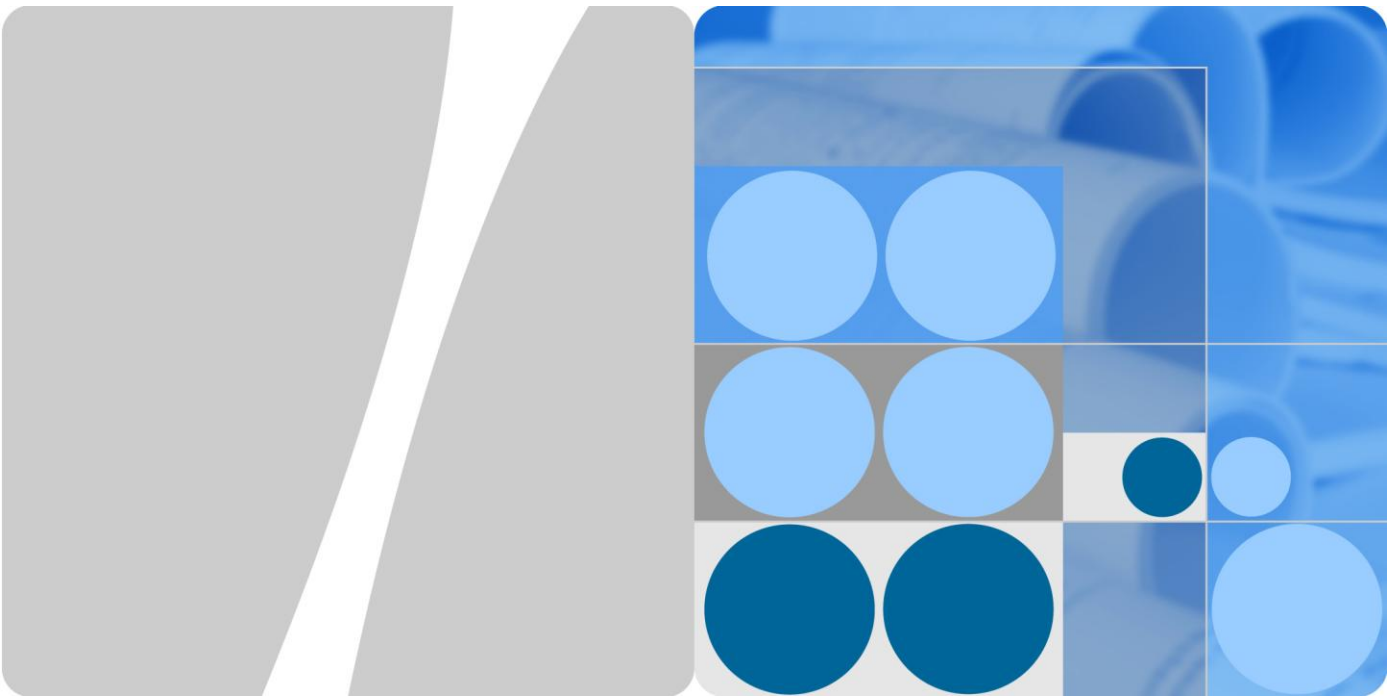

HUAWEI RH2288 V3 Rack Server White Paper 01

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1 Overview

The HUAWEI RH2288 V3 (RH2288 V3 for short) is a general-purpose 2U dual-socket rack server launched to meet customer requirements for the Internet, Internet data center (IDC), cloud computing, enterprise, and telecom service applications.

The RH2288 V3 features high-performance computing (HPC), large storage capacity, low power consumption, high scalability and reliability, and easy management and deployment. It is suitable for multiple applications, including storage services such as distributed storage, data mining, electronic album, and video, basic enterprise applications, and telecom services.

The RH2288 V3 supports the following hard disk configurations:

Generic configuration:

- RH2288 V3 with 8 hard disks

  The server supports eight front 2.5-inch Serial Attached SISC (SAS) hard disk drives (HDDs), Serial Advanced Technology Attachment (SATA) HDDs, or solid-state drives (SSDs) with one SAS card or SAS RAID controller card (SCSI refers to Small Computer System Interface.).
- RH2288 V3 with 12 hard disks

  The server supports twelve front 3.5-inch SAS or SATA HDDs with one SAS card or SAS RAID controller card.
- RH2288 V3 with 25 hard disks

  The server supports twenty-five front 2.5-inch SAS HDDs, SATA HDDs, or SSDs with one SAS card or SAS RAID controller card.

Specific configuration:

- RH2288 V3 with 10 hard disks

  The server supports ten front 3.5-inch SAS or SATA hard disks. The Intel chipset (PCH) is directly connected to the hard disk backplane, and the RH2288 V3 with 10 hard disks supports only software RAID.
- RH2288 V3 with 24 hard disks

  The server supports twenty-four front 2.5-inch, SAS HDDs, SATA HDDs, and SSDs, which are directly connected to three SAS cards or SAS RAID controller cards through the hard disk backplane, without through the expander. The hard disk configuration is ideal for applications that require high disk performance.

NOTE

If you have any doubt about the hard disk configuration, consult the local Huawei sales representatives.

2 Features

Performance and Scalability

The RH2288 V3 provides the following features to enhance performance and scalability:

- The Intel®Xeon® E5-2600 v3 processor ensures high processing performance by providing:
  - Up to 14 cores
  - 35 MB L3 cache
  - 3.0 GHz frequency
  - Two 9.6 GT/s QuickPath Interconnect (QPI) links between processors
- An RH2288 V3 supports two processors, 28 cores, and 56 threads, which maximizes the concurrent execution of multithreaded applications.
- The RH2288 V3 supports up to sixteen 2133 MHz double data rate 4 (DDR4) load-reduced DIMMs (LRDIMMs) to provide a maximum memory capacity of 512 GB. The maximum theoretical memory bandwidth is 136.5 GB/s, ensuring high speed. The LRDIMMs adopt error checking and correcting (ECC) technology, ensuring high availability.
- 1.2 V DDR4 LRDIMMs consume 20% less power than 1.5 V DDR3 DIMMs supported by the previous platform.
- Intel® Turbo Boost Technology 2.0 allows processor cores to run faster than Thermal Design Power (TDP) configuration specified frequency if they are operating below power, current, and temperature specification limits.
- Intel Hyper-Threading technology enables each processor core to run up to two threads, improving parallel computing capacity.
- The hardware-assisted Intel®Virtualization Technology (Intel® VT) allows operating system (OS) vendors to better use hardware to address virtualized workloads.
- Integrated with the Intel® Advanced Vector Extensions 2.0 (AVX 2.0) instruction set, the RH2288 V3 improves floating-point computing performance for compute-intensive applications.
- The use of only SSDs provides higher I/O performance than the mixed use of HDDs and SSDs or use of only HDDs. An SSD can support up to 100 times more I/O operations per second (IOPS) than a typical HDD.
- The RH2288 V3 provides elastic, scalable storage capacity with various hard disk configurations to meet diverse storage and upgrade requirements.

- The RH2288 V3 supports onboard or plug-in NICs for providing a variety of network ports.
- The RH2288 V3 supports Peripheral Component Interconnect Express (PCIe) 3.0 to provide 60% higher I/O bandwidth (8 Gbit/s) than PCIe 2.0 (5 Gbit/s).
- The Intel® Xeon® E5 series processors incorporate the PCIe 3.0 controller using the Intel Integrated I/O technology to shorten I/O latency and enhance overall system performance.

Availability and Serviceability

The RH2288 V3 provides the following features to improve availability and serviceability:

- The RH2288 V3 uses carrier-class components and follows the engineering process to dramatically improve system reliability.
- The RH2288 V3 uses hot-swappable SATA HDDs, SAS HDDs, or SSDs. It supports RAID 0, 1, 1E, 10, 5, 50, 6, and 60, and offers a RAID cache. A supercapacitor is used to protect RAID cache data from power failures.
- The UID and HLY indicators on the front panel, fault diagnosis LED, and iBMC web user interface (WebUI) help technical support personnel promptly obtain the status of key components and locate failed or failing components. This simplifies maintenance, accelerates troubleshooting, and helps improve system availability.
- SSDs offer better reliability than HDDs, which extends system uptime.
- The Huawei integrated management module (iBMC) monitors system parameters in real time, triggers alarms, and performs recovery actions in case of failures. This helps minimize system downtime.
- For RH2288 V3 servers used in China, Huawei provides a three-year warranty for parts replacement and limited onsite repair, as well as a 10-hour-a-day, 5-day-a-week Next Business Day (NBD) support program with optional service upgrades.
- For RH2288 V3 servers used outside China, Huawei provides a three-year warranty for parts replacement and repair, as well as a 9-hour-a-day, 5-day-a-week NBD support program. Huawei delivers the repaired or new parts within 45 calendar days after receiving the defective parts.

Manageability and Security

The RH2288 V3 provides the following features to ensure manageability and security:

- The built-in management module iBMC monitors server operating status and provides remote management.
- The Network Controller Sideband Interface (NCSI) feature allows a network port to provide functions of both a management network port and a service port, maximizing return on investment (ROI) for customers. NCSI can be enabled or disabled using iBMC or the basic input/output system (BIOS). NCSI is disabled by default.
- The integrated industry-standard Unified Extensible Firmware Interface (UEFI) increases efficiency of setup, configuration, and updates, and simplifies the fault handling process.
- The server chassis panel can be locked to ensure security of local server data.
- Chassis-opening events are logged, which improves system security.
- The industry-standard Advanced Encryption Standard–New Instruction (AES NI) supports faster and stronger encryption.

- The Intel Execute Disable Bit function prevents certain types of malicious buffer overflow attacks when working with a supported OS.

NOTE

The service network port supporting NCSI has the following features:

- The service network port can be bound to a network port on a LAN on motherboard (LOM) of the server or a network port (host network port 1 by default) on the onboard card.
- The service network port allows you to enable, disable, and configure a virtual local area network (VLAN) ID. A 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.

Energy Efficiency

The RH2288 V3 provides the following features to save energy:

- The RH2288 V3 supports 80 Plus Platinum power supply units (PSUs) with different power levels. The PSUs provide 94% power efficiency at 50% load.
- The voltage regulator-down (VRD) PSUs reduce the energy loss in DC/DC power conversion.
- The RH2288 V3 supports area-based and Proportional-Integral-Derivative (PID) intelligent fan speed adjustment, and intelligent processor frequency adjustment, reducing power consumption.
- The improved thermal design with energy-efficient fans ensures optimal heat dissipation and reduces overall system power consumption.
- The RH2288 V3 provides power capping and power control functions.
- Hard disks can be powered on at different times to reduce startup power consumption.
- The Intel®Xeon®E5-2600 v3 series processors provide better performance than the previous-generation Intel®Xeon® processors while fitting into the same TDP limits.
- The Intel® Intelligent Power Capability allows a single processor to be powered on or off based on site requirements.
- Low-voltage Intel®Xeon® processors consume less energy and apply to data center and telecommunication environments that have power and thermal limitations.
- The 1.2 V DDR4 registered DIMMs (RDIMMs) consume 20% less energy than 1.5 V DDR3 RDIMMs.
- SSDs consume 80% less power than HDDs.

Support for Customization

- The RH2288 V3 is a Huawei proprietary server.
- Huawei also provides customized development services in a timely manner.

3 Logical Architecture

Figure 3-1 shows the logical architecture of the RH2288 V3.

The RH2288 V3 supports two Intel®Xeon® E5-2600 v3 (Haswell-EP) series processors and 16 DDR4 DIMMs. Processors are connected by using QPI buses at a maximum rate of 9.6 GT/s.

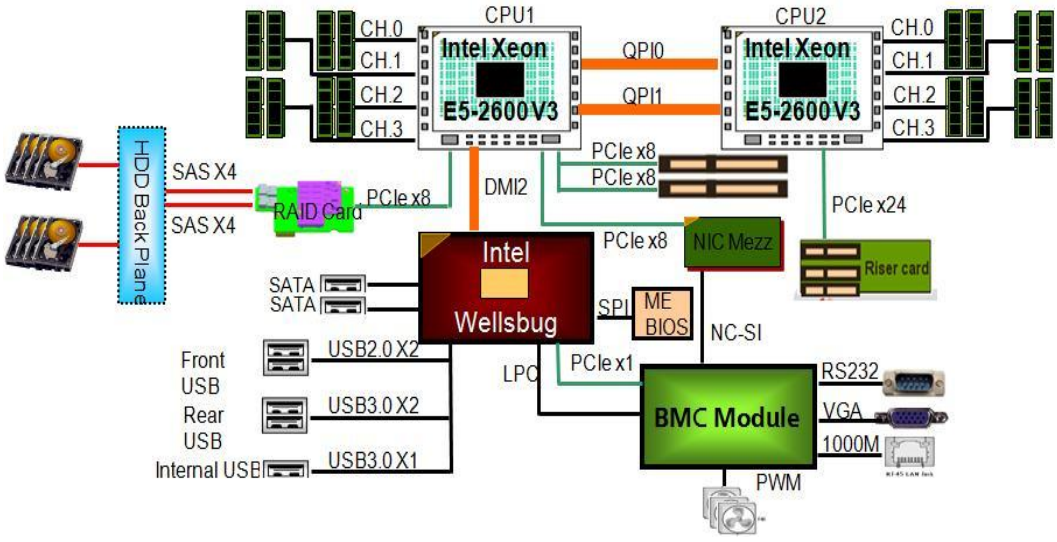
NOTE

The RH2288 V3 supports a maximum of two E5-2600 v3 series processors. For details about the processor installation positions, see "Installing a CPU" in the *RH2288 V3 Server V100R003 Troubleshooting*.

Each processor connects to one Peripheral Component Interconnect Express (PCIe) riser card for providing various PCIe slots.

The RAID controller card and the hard disk backplane form a hard disk interface module, which connects to the processors through PCIe connectors.

Figure 3-1 RH2288 V3 logical architecture



4 Hardware Description

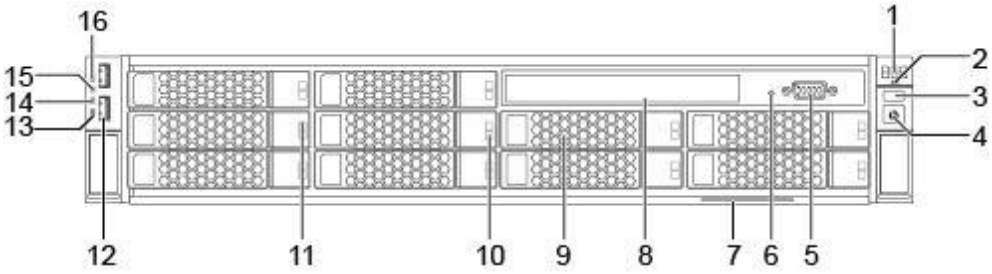
About This Chapter

4.1 Appearance

Front Panel

Figure 4-1 shows the front panel of the RH2288 V3 with 10 hard disks.

Figure 4-1 Front panel of the RH2288 V3 with 10 hard disks

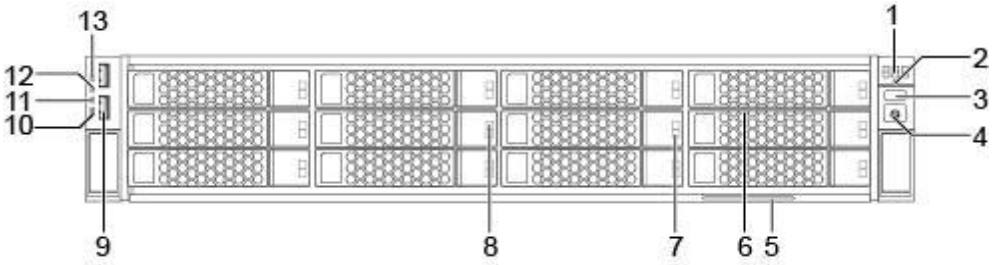


1	Fault diagnosis LED	2	Health status indicator
3	UID button/indicator	4	Power button/indicator
5	VGA port	6	NMI button
7	Customer information label	8	Built-in DVD-ROM drive
9	Hard disks (slots numbered 0 to 9 from top to bottom and from left	10	Hard disk active indicators

	to right)		
11	Hard disk fault indicators	12	USB 2.0 port
13	Ethernet port indicator 4	14	Ethernet port indicator 3
15	Ethernet port indicator 2	16	Ethernet port indicator 1

Figure 4-2 shows the front panel of the RH2288 V3 with 12 hard disks.

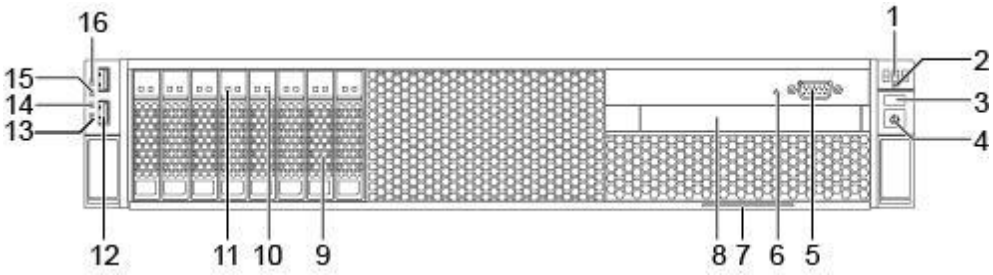
Figure 4-2 Front panel of the RH2288 V3 with 12 hard disks



1	Fault diagnosis LED	2	Health status indicator
3	UID button/indicator	4	Power button/indicator
5	Customer information label	6	Hard disks (slots numbered 0 to 11 from top to bottom and from left to right)
7	Hard disk active indicators	8	Hard disk fault indicators
9	USB 2.0 port	10	Ethernet port indicator 4
11	Ethernet port indicator 3	12	Ethernet port indicator 2
13	Ethernet port indicator 1		

Figure 4-3 shows the front panel of the RH2288 V3 with 8 hard disks.

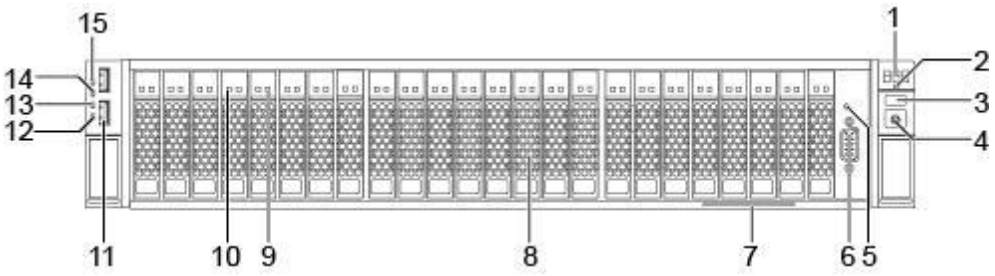
Figure 4-3 Front panel of the RH2288 V3 with 8 hard disks



1	Fault diagnosis LED	2	Health status indicator
3	UID button/indicator	4	Power button/indicator
5	VGA port	6	NMI button
7	Customer information label	8	Built-in DVD-ROM drive
9	Hard disks (slots numbered 0 to 7 from left to right)	10	Hard disk active indicators
11	Hard disk fault indicators	12	USB 2.0 port
13	Ethernet port indicator 4	14	Ethernet port indicator 3
15	Ethernet port indicator 2	16	Ethernet port indicator 1

Figure 4-4 shows the front panel of the RH2288 V3 with 24 hard disks.

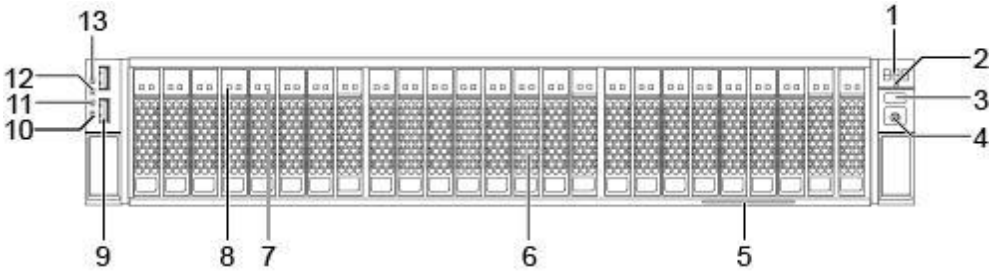
Figure 4-4 Front panel of the RH2288 V3 with 24 hard disks



1	Fault diagnosis LED	2	Health status indicator
3	UID button/indicator	4	Power button/indicator
5	NMI button	6	VGA port
7	Customer information label	8	Hard disks (slots numbered 0 to 23 from left to right)
9	Hard disk active indicators	10	Hard disk fault indicators
11	USB 2.0 port	12	Ethernet port indicator 4
13	Ethernet port indicator 3	14	Ethernet port indicator 2
15	Ethernet port indicator 1		

Figure 4-5 shows the front panel of the RH2288 V3 with 25 hard disks.

Figure 4-5 Front panel of the RH2288 V3 with 25 hard disks

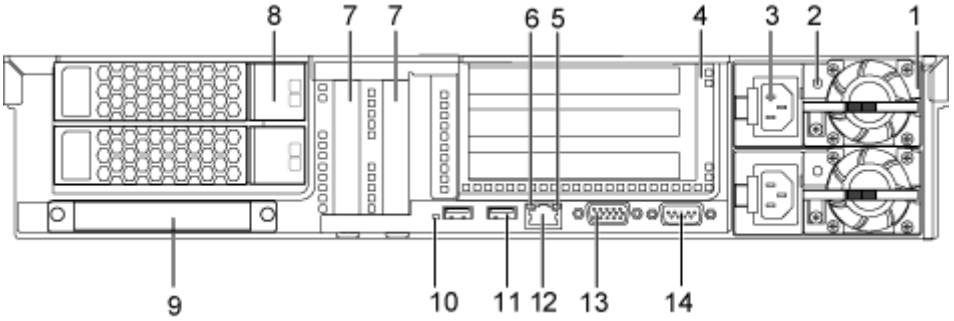


1	Fault diagnosis LED	2	Health status indicator
3	UID button/indicator	4	Power button/indicator
5	Customer information label	6	Hard disks (slots numbered 0 to 24 from left to right)
7	Hard disk active indicators	8	Hard disk fault indicators
9	USB 2.0 port	10	Ethernet port indicator 4
11	Ethernet port indicator 3	12	Ethernet port indicator 2
13	Ethernet port indicator 1		

Rear Panel

Figure 4-6 shows the rear panel of the RH2288 V3.

Figure 4-6 Rear panel of the RH2288 V3



1	PSU	2	PSU indicator
3	Power socket of a PSU	4	I/O module 2
5	Connectivity status indicator	6	Data transmission status indicator
7	Onboard standard PCIe slot	8	I/O module 1

9	I/O NIC	10	UID indicator
11	USB 3.0 port	12	Management network port (Mgmt)
13	VGA port	14	Serial port

In Figure 4-6, a riser card or a 2.5-inch or 3.5-inch rear hard disk can be installed in position 4, and a 2.5-inch or 3.5-inch rear hard disk can be installed in position 8.

- If the RH2288 V3 is equipped with twelve front 3.5-inch hard disks, a maximum of four rear 3.5-inch or 2.5-inch hard disks can be installed.
- If the RH2288 V3 is equipped with twenty-five front 2.5-inch hard disks, a maximum of two rear 2.5-inch hard disks can be installed.
- If the RH2288 V3 is not configured with any rear hard disk, only one I/O module can be installed. Each I/O module provides two or three PCIe slots.

4.2 Ports

Table 4-1 and Table 4-2 describe the external ports on the RH2288 V3.

Table 4-1 Ports on the front panel

Port	Type	Quantity	Description
Video graphics array (VGA) port	DB15	1	This port is used to connect to a monitor or a keyboard, video, and mouse (KVM).
USB port	USB 2.0	2	The USB ports are used to connect to USB devices. **NOTICE** Before connecting an external USB device, check that the USB device operates properly. A server may fail if it is connected to an abnormal USB device.

Table 4-2 Ports on the rear panel

Port	Type	Quantity	Description
VGA port	DB15	1	This port is used to connect to a monitor or a KVM.
USB port	USB 3.0	2	The USB ports are used to connect to USB devices. **NOTICE** Before connecting an external USB device, check that the USB device operates properly. A server

Port	Type	Quantity	Description
			may fail if it is connected to an abnormal USB device.
Management network port (Mgmt)	Ethernet port	1	This 1000 Mbit/s Ethernet port is used to manage the server.
Serial port	DB9	1	This port is used as the system serial port by default. You can set it as the iBMC serial port using the iBMC CLI. This port is used for debugging.
Network port	-	-	The port types and quantity vary according to the configured NIC.

4.3 Indicators and Buttons

You can observe the indicators to determine the current status of the RH2288 V3.

Table 4-3 describes the indicators and buttons on the RH2288 V3 front panel.

Table 4-3 Indicators and buttons on the front panel

Silk Screen	Meaning	Color	State Description
	Fault diagnosis LED	None	• ---: The server is operating properly. • Error code: A server component is faulty.
	Power button/indicator	Yellow and green	• Off: The server is not powered on. • Blinking yellow: iBMC is being started. • Steady yellow: The server is to be powered on. • Steady green: The server is properly powered on. **NOTE** You can hold down the power button for 6 seconds to power off the server.
	UID button/indicator	Blue	The UID button/indicator helps identify and locate a server in a rack. You can turn on or off the UID indicator by manually pressing the UID button or

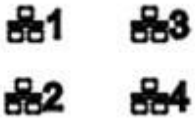
Silk Screen	Meaning	Color	State Description
			remotely running a command on the iBMC CLI. • Steady on: The server is located. • Off: The server is not located. You can hold down the UID button for 4 to 6 seconds to reset iBMC.
	Health status indicator	Red and green	• Steady green: The server is operating properly. • Blinking red at 1 Hz: A major alarm is generated. • Blinking red at 5 Hz: A critical alarm is generated.
-	Hard disk active indicator	Green	• Off: The hard disk cannot be detected or is faulty. • 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.
-	Hard disk fault indicator	Yellow	• Off: The hard disk is operating properly or a hard disk in the RAID group cannot be detected. • Blinking yellow: The hard disk is located, or RAID is being rebuilt. • Steady yellow: The hard disk cannot be detected or is faulty.
	Network port link status indicator	Green	This indicator shows the status of each Ethernet port on the NIC. • Steady green: The port is properly connected. • Off: The port is not in use. **NOTE** If the NIC provides only two network ports, indicators 1 and 2 are used.

Table 4-4 describes the indicators on the RH2288 V3 rear panel.

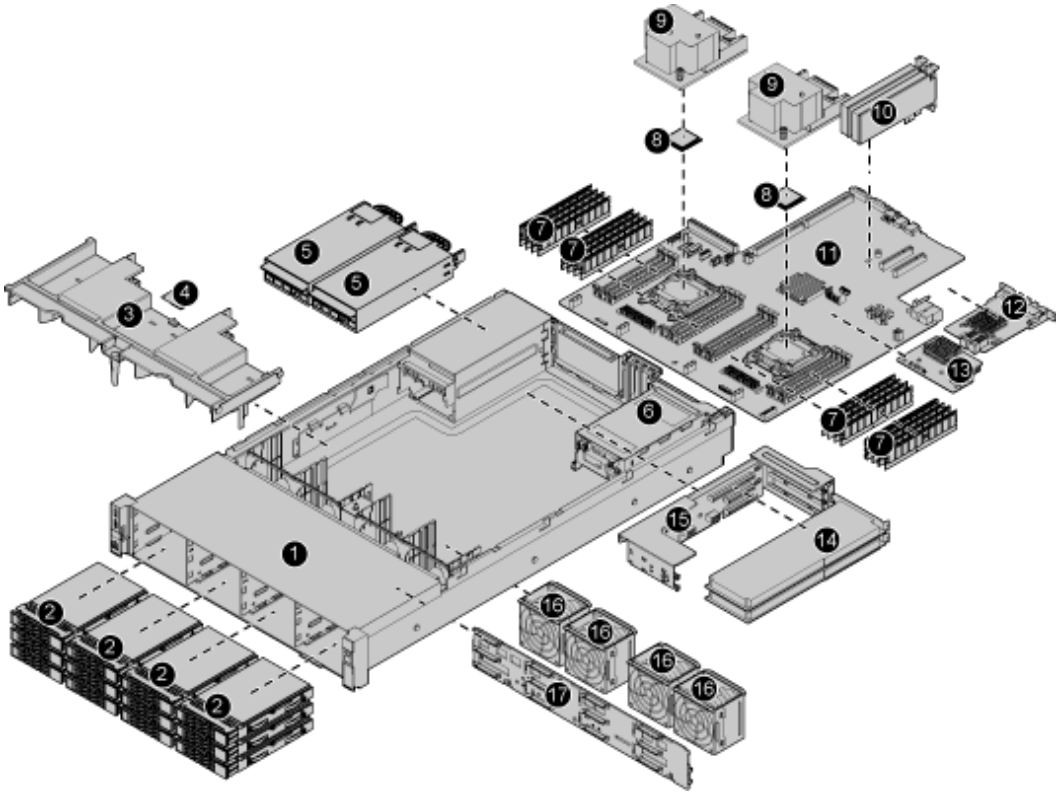
Table 4-4 Indicators on the rear panel

Indicator	Color	State Description
Data transmission status indicator	Orange	• Off: No data is being transmitted. • Blinking: Data is being transmitted.
Connectivity status indicator	Green	• Steady on: The network is properly connected. • Off: The network is not connected.
UID indicator	Blue	• Off: The server is not located. • On: The server is located.
PSU indicator	Green	• Steady on: The power input is normal. • Off: No AC power is supplied or the system is in the standby state.
Hard disk active indicator	Green	• Steady on: The hard disk is operating properly. • Blinking: Data is being read from or written to the hard disk. • Off: The hard disk is not properly installed or not powered on, or no hard disk is installed.
Hard disk fault indicator	Yellow	• Steady on: The hard disk is faulty. • Blinking: RAID is being rebuilt on the hard disk. • Off: The hard disk is operating properly.

4.4 Physical Structure

Figure 4-7 shows the components of the RH2288 V3 with 12 hard disks.

Figure 4-7 RH2288 V3 components



1	Chassis	2	Hard disk
3	Air duct	4	Supercapacitor
5	PSU	6	Rear hard disk tray (I/O module 1, corresponding to the processor in socket CPU1)
7	DIMM	8	Processor
9	Heat sink	10	PCIe cards (installed on the mainboard)
11	Mainboard	12	I/O NIC
13	RAID controller card	14	PCIe card (installed on a riser card)
15	Riser card tray (I/O module 2, corresponding to the processor in socket CPU2)	16	Fan module
17	Hard disk backplane		

Table 4-5 describes the RH2288 V3 components.

Table 4-5 RH2288 V3 components

No.	Name	Description
1	Chassis	A chassis houses all components.
2	Hard disks	The RH2288 V3 uses hot-swappable hard disks to store data. It supports the following hard disk configurations: • RH2288 V3 with 12 hard disks: supports a maximum of twelve 3.5-inch SAS or SATA HDDs. • RH2288 V3 with 10 hard disks: supports a maximum of ten 3.5-inch SAS or SATA HDDs. • RH2288 V3 with 25 hard disks: supports a maximum of twenty-five 2.5-inch SAS HDDs, SATA HDDs, or SSDs. • RH2288 V3 with 8 hard disks: supports a maximum of eight 2.5-inch SAS HDDs, SATA HDDs, or SSDs. • RH2288 V3 with 24 hard disks: supports a maximum of twenty-four 2.5-inch SAS HDDs, SATA HDDs, or SSDs.
3	Air duct	The air duct facilitates ventilation for the chassis.
4	Supercapacitor	A supercapacitor is required to protect RAID cache data from power failures when the RH2288 V3 uses the LSISAS3108 controller card.
5	PSU	The RH2288 V3 uses two hot-swappable PSUs in 1+1 redundancy mode. You can use three types of PSUs based on the input power: • AC PSUs: 100–240 V AC • DC PSUs: –48 V to –60 V • 240 V high-voltage (HV) DC PSUs: 192–288 V DC • 380 V HV DC: 260–400 V DC **NOTE** The PSUs support double-pole/neutral fusing.
6	Rear hard disk tray (I/O module 1, corresponding to the processor in CPU1)	The rear disk tray holds 2.5-inch or 3.5-inch hard disks. I/O module 1 supports the following configurations: • Two 2.5-inch hard disk slots • Two 3.5-inch hard disk slots
7	DIMM	• Maximum number of DDR4 RDIMMs or LRDIMMs: 16 • Maximum memory capacity: 512 GB • Capacity per DIMM: 8 GB, 16 GB, and 32 GB • Memory speed: DDR4 1600 MHz, 1866 MHz, and 2133 MHz
8	Processor	The RH2288 V3 uses Intel®Haswell-EP® E5-2600 v3 4-core, 6-core, 8-core, 10-core, 12-core, 14-core processors with up to 120 W power to provide a powerful data processing capability. A processor integrates a memory controller and PCIe controller.

No.	Name	Description
		NOTE The RH2288 V3 supports a maximum of two E5-2600 v3 series processors. For details about the processor installation positions, see "Installing a CPU" in the *RH2288 V3 Server V100R003 Troubleshooting*.
9	Heat sink	A heat sink dissipates heat for a processor. Each processor is configured with one heat sink.
10	PCIe cards (installed on the mainboard)	The RH2288 V3 provides two PCIe 3.0 x8 slots for installing half-height half-length standard PCIe cards.
11	Mainboard	The mainboard integrates basic components, such as the BIOS chip, Platform Controller Hub (PCH) chip, and expansion slots, and provides processor sockets and DIMM slots.
12	NIC	The RH2288 V3 supports one GE NIC to provide two or four GE ports, or supports one 10GE NIC to provide two 10GE electrical or optical ports. Both NICs support the NCSI function.
13	RAID controller card	The RH2288 V3 supports RAID controller cards of the following models: • SR130: – Uses the LSISAS3008 chip. – Supports RAID 0, 1, 1E, and 10. – Does not provide cache data protection upon power failures. • SR430C: – Uses the LSISAS3108 chip. – Provides a 1 GB or 2 GB cache. – Supports RAID 0, 1, 10, 5, 50, 6, and 60. – Provides a supercapacitor to protect cache data from power failures. – Supports a maximum of 32 hard disks. These RAID controller cards support RAID state migration, RAID configuration memory, and web-based remote configuration. **NOTE** The preceding information is for reference only. For details, see the *Compatibility List*.
14	PCIe card (installed on a riser card)	The RH2288 V3 supports three types of riser cards: • Riser card 1 with three PCIe 3.0 slots: – One full-height full-length PCIe 3.0 x16 slot (bandwidth: PCIe 3.0 x8) – One full-height full-length PCIe 3.0 x8 slot – One full-height half-length PCIe 3.0 x8 slot • Riser card 2 with two PCIe 3.0 slots:

No.	Name	Description
		– One full-height full-length PCIe 3.0 x16 slot (bandwidth: PCIe 3.0 x8) – One full-height full-length PCIe 3.0 x16 slot • Riser card 3 with two 2.5-inch hard disks and one PCIe 3.0 slot: – One full-height half-length PCIe 3.0 x16 slot (bandwidth: PCIe 3.0 x8)
15	Riser card tray (I/O module 2, corresponding to the processor in socket CPU2)	A riser card tray secures the PCIe riser card. I/O module 2 supports the following slots: • One full-height full-length standard PCIe 3.0 x16 slots (bandwidth of one slot: PCIe 3.0 x8), one full-height full-length standard PCIe 3.0 x8 slot, and one full-height half-length standard PCIe 3.0 x8 slot • Two full-height full-length standard PCIe 3.0 x16 slots (bandwidth of one slot: PCIe 3.0 x8) • Two 2.5-inch hard disk slots and one full-height half-length standard PCIe 3.0 x16 slot (bandwidth: PCIe 3.0 x8) • Two 3.5-inch hard disk slots
16	Fan module	Fan modules dissipate heat for the RH2288 V3, and support hot swap. When one fan fails, the speed of adjacent fans is adjusted based on areas to ensure optimal heat dissipation.
17	Hard disk backplane	The hard disk backplane supplies power to hard disks and provides data transmission channels. The RH2288 V3 supports five types of hard disk backplanes for installing 12, 10, 25, 8, and 24 hard disks respectively.

5 Technical Specifications

Table 5-1 lists the RH2288 V3 technical specifications.

Table 5-1 Technical specifications

Item	Specifications
Form factor	2U rack server
Processor	Up to two Intel®Xeon® E5-2600 v3 series processors: • Number of cores per processor: 14 cores (2.3 GHz), 12 cores (2.6 GHz), 10 cores (2.6 GHz), 8 cores (2.6 GHz), 6 cores (2.4 GHz), and 4 cores (3.0 GHz) • Number of QPI links: 2 • Maximum transmission speed per QPI link: 9.6 GT/s • Maximum memory speed: 2133 MHz • Maximum L3 cache capacity: 45 MB
Chipset	Intel C610
Memory	• Up to 16 DDR4 DIMM slots (8 DIMMs per processor) for installing either RDIMMs or LRDIMMs: • 16 x 16 GB RDIMMs for two processors, with a maximum memory capacity of 256 GB • 16 x 32 GB LRDIMMs for two processors, with a maximum memory capacity of 512 GB • Maximum memory speed: 2133 MHz • Data protection measures: ECC, memory mirroring, Single Device Data Correction (SDDC), memory sparing, and lockstep
Storage	• The RH2288 V3 supports the following hard disk configurations: – RH2288 V3 with 8 hard disks: supports a maximum of eight 2.5-inch SAS HDDs, SATA HDDs, or SSDs. – RH2288 V3 with 12 hard disks: supports a maximum of twelve 3.5-inch SAS or SATA HDDs. – RH2288 V3 with 25 hard disks: supports a maximum of twenty-five

Item	Specifications
	2.5-inch SAS HDDs, SATA HDDs, or SSDs. – RH2288 V3 with 10 hard disks: supports a maximum of ten 3.5-inch SATA HDDs. – RH2288 V3 with 24 hard disks: supports a maximum of twenty-four 2.5-inch SAS HDDs, SATA HDDs, or SSDs. • Hard disks are hot-swappable. • The RH2288 V3 supports RAID 0, 1, 10, 1E, 5, 50, 6, and 60. It protects cache data from power failures, and supports RAID state migration, RAID configuration memory, self-diagnosis, and web-based configuration. • The mainboard can be configured with a SAS card or SAS RAID controller card (with a maximum of 2 GB cache) to improve hard disk storage performance and ensure user data security. • The RAID controller card does not occupy a standard PCIe slot, improving system scalability. **NOTE** 1. 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, contact Huawei sales representatives. 2. If the server is equipped with 12 hard disks at the front, you can install two or four 2.5-inch SAS HDDs, SATA HDDs, and SSDs or two or four 3.5-inch SAS HDDs and SATA HDDs at the rear to expand the local storage capacity. For details, contact Huawei sales representatives. 3. If the server is equipped with 25 hard disks at the front, you can install two 2.5-inch SAS HDDs, SATA HDDs, and SSDs at the rear to expand the local storage capacity. For details, contact Huawei sales representatives. 4. If the server is equipped with 10 hard disks, you can use only 6 Gbit/s SATA disks and the hard disk controller is integrated in the Intel PCH. For details, contact Huawei sales representatives. 5. If the server is equipped with 24 hard disks at the front, you can install two 2.5-inch SAS HDDs, SATA HDDs, and SSDs at the rear to expand the local storage capacity. In this situation, three SAS cards or SAS RAID controller cards are required. For details, contact Huawei sales representatives.
Network port	Four types of NICs are supported, which provide the following network ports: • Two GE electrical ports, supporting NCSI, Wake on LAN (WOL), and Preboot Execution Environment (PXE) • Four GE electrical ports, supporting NCSI, WOL, and PXE • Two 10GE optical ports, supporting NCSI and PXE • Two 10GE electrical ports, supporting NCSI, WOL, and PXE
PCIe slot	• The RH2288 V3 provides one PCIe 3.0 x8 slot for the RAID controller card and five standard PCIe 3.0 x8 slots. The specifications of the five standard PCIe slots are described as follows: – One full-height full-length standard PCIe 3.0 x16 slots (bandwidth of one slot: PCIe 3.0 x8), one full-height full-length standard PCIe 3.0 x8 slot, and one full-height half-length standard PCIe 3.0 x8 slot on I/O module 2 – Two half-height half-length standard PCIe 3.0 x8 slots on the mainboard

Item	Specifications
	• PCIe slots can house Huawei PCIe SSDs to improve I/O performance for search, cache, and download services. • PCIe slots can house K2000 and NVS 315 GPUs. **NOTE** 1. For details about the PCIe cards supported by the RH2288 V3, see the compatibility list. If the PCIe cards that you use are not in the compatibility list, consult the local Huawei sales representatives or Huawei technical support. 2. Specifications of I/O module 1: - Two 2.5-inch hard disk slots - Two 3.5-inch hard disk slots 3. Specifications of I/O module 2: - One full-height full-length standard PCIe 3.0 x16 slot (bandwidth: PCIe 3.0 x8), one full-height full-length standard PCIe 3.0 x8 slot, and one full-height half-length standard PCIe 3.0 x8 slot - Two full-height full-length standard PCIe 3.0 x16 slots (bandwidth of one slot: PCIe 3.0 x8) - Two 2.5-inch hard disk slots and one full-height half-length standard PCIe 3.0 x16 slot (bandwidth: PCIe 3.0 x8) For details about the configuration, consult the local Huawei sales representatives.
Port	• Two USB 2.0 ports and one DB15 VGA port on the front panel (The VGA port is provided only by the RH2288 V3 with eight 2.5-inch or ten 3.5-inch hard disks.) • Two USB 3.0 ports, one DB15 VGA port, one DB9 serial port, and one RJ45 system management port on the rear panel • One internal USB 3.0 port and two Mini SSD (SATA DOM) ports
Fan module	Four hot-swappable fan modules, which tolerate the failure of a single fan **NOTE** If you use GPUs that have high power consumption but provide no fans, configure fan modules with higher cooling performance. For details, contact Huawei sales representatives.
PSU	Two hot-swappable PSUs in redundancy mode: • 460 W AC Platinum PSUs, supporting 240 V HV DC • 750 W AC Platinum PSUs, supporting 240 V HV DC • 750 W AC Titanium PSUs • 1200 W PSUs, supporting 380 V HV DC • 800 W PSUs, supporting −48 V DC or −60 V DC **NOTE** For details about the PSUs supported by the RH2288 V3, see the *Compatibility List*.
System management	• UEFI • Huawei iBMC: supports Intelligent Platform Management Interface (IPMI), Serial over LAN (SOL), KVM over IP, and virtual media, and provides one 10/100/1000M RJ45 management network port. • NCSI

Item	Specifications
Security	• Power-on password • Administrator password • Chassis-opening logging • Front bezel
Video card	The system mainboard integrates the display chip and provides 32 MB display memory. The maximum resolution is 1920 x 1200 at 60 Hz with 24 M colors.
Supported OSs	• Red Hat Enterprise Linux 6.5 x86_64 • SUSE Linux Enterprise Server 11.3 x86_64 • Windows Server 2012 R2 Enterprise x86_64 • Citrix XenServer 6.2.0 • VMware ESXi 6.5.0 **NOTE** The preceding information is for reference only. For details, see the *Compatibility List*.
Dimensions (H x W x D)	• Chassis equipped with 3.5-inch hard disks: 86.1 mm (2 U) x 447 mm x 748 mm (3.39 in. x 17.60 in. x 29.45 in.) • Chassis equipped with 2.5-inch hard disks: 86.1 mm (2 U) x 447 mm x 708 mm (3.39 in. x 17.60 in. x 27.87 in.)
Weight	Net weight: • RH2288 V3 with 8 hard disks: 27 kg (59.54 lb) • RH2288 V3 with 10 hard disks: 29 kg (63.95 lb) • RH2288 V3 with 12 hard disks: 30 kg (66.15 lb) • RH2288 V3 with 25 hard disks: 30 kg (66.15 lb) • RH2288 V3 with 24 hard disks: 29 kg (63.95 lb) Packing material weight: 5 kg (11.03 lb)

6 Component Compatibility

About This Chapter

6.1 Processor

The RH2288 V3 supports up to two Intel® Xeon® E5-2600 v3 processors. If only one processor is configured, this processor must be installed in socket CPU1. Table 6-1 lists the processors supported by the RH2288 V3.

NOTE

- Table 6-1 is for reference only. For details about the processors available, consult the local Huawei sales representatives.
- A server must use processors of the same model.

Table 6-1 Supported processors

Part Number	Description	Remarks
41020499	X86 series-FCLGA2011-1600MHz-1.8V-64bit-85000mW-Haswell EP Xeon E5-2603 v3-6Core	
41020491	X86 series-FCLGA2011-1900MHz-1.8V-64bit-85000mW-Haswell EP Xeon E5-2609 v3-6Core	
41020498	X86 series-FCLGA2011-2400MHz-1.8V-64bit-85000mW-Haswell	

Part Number	Description	Remarks
	EP Xeon E5-2620 v3-6Core	
41020502	X86 series-FCLGA2011-3000MHz-1.8V-64bit-105000mW-Haswell EP Xeon E5-2623 v3-4Core	
41020497	X86 series-FCLGA2011-2400MHz-1.8V-64bit-85000mW-Haswell EP Xeon E5-2630 v3-8Core	
41020503	X86 series-FCLGA2011-1800MHz-1.8V-64bit-55000mW-Haswell EP Xeon E5-2630L v3-8Core	
41020496	X86 series-FCLGA2011-2600MHz-1.8V-64bit-90000mW-Haswell EP Xeon E5-2640 v3-8Core	
41020490	X86 series-FCLGA2011-2300MHz-1.8V-64bit-105000mW-Haswell EP Xeon E5-2650 v3-10Core	
41020492	X86 series-FCLGA2011-1800MHz-1.8V-64bit-65000mW-Haswell EP Xeon E5-2650L v3-12Core	
41020489	X86 series-FCLGA2011-2600MHz-1.8V-64bit-105000mW-Haswell EP Xeon E5-2660 v3-10Core	
41020488	X86 series-FCLGA2011-2300MHz-1.8V-64bit-120000mW-Haswell EP Xeon E5-2670 v3-12Core	
41020487	X86 series-FCLGA2011-2500MHz-1.8V-64bit-120000mW-Haswell EP Xeon E5-2680 v3-12Core	
41020495	X86 series-FCLGA2011-2000MHz-1.8V-64bit-120000mW-Haswell EP Xeon E5-2683 v3-14Core	

NOTE

The CPUs configured for one server must be of the same specifications.

6.2 Memory

Memory Capacity Configuration Rules

The RH2288 V3 supports a maximum of eight DIMMs when one processor is installed and a maximum of 16 DIMMs when two processors are installed. Each processor comes with four memory channels, and each channel supports two DIMMs.

Observe the following rules when configuring DIMMs:

1. The RH2288 V3 does not support mixed use of RDIMMs and LRDIMMs.
2. Each memory channel supports a maximum of eight ranks.

NOTE

A memory channel supports more than eight ranks for LRDIMMs, because a quad-rank LRDIMM generates the same electrical load on a memory bus as a single-rank RDIMM.

3. The maximum number of DIMMs to be installed on the server varies depending on the processor type, DIMM type, number of ranks, and operating voltage. For details, see "Maximum number of DIMMs" in Table 1 RDIMM configuration rules and Table 2 LRDIMM configuration rules.

NOTE

Number of DIMMs supported by each channel ≤ Number of ranks supported by each memory channel/Number of ranks supported by each DIMM

4. All DIMMs on the server operate at the same speed, which is determined as the smaller value of:

- Memory speed supported by a specified processor.
- Lowest maximum operating speed for the selected memory configuration that depends on the rated speed, operating voltage, and number of DIMMs for each memory channel. For details, see "Maximum operating speed" in Table 1 RDIMM configuration rules and Table 2 LRDIMM configuration rules.

Table 6-2 RDIMM configuration rules

Item		RDIMM	
Rank		Single-rank	Dual-rank
Rated speed (MHz)		2133	2133
Rated voltage (V)		1.2	1.2
Operating voltage (V)		1.2	1.2
Maximum number of RDIMMs		16	16
Maximum capacity per RDIMM (GB)		8	16
Maximum memory capacity (GB)		128	256
Maximum memory capacity at the maximum operating speed (GB)		128	256
Maximum operating speed (MHz)	One RDIMM per channel	2133	2133
	Two RDIMMs per	2133	2133

Item		RDIMM	
	channel		

NOTE

The maximum number of RDIMMs listed in Table 1 RDIMM configuration rules is based on 2-processor configuration. If the server has only one processor, the maximum number of RDIMMs is half the values in Table 1 RDIMM configuration rules.

Table 6-3 LRDIMM configuration rules

Item		LRDIMM
Rank		Quad-rank
Rated speed (MHz)		2133
Rated voltage (V)		1.2
Operating voltage (V)		1.2
Maximum number of LRDIMMs		16
Maximum capacity per LRDIMM (GB)		32
Maximum memory capacity (GB)		512
Maximum memory capacity at the maximum operating speed (GB)		512
Maximum operating speed (MHz)	One LRDIMM per channel	2133
	Two LRDIMMs per channel	2133

NOTE

The maximum number of LRDIMMs listed in Table 1 RDIMM configuration rules is based on 2-processor configuration. If the server has only one processor, the maximum number of LRDIMMs is half the values in Table 1 RDIMM configuration rules.

Memory Slot Configuration Rules

- The RH2288 V3 supports DIMMs of 8 GB, 16 GB, and 32 GB. When the RH2288 V3 is fully configured with DIMMs, the maximum memory capacity is 512 GB.
- The RH2288 V3 provides 16 slots for installing DDR4 DIMMs. Each processor integrates four memory channels. Four memory channels for the processor in socket CPU1 are 1A, 1B, 1C, and 1D, and those for the processor in socket CPU2 are 2A, 2B, 2C, and 2D. Table 6-4 describes the composition of each memory channel. Figure 6-1 shows the DIMM installation positions.

Table 6-4 Memory channels

Processor Socket	Memory Channel	Composition	Primary Memory Channel
CPU1	1A	DIMM000(A)	DIMM000(A)
		DIMM001(E)	
	1B	DIMM010(B)	DIMM010(B)
		DIMM011(F)	
	1C	DIMM020(C)	DIMM020(C)
		DIMM021(G)	
	1D	DIMM030(D)	DIMM030(D)
		DIMM031(H)	
CPU2	2A	DIMM100(A)	DIMM100(A)
		DIMM101(E)	
	2B	DIMM110(B)	DIMM110(B)
		DIMM111(F)	
	2C	DIMM120(C)	DIMM120(C)
		DIMM121(G)	
	2D	DIMM130(D)	DIMM130(D)
		DIMM131(H)	

Figure 6-1 DIMM installation positions

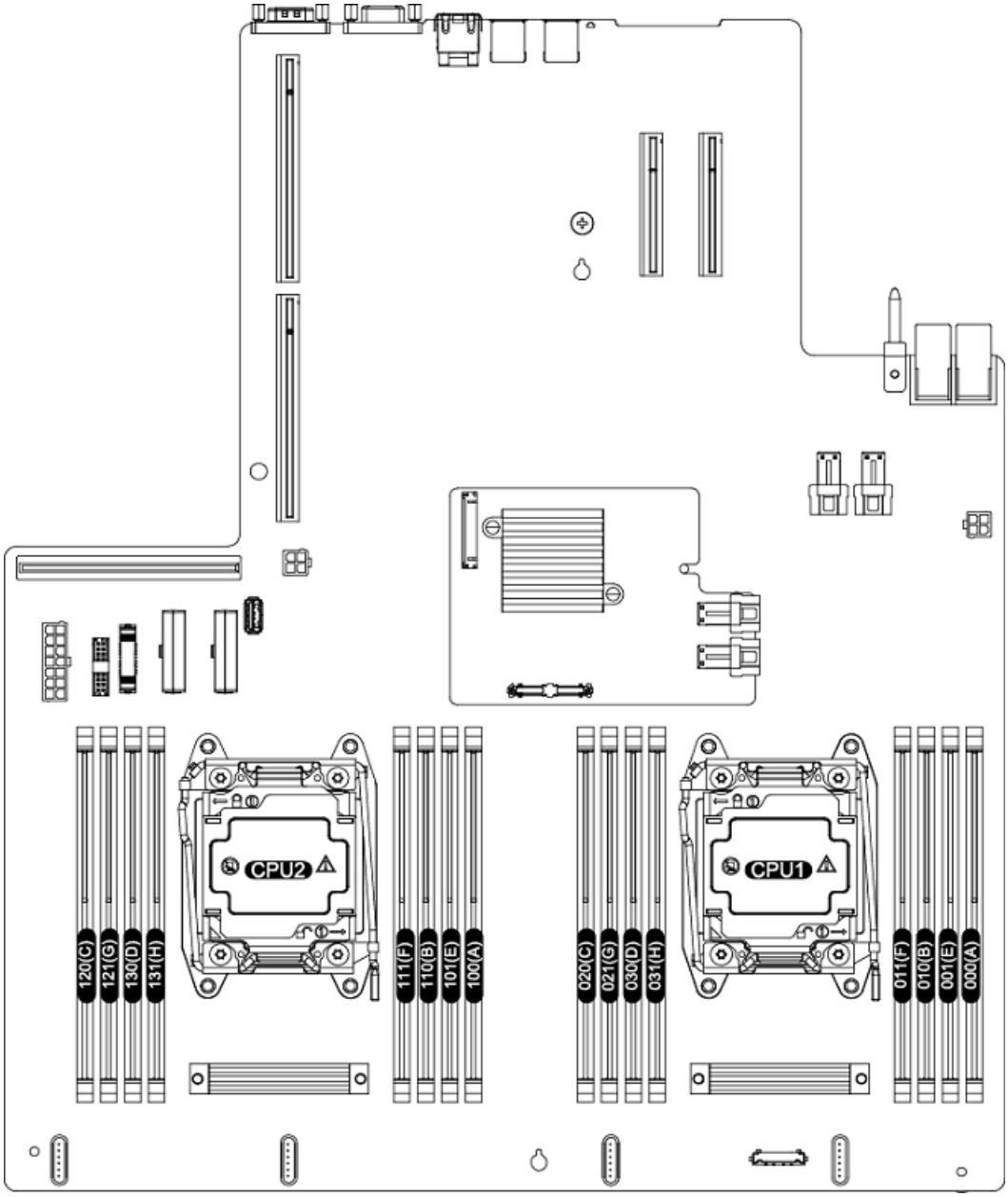


Table 6-5 describes the DIMM installation sequence.

Table 6-5 DIMM installation sequence

Processor Socket	DIMM Installation Sequence
CPU1	000(A), 010(B), 020(C), 030(D), 001(E), 011(F), 021(G), and then 031(H)
CPU1 and CPU2	000(A), 100(A), 010(B), 110(B), 020(C), 120(C), 030(D), 130(D), 001(E), 101(E), 011(F), 111(F), 021(G), 121(G), 031(H), and then 131(H)

Memory Protection Technologies

The RH2288 V3 uses the following memory data protection technologies:

- ECC
- Memory mirroring
- SDDC
- Memory sparing
- Lockstep

Supported DIMMs

Table 6-6 lists the DIMMs supported by the RH2288 V3.

NOTE

- Table 6-6 is for reference only. For details about the DIMMs available, consult the local Huawei sales representatives.
- A server must use DIMMs of the same model.

Table 6-6 Supported DIMMs

Part Number	Description	Remarks
06200176	DDR4 RDIMM-16GB-2Rx4 1.2V 2133	
06200186	DDR4 LRDIMM-32GB-4Rx4 1.2V 2133	Temporary part number

NOTE

The DIMMs configured for one server must be of the same specifications.

6.3 Storage

The RH2288 V3 supports the following hard disk configurations:

- RH2288 V3 with 8 hard disks: supports a maximum of eight 2.5-inch SAS HDDs, SATA HDDs, or SSDs.
- RH2288 V3 with 16 hard disks: supports a maximum of twelve front 3.5-inch SAS or SATA HDDs and four rear 2.5-inch or 3.5-inch SAS or SATA HDDs.
- RH2288 V3 with 27 hard disks: supports a maximum of twenty-five front 2.5-inch SAS HDDs, SATA HDDs, or SSDs and two rear 2.5-inch SAS or SATA HDDs.

Table 1 Supported hard disks lists the hard disks supported by the RH2288 V3.

NOTE

Table 1 Supported hard disks is for reference only. For details about the hard disks available, consult the local Huawei sales representatives.

Table 6-7 Supported hard disks

Part Number	Description	Remarks
02310YCM	10000 RPM - 2.5' SAS 6Gbps - 300GB HDD	
02310YCR	10000 RPM - 2.5' SAS 6Gbps - 600GB HDD	
02310YCT	10000 RPM - 2.5' SAS 6Gbps - 900GB HDD	
02310YCU	10000 RPM - 2.5' SAS 6Gbps - 1200GB HDD	
02310YCL	15000 RPM - 2.5' SAS 6Gbps - 146GB HDD	
02310YCN	15000 RPM - 2.5' SAS 6Gbps - 300GB HDD	
02311AYF	15000 RPM - 2.5' SAS 12Gbps - 600GB HDD	
02310YCG	7200 RPM - 2.5' SATA 6Gbps - 500GB HDD	
02310YCH	7200 RPM - 2.5' SATA 6Gbps - 1000GB HDD	
02310YCV	7200 RPM - 2.5' NL SAS 6Gbps - 1000GB HDD	
02311AYJ	7200 RPM - 3.5' NL SAS 6Gbps - 1000GB HDD	
02311AYM	7200 RPM - 3.5' NL SAS 6Gbps - 2000GB HDD	
02311AYN	7200 RPM - 3.5' NL SAS 6Gbps - 3000GB HDD	
02311AYP	7200 RPM - 3.5' NL SAS 6Gbps - 4000GB HDD	
02311AYR	7200 RPM - 3.5' SATA 6Gbps - 1000GB HDD	
02311AYT	7200 RPM - 3.5' SATA 6Gbps - 2000GB HDD	
02311AYU	7200 RPM - 3.5' SATA 6Gbps - 3000GB HDD	
02311AYV	7200 RPM - 3.5' SATA 6Gbps - 4000GB HDD	
02310YCW	MLC 2.5' SATA 6Gbps - 240GB SSD	
02310YDA	MLC 2.5' SATA 6Gbps - 480GB SSD	
02311BAD	MLC 2.5' SATA 6Gbps - 800GB SSD	
02310YCY	eMLC 2.5' SATA 6Gbps - 200GB SSD	
02310YCX	eMLC 2.5' SATA 6Gbps - 400GB SSD	
02311BAE	eMLC 2.5' SATA 6Gbps - 800GB SSD	

Table 2 Supported RAID controller cards lists the RAID controller cards supported by the RH2288 V3.

NOTE

Table 2 Supported RAID controller cards is for reference only. For details about the RAID controller cards available, consult the local Huawei sales representatives.

Table 6-8 Supported RAID controller cards

Part Number	Description	Remarks
03022CDE	SR130 Server Raid Controller- SAS 12G/SATA 6G - RAID0 / RAID1 / RAID1E /RAID10	
02310UUB	SR430C Server Raid Controller- SAS 12G/SATA 6G - Cache 1GB -32 Disk- RAID0 / RAID1 / RAID10 /RAID5 / RAID6 /RAID50 /RAID60 - Support SuperCap	YES Certification URL: ?
02310UUA	SR430C Server Raid Controller- SAS 12G/SATA 6G - Cache 2GB -32 Disk- RAID0 / RAID1 / RAID10 /RAID5 / RAID6 /RAID50 /RAID60 - Support SuperCap	YES Certification URL: ?

Table 3 RAID level comparison provides the comparison between RAID levels in performance, the minimum number of hard disks, and disk usage.

Table 6-9 RAID level comparison

RAID Level	Reliability	Read Performance	Write Performance	Minimum Number of Hard Disks	Disk Usage
RAID 0	Low	High	High	2	100%
RAID 1	High	Low	Low	2	1/N
RAID 5	Relatively high	High	Medium	3	(N – 1)/N
RAID 6	Relatively high	High	Medium	4	(N – 2)/N
RAID 10	High	Medium	Medium	4	M/N
RAID 50	High	High	Relatively high	6	(N – M)/N
RAID 60	High	High	Relatively high	8	(N – M x 2)/N

NOTE
N indicates the number of member disks in a RAID group, and M indicates the number of subgroups in a RAID group.

6.4 I/O Expansion

The RH2288 V3 provides various PCIe cards. You can select the following PCIe cards based on the card type and rate:

- Fibre Channel (FC) host bus adapter (HBA)
- Converged network adapter (CNA)
- InfiniBand (IB) expansion card
- SAS HBA
- Network expansion card
- SSD card
- GPU

Table 1 Supported standard PCIe cards (FC HBAs)toTable 7 Supported NIC mezz cards list the PCIe cards supported by the RH2288 V3.

NOTE

Table 1 Supported standard PCIe cards (FC HBAs)toTable 7 Supported NIC mezz cards are for reference only. For details about the PCIe cards available, consult the local Huawei sales representatives.

Table 6-10 Supported standard PCIe cards (FC HBAs)

Part Number	Vendor	Model	Description	OS	Storage	Switch	Driver	Remarks
06030220	Qlogic	QLE2562	Dual Port 8Gbps Fibre Channel Host Bus Adapter Card -PCIE 2.0 -multi-mode optic -DLC -Half-height half-length	*Compatibility List URL:* ?			URL: ?	with SFP+ Optics itself See[1]
06030221	Qlogic	QLE2560	Single Port 8Gbps Fibre Channel Host Bus Adapter Card -PCIE 2.0 -multi-mode optic -DLC -Half-height half-length	*Compatibility List URL:* ?			URL: ?	with SFP+ Optics itself See[1]
06030217	Emulex	LPE12002	Dual Port 8Gbps Fibre Channel Host Bus Adapter Card -PCIE 1.0 -multi-mode optic -DLC -Half-height half-length	*Compatibility List URL:* ?			URL: ?	with SFP+ Optics itself See[1]
06030216	Emulex	LPE12000	Single Port 8Gbps Fibre Channel Host Bus Adapter Card -PCIE 1.0 -multi-mode optic -DLC -Half-height half-length	*Compatibility List URL:* ?			URL: ?	with SFP+ Optics itself See[1]
06030277	Qlogic	QLE2670	Single Port-16Gbps,PCIE	*Compatibility List URL:* ?			URL: ?	with SFP+

Part Number	Vendor	Model	Description	OS	Storage	Switch	Driver	Remarks
			3.0 -Vendor ID 1077-Device ID 2031-1,English Doc,Multimode optical module,half width half length					Optics itself See[1]
06030278	Qlogic	QLE2672	Double Ports-16Gbps,PCIE 3.0 -Vendor ID 1077-Device ID 2031-2,English Doc,Multimode optical module,half width half length	*Compatibility List URL:* ?			URL: ?	with SFP+ Optics itself See[1]

NOTE

1. The drivers are provided by original vendors.

Table 6-11 Supported standard PCIe cards (CNAs)

Part Number	Vendor	Model	Description	OS	Storage	Switch	Driver	Remarks
06030223	Emulex	OCe11102-F1M	Dual Port 10Gbps FCoE Host Bus Adapter Card -PCIE 2.0 -multi-mode optic -Half-height half-length	*Compatibility List URL:* ?			URL: ?	with SFP+ Optics itself See[1]

NOTE

The drivers are provided by original vendors.

Table 6-12 Supported standard PCIe cards (IB expansion cards)

Part Number	Vendor of IB card	Model of IB card	Description	OS	Storage	Switch	Driver	Remarks
06030284	Mellanox	MCX354A-FCBT	InfiniBand MCX354A-FCBT,FDR Dual port-56Gb/s,PC	OS Compatibility List URL: ?			URL: ?	See[1] See[2]

Part Number	Vendor of IB card	Model of IB card	Description	OS	Storage	Switch	Driver	Remarks
			IE 3.0 X8-Device ID 1003-1,English Doc,half width half length					
06030285	Mellanox	MCX353A-FCBT	InfiniBand MCX353A-FCBT,FDR Single port-56Gb/s,PCIE 3.0 X8-Device ID 1003-1,English Doc,half width half length	OS Compatibility List URL: ?			URL: ?	See[1] See[2]

NOTE

1. The drivers are provided by original vendors.
2. Made in Israel, cannot be sold to LAS.

Table 6-13 Supported standard PCIe cards (NICs)

Part Number	Vendor	Model of card	Model of Chip	Description	Driver	SFP+ Direct Attach Copper	SFP+ Optics	Remarks
06310025	Intel	E1G44HT (I340-T4)	82580	Quad Port Gigabit Ethernet Card,RJ45 Copper,PCIE 2.0 X4 -Half-height half-length	URL: ?			RJ45 copper See[1] N
06310040	Silicom	PE2G4I80L	82580	Quad Port Gigabit Ethernet Card,RJ45 Copper,PCIE 2.0 X4 -Half-height half-length	URL: ?			RJ45 copper See[1]
06310024	Intel	E10G42BTDA	82599	Dual Port 10 Gigabit Ethernet Server Adapter,SFP+ Direct Attach Copper,PCIE 2.0 X8 -Half-height half-length	URL: ?	04050233; 04050185; 04050186		See[1]

Part Number	Vendor	Model of card	Model of Chip	Description	Driver	SFP+ Direct Attach Copper	SFP+ Optics	Remarks
06310026	Intel	E10G42BFSR	82599	Dual Port 10 Gigabit Ethernet Server Adapter,LC Fiber Optic, PCIE 2.0 X8 -Half-height half-length	URL: ?			With SFP+ optics itself See[1]
03030WSQ	Huawei	SP310	82599	Dual Port 10 Gigabit Ethernet Card, XFP/SFP+,PCIE 2.0 X8 -Half-height half-length	URL: ?	04050233; 04050185; 04050186	34060494	See[1]
06310058	Intel	I350F2G1P2091421 5	I350	Dual Port Gigabit Ethernet Server Adapter,LC Fiber Optic, PCIE 2.0 X4 -Half-height half-length	URL: ?			With SFP+ optics itself See[1]
06310070	Intel	I350T2G1P2091422 5	I350	Dual Port Gigabit Ethernet Server Adapter,RJ45 Copper, PCIE 2.0 X4 -Half-height half-length	URL: ?			RJ45 copper See[1]

NOTE

The drivers are provided by original vendors.

Table 6-14 Supported standard PCIe cards (PCIe SSDs)

Part Number	Vendor of SSD card	Model of SSD card	Description	OS	Driver	Remarks
03030TLH	Huawei	ES3000	Finished Board,ES3000,CN21EDBCT01,The 4th Generation-PCIE 2.0 X8-19e5-0007-1-S	• VMware 5.0 • Windows Server 2008 R2 x64 • SUSE	URL: ?	

Part Number	Vendor of SSD card	Model of SSD card	Description	OS	Driver	Remarks
			SD Card (400GB)(OSCA),ES3000-4-0.4	Linux Enterprise Server 11 SP2 x64		
03030PXT	Huawei	ES3000	Finished Board,ES3000,CN21EDBCT01,The 4th Generation-PCIE 2.0 X8-19e5-0007-1-SSD Card (800GB)(OSCA),ES3000-4-0.8	• VMware 5.0 • Windows Server 2008 R2 x64 • SUSE Linux Enterprise Server 11 SP2 x64	URL: ?	
03030PXS	Huawei	ES3000	Finished Board,ES3000,CN21EDBCR01,The 4th Generation-PCIE 2.0 X8-19e5-0007-1-SSD Card (1200GB)(OSCA),ES3000-4-1.2	• VMware 5.0 • Windows Server 2008 R2 x64 • SUSE Linux Enterprise Server 11 SP2 x64	URL: ?	
03030PWG	Huawei	ES3000	Finished Board,ES3000,CN21EDBCP01,The 4th Generation-PCIE 2.0 X8-19e5-0007-1-SSD Card (2400GB)(OSCA),ES3000-4-2.4	• VMware 5.0 • Windows Server 2008 R2 x64 • SUSE Linux Enterprise Server 11 SP2 x64	URL: ?	

Table 6-15 Supported standard PCIe cards (GPUs)

Part Number	Vendor of GPU card	model of GPU card	Description	OS	Driver	Certification Link	Remarks
06320062	Nvidia	K2000	Video Card,GPU card, Quadro K2000, 2GB Memory, 64GB/s Bandwidth, PCIE 2.0 X16-10DE-0DD8|0BE9-2, 51.1W, SingleSlot, ActiveCoolling, EN-CN Documents, Configuration sheet, Enterprise Computing Used	• SUSE Linux Enterprise Server 11 Service Pack 3 for Intel EM64T • Red Hat Enterprise Linux 6 Update 5 Server for Intel EM64T • Windows Server 2012 R2	URL : ?		See[1] See[3]

NOTE

1. Single card supported only.
2. Up to two cards.
3. The drivers are provided by original vendors.

Table 6-16 Supported NIC mezz cards

Part Number	Vendor	Model of Card	Model of Chip	Description	OS	SFP+ Direct Attach Copper	SFP+Optics	Remarks
03021XTQ	Huawei	SM210	5719	Manufactured Board,BC11FGEA,4*GE Interface Card,Servers,PCIE 1.0 X4-Vendor ID 14e4-Device	• Windows Server 2012 R2 • Red Hat Enterprise Linux 6.5 or 7.0 • SUSE Linux			

Part Number	Vendor	Model of Card	Model of Chip	Description	OS	SFP+ Direct Attach Copper	SFP+Optics	Remarks
				ID 00-4-Board ID 0X14,4*1	Enterprise Server 11 SP3 • VMware ESXi 5.5 • Citrix 6.2			
03022CKQ	Huawei	SM211	I350	Manufactured Board,BC11FGEB,2*GE Interface Card--PCIE 2.0 X4-Vendor ID 8086-Device ID 1521-2-Board ID 0X17-4*1	• Windows Server 2012 R2 • Red Hat Enterprise Linux 6.5 or 7.0 • SUSE Linux Enterprise Server 11 SP3 • VMware ESXi 5.5 • Citrix 6.2			
03021YTD	Huawei	SM231	82599	Manufactured Board,BC11FXEB,2X10GE NetCard,-PCIE 2.0 X8,Vendor ID 8086,Device ID 0,2,Board ID 0X15,2*1	• Windows Server 2012 R2 • Red Hat Enterprise Linux 6.5 or 7.0 • SUSE Linux Enterprise Server 11 SP3 • VMware ESXi 5.5 • Citrix 6.2			
03022GEX	Huawei	SM233	x540	Manufactured Board,BC11FGED,2*10GBASET Interface Card--PCIE 2.1 X8-Vendor ID 8086-Device ID 10A6-Board ID 0X19-4*1	• Windows Server 2012 R2 • Red Hat Enterprise Linux 6.5 or 7.0 • SUSE Linux Enterprise Server 11 SP3			

Part Number	Vendor	Model of Card	Model of Chip	Description	OS	SFP+ Direct Attach Copper	SFP+Optics	Remarks
					• VMware ESXi 5.5 • Citrix 6.2			

6.5 PSU

Table 6-17 lists the PSUs supported by the RH2288 V3.

NOTE

- Table 6-17 is for reference only. For details about the PSUs available, consult the local Huawei sales representatives.
- A server must use PSUs of the same model.

Table 6-17 Supported PSUs

Part Number	Description	Remarks
02131058	AC/DC Power Module 750W 100V-240V/9.0~4.5A OR 240V DC/5A +12V/62.5A 94% Platinum. 2559BTU/hr	
02270113	DC/DC Power Module 824W -38V--75V/26A +12V/65A 93.5% Gold. 2811BTU/hr	
02130957	AC/DC Power Module 460W 90V-264V/6~3A OR 240V DC/5A +12V/38A 94.0% Platinum. 1570BTU/hr	
02270146	DC/DC Power Module 1200W 260-400V/6A +12V/100A 94% Platinum. 4094 BTU/hr	only for china

6.6 OS and Software

Table 6-18 lists the OSs supported by the RH2285 V3.

NOTE

Table 6-18 is for reference only. For details about the OSs available, consult the local Huawei sales representatives.

Table 6-18 Supported OSs

Version	Description	Remarks
Windows 2012 R2	Microsoft Windows Server 2012 R2 64bit Windows Certification URL:?	See [2]
SLES 11.3	SUSE Linux Enterprise Server 11 Service Pack 3 for x86/Intel EM64T	See [2]
RHEL 6U5	Red Hat Enterprise Linux 6 Update 5 Server for x86/Intel EM64T	See [2]
RHEL 7.0	Red Hat Enterprise Linux 7 Server for Intel EM64T	See [2]

NOTE

1. Install an OS by using the ServiceCD: Use the ServiceCD DVD or image file for installation. The latest ServiceCD is available at ?
2. Install an OS directly: Use the physical DVD-ROM drive to load the installation DVD or use the virtual DVD-ROM drive to load the image file for installation.
3. Load drivers while installing an OS: Load hardware drivers during OS installation.
4. Install an OS by making an installation source: Use the OS installation program and hardware drivers to make an installation source for installation.

   Note: For details about the four OS installation methods, see the *HUAWEI Server OS Installation Guide*. To obtain this document, perform the following steps:

   1) Log in to http://enterprise.huawei.com/en

   2) Choose SUPPORT > Product Support > Cloud Computing & Data Centers > Server.

   3) Select the type and model of the server on which the OS is to be installed, and click the document link in the Installation & Upgrade area to download this document.

Table 6-19lists the virtualization software supported by the RH2285 V3.

Table 6-19 Supported virtualization software

Version	Description	Remarks
Windows 2012 R2 Hyper-V	Windows 2012 R2 Hyper-V Windows Certification URL:?	See [2]
Vmware 5.5	Vmware ESXi 5.5.0 Vmware Certification URL:?	See [2]
Citrix 6.2	Citrix XenServer 6.2.0	SR130 See [4] Others See [2]

NOTE

1. Install an OS by using the ServiceCD: Use the ServiceCD DVD or image file for installation. The latest ServiceCD is available at ?
2. Install an OS directly: Use the physical DVD-ROM drive to load the installation DVD or use the virtual DVD-ROM drive to load the image file for installation.
3. Load drivers while installing an OS: Load hardware drivers during OS installation.
4. Install an OS by making an installation source: Use the OS installation program and hardware drivers to make an installation source for installation.

   Note: For details about the four OS installation methods, see the *HUAWEI Server OS Installation Guide*. To obtain this document, perform the following steps:

   1) Log in to http://enterprise.huawei.com/en

   2) Choose SUPPORT > Product Support > Cloud Computing & Data Centers > Server.

   3) Select the type and model of the server on which the OS is to be installed, and click the document link in the Installation & Upgrade area to download this document.

7 System Management

The server uses Huawei's proprietary iBMC intelligent management system (iBMC for short) to implement remote server management. iBMC complies with IPMI V2.0 standards and provides reliable hardware monitoring and management.

iBMC supports the following features and protocols:

- KVM and text console redirection
- Remote virtual media
- IPMI V2.0
- Simple Network Management Protocol version 3 (SNMPv3)
- Common information model (CIM)
- Login using a web browser

Table 7-1 describes the specifications of iBMC.

Table 7-1 Specifications of iBMC

Item	Specifications
Management interface	iBMC integrates with any standard management system through the following interfaces: • IPMI 2.0 • CLI • SM_CLP • HTTPS • SNMPv3 • Web Services-Management (WS-MAN)
Fault detection	iBMC detects faults and accurately locates faults in hardware, for example, an FRU.
Alarm management	iBMC supports alarm management and reports alarms using the SNMP trap, Simple Mail Transfer Protocol (SMTP), and syslog service to ensure 24/7 continuous operation.
Integrated virtual KVM	iBMC provides remote maintenance measures for troubleshooting the system, and supports a maximum resolution of 1920 x 1200.

Item	Specifications
Integrated virtual media	iBMC virtualizes local media devices, images, USB keys, and folders into media devices on a remote server, simplifying OS installation. (The virtual DVD-ROM drive supports a maximum transmission rate of 8 Mbyte/s.)
WebUI	iBMC provides a user-friendly graphical user interface (GUI), which simplifies users' configuration and query operations. The iBMC WebUI supports OSs, web browsers, and JRE of the following versions: • Windows XP (32-bit); Internet Explorer 8.0/9.0/10.0, Firefox 9.0, or Google Chrome 13.0; JRE 1.6.0 U25 or later • Windows 7 (32-bit); Internet Explorer 8.0/9.0/10.0, Firefox 9.0, or Google Chrome 13.0; JRE 1.6.0 U25 or later • Red Hat Enterprise Linux 4.3 (64-bit); Firefox 9.0; JRE 1.6.0 U25 or later • Red Hat Enterprise Linux 6.0 (64-bit); Firefox 9.0; JRE 1.6.0 U25 or later • Mac; Safari or Firefox 9.0; JRE 1.6.0 U25 or later
Fault reproduction	iBMC reproduces faults to facilitate fault diagnosis.
Screen snapshots and screen videos	iBMC allows you to view screenshots and videos without login, which facilitates routine preventive maintenance inspection (PMI).
Domain name service (DNS) and directory service	iBMC supports the DNS and directory service, significantly simplifying network and configuration management.
Dual-image backup	iBMC starts software from a backup image if the software fails.
Asset management	iBMC provides intelligent asset management.
Intelligent power management	iBMC uses the power capping technology to increase deployment density, and uses dynamic energy saving to lower operating expenses.
IPv6	iBMC supports IPv6 to ensure sufficient IP addresses.
NCSI	iBMC supports NCSI, which allows you to access iBMC through the service network port.

8 Warranty

According to the *Huawei Warranty Policy for Servers & Storage Products* (*Warranty Policy* for short), Huawei provides a three-year warranty for the server, a one-year warranty for DVD-ROM drives and iBBUs, 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 service and/or parts may not be available in all countries. For more information about warranty services in your country, contact Huawei technical support or the local Huawei representative office.

Table 8-1 describes the warranty service response time.

Table 8-1 Response time

Service	Response Time	Description	Remarks
Help Desk	24/7	Available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	None
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 end of a customer's service request and beginning of the response by the technical support to offer troubleshooting services.
Online technical support	24/7	Huawei enterprise support website (http://enterprise.huawei.com):	None

Service	Response Time		Description	Remarks
			available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	
Licensing of software updates	24/7		Available 9 hours a day, 5 days a week (09:00 to 18:00, Monday to Friday), excluding official holidays.	The repaired or replacement parts will be shipped within 45 calendar days after Huawei receives the defective parts.
Return for repair	Outside China	9/5 hours, 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.	The repaired or replacement parts will be shipped within 45 calendar days after Huawei receives the defective parts.
	In China	10/5 hours, next business day	Available 10 hours a day, 5 days a week (08:00 to 18:00, Monday to Friday), excluding official holidays. Arrival: NBD	1. Service requests submitted after 15:30 will be handled the next business day. 2. The response time starts when a remote decision is made to appoint an onsite engineer.

Table 8-2 describes warranty services provided by Huawei.

Table 8-2 Warranty services

Service	Description

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	After receiving a service request for rectifying a network or system fault, Huawei engineers will analyze and handle the fault remotely and proceed to rectify it in the shortest possible time. There are two methods for remote troubleshooting: telephone support and remote access.
Online technical support	Huawei enterprise support website (http://enterprise.huawei.com) provides product and technical materials, such as product manuals, configuration guides, networking case study, and maintenance experience collections. Registered users can access the website and download required documents.
Licensing of software updates	To ensure that the devices operate stably, Huawei provides software patches whenever necessary.
Return for repair	Huawei provides repair or replacement services for customers 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. Huawei provides a three-year warranty for parts replacement and onsite repair for the server used in China. Huawei provides a 10-hour-a-day, 5-day-a-week NBD support program. Huawei provides a three-year warranty for parts replacement and repair for the server used outside China. Huawei provides a 9-hour-a-day, 5-day-a-week NBD support program. Huawei delivers the repaired or new parts within 45 calendar days after receiving the defective parts.

9 Physical Specifications

Table 9-1 describes the physical specifications of the RH2288 V3.

Table 9-1 Physical specifications

Item	Specifications
Dimensions (H x W x D)	• Chassis equipped with 3.5-inch hard disks: 86.1 mm (2 U) x 447 mm x 748 mm (3.39 in. x 17.60 in. x 29.45 in.) • Chassis equipped with 2.5-inch hard disks: 86.1 mm (2 U) x 447 mm x 708 mm (3.39 in. x 17.60 in. x 27.87 in.)
Installation dimensions	The RH2288 V3 fits into a common rack complying with the IEC 297 standard. • Rack width: 19 in. • Rack depth: > 1000 mm (39.37 in.)
Power rating of PSUs	The PSUs support the following power ratings: • 460 W AC Platinum PSUs • 750 W AC Platinum PSUs • 750 W AC Titanium PSUs • 1200 W 380 V HV DC PSUs • 800 W –48 V DC PSUs **NOTE** For more information, see the *Compatibility List*.
Weight in full configuration	Maximum weight: • With 8 hard disks: 27 kg (59.54 lb) • With 10 hard disks: 29 kg (63.95 lb) • With 12 hard disks: 30 kg (66.15 lb) • With 25 hard disks: 30 kg (66.15 lb) • With 24 hard disks: 29 kg (63.95 lb) Packing material weight: 5 kg (11.03 lb)
Input voltage	• 460 W AC Platinum PSUs: 100–240 V AC or 192–288 V DC

Item	Specifications
	• 750 W AC Platinum PSUs: 100–240 V AC or 192–288 V DC • 750 W AC Titanium PSUs: 200–240 V AC • 1200 W 380 V HV DC PSUs: 260–400 V DC • 800 W –48 V DC PSUs: –48 V to –60 V DC **NOTE** The recommended current for the external power circuit breaker connected to the RH2288 V3 is 32 A or larger.
Temperature	• Operating temperature: 5 ℃ to 45 ℃ (41 ℉ to 113 ℉) • Storage temperature: –40 ℃ to +65 ℃ (–40 ℉ to 149 ℉) • Temperature change rate: < 20 ℃/hour (36 ℉/hour). **NOTE** • The RH2288 V3 can work at the highest temperature of 35 ℃ (95 ℉) when it is configured with rear hard disks and 30 ℃ (86 ℉) when one fan fails. • The RH2288 V3 can work at the highest temperature of 35 ℃ (95 ℉) when it is configured with Huawei PCIe SSDs. • The RH2288 V3 can work at the highest temperature of 35 ℃ (95 ℉) when it is configured with GPUs of high power consumption. The system performance may deteriorate when one fan fails.
Altitude	≤ 3000 m (9842.40 ft) When the altitude is higher than 900 m (2952.72 ft), the operating temperature decreases by 1 ℃ (1.8 ℉) per 300 m (984.24 ft).
Humidity	• Operating humidity: 8% RH to 90% RH (non-condensing) • Storage humidity: 5% RH to 95% RH (non-condensing) • Humidity change rate: < 20% RH/hour
Acoustic Noise	The data listed in the following is 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 23 ℃ (73.4 ℉) ambient environment. Noise emissions are measured in accordance with ISO 7999 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). • Idle: – LWAd: 5.1 Bels – LpAm: 35.1 dBA • Operating: – LWAd: 6.1Bels – LpAm: 45.1 dBA **NOTE** The actual sound levels generated during server operating vary depending on the server configuration, load, and ambient temperature.

10 Certifications

No	Country/Region	Certification	Standards
1	China	RoHS	SJ/T 11363—2006 SJ/T 11364—2006 GB/T 26572—2011
2	China	CCC	GB4943.1-2011 GB9254-2008(Class A) GB17625.1-2012
6	Europe	CE	Safety: IEC 60950-1:2005(2nd Edition)+A1:2009 and/or EN 60950-1:2006+A11:2009+A1:2010+ A12:2011 EMC: EN 55022:2010 CISPR 22:2008 EN 55024:2010 CISPR 24:2010 ETSI EN 300 386 V1.6.1:2012 ETSI ES 201 468 V1.3.1:2005 IEC 61000-3-2:2005+A1:2008+A2:2009/EN 61000-3-2:2006+A1:2009+A2:2009 IEC 61000-3-3:2008/EN 61000-3-3:2008 IEC 61000-6-2:2005/EN 61000-6-2:2005 IEC 61000-6-4:2006+A1:2010/EN 61000-6-4:2007+A1:2011 RoHS: 2002/95/EC, 2011/65/EU, EN 50581: 2012 REACH: EC NO. 1907/2006 WEEE: 2002/96/EC, 2012/19/EU

No	Country/Region	Certification	Standards
7	America	FCC	FCC CFR47 Part 15:2005 Class A
9	America	Energy Star	ENERGY STAR® Program Requirements for Computer Servers
10	Canada	IC	ICES-003:2004 Class A
11	Australia	C-tick	AS/NZS CISPR 22:2009
12	Japan	VCCI	VCCI V-3:2012
13	Saudi	SASO	IEC 60950-1: 2005 (2nd Edition) + A1:2009 EN 60950-1:2006+A11:2009+A1:2010 + A12:2011
14	Nigeria	SONCAP	IEC 60950-1: 2005 (2nd Edition) + A1:2009 EN 60950-1:2006+A11:2009+A1:2010 + A12:2011
15	Kuwait	Kucas	IEC 60950-1: 2005 (2nd Edition) + A1:2009 EN 60950-1:2006+A11:2009+A1:2010 + A12:2011