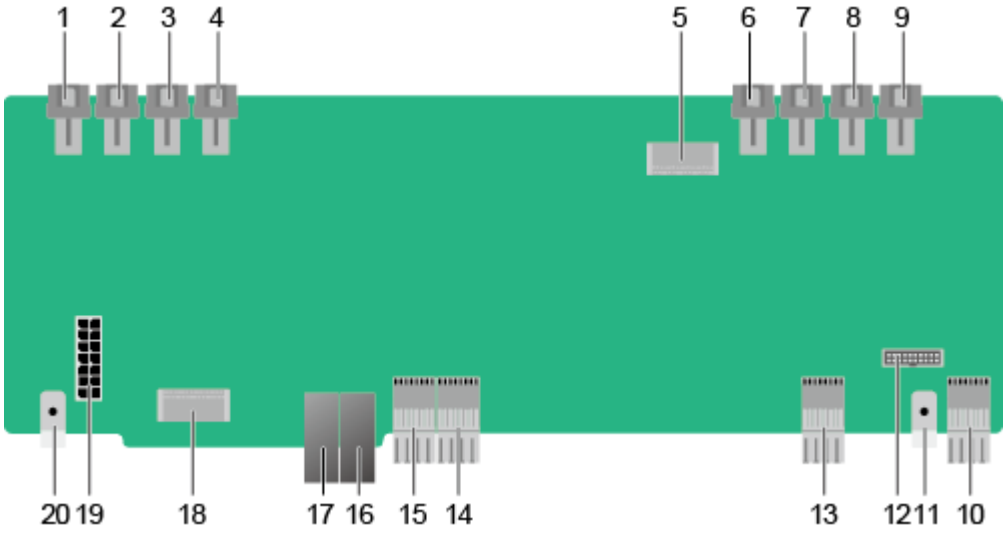
FIO-D supports a maximum of eight SAS/SATA hard disks or NVMe SSDs and two RAID controller cards. The NVMe SSDs do not support RAID configuration. The RAID controller cards are not required if FM-D is fully configured with NVMe SSDs.

Figure 1-39 Physical structure of FIO-D



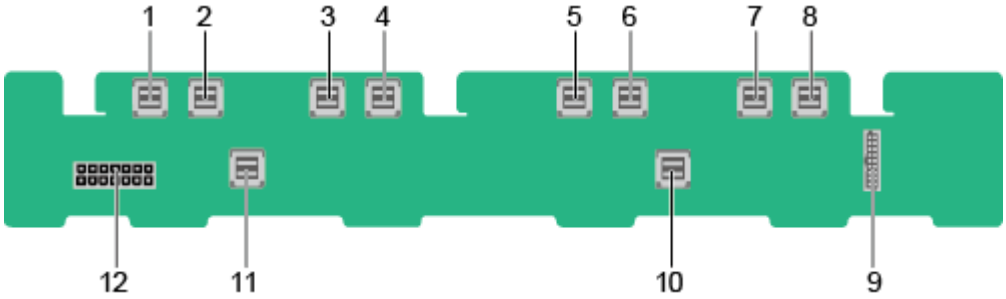
1	SAS/SATA hard disk or NVMe SSD	2	FIO-D
3	Hard disk backplane	4	Supercapacitor (optional)
5	I/O board	6	RAID controller card 1 (RAID-1)
7	RAID controller card 2 (RAID-2)	-	-

Figure 1-40 FIO-D



1	PCIe connector (PORT7)	2	PCIe connector (PORT6)
3	PCIe connector (PORT5)	4	PCIe connector (PORT4)
5	RAID controller card 1 connector	6	PCIe connector (PORT3)
7	PCIe connector (PORT2)	8	PCIe connector (PORT1)
9	PCIe connector (PORT0)	10	Backplane signal connector
11	Guide sleeve	12	Signal cable connector (20-pin)
13	Backplane signal connector	14	Backplane signal connector
15	Backplane signal connector	16	Backplane power connector
17	Backplane power connector	18	RAID controller card 2 connector
19	Power connector (14-pin)	20	Guide sleeve

Figure 1-41 FIO-D hard disk backplane



1	PCIe cable connector (Port 7)	2	PCIe cable connector (Port 6)
3	PCIe cable connector (Port 5)	4	PCIe cable connector (Port 4)
5	PCIe cable connector (Port 3)	6	PCIe cable connector (Port 2)
7	PCIe cable connector (Port 1)	8	PCIe cable connector (Port 0)
9	Signal cable connector (20-pin)	10	SAS cable connector (PORTA/J26)
11	SAS cable connector (PORTB/J25)	12	Power connector (14-pin)

For details about FIO-D indicators, see **1.4.7.2 SAS/SATA Hard Disk Indicators** and **1.4.7.3 NVMe SSD Indicators**.

NOTE

The FIO-B, FIO-D, and FIO-G cannot be installed in the SCE at the same time. You can install one of them or do not install any FIO. If no FIO is installed, install a filler module in the vacant slot.

1.4.6 FIO-G

Figure 1-42 shows the physical structure of an FIO-G.

Figure 1-42 FIO-G components

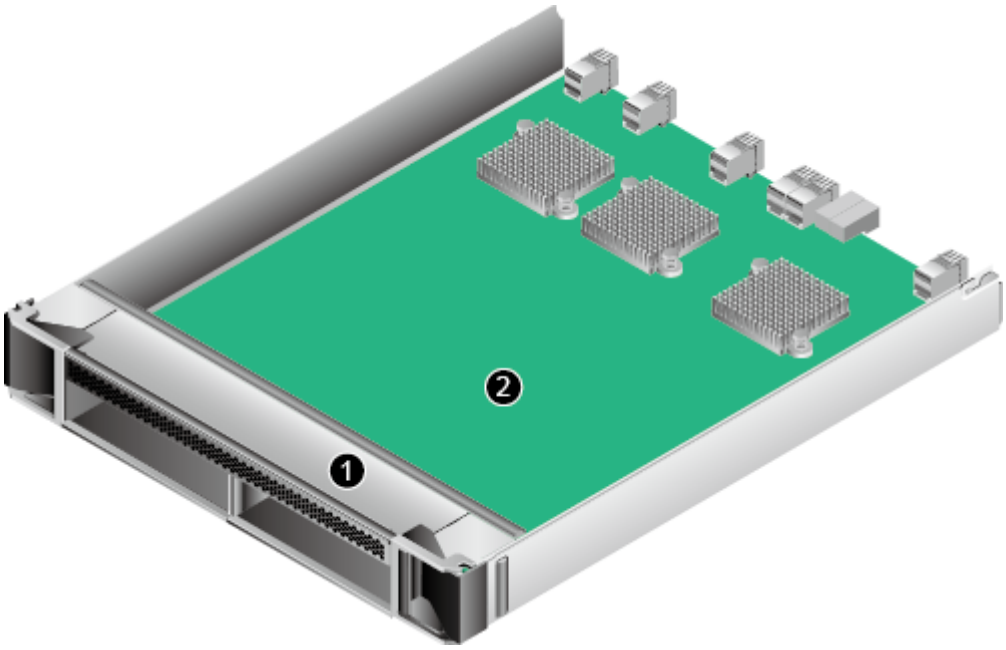


Table 1-30 FIO-G components

No.	Name	Function
1	FIO-G enclosure	Houses an FIO-G and provides two FPC slots to connect to an REE.
2	Front I/O board of model G	Contains components, such as the PCIe switch chip and PCIe Redriver, and supports signal relay.

NOTE

The FIO-B, FIO-D, and FIO-G cannot be installed in the SCE at the same time. You can install one of them or do not install any FIO. If no FIO is installed, install a filler module in the vacant slot.

1.4.7 Hard Disk Slot Numbers and Indicators

1.4.7.1 Hard Disk Slot Numbers

The hard disk slot numbers are the same on SCM-B and SCM-C, as shown in Figure 1-43.

Figure 1-43 Hard disks on SCM-B and SCM-C

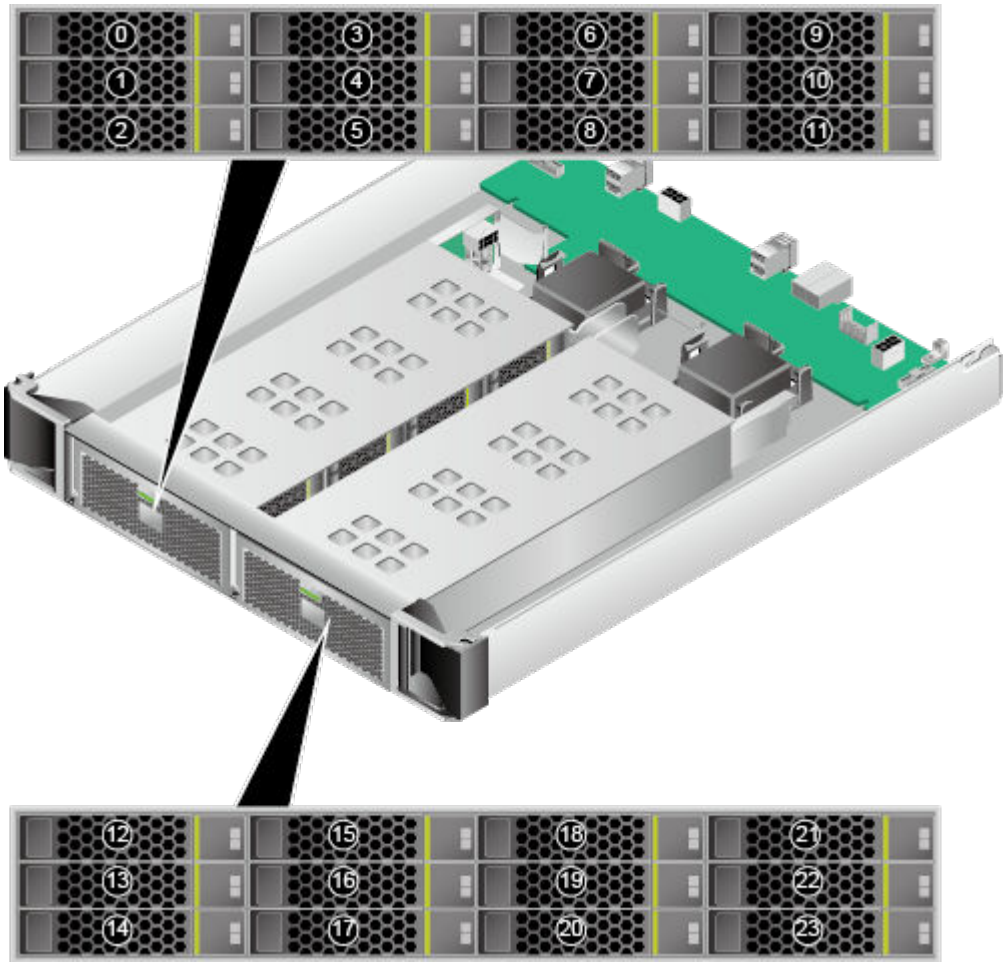
Silkscreen	Slot ID on the iBMC WebUI
0	SCMx[1] Disk0
1	SCMx Disk1
2	SCMx Disk2
3	SCMx Disk3

NOTE

[1]: **x** indicates the slot number of an SCM. The SCMs are numbered 1 to 8 from left to right.

Figure 1-44 shows the FIO-B hard disk slot numbers.

Figure 1-44 FIO-B hard disks



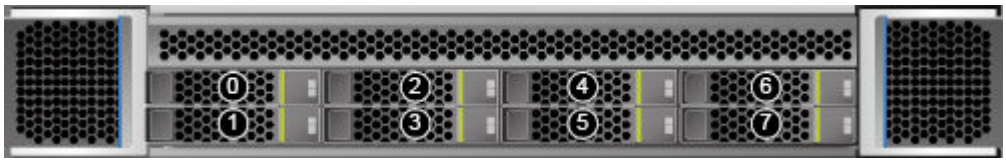
Silkscreen	Slot ID on the iBMC WebUI
0	FIO Disk0
1	FIO Disk1
2	FIO Disk2
3	FIO Disk3
...	...
23	FIO Disk23

NOTE

Disks 0 to 2 and disks 12 to 14 are in the far left and right slots respectively.

Figure 1-45 shows the FIO-D hard disk slot numbers.

Figure 1-45 FIO-D hard disks



Silkscreen	Slot ID on the iBMC WebUI
0	FIO Disk0
1	FIO Disk1
2	FIO Disk2
3	FIO Disk3
...	...
7	FIO Disk7

1.4.7.2 SAS/SATA Hard Disk Indicators

Figure 1-46 shows SAS/SATA hard disk indicators and Table 1-31 describes the indicators.

Figure 1-46 SAS/SATA hard disk indicators

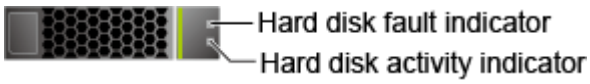


Table 1-31 SAS/SATA hard disk indicators

Name	State Description
Hard disk fault indicator	● Off: The hard disk is operating normally or not detected in a RAID array. ● Blinking yellow: The hard disk is being located, or RAID is being rebuilt. ● Steady yellow: The hard disk is not detected, the hard disk is faulty, or the RAID array status of the hard disk is abnormal. **NOTE** If the fault indicator is steady yellow, run a command to check the RAID status to determine whether the RAID array status is abnormal or whether the hard disk is faulty. For details about command description, see the *Huawei V5 Server RAID Controller Card User Guide*.
Hard disk activity indicator	● Off: The hard disk is faulty or not detected. ● Blinking green: Data is being read from or written to the hard disk, or synchronized between hard disks. ● Steady green: The hard disk is inactive.

1.4.7.3 NVMe SSD Indicators

Figure 1-47 shows NVMe SSD indicators and Table 1-32 describes the indicators.

Figure 1-47 NVMe SSD indicators

Table 1-32 NVMe SSD indicators

Green Indicator	Yellow Indicator	Description
Off	Off	The NVMe SSD is not detected.
Steady green	Off	The NVMe SSD is detected and working properly.
Blinking green at 2 Hz	Off	Data access to the NVMe SSD is in progress.
Off	Blinking yellow at 2 Hz	The NVMe SSD is being 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.

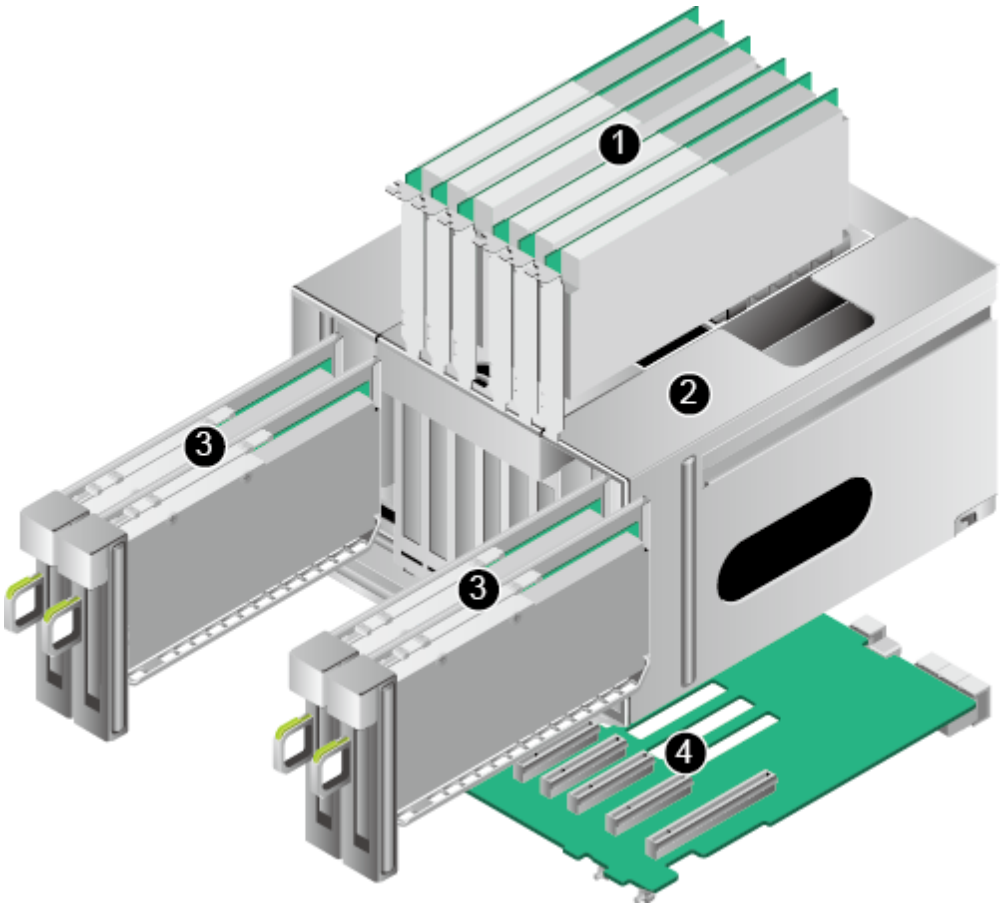
1.4.8 SCE BIO

The SCE of the 9008 V5 supports two types of BIOs for installing PCIe cards. You can select either of BIOs based on the deployment requirements.

V5-BIO-A: supports four full-height hot-swappable PCIe cards and six full-height non-hot-swappable PCIe cards. Figure 1-48 shows the physical structure of the V5-BIO-A.

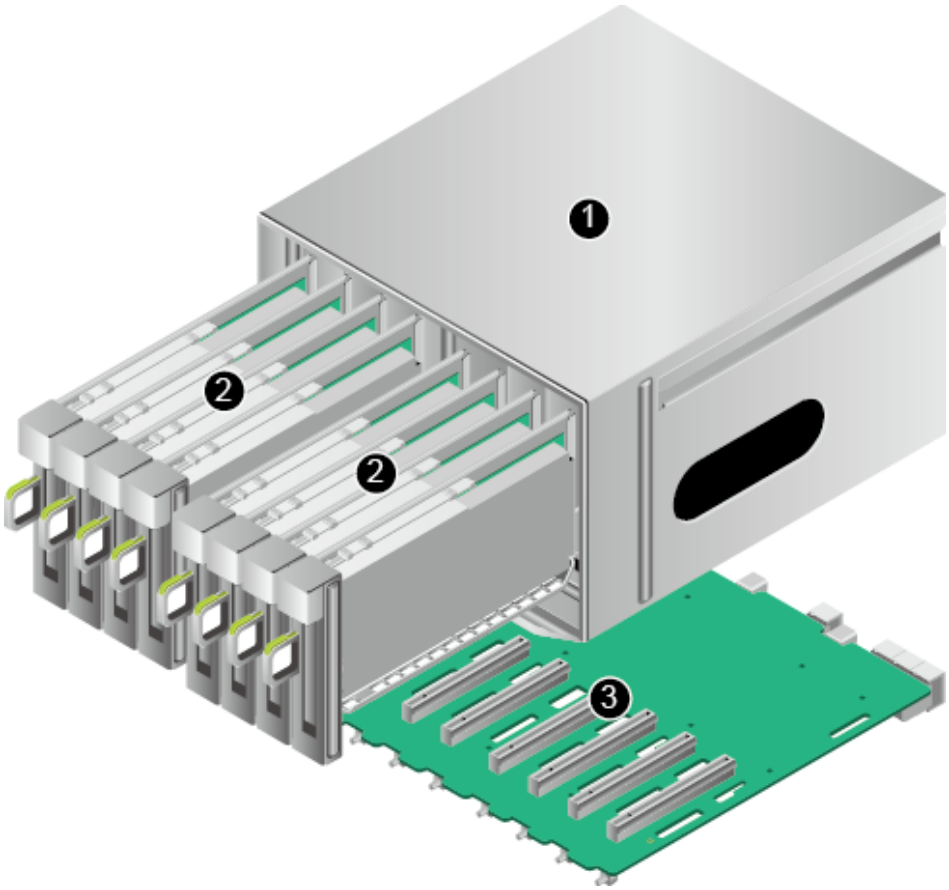
V5-BIO-B: supports eight full-height hot-swappable PCIe cards. Figure 1-49 shows the physical structure of the V5-BIO-B.

Figure 1-48 Physical structure of V5-BIO-A



1	Non-hot-swappable PCIe card	Slots 3 to 8 support full-height 3/4-length PCIe 3.0 x8 non-hot-swappable PCIe cards.
2	Non-hot-swappable PCIe card case	The case supports and protects non-hot-swappable PCIe cards.
3	Hot-swappable PCIe card	Slots 1 and 10 support PCIe 3.0 x16 hot-swappable PCIe cards. Slots 2 and 9 support PCIe 3.0 x8 hot-swappable PCIe cards.
4	BIO board	The board provides PCIe slots.

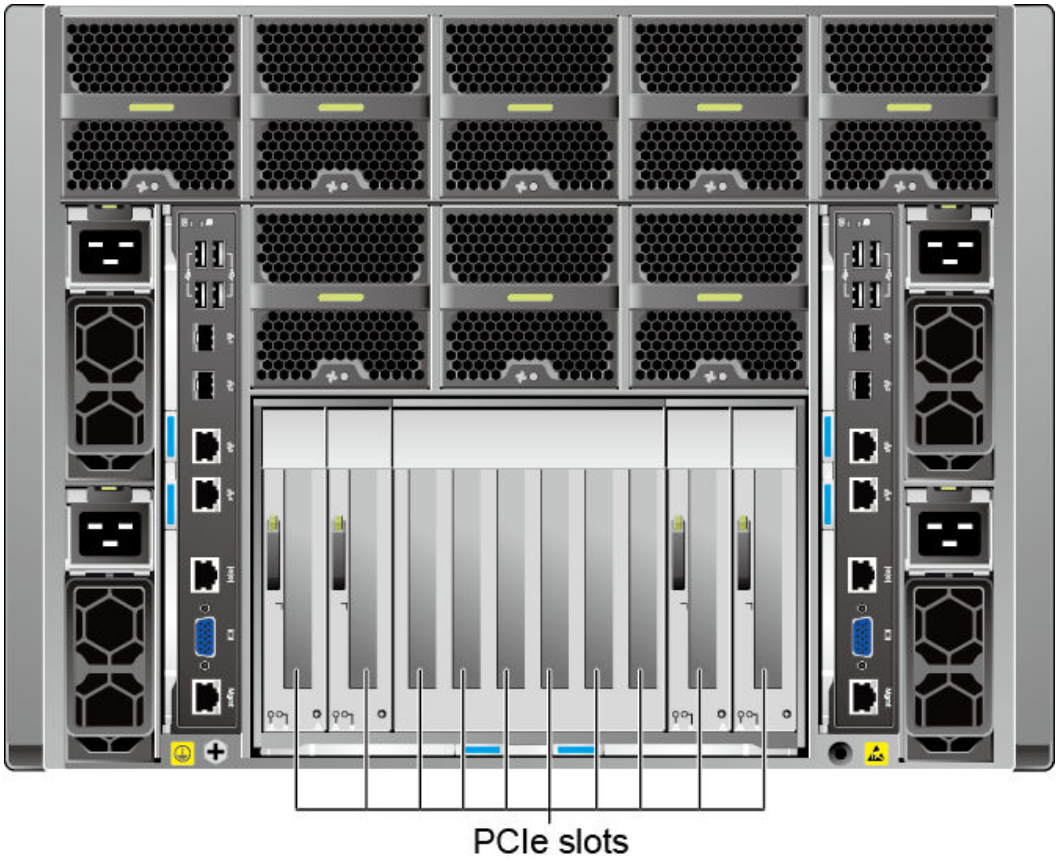
Figure 1-49 Physical structure of V5-BIO-B



1	Hot-swappable PCIe card case	The case supports and protects hot-swappable PCIe cards.
2	Hot-swappable PCIe card	Slots 1 and 8 support PCIe 3.0 x16 hot-swappable PCIe cards. Slots 2 and 7 support PCIe 3.0 x8 hot-swappable PCIe cards.
3	BIO board	The board provides PCIe slots.

Figure 1-50 shows the PCIe slot layout of a V5-BIO-A in a 9008 V5 (without a CME).

Figure 1-50 PCIe slot layout of a V5-BIO-A



The PCIe slots are numbered 1 to 10 from left to right.

V5-BIO-A PCIe slot description

The V5-BIO-A of the 9008 V5 provides 10 standard PCIe slots. For details about these slots, see **Table 1-33**.

NOTE

The PCIe slots mapping to a vacant SCM are unavailable.

Table 1-33 V5-BIO-A PCIe slot description

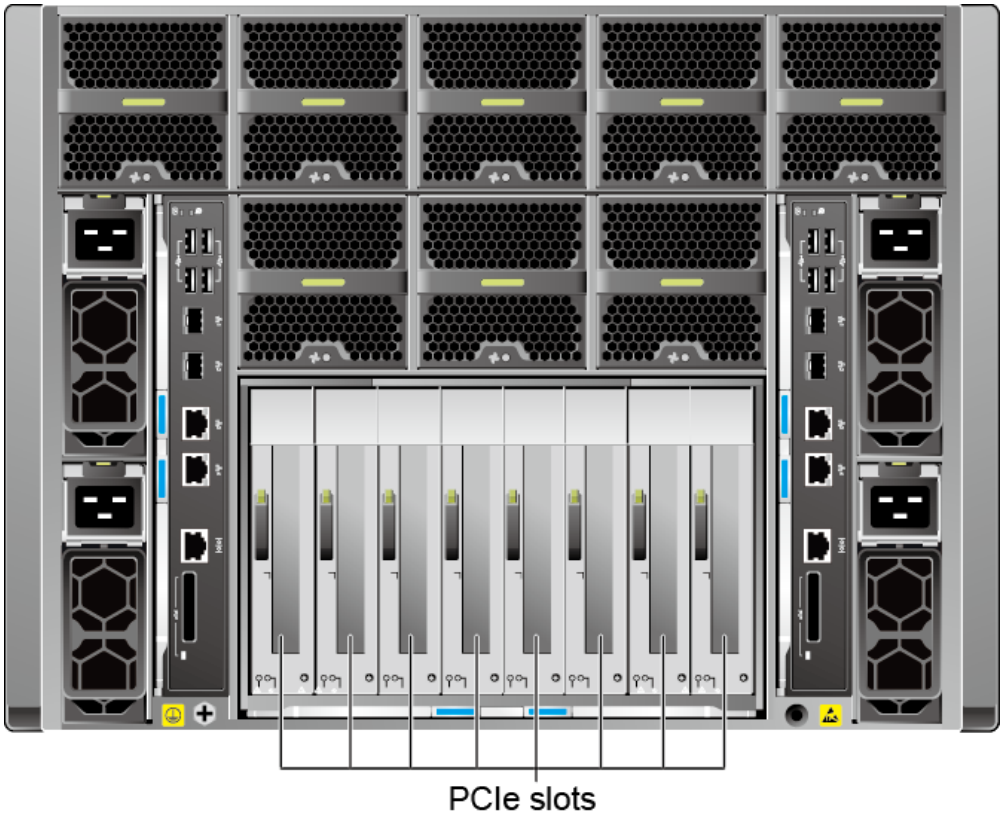
PCIe Slot	SCM	PCIe Standard	Connector Width	Bus Width	Port Number	Bus/Device/Function Number (B/D/F)	Slot Size	Hot-Swappable
Slot1	SCM 7	PCIe 3.0	x16	x16	Port1A	8P:C1/00/00 4P:83/00/00	Full-height 3/4-length	Yes

PCIe Slot	SCM	PCIe Standard	Connector Width	Bus Width	Port Number	Bus/Device/Function Number (B/D/F)	Slot Size	Hot-Swappable
Slot2	SCM 8	PCIe 3.0	x8	x8	Port2C	8P:EA/02/00 4P:E2/02/00	Full-height 3/4-length	Yes
Slot3	SCM 6	PCIe 3.0	x8	x8	Port2C	8P:AE/02/00 4P:62/02/00	Full-height 3/4-length	No
Slot4	SCM 7	PCIe 3.0	x8	x8	Port2C	8P:C6/02/00 4P:A2/02/00	Full-height 3/4-length	No
Slot5	SCM 5	PCIe 3.0	x8	x8	Port1C	8P:81/02/00 4P:08/02/00	Full-height 3/4-length	No
Slot6	SCM 4	PCIe 3.0	x8	x8	Port2C	8P:6A/02/00 4P:E2/02/00	Full-height 3/4-length	No
Slot7	SCM 3	PCIe 3.0	x8	x8	Port2C	8P:46/02/00 4P:A2/02/00	Full-height 3/4-length	No
Slot8	SCM 2	PCIe 3.0	x8	x8	Port2C	8P:2E/02/00 4P:62/02/00	Full-height 3/4-length	No
Slot9	SCM 1	PCIe 3.0	x8	x8	Port1C	8P:04/02/00 4P:08/02/00	Full-height 3/4-length	Yes
Slot10	SCM 3	PCIe 3.0	x16	x16	Port1A	8P:41/00/00 4P:83/00/00	Full-height 3/4-length	Yes

PCIe Slot	SCM	PCIe Standard	Connector Width	Bus Width	Port Number	Bus/Device/Function Number (B/D/F)	Slot Size	Hot-Swappable
Note 1: All slots support full-height 3/4-length PCIe cards and are backward compatible with half-height half-length PCIe cards. Note 2: All slots support PCIe cards of 75 W or higher power, depending on the PCIe card model. Note 3: This table lists the default values of **B/D/F** when CPUs and PCIe devices are fully configured. If CPUs are not in full configuration or a PCIe card with a PCI bridge is configured, the values of **B/D/F** may differ.								

Figure 1-51 shows the PCIe slot layout of a V5-BIO-B in a 9008 V5 (with a CME).

Figure 1-51 PCIe slot layout of a V5-BIO-B



The PCIe slots are numbered 1 to 8 from left to right.

V5-BIO-B PCIe slot description

The BIO of the 9008 V5 provides 8 standard PCIe slots. For details about these slots, see **Table 1-34**.

NOTE

The PCIe slots mapping to a vacant SCM are unavailable.

Table 1-34 V5-BIO-B PCIe slot description

PCIe Slot	SCM	Connector Width	Bus Width	Port Number	Segment/Bus/Device/Function Number (B/D/F)	Bus/Device/Function Number (B/D/F)
Slot1	SCM7	x16	x16	Port1A	8P: 0001:82/00/00 4P:82/00/00	8P:C1/00/00 4P:83/00/00
Slot2	SCM8	x16	x8	Port2C	8P: 0001:E1/02/00 4P:E1/02/00	8P:EA/02/00 4P:E2/02/00
Slot3	SCM6	x16	x8	Port2C	8P: 0001:61/02/00 4P:61/02/00	8P:AE/02/00 4P:62/02/00
Slot4	SCM5	x16	x8	Port1C	8P: 0001:02/02/00 4P:08/02/00	8P:81/02/00 4P:08/02/00
Slot5	SCM4	x16	x8	Port2C	8P: 0000:E1/02/00 4P:E1/02/00	8P:6A/02/00 4P:E2/02/00
Slot6	SCM2	x16	x8	Port2C	8P: 0000:61/02/00 4P:61/02/00	8P:2E/02/00 4P:62/02/00
Slot7	SCM1	x16	x8	Port1C	8P: 0000:08/02/00 4P:08/02/00	8P:04/02/00 4P:08/02/00
Slot8	SCM3	x16	x16	Port1A	8P: 0000:82/00/00 4P:82/00/00	8P:41/00/00 4P:83/00/00

NOTICE

- All slots support full-height 3/4-length PCIe cards and are backward compatible with half-height half-length PCIe cards.
- All slots support PCIe cards of 75 W or lower power, depending on the PCIe card model.
- The table lists the default values of **B/D/F** when CPUs and PCIe devices are fully configured. If CPUs are not in full configuration or a PCIe card with a PCI bridge is configured, the values of **B/D/F** may differ.

Restricted PCIe Slots

Boot Mode in the BIOS is **UEFI** by default. In UEFI mode, there is no restricted PCIe slot. If **Boot Mode** is changed to **Legacy**, there are restricted PCIe slots.

Some PCIe cards require I/O resources. When installing PCIe cards in PCIe slots, note the following points:

- A PCIe card that requires no I/O resources can be installed in any PCIe slot.
- A PCIe card that requires I/O resources cannot be installed in a restricted PCIe slot that provides no I/O resources because the system has insufficient I/O resources. Restricted PCIe slots support only PCIe cards that do not require I/O resources. **Table 1-35** shows the restricted PCIe slots on the BIO.

Table 1-35 Restricted PCIe slots on the BIO

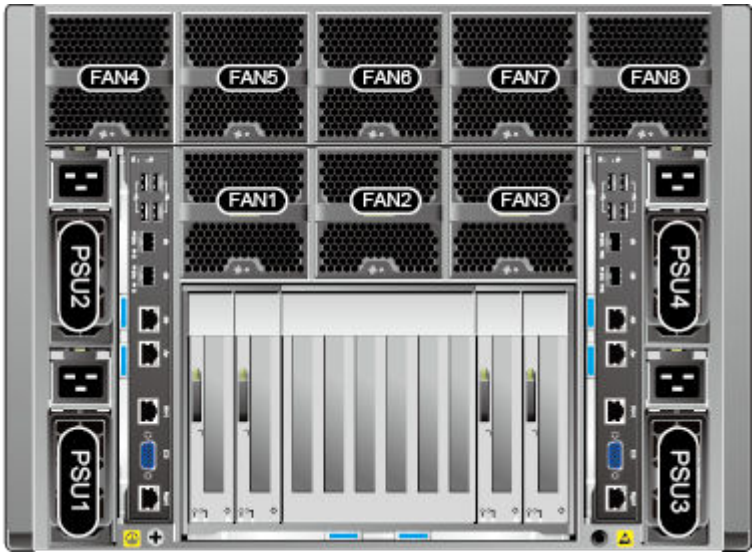
Operating Mode		Restricted PCIe Slots
Single-system	V5-BIO-A	Slots 5 and 7
Single-system	V5-BIO-B	Slot4
Dual-system	V5-BIO-A	None
Dual-system	V5-BIO-B	None
Note: PCIe cards whose values in the **I/O Ports** column in the **Huawei Server Compatibility Checker** are **Yes** cannot be installed in the restricted PCIe slots. If such a PCIe card is installed in a restricted PCIe slot, the server reports a critical alarm indicating an I/O resource configuration error. To clear this alarm, install the PCIe card in an unrestricted PCIe slot. Note 2: When the 9008 V5 is fully configured with seven FC cards, the SAN boot function is not supported.		

1.4.9 Fan Modules

The fan speed can be adjusted. In normal cases, the fans run at the minimum speed. If the server temperature increases, the speed will increase accordingly.

Figure 1-52 shows the positions of the fan modules.

Figure 1-52 Positions of the fan modules (rear panel, not supporting a CME)



1.4.10 CME

Figure 1-53 shows the physical structure of the CME. Table 1-36 describes the CME components.

Figure 1-53 CME components

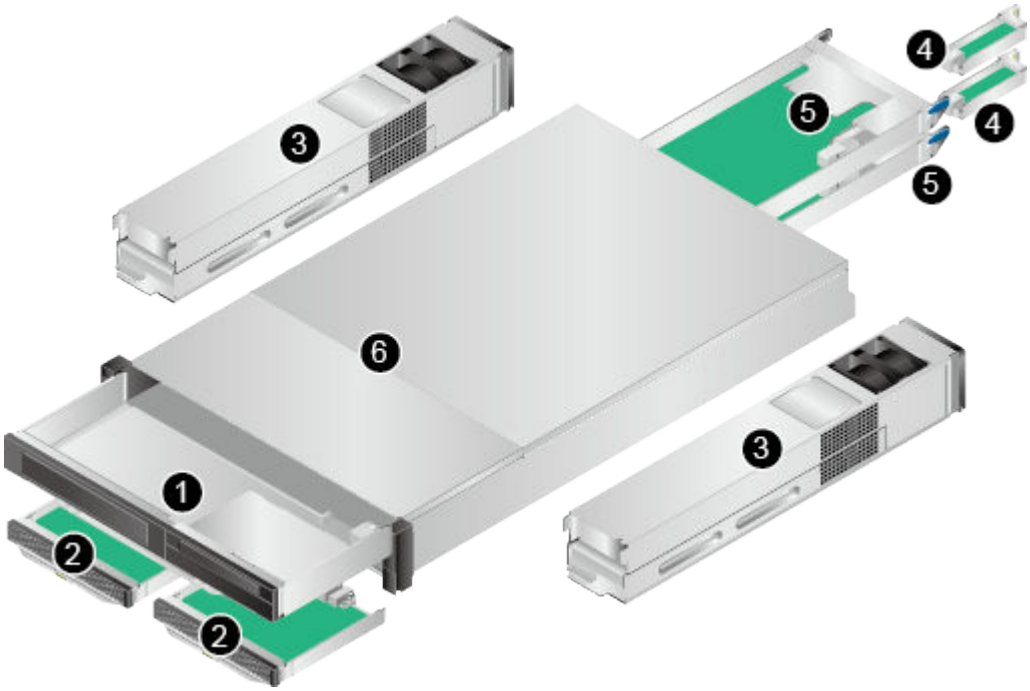


Table 1-36 CME components

No.	Name	Function
1	CIM	The CIM implements LCD access management and centralized access of the virtual KVM in each physical partition during local maintenance, and controls power-on and power-off for the entire cabinet.
2	CMCs	The CMCs manage components in the cabinet, sensors and events, users, fan modules, and PSUs, and perform Intelligent Platform Management Interface (IPMI) processing and remote maintenance.
3	PFMs	The PFMs supply power to and dissipate heat from the CME.
4	ACMs	Provide a single-source 100 MHz reference clock, which is used as by the QuickPath Interconnect (QPI), node interconnect (NI), and PCIe ports.
5	CPIs	The CPIs implement partition control, including CPU overheat protection, CPU hot swap control, status and TSC clock verification, and synchronous power control, reset, and error isolation.
6	CME	Houses the CIM, CMCs, PFMs, CPIs, and ACMs.

1.4.11 REE

1.4.11.1 REE Physical Structure (Front View)

Figure 1-54 shows the front view of an REE.

Figure 1-54 REE components at the front

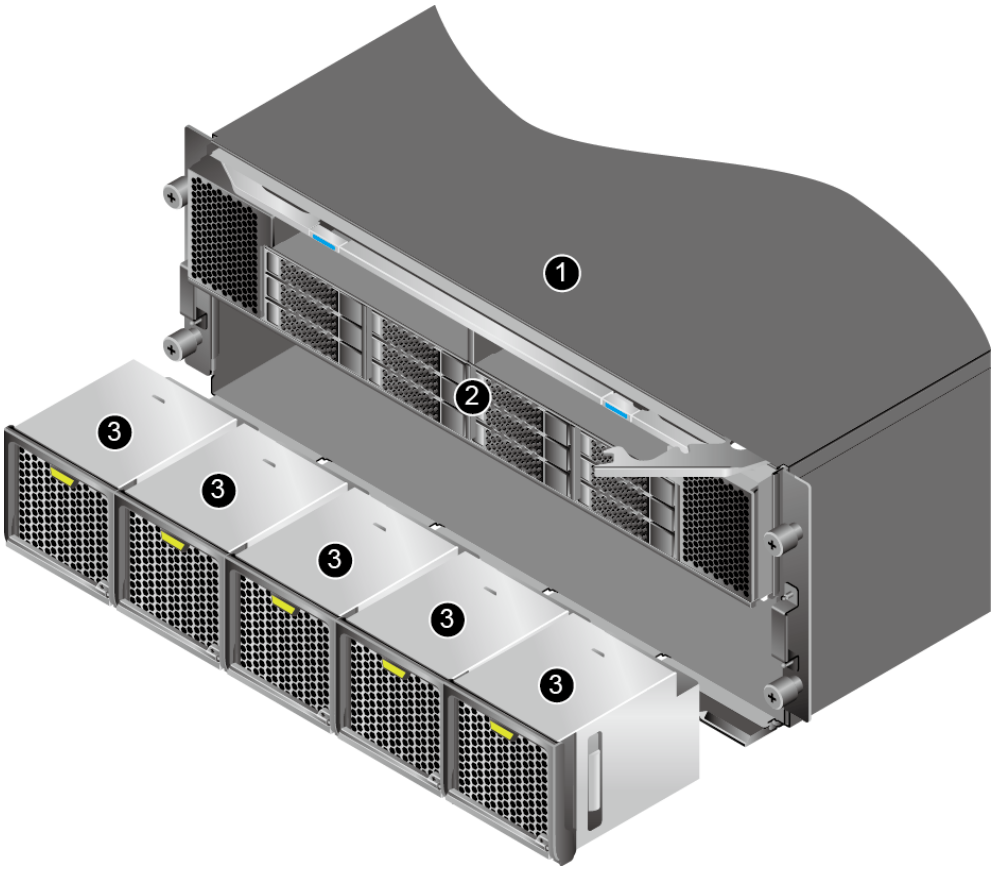


Table 1-37 REE components at the front

No.	Name	Function
1	Enclosure	Houses and protects REE components.
2	Switch module	Consists of hard disks, RAID controller cards, supercapacitors, and an air duct.
3	Fan modules	Dissipate heat from the REE. Fan modules are hot-swappable and redundant. If one fan module becomes faulty, the other fan modules run at full speed to balance heat dissipation for the REE.

1.4.11.2 REE Physical Structure (Rear View)

The REE supports two types of BIOs:

- Half-height BIO (BIO-C or BIO-D) with non-hot-swappable PCIe cards
- Full-height BIO (BIO-E) with hot-swappable PCIe cards

Figure 1-55 and **Figure 1-56** show the rear views of REEs.

Figure 1-55 REE rear view (BIO-C or BIO-D)

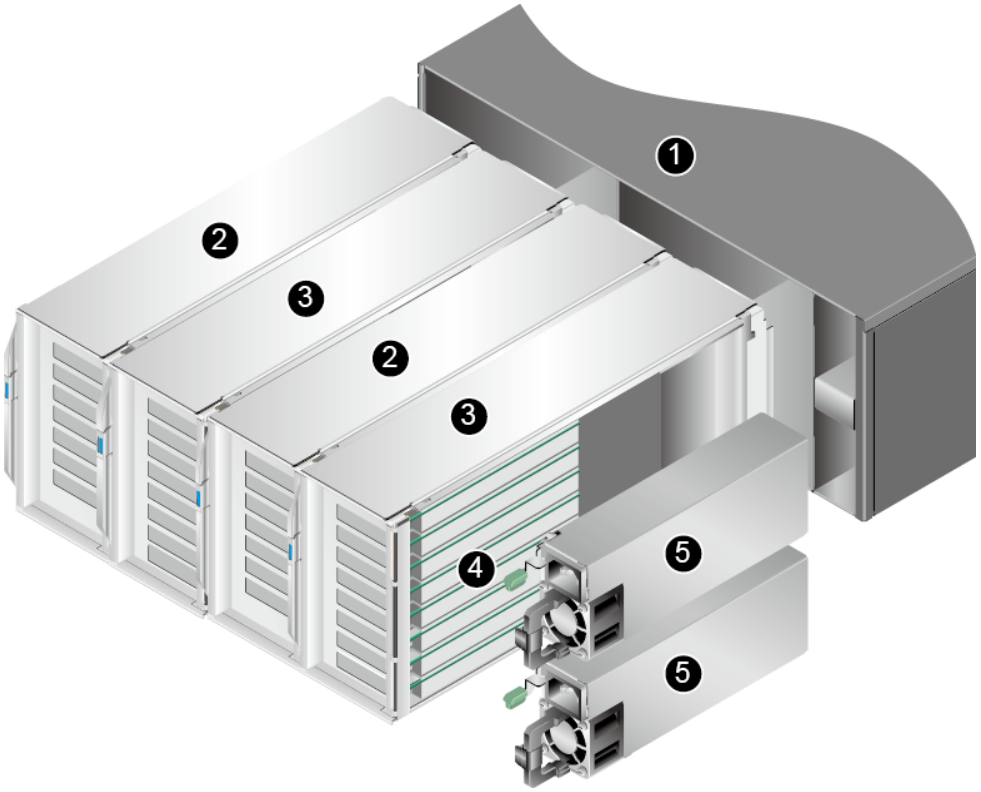


Table 1-38 REE components at the rear

No.	Name	State Description
1	Enclosure	Houses and protects REE components.
2	BIO-Ds	Each BIO-D provides seven non-hot-swappable PCIe 3.0 x8 slots. BIO-Ds can be installed only in BIO slots 1 and 3.
3	BIO-Cs	Each BIO-C provides eight non-hot-swappable PCIe 3.0 x4 slots. BIO-Cs can be installed only in BIO slots 2 and 4.
4	PCIe Cards	PCIe 3.0 x4 or PCIe 3.0 x8 cards
5	PSUs	Each REE has two AC PSUs in 1+1 redundancy mode.

Figure 1-56 REE rear view (BIO-E)

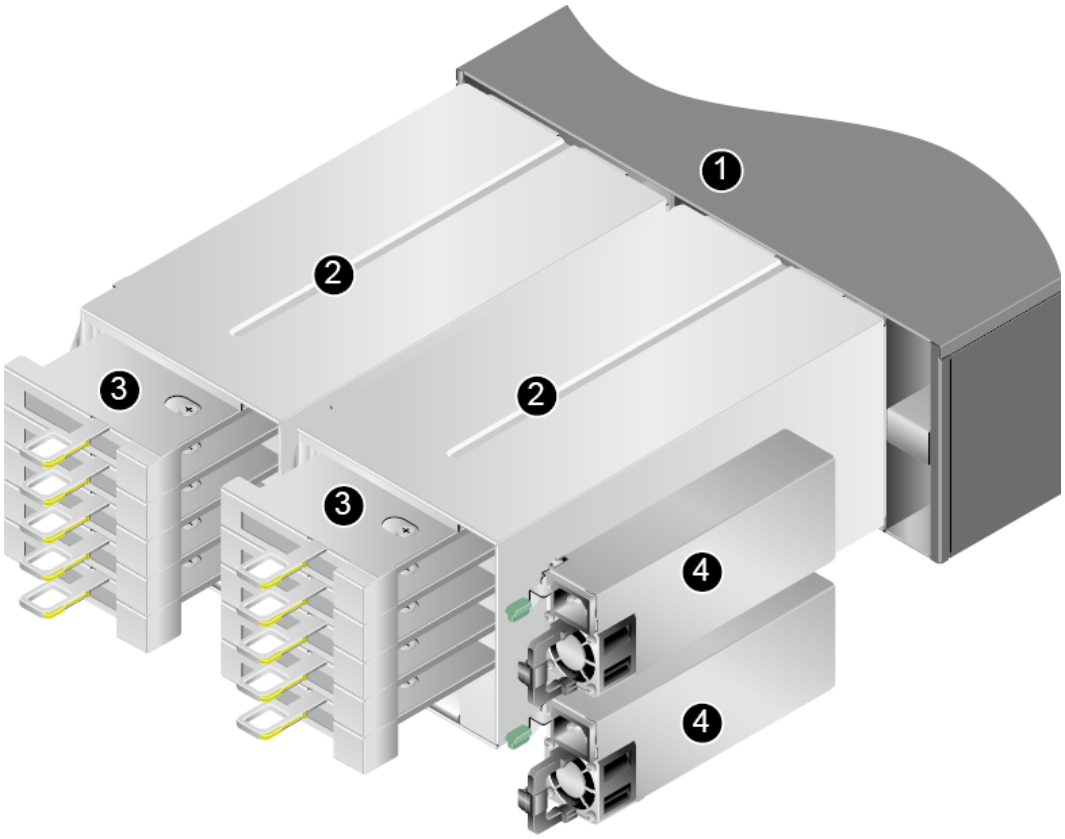


Table 1-39 REE components at the rear

No.	Name	Function
1	Enclosure	Houses and protects REE components.
2	BIO-Es	Each BIO-E provides three PCIe 3.0 x8 slots and two PCIe 3.0 x16 slots to support PCIe cards. Supports hot swap.
3	PCIe Cards	PCIe 3.0 x8 and PCIe 3.0 x16 cards
4	PSUs	Each REE has two 1700 W AC PSUs in 1+1 redundancy mode.

1.4.11.3 FPC Physical Structure

The flexible printed circuit (FPC) is used to connect an SCE and an REE. It leads PCIe resources and control resources in the SCE to the REE, expanding the number of PCIe slots and enabling enclosure-level management.

Figure 1-57 shows the physical structure of an FPC.

Figure 1-57 FPC components

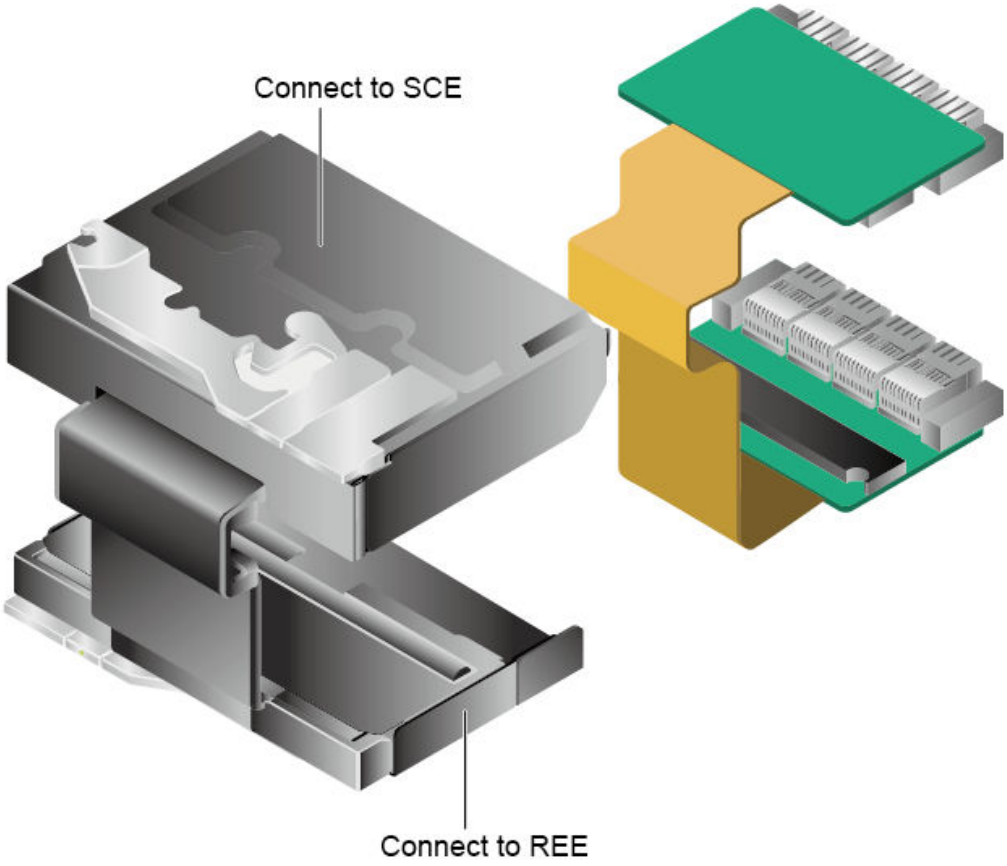


Table 1-40 FPC components

No.	Name	Function
1	Mechanical part	Carries and protects the FPC. One end is connected to the FIO-G of an SCE, and the other end is connected to the switch module of an REE.
2	Printed circuit board (PCB)	Adopts high-speed passive design to ensure reliability, leading the PCIe resources and management interfaces of an SCE to an REE and facilitating PCIe resource extension and REE management.

1.4.11.4 Switch Module Physical Structure

Figure 1-58 shows the physical structure of a switch module.

Figure 1-58 Switch module components

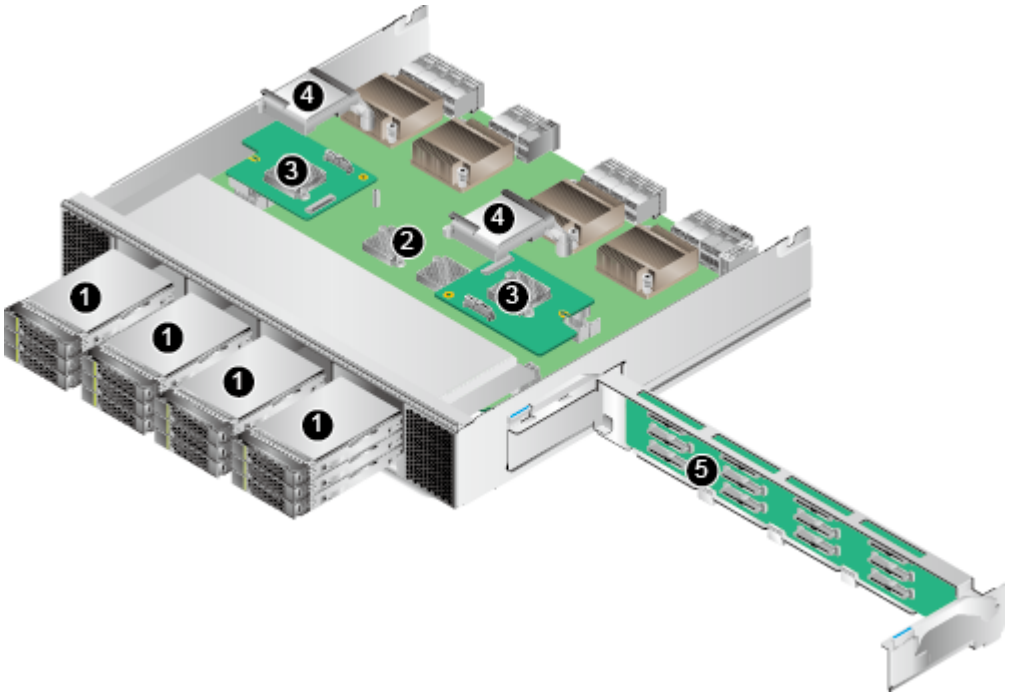


Table 1-41 Switch module components

No.	Name	Function
1	Hard disks	Store data. Up to 12 hot-swappable 2.5-inch SAS HDDs or SSDs
2	PCIe chips	Implement PCIe signal switching.
3	RAID controller cards	Use LSI SAS3108 chips and support RAID level migration and RAID configuration memory. Two types of RAID controller cards are supported: RAID controller card that supports RAID 0, 1, 10, 1E, and RAID controller card that supports RAID 0, 1, 10, 5, 50, 6, 60. Supports 1 GB RAID cache. Support BBUs or supercapacitors for 24/3 power-off protection.
4	Supercapacitors	Protect cache data from power failures for the LSI SAS3108 controller cards.
5	Hard disk backplane	Supplies power to hard disks and provides data transmission channels.

1.4.11.5 REE BIO Physical Structure

The REE supports two types of BIOs:

- Full-height BIO (BIO-E) with hot-swappable PCIe cards
  Figure 1-59 shows the physical structure of a BIO-E.

Figure 1-59 Physical structure of BIO-E

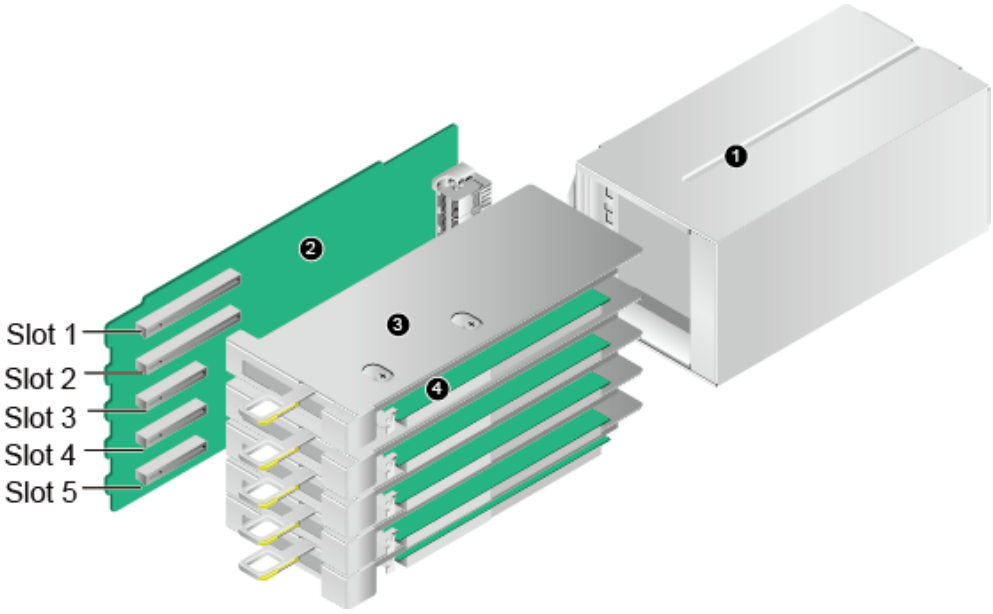


Table 1-42 BIO-E components

No.	Name	Function
1	BIO-E enclosure	Supports and protects a BIO-E.
2	BIO-E support board	Provides PCIe slots.
3	PCIe card brackets	Secure a PCIe cards.
4	PCIe Cards	PCIe 3.0 x8 and PCIe 3.0 x16 cards

- Half-height BIO-C and BIO-D with non-hot-swappable PCIe cards
  Figure 1-60 and **Figure 1-61** show the physical structure of BIO-C and BIO-D.

Figure 1-60 Physical structure of BIO-C

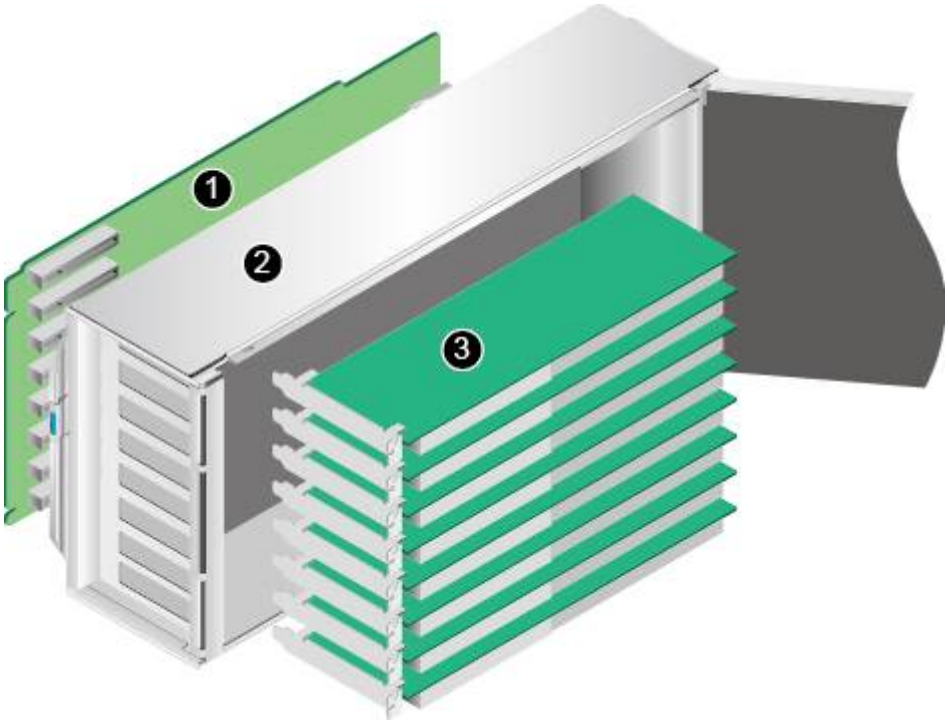


Figure 1-61 Physical structure of BIO-D

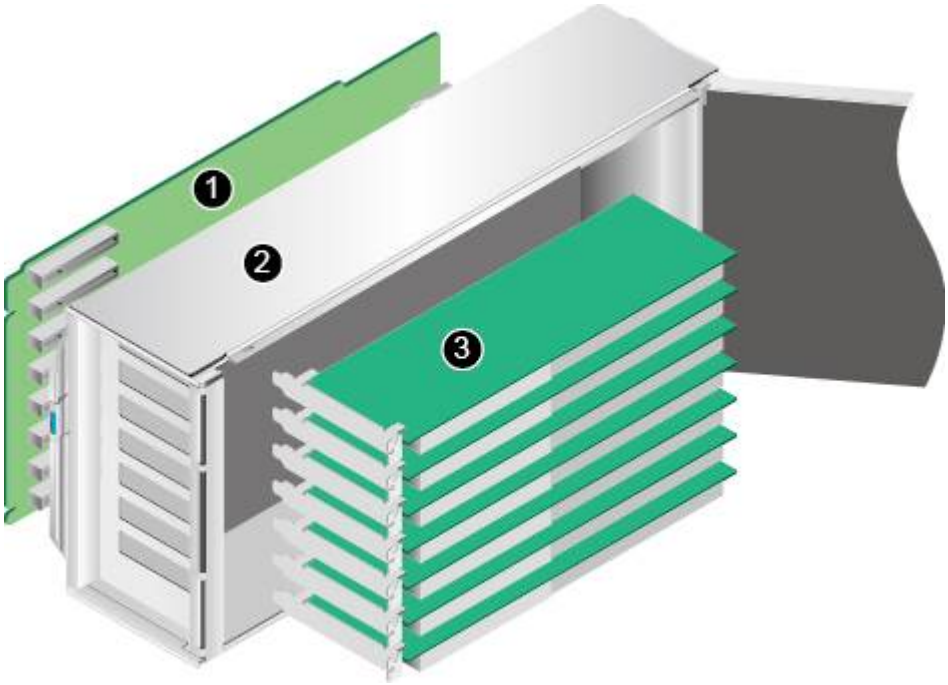


Table 1-43 BIO-C and BIO-D components

No.	Name	Function
1	BIO support board	Provides PCIe slots.
2	Half-height BIO enclosure	Supports and protects a BIO.
3	PCIe Cards	8-slot BIO-C: supports eight PCIe 3.0 x4 cards. 7-slot BIO-D: supports seven PCIe 3.0 x8 cards.

1.5 Logical Structure

The 9008 V5 logically consists of the following modules:

- Cabinet module: This module consists of the backplane, indicator board, fan modules, and cabinet. As the basic component of a KunLun server, this module houses and interconnects various components, and provides power supply and cooling channels for the system.
- SCM: As the core computing unit, each SCM consists of one CPU board and a maximum of 12 DIMMs.
- Front I/O module (FIO): An FIO houses hard disks, RAID controller cards, and internal PCIe riser cards. When a resource expansion enclosure (REE) is configured, the FIO leads the PCIe resources to the REE. (REEs are available in 2018Q2)
- Back I/O module (BIO): A BIO in the SCE or REE provides rear PCIe slots for installing standard PCIe cards.

1.5.1 Logical Structures for CPU Interconnection

Figure 1-62 and **Figure 1-63** show the logical structures for CPU interconnection.

Figure 1-62 UPI topology in single-system mode

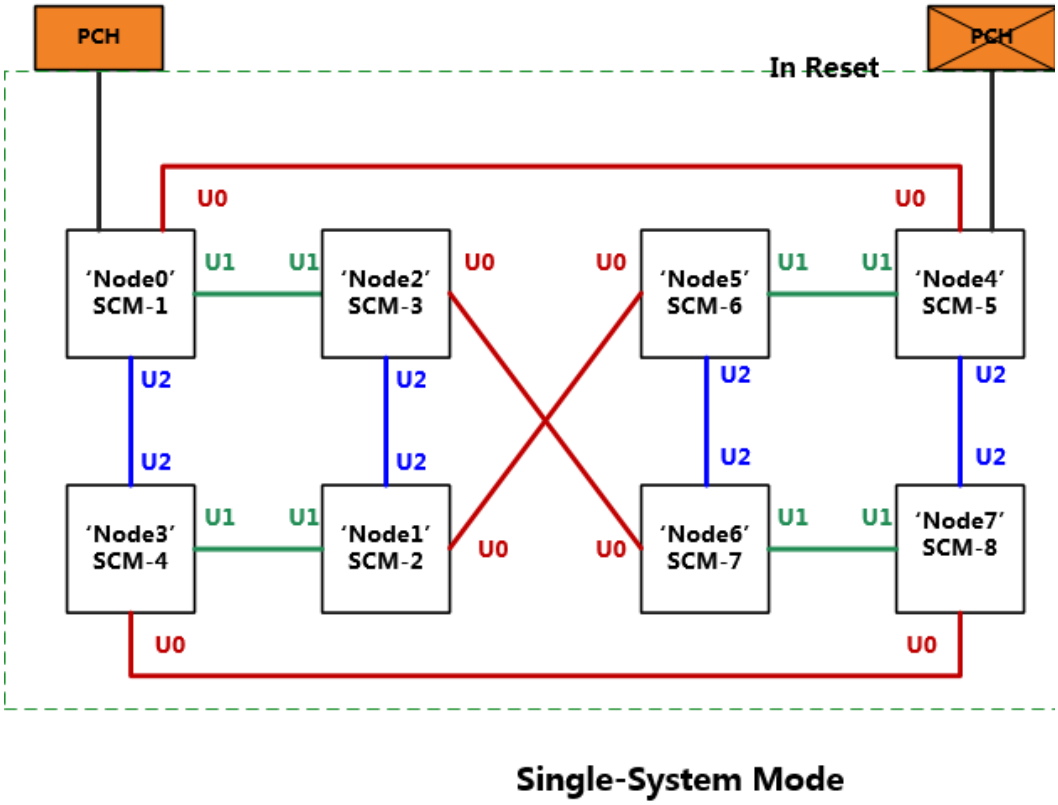
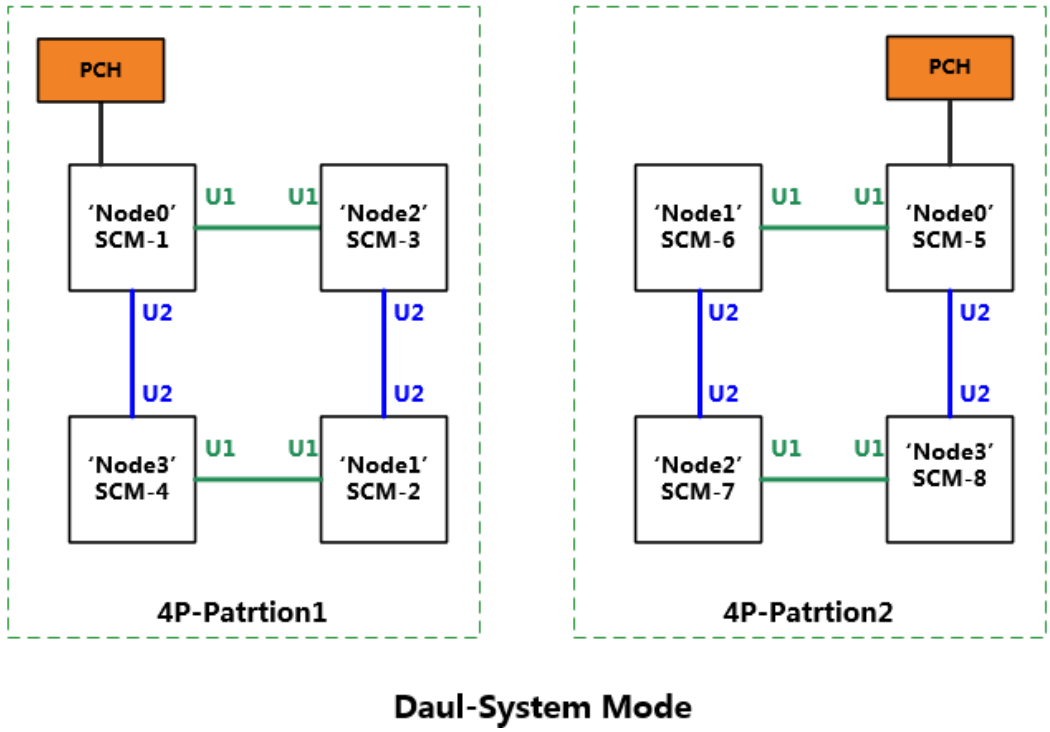


Figure 1-63 UPI topology in dual-system mode



1.5.2 SCE Logical Structures

Figure 1-64 and Figure 1-65 show the logical structures of modules in an SCE.

Figure 1-64 Logical structure of a CPU board module

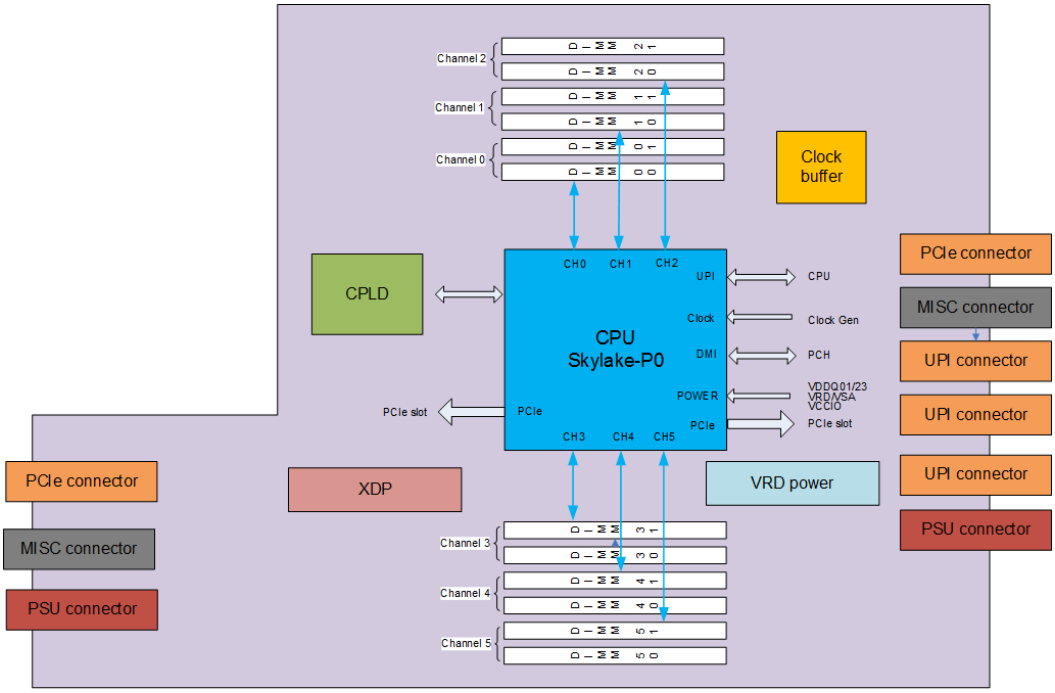
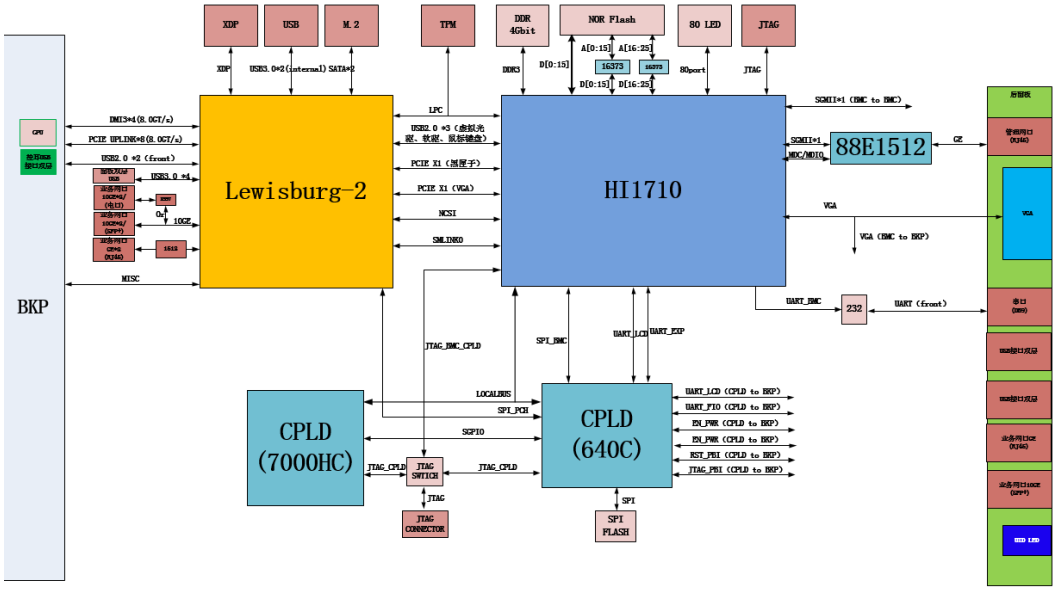


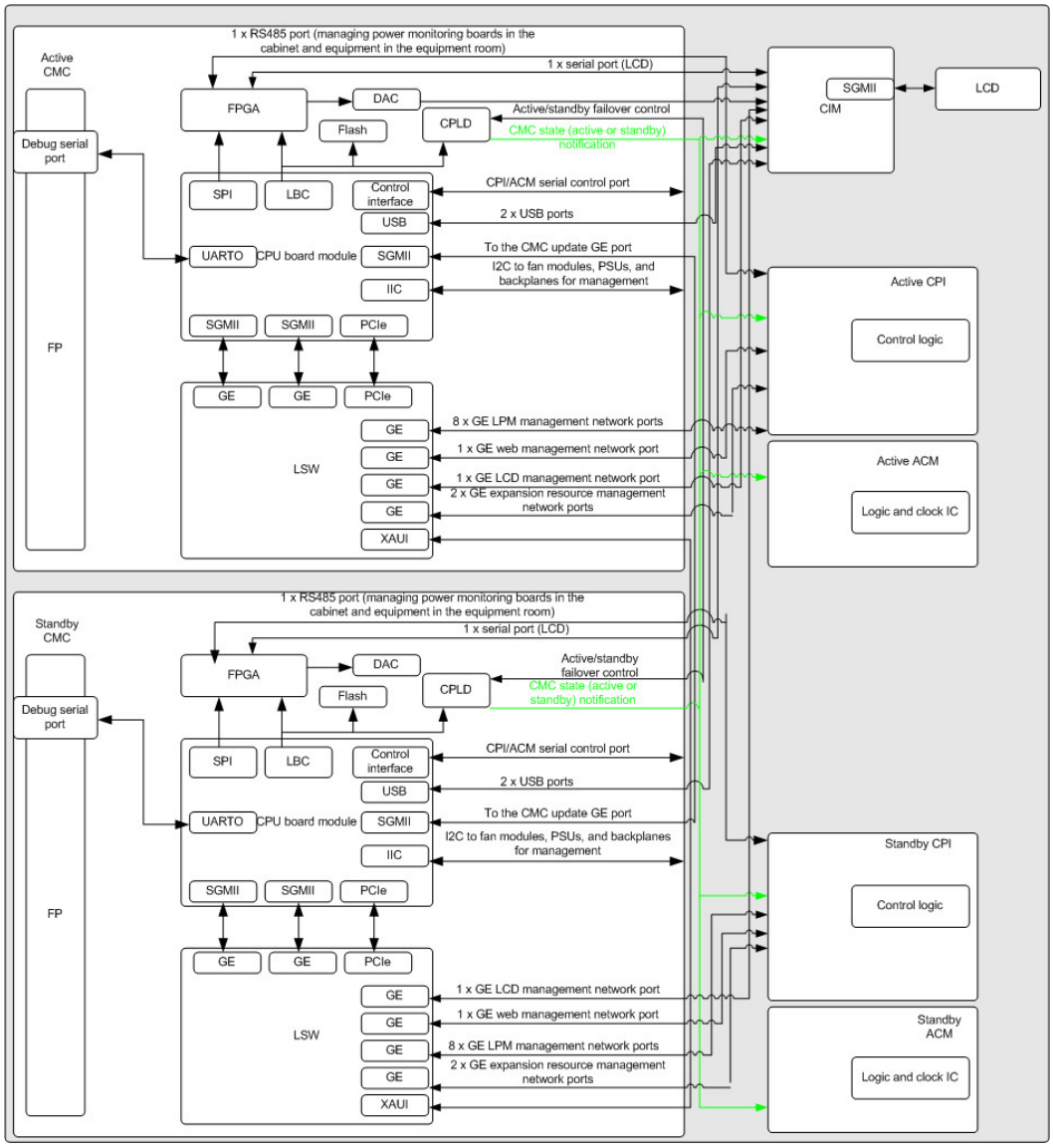
Figure 1-65 Logical structure of an LPM



1.5.3 CME Logical Structure

Figure 1-66 shows the CME logical structure.

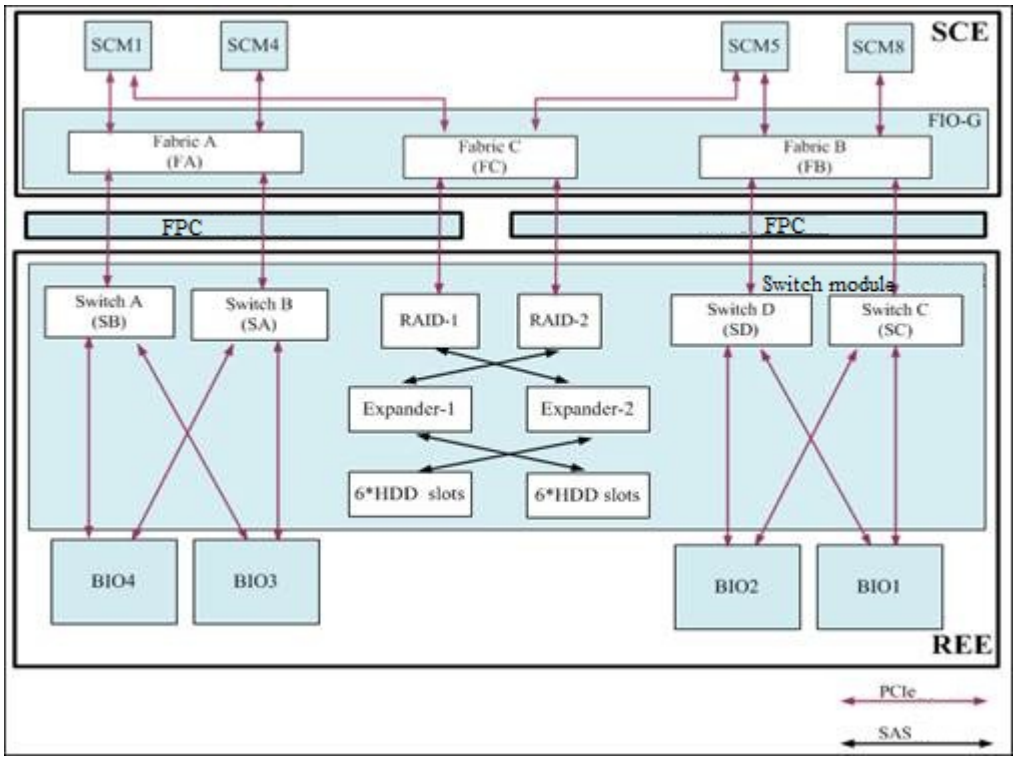
Figure 1-66 CME logical structure



1.5.4 REE Logical Structure

Figure 1-67 shows the REE logical structure.

Figure 1-67 REE logical structure



1.6 Physical Partitioning

The 9008 V5 adopts the Huawei KPar technology to implement the physical partitioning function and can operate in single-system or dual-system mode. KPar changes the interconnection topology between CPUs based on the collaboration between the iBMC and the BIOS. In single-system mode, eight CPUs are in the same UPI topology. In dual-system mode, eight CPUs are divided into two groups and the four CPUs in each group are in a UPI topology.

- The 9008 V5 operates in single-system mode by default. In this mode, the 9008 V5 operates as a single system.
- The dual-system mode is also called dual-partition mode. In this mode, the 9008 V5 operates as two 4P systems: systems A and B, which are also called partitions A and B.

The physical partitioning function improves service load flexibility. You can set the operating mode of the 9008 V5 based on service requirements, which helps maximize return on investment (ROI).

The KPar technology has the following features:

- Easy switching: You can implement one-click switching between the system operating modes using the iBMC WebUI, without upgrading any software.
- Unified UI: When the 9008 V5 operates in single-system mode, the iBMC provides a unified UI for management.
- Symmetrical distribution of service resources: When the 9008 V5 operates in dual-system mode, service resources are symmetrically distributed in the two partitions.

- Joint control over platform resources: When the 9008 V5 operates in dual-system mode, fan modules and PSUs can be globally shared by the two partitions to achieve optimal overall performance.
- DVD drive and LCD sharing: When the 9008 V5 operates in dual-system mode, the two partitions share the DVD drive and LCD, which facilitates local maintenance and one-click switching between the system operating modes using the LCD or iBMC WebUI.

Figure 1-68 UPI topology in dual-system mode

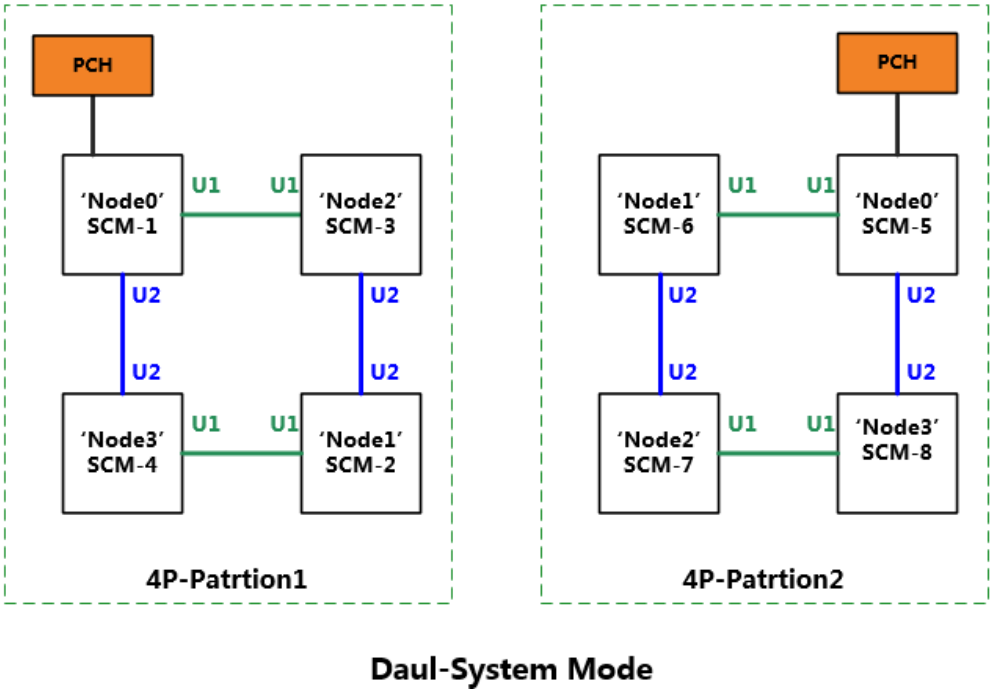


Table 1-44 Resources in dual-system mode

Item	Partition A	Partition B
SCM	SCM-1 to SCM-4	SCM-5 to SCM-8
BIO PCIe slot	BIO: slot 6 to slot 10	BIO: slot 1 to slot 5
FIO hard disk and RAID controller card	FIO-B ● Disk 0 to Disk 11 ● RAID 1 FIO-D ● Disk 0 to Disk 3 ● RAID 1	FIO-B: ● Disk 12 to Disk 23 ● RAID 2 FIO-D: ● Disk 4 to Disk 7 ● RAID 2
LPM	LPM-2	LPM-1
DVD drive	Shared mode. The DVD drive is shared by partitions A and B. You can switch between partitions A and B using the LCD or iBMC WebUI.	
LCD	Shared mode. The DVD drive is shared by partitions A and B. You can switch between partitions A and B using the LCD or iBMC WebUI.	

Item	Partition A	Partition B
PSU	Shared mode. The PSUs are shared by partitions A and B.	
Fan module	Shared mode. The fan modules are shared by partitions A and B.	
System backplane	Shared mode. The backplane is shared by partitions A and B.	

1.7 Logical Partitioning

KunLun mission critical servers support logical partitioning (L-Par), which enables more flexible partitioning. The hardware resources (CPU, memory, and I/O devices) used by a logical partition are isolated. Compared with a physical partition, a logical partition is more flexible and provides more fine-grained partitioning capabilities.

Firmware is used to isolate hardware resources of logical partitions. It is a platform between the physical hardware and the logical partition OS to shield physical hardware differences for logical partitions and provide necessary hardware resources for users based on the configuration of the logical partition.

Logical partitioning technology has the following features:

- High performance: CPU resources are exclusively occupied by logical partitions to avoid CPU contention and improve task real-time performance. I/O devices are directly and exclusively used. The I/O device instructions from a logical partition OS can be directly sent to physical devices without transfer, improving I/O performance.
- High availability: The physical hardware resources of logical partitions are isolated so that hardware faults of a logical partition do not affect other logical partitions. L-Par supports HA and Oracle RAC to reduce the planned system downtime and improve logical partition availability.
- High security: The security of the logical partition is hardened by CPU, memory, and I/O isolation.
- High manageability: Logical partitions can be managed with hardware devices on a unified WebUI. The black box feature enables the system to automatically store the kernel logs, system snapshots, kernel diagnosis information, and last word logs of logical partitions when the system is abnormal or breaks down, and save the logs to the non-volatile storage device.

Table 1-45 lists the logical partition specifications of a KunLun mission critical server.

Table 1-45 Logical partition specifications

Indicator	Specification	Remarks
Number of logical partitions supported by a physical partition	40	Maximum number of logical partitions that can be powered on in a single physical partition or a server.

Indicator	Specification	Remarks
Maximum memory of a logical partition	4 TB	Maximum memory of a logical partition. The minimum memory is 1 GB. The memory can be adjusted with a step of 64 MB.
Maximum number of CPU cores of a logical partition	96	Maximum number of CPU cores of a logical partition. The unit is core.
Maximum number of local disks of logical partitions	60	1. Local disks adopt two modes, Physical Raw Device Mapping (PRDM) and Virtual Raw Device Mapping (VRDM). The local disks refer to the disks that are mapped to logical partitions by firmware. You can use the local HDDs/SSDs or remote disk array disks for mapping. 2. The remote disk array disks that can be used by logical partitions through pass-through FC cards depend on the number of disks that can be identified by the Guest OS, but are irrelevant to the limit on the number of local disks.
Maximum number of PCI devices of a logical partition	28	Maximum number of PCI devices of a logical partition.

NOTE

For details about the KunLun logical partitioning feature, see the *Huawei KunLun Mission Critical Server L-Par Feature Description*.

1.8 RAS Features

The 9008 V5 supports a rich set of RAS features. You can configure these features for better performance.

KunLun servers support two types of RAS features:

- Key RAS features
  - Memory reliability
  - CPU reliability
  - IIO reliability
  - Fault diagnosis & management (FDM)
  - Proactive failure analysis engine (PFAE)
- Enhanced RAS features
  - Key memory address mirroring (2018 Q4)
  - MSP technology for memory security protection (2018 Q4)

NOTE

For details about RAS features, see the *KunLun Mission Critical Server RAS White Paper*.

1.9 Technical Specifications

Table 1-46 describes the technical specifications for KunLun servers.

Table 1-46 Technical specifications

Mechanical specifications	Dimensions (H x W x D)	● 9008 V5 with Huawei cabinet and acoustic doors: 2000 mm x 600 mm x 1550 mm (78.74 in. x 23.62 in. x 61.02 in.) ● 9008 V5 without a cabinet: – CME (H x W x D): 86.1 mm x 447 mm x 750 mm (3.39 in. x 17.60 in. x 29.53 in.) – SCE (H x W x D): 352.4 mm x 447 mm x 855 mm (13.87 in. x 17.60 in. x 33.66 in.) – REE (H x W x D): 175 mm x 447 mm x 790 mm (6.89 in. x 17.60 in. x 31.10 in.)
	Weight	● Fully loaded 9008 V5 cabinet: ≤ 515 kg (1135.58 lb). The weight depends on the actual hardware configuration. ● 9008 V5 without a cabinet: – Fully loaded SCE: ≤ 153 kg (337.37 lb) – Fully loaded CME: ≤ 25 kg (55.13 lb) – Fully loaded REE: ≤ 60 kg (132.30 lb) The weight depends on the actual hardware configuration.
Environmental specifications	Temperature	● Operating range: 5ºC to 40ºC (41ºF to 104ºF) (ASHRAE Class A3 compliant, some configurations support a maximum of 35°C operating temperature) ● Storage range: –40°C to +65°C (–40°F to +149°F) ● The temperature change is less than 20°C (36°F) per hour, and the long-term storage temperature is 21°C to 27°C (69.8°F to 80.6°F) **NOTE** 1. For CPUs of 150 W and lower, (including 8153, 8156, 8158, and 8164), the maximum operating temperature is 45°C (113°F, ASHRAE CLASS A4 compliant). 2. If FIO-B is used, the maximum operating temperature is 35°C (95°F).
	Relative humidity (RH)	● Operating range: 10% to 90% (twmax = 29°C) ● Storage range: 5% to 95% (twmax = 38°C) ● Maximum change rate: 20% RH/h
	Maximum altitude	3000 m (9842.40 ft) The maximum operating temperature decreases by 1°C (1.8°F) with every increase of 300 m (984.24 ft) in an altitude above 900 m (2952.72 ft).

	Acoustic noise	The following values are the declared A-weighted sound power levels (LWAd) and declared average bystander position A-weighted sound pressure levels (LpAm) when the server is operating in a 23ºC (73.4ºF) ambient environment. Noise emissions are measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). ● Idle: – LWAd: 6.3 Bels (with a cabinet and acoustic doors) – LpAm: 52.7 dBA (with a cabinet and acoustic doors) ● Operating: – LWAd: 6.7 Bels (with a cabinet and acoustic doors) – LpAm: 56.8 dBA (with a cabinet and acoustic doors) **NOTE** Actual sound levels generated during server operation vary depending on server configuration, load, and ambient temperature.
	Contaminant	● Corrosive gaseous contaminant ● Corrosion rate of the copper test piece: < 300 Å/month (in compliance with the ANSI/ISA-71.04-2013 gaseous corrosion level G1) ● Corrosion rate of the silver test piece: < 200 Å/month ● Particle contaminant ● The ISO14664-1 Class 8 requirements are met. ● You are advised to hire a professional organization to monitor particle contaminants in the equipment room. There is no explosive, conductive, magnetic, or corrosive dust in the equipment room.
AC power input specifications	External sockets and cables	● KunLun 9008 V5 server with a cabinet: REEs are optional. When no REEs are configured, the server requires two IEC60309 32 A single-phase three-core industrial plugs, with dual AC power supplies in 1+1 redundancy mode; when REEs are configured, the server requires four IEC60309 32 A single-phase three-core industrial plugs, with dual AC power supplies in 2+2 redundancy mode; or two IEC60309 32 A three-phase five-core industrial plugs, with dual AC power supplies in 1+1 redundancy mode. KunLun 9008 V5 server without a cabinet: The CME requires two PFMs and C13 AC power cables; each SCE requires two or four 3000 W AC PSUs and C19 AC power cables; each REE requires two AC PSUs and C13 AC power cables.

	Input voltage	● KunLun 9008 V5 server without a cabinet: Each IEC60309 32 A single-phase three-core industrial plug supports an input voltage range of 200 V to 240 V AC at 50 Hz or 60 Hz, with up to 32 A input. Each IEC60309 32 A three-phase five-core industrial plug supports an input voltage range of 346 V to 415 V AC at 50 Hz or 60 Hz, with up to 32 A input. ● KunLun 9008 V5 server without a cabinet: Each CME, SCE, or REE PSU supports an input voltage range of 90 V to 264 V AC at 50 Hz or 60 Hz.
Power output specifications	Rated output voltage	● CME, SCE, or REE: 12 V DC ● PDUs or APD: 200 V to 240 V AC
Power consumption	Maximum power consumption	● 9008 V5: ≤ 2800 W ● The power consumption depends on the actual hardware configuration.

1.10 Advantages

Stability and Reliability

- Has a rich set of RAS features, greatly improving server availability
- Complies with carrier-grade component selection criteria, derating design standards, and reliability test requirements.
- Implements redundancy for key components such as the BIOS flash memory, management software image, PSUs, and fan modules.

Excellent Performance

- Supports a maximum of eight Intel® Xeon® 81xx/61xx series processors, each with a maximum thermal design power (TDP) of 205 W. A single CPU supports up to 28 cores and 56 threads (v4 CPU). The 9008 V5 supports up to 224 cores and 448 threads.
- Supports a maximum of 96 DDR4 DIMMs and a maximum memory capacity of 12 TB (with *M CPUs and 128 GB DIMMs configured).
- Supports a maximum of 48 2.5-inch SAS/SATA HDDs or SSDs.
- Supports a maximum of 40 2.5-inch NVMe SSDs.

Leading Architecture

- Supports smooth expansion of 2P, 4P, 6P, and 8P configurations, boosting scale-up capability for mission-critical applications and adapting to complex business integration environments.
- Uses Huawei physical partitioning technology, and supports flexible configuration of physical partition modes.

- Supports flexible, on-demand configurations of hardware modules, including one or more RAID controller cards, and FIOs.
- Supports local integrated cost-effective LAN on motherboards (LOMs).
- Supports modular design, facilitating maintenance, evolution, and upgrade.
- Stably operates at 40°C (104°F) for a long time. For details, see **Table 1-46**.

Simple Maintenance

- Adopts modular design for easy maintenance.
- Supports tool-free installation and maintenance.
- Supports online parts replacement to facilitate maintenance. The parts include PCIe cards, hard disks, fan modules, and PSUs.
- Uses Huawei-developed Hi1710 management chip to provide comprehensive and one-stop device management, service configuration, and fault management.
- Provides an 8-inch touchscreen LCD for onsite maintenance.

2 Features

Performance and Scalability

The 9008 V5 provides the following features to enhance performance and scalability while reducing the total cost of ownership (TCO):

- 2, 4, 6, or 8 Intel® Xeon® Platinum 81XX series processors are supported. In the physical partitioning scenario, 81XX/61XX series processors are supported. The maximum TDP of a processor (Skylake processor) is 205 W.
- Each CPU supports up to 28 cores and uses Intel hyper-threading technology to support up to 56 threads.
- Each CPU provides up to 3.6 GHz frequency and 38.5 MB L3 cache.
- Each CPU supports up to three 10.4 GT/s UltraPath Interconnect (UPI) links.
- Intel® Turbo Boost Technology 2.0 enables CPU cores to run at maximum speeds during peak hours by temporarily going beyond the CPU TDP.
- Intel® Hyper-Threading Technology enables each CPU core to run up to two threads, improving parallel computation capability.
- Intel® Virtualization Technology integrates hardware-level virtualization functions to allow OS vendors to better use hardware to address virtualization workloads.
- Intel® Advanced Vector Extensions (AVX) 512 improves floating-point computing performance for computing-intensive applications.
- The system supports a maximum of 96 DDR4 DIMMs that have a maximum memory speed of 2666 MT/s and support ECC. RDIMMs or LRDIMMs can be configured. The maximum system memory capacity is 12 TB (in *M processor +128 GB DIMM configuration).
- Provides flexible disk configurations to meet different service requirements:
  - Supports a maximum of 40 NVMe SSDs (U.2 connectors).
  - Or supports a maximum of 48 SAS/SATA disks or SSDs.
  - Allows NVMe SSDs and SAS/SATA disks to be configured flexibly.
- Supports new-generation RAID controller cards, with the largest cache of 4 GB. A single RAID controller card supports a maximum of 24 SAS/SATA disks.
- Supports M.2 storage. M.2 SSDs support hardware RAID and hot swap.
- Supports two 10GE optical LOM ports and two GE RJ45 LOM ports (integrated on the mainboard, no additional configuration required).

- Supports a maximum of 18 PCIe slots. The rear panel provides 10 standard PCIe slots, four of which support hot swap. The SCMs and front I/O module support eight built-in PCIe RAID controller cards.

Availability and Serviceability

- The 9008 V5 uses carrier-class components and follows the engineering process to dramatically improve system reliability.
- Key components (such as PSUs, fan modules, and hard disks) adopt redundancy design and support hot swap without opening the enclosure cover. This feature enables quick replacement of faulty components without interrupting system operation.
- Hot swap and RAID configuration of hard disks protect data on hard disks and maximize system uptime.
- Some PCIe cards support hot swap without opening the enclosure cover, which implements PCIe upgrades and replacement without interrupting system operation.
- If no REEs are configured, a 3.5-inch LCD touchscreen diagnosis panel can be configured. If an REE is configured, an 8-inch LCD touchscreen diagnosis panel can be configured. The LCD touchscreen diagnosis panel helps locate faults quickly and accurately, which greatly shortens the fault rectification time.
- The SCE supports four hot-swappable PSUs in N+N redundancy mode.
- Supports eight hot-swappable fan modules in N+1 redundancy mode.
- The CMC monitors system parameters in real time, triggers alarms, and performs recovery actions upon failures to minimize system downtime.
- Integrated fault management and proactive failure analysis (PFA) improve fault locating efficiency and reduce unexpected downtime.
- Huawei provides a three-year warranty for parts replacement and onsite repair for the servers used in China. Huawei provides a 10-hour-a-day, 5-day-a-week support program. Service requests will be handled the next business day. Optional service upgrades are available.
- Huawei provides a three-year warranty for parts replacement and repair for the servers used outside China. Huawei provides a 9-hour-a-day, 5-day-a-week support program. Service requests will be handled the next business day. Huawei delivers the repaired or new parts within 45 calendar days after receiving the defective parts.

KunLun servers provide the following features to simplify local and remote server management and improve security:

- The CMC on a KunLun server monitors server operating status, implements remote management and cascading management of multiple servers.
- The integrated industry-standard Unified Extensible Firmware Interface (UEFI) increases efficiency of setup, configuration, and updates and simplifies the fault handling process.
- KunLun servers adopt strict security test criteria and a chip-level Huawei proprietary management system to ensure secure system operations.

Manageability and Security

The 9008 V5 provides the following features to enhance manageability and security:

With CME, The 9008 V5 provides the following features to simplify local and remote server management and improve security:

- The CMC on a KunLun server monitors server operating status, implements remote management and cascading management of multiple servers.
- The integrated industry-standard UEFI increases efficiency of setup, configuration, and updates and simplifies the fault handling process.
- KunLun servers adopt strict security test criteria and a chip-level Huawei proprietary management system to ensure secure system operations.

If the CME is not configured, the Huawei-developed BMC management chip is used to provide excellent management features:

- The built-in iBMC module based on the Huawei Hi1710 chip monitors server operating status and provides remote management.
- The Network Controller Sideband Interface (NC-SI) feature[1] allows a network port to provide functions of both a management network port and a service port, maximizing return on investment (ROI) for customers. NC-SI can be enabled or disabled using iBMC or the basic input/output system (BIOS). NC-SI is disabled by default.
- The integrated industry-standard UEFI increases efficiency of setup, configuration, and updates and simplifies the fault handling process.

Security features:

- The trusted platform module (TPM) provides advanced encryption functions, such as digital signatures and remote authentication.
- The Intel® Advanced Encryption Standard–New Instructions (AES NI) support faster and stronger encryption.
- The Intel® Execute Disable Bit (EDB) function prevents certain types of malicious buffer overflow attacks when working with a supported OS.
- The Intel® Trusted Execution technology provides enhanced security by using hardware-based defense against malicious software attacks, allowing an application to run in an isolated space from all other applications running on the OS. [2]

NOTE

[1] The service network port supporting NC-SI has the following features:

- The service network port can be bound to a LOM port (host network port 1 by default) of the server.
- The service network port allows you to enable, disable, and configure a virtual local area network (VLAN) ID. The VLAN ID is disabled by default, and the default VLAN ID is **0**.
- The service network port supports IPv4 and IPv6 addresses. You can set an IP address, subnet mask, default gateway, and IPv6 address prefix length for the service network port.

[2] Only the single-system mode supports Trusted Execution technology, while the dual-system mode does not support this technology.

Energy Efficiency

The 9008 V5 offers the following features to save energy:

- Supports Titanium PSUs, with up to 96% conversion efficiency.
- Uses voltage regulator-down (VRD) PSUs to reduce the energy loss in DC/DC power conversion.
- Supports area-based and intelligent fan speed adjustment, Proportional-Integral-Derivative (PID) speed adjustment, and intelligent CPU frequency adjustment, reducing power consumption.
- Adopts fully optimized heat dissipation design and energy-efficient fans, reducing system power consumption for heat dissipation.

- Supports power capping and power control.
- Disks are not powered on simultaneously, which reduces the server startup power consumption.
- The Intel® Intelligent Power Capability allows a single CPU to be powered on or off based on site requirements.
- Low-voltage Intel® Xeon® CPUs consume less energy and apply to the data center and telecommunication environments that have power and thermal limitations.
- SSDs consume 80% less power than HDDs.

3 Product Specifications

Table 3-1 lists the KunLun mission critical server specifications:

- 9008 V5 (without a CME): does not support CME, REE, or logical partitioning.
- 9008 V5 (with a CME): supports unified management of physical partitions and logical partitions, 8-inch touchscreen, and CME and ACM redundancy configuration.

Table 3-1 Product Specifications

Item	9008 V5 (Without a CME)	9008 V5 (with a CME)
Form factor	8U rack server	SCE + CME + (optional) REE. An optional cabinet and acoustic doors can be configured, but shipment with a cabinet is not supported.
Basic configuration	One SCE	One SCE, one CME, and one REE
Processor	2, 4, 6, or 8 Intel® Xeon® Platinum 81XX series CPUs, with the maximum TDP of 205 W. Each physical partition supports a maximum of four 81XX/61XX series processors.	2, 4, 6, or 8 Intel® Xeon® Platinum 81XX series processors, each with a maximum TDP of 205 W. Each physical partition supports a maximum of four 81XX/61XX series processors.

Item	9008 V5 (Without a CME)	9008 V5 (with a CME)
Memory	● Up to 96 DDR4 DIMM slots (12 DDR4 DIMM slots per CPU) for installing either RDIMMs, LRDIMMs, or 3DS LRDIMMs ● Maximum memory speed: 2666 MT/s ● 96 x 32 GB RDIMMs, with a maximum memory capacity of 3 TB ● LRDIMM: When 96 x 64 GB LRDIMMs are installed, the maximum memory is 6 TB; when 96 x 128 GB LRDIMMs are installed, the maximum memory is 12 TB (with M processors configured). ● Data protection measures: ECC, memory mirroring, single device data correction (SDDC), adaptive double device data correction (ADDDC), and lockstep **NOTE** When X8 memory is used, the ADDDC function is not supported.	● Up to 96 DDR4 DIMM slots (12 DDR4 DIMM slots per CPU) for installing either RDIMMs, LRDIMMs, or 3DS LRDIMMs ● Maximum memory speed: 2666 MT/s ● 96 x 32 GB RDIMMs, with a maximum memory capacity of 3 TB ● LRDIMM: When 96 x 64 GB LRDIMMs are installed, the maximum memory is 6 TB; when 96 x 128 GB LRDIMMs are installed, the maximum memory is 12 TB (with M processors configured). ● Data protection measures: ECC, memory mirroring, single device data correction (SDDC), adaptive double device data correction (ADDDC), and lockstep **NOTE** When X8 memory is used, the ADDDC function is not supported.

Item	9008 V5 (Without a CME)	9008 V5 (with a CME)
Local storage	● The server supports the following storage modules: – SAS SCM (SCM-B): Each supports a maximum of four SAS/SATA disks. A server supports a maximum of six SCM-Bs, each with one RAID controller card. – NVMe SCM (SCM-C): Each supports a maximum of four NVMe SSDs. A server supports a maximum of eight SCM-Cs and no RAID controller card is required. – Enhanced FIO (FIO-B): supports a maximum of 24 SAS/SATA hot-swappable disks, requiring one or two RAID controller cards. – NVMe FIO (FIO-D): supports a maximum of eight U.2 disk connectors for SAS/SATA disks or NVMe SSDs. The FIO-D provides two RAID controller card slots. RAID controller cards are not required when all disks are NVMe SSDs. ● NVMe SSDs support scheduled hot swap (working with the OS). **NOTE** The maximum storage capacity of the server varies depending on the maximum capacity of a single hard disk. For details about the maximum storage capacity of the server, contact your local Huawei sales representatives.	The server supports the following storage modules: When no REE is configured: ● SAS SCM (SCM-B): Each supports a maximum of four SAS/SATA disks. A server supports a maximum of six SCM-Bs, each with one RAID controller card. ● NVMe SCM (SCM-C): Each supports a maximum of four NVMe SSDs. A server supports a maximum of eight SCM-Cs and no RAID controller card is required. ● Enhanced FIO (FIO-B): supports a maximum of 24 SAS/SATA hot-swappable disks, requiring one or two RAID controller cards. ● NVMe FIO (FIO-D): supports a maximum of eight U.2 disk connectors for SAS/SATA disks or NVMe SSDs. The FIO-D provides two RAID controller card slots. RAID controller cards are not required when all disks are NVMe SSDs. ● NVMe SSDs support scheduled hot swap (working with the OS). When an REE is configured: ● Up to 12 x 2.5-inch hot-swappable SAS HDDs or SSDs ● Up to two optional screw-in RAID controller cards **NOTE** The maximum storage capacity of the server varies depending on the maximum capacity of a single hard disk. For details about the maximum storage capacity of the server, contact your local Huawei sales representatives.
Network port	Two RJ45 GE LOM ports and two 10GE SFP+ network ports	Single-system mode: two RJ45 GE LOM ports and two 10GE SFP+ network ports. Physical partition mode: Each partition supports two RJ45 GE LOM ports and two 10GE SFP+ network ports.

Item	9008 V5 (Without a CME)	9008 V5 (with a CME)
SCE PCIe expansion	Up to 18 PCIe 3.0 slots	The 9008 V5 provides a maximum of 18 PCIe 3.0 slots.
REE PCIe expansion	Not supported	The 9008 V5 supports one REE. An REE provides rear PCIe slots that support PCIe cards with or without external cables and supports two types of specifications: ● Two BIO-C and two BIO-D modules: support 14 half-height PCIe 3.0 x8 and 16 half-height PCIe 3.0 x4 non-hot-swappable slots. ● Two BIO-E modules: support four full-height PCIe 3.0 x16 and six full-height PCIe 3.0 x8 hot-swappable slots.
External port	● Front panel: two USB 2.0 ports and one DB15 VGA port ● Rear panel (two LPMs): two USB 3.0 ports, one DB15 VGA port, one RJ45 serial port, one RJ45 system management port, two GE electrical ports, and two 10GE optical ports on each LPM **NOTE** Some ports on the LPMs are unavailable in single-system mode.	SCE: ● Front panel: two USB 2.0 ports and one DB15 VGA port ● Rear panel (two LPMs): two USB 3.0 ports, one DB15 VGA port, one RJ45 serial port, one RJ45 system management port, two GE electrical ports, and two 10GE optical ports on each LPM **NOTE** Some ports on the LPMs are unavailable in single-system mode.
	Not supported	CME: ● The CME provides two USB 2.0 ports, one system power button, one UID button, one VGA port, and one management serial port on its front panel. ● The CME provides one GE management network port and one GE stacking port on its front panel.
DVD drive	One built-in DVD-RW drive	A shared Serial Advanced Technology Attachment (SATA) DVD-RW drive, which supports remote access to a virtual DVD drive from a physical partition
LCD	One 3.5-inch LCD touchscreen diagnosis panel.	8-inch capacitive TFT touchscreen for local management

Item	9008 V5 (Without a CME)	9008 V5 (with a CME)
Video card	The LPM integrates an SM750 graphics card chip, providing a memory capacity of 32 MB and supporting a maximum resolution of 1920 x 1200 at 60 Hz with 16 M colors. **NOTE** 1. The maximum resolution 1920 x 1200 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. 2. If the chassis provides the front and rear VGA ports and only one VGA port is connected to a monitor, the display effect may be affected.	Front VGA port: The LPM integrates a video card that supports 32 MB display memory. CME VGA port: The KVM supports a maximum resolution of 1280 x 1200. **NOTE** 1. The maximum resolution 1920 x 1200 of the front VGA port 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. 2. If the chassis provides the front and rear VGA ports and only one VGA port is connected to a monitor, the display effect may be affected.
System management	iBMC management system based on the Huawei Hi1710 chip	Remote management, WebUI, virtual KVM, and standard protocols such as IPMI 2.0 and Simple Network Management Protocol (SNMP)
Security	● Power-on password ● Administrator password	● Power-on password ● Administrator password
OS Compatibility	● Red Hat Enterprise Linux ● SUSE Linux Enterprise Server ● Microsoft Windows Server **NOTE** The preceding information is for reference only. To check supported OSs, use the **Huawei Server Compatibility Checker**.	● Red Hat Enterprise Linux ● SUSE Linux Enterprise Server ● Microsoft Windows Server **NOTE** The preceding information is for reference only. To check supported OSs, use the **Huawei Server Compatibility Checker**.
Physical partitioning	Up to two physical partitions (8-CPU configuration) or one 2P/4P/6P/8P single system.	Up to two physical partitions (4/6/8-CPU configuration) or one 2P/4P/6P/8P single system.

4 Component Compatibility

4.1 CPU

The 9008 V5 supports four or eight Intel® Xeon® Platinum 81XX/61XX series processors, as shown in **Table 4-1**. **Table 4-2** lists the processors supported by the 9008 V5.

Table 4-1 9008 V5 CPU configurations

Number of CPUs	Installation Position	Support for Dual-System Mode
2	SCM-1, SCM-4	No
4	SCM-1 to SCM-4	No
4	SCM-1, SCM-4, SCM-5, SCM-8	Yes
6	SCM-1 to SCM-6	Yes
8	SCM-1 to SCM-8	Yes

Table 4-2 Supported CPUs

BOM Number	Model	Description
02311XWB	Intel® Xeon® Platinum 8156	Function Module,Server,BC8M08CPU,Intel Xeon Platinum 8156(3.6GHz/4-core/16.5MB/105W) CPU (with heat sink)
02311XWC	Intel® Xeon® Platinum 8153	Function Module,Server,BC8M09CPU,Intel Xeon Platinum 8153(2.0GHz/16-core/22MB/125W) CPU (with heat sink)
02311XVY	Intel® Xeon® Platinum 8160	Function Module,Server,BC8M06CPU,Intel Xeon Platinum 8160(2.1GHz/24-core/33MB/150W) CPU (with heat sink)
02311XNW	Intel® Xeon® Platinum 8168	Function Module,Server,BC8M02CPU,Intel Xeon Platinum 8168(2.7GHz/24-core/33MB/205W) CPU (with heat sink)
02311XVW	Intel® Xeon® Platinum 8164	Function Module,Server,BC8M05CPU,Intel Xeon Platinum 8164(2.0GHz/26-core/35.75MB/150W) CPU (with heat sink)
02311XVS	Intel® Xeon® Platinum 8170	Function Module,Server,BC8M04CPU,Intel Xeon Platinum 8170(2.1GHz/26-core/35.75MB/165W) CPU (with heat sink)
02311XNY	Intel® Xeon® Platinum 8176	Function Module,Server,BC8M03CPU,Intel Xeon Platinum 8176(2.1GHz/28-core/38.5MB/165W) CPU (with heat sink)
02311XNT	Intel® Xeon® Platinum 8180	Function Module,Server,BC8M01CPU,Intel Xeon Platinum 8180(2.5GHz/28-core/39MB/205W) CPU (with heat sink)

NOTE

- For the latest compatibility information, use the **Huawei Server Compatibility Checker** or consult your local Huawei sales representatives.
- The 61XX series processors can be used only in the physical partition mode.

4.2 Memory

Memory Configuration Rules

Each CPU of the 9008 V5 supports two integrated memory controllers (iMCs). Each iMC supports three memory channels: CH0 to CH2 by iMC0 for and CH3 to CH5 by iMC1. Each memory channel can house a maximum of two DDR4 DIMMs. Therefore, a maximum of 12 DDR4 DIMMs can be installed for each CPU. The DIMM configuration rules are as follows:

- DIMMs of different types (RDIMMs and LRDIMMs) cannot be installed on one server.

- All DIMMs operate at the same speed, which is the smaller value of:
  - 2666 MT/s (maximum DDR4 rate supported by Platinum CPUs)
  - Maximum rated working frequency supported by a DIMM

For example, if 81XX CPUs are used and the maximum rated working frequency of DIMMs is 2400 MT/s, the maximum working frequency of DIMMs is 2400 MT/s.

DIMM Configuration Rules

Figure 4-1 shows the DIMM slots and their numbers.

Figure 4-1 DIMM slot numbers

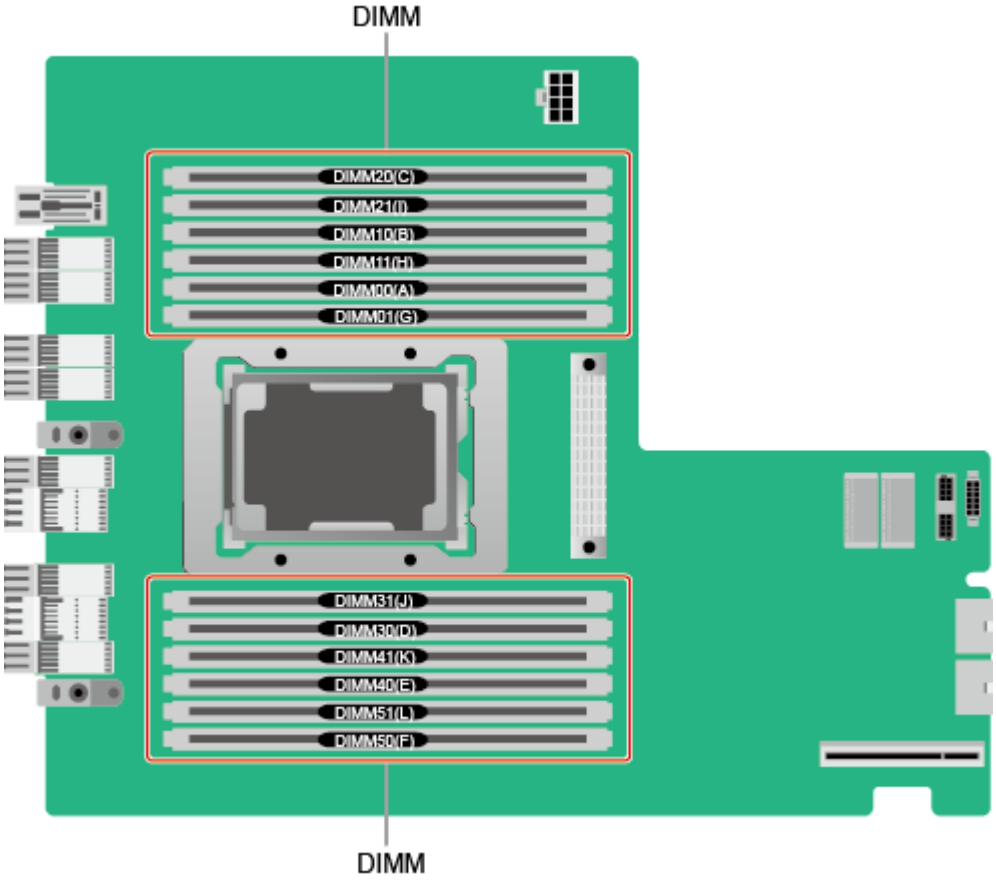


Table 4-3 describes the composition of each channel.

Table 4-3 Channels

Channel	DIMM
CH0	DIMM00(A)
	DIMM01(G)
CH1	DIMM10(B)
	DIMM11(H)

Channel	DIMM
CH2	DIMM20(C)
	DIMM21(I)
CH3	DIMM30(D)
	DIMM31(J)
CH4	DIMM40(E)
	DIMM41(K)
CH5	DIMM50(F)
	DIMM51(L)

Table 4-4 describes the memory configuration scenarios, and Table 4-5 describes the principles for configuring the memory of a single CPU.

Table 4-4 DIMM configuration rules

Scenario	Configuration Rules
Mirroring function disabled	For details, see Table 4-5.
Mirroring function enabled[1]	● Configure the same number of DIMMs for all CPUs and install them symmetrically. ● The mirroring function can be enabled only when 4, 6, 8, or 12 DIMMs are configured for each CPU. – Four DIMMs: slots A, B, D, and E – Six DIMMs: slots A, B, C, D, E, and F – Eight DIMMs: slots A, G, B, H, D, J, E, and K – Twelve DIMMs: all slots

Table 4-5 DIMM configuration rules for one CPU

Channel	DIMM Position (Silkscreen)	Number of Supported DIMMs											
		1	2	3	4	5	6	7	8	9	10	11	12
0	00	●	●	●	●	●	●	●	●	●	●	●	●

	01								●	●	●	●	●
1	10		●	●	●	●	●	●	●	●	●	●	●
	11								●	●	●	●	●
2	20			●		●	●	●		●	●	●	●
	21									●		●	●
3	30				●	●	●	●	●	●	●	●	●
	31								●		●	●	●
4	40				●	●	●	●	●	●	●	●	●
	41								●		●	●	●
5	50						●	●		●	●	●	●
	51												●

NOTE

The mirroring function mirrors the two or three channels of the same iMC.

Supported DIMMs

Table 4-6 lists the DIMMs supported by the 9008 V5.

Table 4-6 Supported DIMMs

BOM Number	Capacity	Description	Quantity (per CPU)
02311VVS	8 GB	DDR4 RDIMM-8GB-2666MT/s-1Rank(1G*8bit)	12
02311VVT	16 GB	DDR4 RDIMM-16GB-2666MT/s-2Rank(1G*8bit)	**Huawei Server Compatibility Checker** 12
02311VVU	32 GB	DDR4 RDIMM-32GB-2666MT/s-2Rank(2G*4bit)	12
02311VVV	64 GB	DDR4 LRDIMM Memory,64GB,2666MT/s, 4Rank(2G*4bit)	12

NOTE

- For the latest compatibility information, use the **Huawei Server Compatibility Checker** or consult your local Huawei sales representatives.

4.3 Storage

Table 4-7 lists the storage modules supported by the 9008 V5. For more information about disks, use the **Huawei Server Compatibility Checker**.

Table 4-7 Storage modules

Module	Maximum Number of Disks per Module[1]	Disk Controller and Mounting Mode	Storage Modules per Server[3]
SCM-B	4 (SAS/SATA disk)	One RAID controller card	6
SCM-C	4[2] (NVMe SSD)	Mounted to the CPU in the SCM	8
FIO-B	24 (SAS/SATA disk)	One or two RAID controller cards	1
FIO-D	8 (SAS/SATA disk or NVMe SSD)	• SAS/SATA disks: one or two RAID controller cards • NVMe SSDs: no RAID controller card	1
REE	12 (SAS/SATA disk)	One or two RAID controller cards	1

NOTE

- [1]: The disks include 2.5-inch SAS/SATA disks and 2.5-inch NVMe SSDs.
- [2]: SCM-C supports only NVMe SSDs.
- [3]: The total number of FIO-B and FIO-D modules cannot be greater than 1.

Table 4-8 lists supported RAID controller cards. **Table 4-9** lists the RAID levels.

Table 4-8 Supported RAID controller cards

Model	BOM Number	Support for Supercapacitor	Chip	Description
SR450C-M 2GB	03024JMY	Yes	Avago 3508	Manufactured Board,SR450C-M 2G,BC11RLCB,SR450C-M 2G SAS/SATA RAID Card MR,RAID0,1,5,6,10,50,60,2GB Cache(Avago3508),Support SuperCap and Sideband Management,Board ID 0X2a,2*2
SR450C-M 4GB	03024JMX	Yes	Avago 3508	Manufactured Board,SR450C-M 4G,BC11RLCBA,SR450C-M 4G SAS/SATA RAID Card MR,RAID0,1,5,6,10,50,60,4GB Cache(Avago3508),Support SuperCap and Sideband Management,Board ID 0X27,2*2
SR450-M 2G	03024JNJ	No	Avago 3508	Manufactured Board,SR450-M 2G,BC11RLCBB,SR450-M 2G SAS/SATA RAID Card MR,RAID0,1,5,6,10,50,60,2GB Cache(Avago3508), NO support for Supercap,Board ID 0X5a,2*2
RU430C -1G	02311XXC	Yes	LSI3108	Function Module, 9032,BC9M01ESMM,Kunlun Mission Critical Server,LSI 3108 RAID Card,RAID0,1,5,6,10,50,60,RU430C 1GB Cache,With SuperCap and Out-of-Band Management
RU430C -1G	02311XXD	Yes	LSI3108	Function Module, 9032,BC9M01ESMN,Kunlun Mission Critical Server,LSI 3108 RAID Card,RAID0,1,5,6,10,50,60,RU430C 2GB Cache,With SuperCap and Out-of-Band Management

NOTE

- For the latest compatibility information, use the **Huawei Server Compatibility Checker** or consult your local Huawei sales representatives.

Table 4-9 RAID level comparison

RAID Level	Reliability	Read Performance	Write Performance	Disk Usage
RAID 0	Low	High	High	100%
RAID 1	High	High	Low	50%
RAID 5	Relatively high	High	Medium	(N – 1)/N
RAID 6	Relatively high	High	Medium	(N – 2)/N
RAID 10	High	High	Medium	50%
RAID 50	High	High	Relatively high	(N – M)/N
RAID 60	High	High	Relatively high	(N – M x 2)/N
Note: N indicates the number of member disks in a RAID array, and M indicates the number of spans in a RAID array.				

4.4 I/O Expansion

The 9008 V5 supports a wide range of PCIe cards for you to choose based on the card type and transmission speed:

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

NOTE

- For the latest compatibility information, use the **Huawei Server Compatibility Checker** or consult your local Huawei sales representatives.

4.5 PSU

Table 4-10 lists the PSUs supported by the 9008 V5. **Table 4-11** lists the input and output specifications of 2000 W Titanium PSUs and 3000 W Platinum PSUs.

Table 4-10 Supported PSUs

BOM Number	Name	Input Voltage/ Current/ Frequency	Maximum Output Voltage and Power	Energy Efficiency Grade	Altitude	Power Cable
02311HNU	2000 W Titanium	100 V to 240 V AC, 10 A, 50/60 Hz 240 V DC, 10 A	12.3 V, 800 W to 2000 W	Titanium	5000 m (16404 ft)	C13
02310LHN	2500 W Platinum	-48 V to -60 V DC, 80 A	12.3 V, 2500 W	Platinum	3000 m (9842.40 ft)	Cord end OT terminal cable
02310LKL	3000 W Platinum	100 V to 240 V AC, 16 A, 50/60 Hz 240 V DC, 16 A	12.3 V, 800 W to 3000 W	Platinum	3000 m (9842.40 ft)	C19

NOTE

For the latest compatibility information, use the **Huawei Server Compatibility Checker** or consult your local Huawei sales representatives.

Table 4-11 2000 W and 3000 W PSU input and output specifications

PSU	Input (Voltage/Maximum Current)	Output (Voltage/Maximum Current/Power)
2000 W Titanium 02311HNU	100 V to 130 V AC, 10 A	12.3 V, 65.06 A, 800 W
	200 V to 220 V AC, 10 A	12.3 V, 146.3 A, 1800 W
	220 V to 240 V AC, 10 A	12.3 V, 162.6 A, 2000 W
	240 V DC, 10 A	12.3 V, 162.6 A, 2000 W
3000 W Platinum 02310LKL	100 V to 130 V AC, 16 A	12.3 V, 97.6 A, 1200 W
	200 V to 220 V AC, 16 A	12.3 V, 203.3 A, 2500 W
	220 V to 240 V AC, 16 A	12.3 V, 243.9 A, 3000 W
	240 V DC, 16 A	12.3 V, 243.9 A, 3000 W

4.6 OS and Software

The 9008 V5 supports mainstream virtualization software and OSs including SLES, RHEL, Windows Server, and VMware ESXi.

NOTE

- For the latest compatibility information, use the **Huawei Server Compatibility Checker** or consult your local Huawei sales representatives.

5 Management

The 9008 V5 without a CEM uses the Huawei-developed Hi1710 management chip to deliver high manageability and security.

- The built-in iBMC module based on the Huawei Hi1710 chip monitors server operating status and provides remote management.
- The Network Controller Sideband Interface (NC-SI) feature[1] allows a network port to provide functions of both a management network port and a service port, maximizing return on investment (ROI) for customers. NC-SI can be enabled or disabled using iBMC or the basic input/output system (BIOS). NC-SI is disabled by default.
- The integrated industry-standard UEFI increases efficiency of setup, configuration, and updates, and simplifies the fault handling process.
- The trusted platform module (TPM) provides advanced encryption functions, such as digital signatures and remote authentication.
- The Intel® Advanced Encryption Standard–New Instructions (AES NI) support faster and stronger encryption.
- The Intel® Execute Disable Bit (EDB) function prevents certain types of malicious buffer overflow attacks when working with a supported OS.
- The Intel® Trusted Execution technology provides enhanced security by using hardware-based defense against malicious software attacks, allowing an application to run in an isolated space from all other applications running on the OS.[2]

NOTE

[1] The service network port supporting NC-SI has the following features:

- The service network port can be bound to a LOM port (host network port 1 by default) of the server.
- The service network port allows you to enable, disable, and configure a virtual local area network (VLAN) ID. The VLAN ID is disabled by default, and the default VLAN ID is **0**.
- The service network port supports IPv4 and IPv6 addresses. You can set an IP address, subnet mask, default gateway, and IPv6 address prefix length for the service network port.

[2] Only the single-system mode supports Trusted Execution technology, while the dual-system mode does not support this technology.

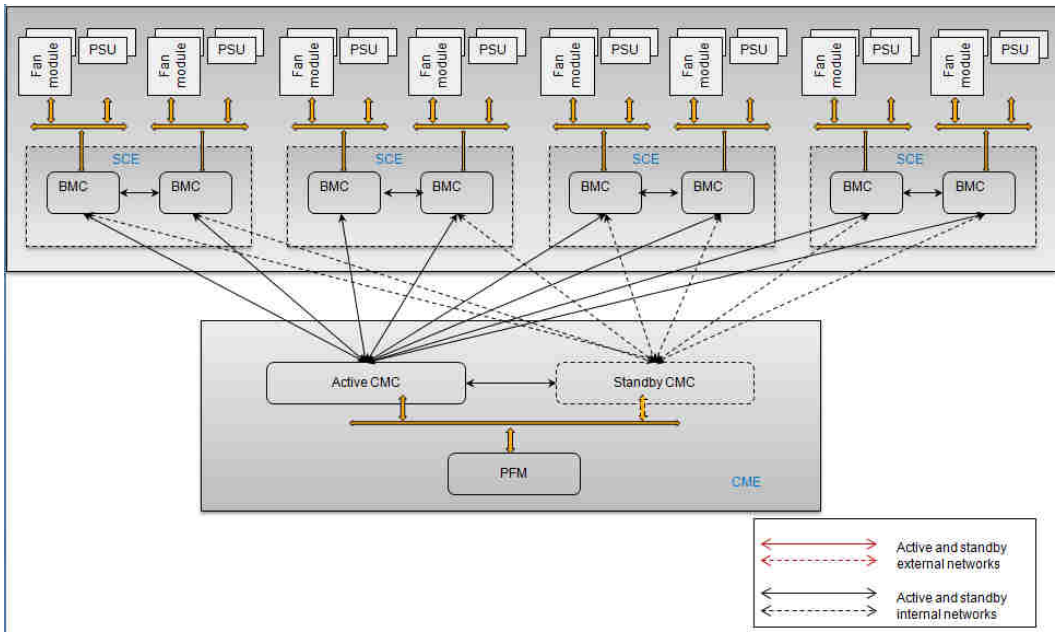
The 9008 V5 with a CME integrates the latest CMC out-of-band management system.

KunLun mission critical server management covers management of SCEs, CMEs, fan modules, and PSUs. Performs asset management, partition management, environment monitoring, field replaceable unit (FRU) health monitoring, and online maintenance, provides

channels for in-band monitoring and commissioning, and supports KVM, SOL, and virtual media.

The management system adopts unified networking. The CMCs are connected to the BMCs in the BPUs of each SCE by using Ethernet switch technology to implement system management. The CMCs instead of the BMCs provide management ports for connecting to the external management and maintenance network. See **Figure 5-1**.

Figure 5-1 Management architecture



The CMCs are Huawei's proprietary advanced software designed for remotely managing servers. The CMCs provide various user interfaces, such as the CLI and WebUI. All user interfaces adopt a highly secure encryption algorithm, ensuring access security. The CMCs monitor all aspects of the server and provide comprehensive alarms and detailed logs. The CMCs operate in active/standby mode. If the active CMC fails, an active/standby failover is automatically triggered so that the standby CMC can take over services from the active one.

Table 5-1 describes the CMC specifications.

Table 5-1 CMC specifications

Item	Specifications
Basic management functions	● UID indicator turning on and off, and host name and location setting and query ● Cabinet health status ● Board information query ● System event and alarm query ● SOL ● KVM/VMM

Item	Specifications
User management	● User online status query ● User creation, modification, and deletion ● Rights-based management
PSU and fan module management	● Power and status monitoring for the CME and SCEs ● Fan speed percentage and fan status monitoring for the CME and SCEs
Physical partition management	● Life cycle management: physical partition creation, modification, and deletion ● Physical partition power-on and power-off
User interface	● HTTPS WebUI ● CLI
Security	● User management ● Role authentication ● Data encryption ● Scenario-based login restriction ● Account security
LCD	● Cabinet name and location query and setting, and overall health status query
Others	● Network Time Protocol (NTP) time synchronization ● Log query and download ● Online maintenance ● Upgrade management

6 Warranty

In accordance with the *Huawei Warranty Policy for Servers & Storage Products* (*Warranty Policy* for short), Huawei provides a three-year warranty for KunLun mission critical servers, a one-year warranty for DVD drives and supercapacitors, and a three-month warranty for software media. The *Warranty Policy* stipulates warranty terms and conditions, including the available services, response time, terms of service, and disclaimer.

The warranty terms and conditions may vary by country, and some services and/or parts may not be available in all countries. For more information about warranty services in your country, contact Huawei technical support or your local Huawei office.

Table 6-1 describes the warranty services provided by Huawei.

Table 6-1 Warranty services

Service	Description
Help Desk	Huawei provides 24-hour after-sales technical support (such as handling requests for troubleshooting and hardware repair), receives and handles customer inquiries, complaints, and suggestions through a dedicated hotline.
Remote troubleshooting	Upon receiving a service request to rectify a network or system fault, Huawei engineers remotely analyze and handle the fault in the shortest possible time through telephone support, remote access, or both.
Online technical support	The Huawei enterprise support website (http://support.huawei.com/enterprise) provides product and technical materials, such as product manuals, configuration guides, networking case studies, and maintenance experience collections. Registered users can access the website to download required documents.
Licensing of software updates	Huawei provides software patches whenever necessary to ensure stable device operation.

Service	Description
Hardware return for repair	Huawei provides repair or replacement services within the promised time to meet customer needs for spare parts. You can return defective parts to the designated Huawei site after submitting a service request. For servers used outside China, Huawei provides a three-year warranty for 9/5 responses to service requests on the next business day. Huawei delivers the repaired or new parts within 45 calendar days after receiving the defective parts. For servers used in China, Huawei provides a three-year warranty for 10/5 responses, on the next business day, to service requests for parts replacement and onsite limited repair.

Table 6-2 describes the warranty service response time.

Table 6-2 Response time

Service	Response Time		Description	Remarks
Help Desk	24/7		24/7: available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	-
Remote troubleshooting	-	-	24/7: available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	The response time is the period between the time when Huawei technical support accepts a customer's service request and the time when Huawei technical support contacts the customer for the first time to offer remote troubleshooting services.
Online technical support	-	-	Huawei enterprise support website (http://support.huawei.com/enterprise): available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	-

Service	Response Time		Description	Remarks
Licensing of software updates	-	-	Huawei enterprise support website (http://support.huawei.com/enterprise): available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	-
Hardware return for repair	Outside China	9/5 responses, shipment within 45 calendar days	Available 9 hours a day, 5 days a week (09:00 to 18:00, Monday to Friday), excluding official holidays.	Repaired or new parts will be shipped within 45 calendar days after Huawei receives the defective parts.
	In China	10/5 responses on the next business day	Available 10 hours a day, 5 days a week (08:00 to 18:00, Monday to Friday), excluding official holidays.	Service requests submitted after 15:30 will be handled the next business day.

7 Certifications

Table 7-1 lists the certifications that KunLun servers have passed.

Table 7-1 Certifications

No.	Country/ Region	Certification	Standard	Remarks
1	China	RoHS	SJ/T 11363-2006 SJ/T 11364-2006 GB/T 26572-2011	
2	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 V1.5.1: 2010 ETSI ES 201 468 V1.3.1: 2005 IEC61000-3-2: 2005 + A1: 2008 + A2: 2009/EN 61000-3-2: 2006 + A1: 2009 + A2: 2009 IEC 61000-3-3: 2008/EN 61000-3-3: 2008 RoHS: 2002/95/EC REACH: EC 1907/2006	

No.	Country/ Region	Certification	Standard	Remarks
3	Saudi Arabia	Multi-country	IEC/EN 61000-6-1 IEC/EN 61000-6-3 IEC/EN 60950-1 IEC 620401	
	Nigeria	Multi-country	IEC60950-1	
	Kuwait	Multi-country	IEC60950-1	
4	North America and multiple countries	CB	IEC 60950-1(ed.2), IEC 60950-1(ed.2);am1, IEC 60950-1(ed.2);am2	Delivered without a KunLun cabinet
5	North America and multiple countries	CB/UL	IEC 60950-1(ed.2), IEC 60950-1(ed.2);am1, IEC 60950-1(ed.2);am2	Delivered without a KunLun cabinet
6	America and Canada	FCC&IC	FCC CFR47 Part 15 Subpart B: 2015 ICES-003 Issue 6:2016*	Delivered without a KunLun cabinet
7	Japan	VCCI	Safety	Delivered without a KunLun cabinet

NOTE

The actual certification may be different from this list. If there is any discrepancy, no further notice will be provided. If you need to know more about the certification, consult the product certification representative.

8 Glossary

Table 8-1 Terms

Acronym or Abbreviation	Full Name	Description
-	acoustic door	-
ACM	advanced clock module	-
APD	AC power distribution	-
BIO	back I/O module	A BIO is installed in an SCE or REE to provide standard PCIe slots.
BPU	basic partition unit	A BPU is a 4-socket physical partition resource.
CIM	central interface module	-
CMC	central management console	-
CME	central management enclosure	-
CPI	central partition interconnect module	-
DIMM	dual in-line memory module	-
DMI	direct media interface	DIM is developed by Intel for connecting a CPU and the PCH.
FIO	front I/O module	An FIO is installed in an SCE.
HDD	hard disk drive	-

Acronym or Abbreviation	Full Name	Description
LPM	local partition management module	An LPM in a BPU implements device management and physical partition control for the BPU. The LPM is integrated with the Intel PCH, and Huawei management chip Hi1710, and Huawei LAN on motherboards (LOMs).
PCH	platform controller hub	KunLun servers use the Intel Lewisburg PCH C622.
PDU	power distribution unit	-
PFM	power and fan integrity module	-
PIC	partition interconnect cable	-
PIP	partition interconnect port	-
UPI	ultra path interconnect	QPI is a point-to-point CPU interconnect developed by Intel.
RAID	redundant array of independent disks	-
RAS	reliability, availability, and serviceability	RAS defines system availability, which is crucial for mission-critical applications.
SCE	system compute enclosure	-
SCM	system compute module	An SCM consists of the following: ● Service resources: one CPU board module and 24 DIMMs ● Board hardware: one CPU board module and two MBMs
TDP	thermal design power	-
REE	resource expansion enclosure	-
FDM	fault diagnosis & management	-
PFAE	proactive failure analysis engine	-

