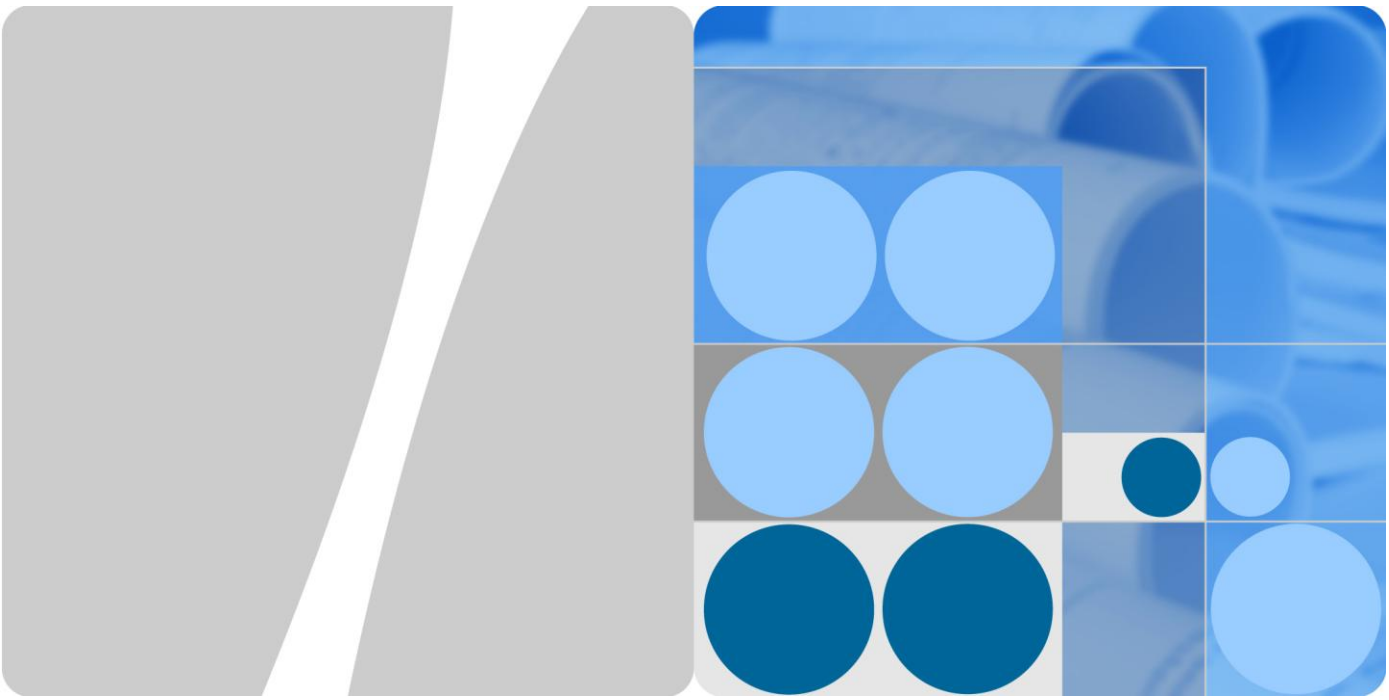

Huawei FusionServer 5288 V3 V100R003

White Paper

Issue 01

Date 2015-11-06

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Contents

1 Overview

The Huawei FusionServer 5288 V3 is a new-generation 4U single-socket or dual-socket rack server that adopts scientific design to ensure excellent computing performance and large-capacity local storage with elastic scalability. The server is designed for cold data storage, video surveillance, cloud storage, and Big Data, and can be widely used in a variety of industries, such as media and entertainment, finance, and public security.

The 5288 V3 supports three types of configurations:

- 5288 V3 with 24 hard disks and one or two processors
  - 24 front 3.5-inch SAS HDDs, SATA HDDs, or SSDs
  - Four internal 3.5-inch or 2.5-inch SAS HDDs, SATA HDDs, or SSDs (optional)
  - One SAS card or SAS RAID controller card
- 5288 V3 with 36 hard disks, only one SAS card or SAS RAID controller card, and one or two processors
  - 24 front 3.5-inch SAS HDDs, SATA HDDs, or SSDs
  - 12 rear 3.5-inch SAS HDDs, SATA HDDs, or SSDs
  - Four internal 3.5-inch or 2.5-inch SAS HDDs, SATA HDDs, or SSDs (optional)
  - One SAS card or SAS RAID controller card
- 5288 V3 with 36 hard disks, two SAS cards or SAS RAID controller cards, and one or two processors
  - 24 front 3.5-inch SAS HDDs, SATA HDDs, or SSDs
  - 12 rear 3.5-inch SAS HDDs, SATA HDDs, or SSDs
  - Four internal 3.5-inch or 2.5-inch SAS HDDs, SATA HDDs, or SSDs (optional)
  - Two SAS cards or SAS RAID controller cards

  The 24 front 3.5-inch hard disks and four internal 3.5-inch or 2.5-inch hard disks are controlled by one SAS card or SAS RAID controller card.

  The 12 rear 3.5-inch hard disks are controlled by another SAS card or SAS RAID controller card.

NOTE

Contact your local Huawei sales representatives if you have any questions about the hard disk configuration.

Figure 1-1 5288 V3

2 Features

Performance and Scalability

The 5288 V3 provides the following features to enhance performance and scalability:

- The Intel® Xeon® E5-2600 v3 series processors ensure high processing performance by providing up to:
  - 16 cores
  - 40 MB L3 cache
  - 3.5 GHz frequency
  - Two 9.6 GT/s QuickPath Interconnect (QPI) links between processors
- A 5288 V3 supports 32 cores and 64 threads in dual-processor configuration or 16 cores and 32 threads in single-processor configuration, which maximizes the concurrent execution of multithreaded applications.
- A 5288 V3 in dual-processor configuration supports up to sixteen 2133 MHz double data rate 4 (DDR4) registered DIMMs (RDIMMs) or load-reduced DIMMs (LRDIMMs) to provide a maximum memory capacity of 512 GB. The maximum theoretical memory bandwidth is 136.5 Gbyte/s, ensuring high speed. The DIMMs adopt the error checking and correcting (ECC) technology, ensuring high availability.
- A 5288 V3 in single-processor configuration supports up to eight 2133 MHz DDR4 RDIMMs or LRDIMMs to provide a maximum memory capacity of 256 GB. The maximum theoretical memory bandwidth is 68.25 Gbyte/s, ensuring high speed. The DIMMs adopt the 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 5288 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 5288 V3 provides elastic, scalable storage capacity with various hard disk configurations to meet diverse storage and upgrade requirements.
- The 5288 V3 supports different models of LOM mezzanine cards for providing a variety of network ports.
- The 5288 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 5288 V3 provides the following features to improve availability and serviceability:

- Uses hot-swappable SATA HDDs, SAS HDDs, or SSDs. The SSDs offer better reliability than HDDs, ensuring continued system performance.
- Supports RAID 0, 1, 1E, 10, 5, 50, 6, and 60, and offers a RAID cache. A supercapacitor is used to protect cache data from power failures.
- Uses the Huawei proprietary intelligent baseboard management system (iBMC) to monitor system parameters in real time, trigger alarms, and perform recovery actions in case of failures, minimizing system downtime.
- Simplifies O&M, accelerates troubleshooting, and improves system availability by providing:
  - UID and HLY indicators on the front panel
  - Fault diagnosis LED
  - Touch LCD diagnosis panel
  - iBMC web user interface (WebUI)

Manageability and Security

The 5288 V3 provides the following features to ensure manageability and security:

- Uses a built-in iBMC to monitor server operating status and provide remote management.
- Integrates the Unified Extensible Firmware Interface (UEFI) to improve setup, configuration, and update efficiency and simplify fault handling.
- Uses the Trusted Platform Module (TPM) to provide advanced encryption functions, including digital signatures and remote authentication.
- Supports Advanced Encryption Standard–New Instruction (AES NI), which allows faster and stronger encryption.
- Allows the server chassis panel to be locked to ensure security of local data.
- Logs the chassis opening events for improved security.
- Supports the Intel Execute Disable Bit function to prevent certain types of malicious buffer overflow attacks when working with a supported OS.

- Supports the Intel Trusted Execution Technology to provide enhanced security by using hardware-based defense against malicious software attacks, allowing each application to run in isolated space.
- Supports the Network Controller Sideband Interface (NC-SI) feature.

NOTE

The service network port supporting NC-SI 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 5288 V3 offers the following energy-conservation features:

- Supports 80 Plus Platinum power supply units (PSUs) of multiple power ratings. The PSUs provide 94% power efficiency at 50% load.
- Supports voltage regulator-down (VRD) power supplies for boards to minimize the energy loss in DC/DC power conversion.
- Ensures optimal heat dissipation and reduces overall system power consumption using improved thermal design, area-based and Proportional-Integral-Derivative (PID) intelligent fan speed adjustment, and intelligent CPU frequency adjustment.
- Supports Intel® Intelligent Power Capability, which allows a processor to be powered on or off based on service requirements.
- Provides power capping and power control functions.
- Improves energy efficiency by using innovative components:
  - The Intel® Xeon® E5-2600 v3 processors provide higher performance over the previous-generation Intel® Xeon® processors while fitting into the same TDP. Low-voltage Intel® Xeon processors consume less energy, ideally suited for data centers and telecommunication environments constrained by power and thermal limitations.
  - The SSDs consume 80% less power than HDDs. In addition, hard disks can be powered on at different times to reduce startup power consumption.
  - The 1.2 V DDR4 RDIMMs consume 20% less energy than 1.5 V DDR3 RDIMMs.

Support for Customization

The Huawei 5288 V3 can be easily customized to a variety of setups.

3 Logical Architecture

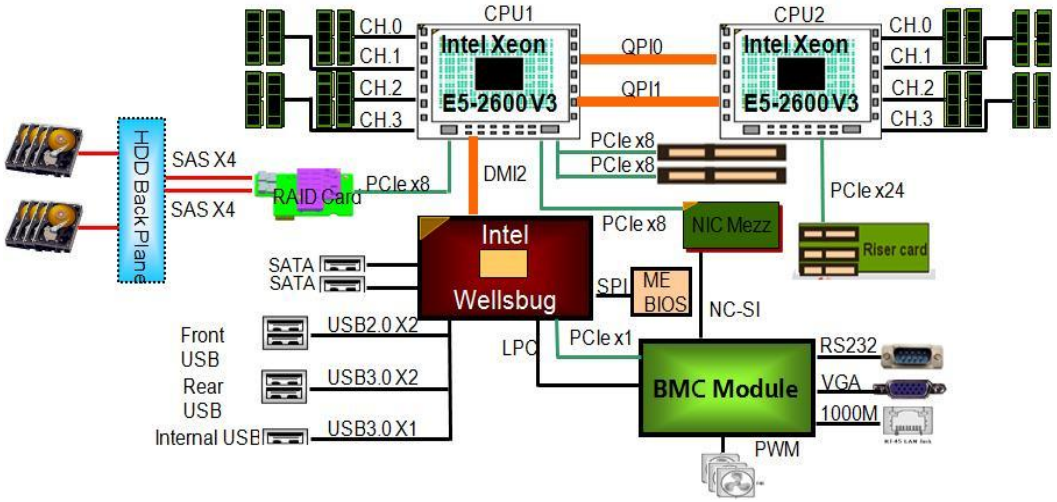
The 5288 V3 in dual-processor configuration supports two Intel® Xeon® E5-2600 v3 (Haswell-EP) series processors and 16 DDR4 DIMMs. The processors are connected by QPI buses at 9.6 GT/s. Figure 3-1 shows the logical architecture of the 5288 V3 in dual-processor configuration.

Each processor connects to one PCIe riser card with a variety of PCIe slots. A RAID controller card and a hard disk backplane form a hard disk interface module, which connects to a processor through PCIe connectors.

NOTE

The 5288 V3 supports a maximum of two E5-2600 v3 series processors. For details about the processor installation positions, see "Installing a CPU" in the *5288 V3 Server V100R003 User Guide*. The 5288 V3 in single-CPU configuration does not support a PCIe riser card.

Figure 3-1 Logical architecture of the 5288 V3 in dual-processor configuration



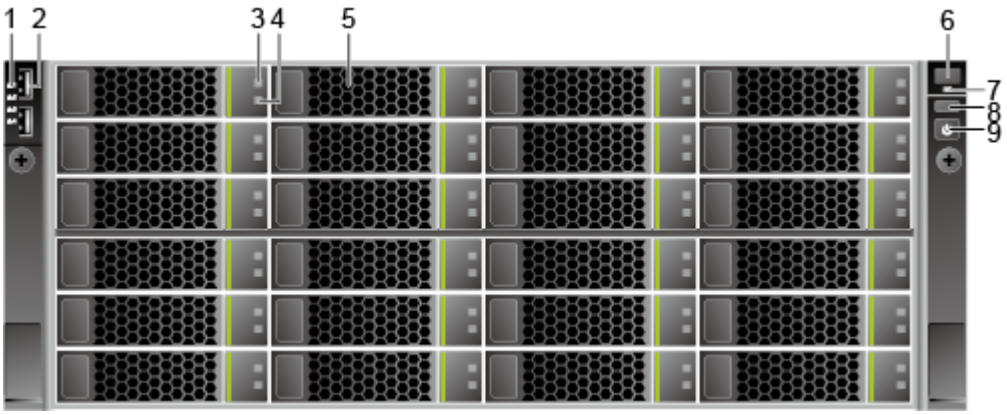
4 Hardware Description

4.1 Appearance

Front Panel

Figure 4-1 shows the 5288 V3 front panel.

Figure 4-1 5288 V3 front panel



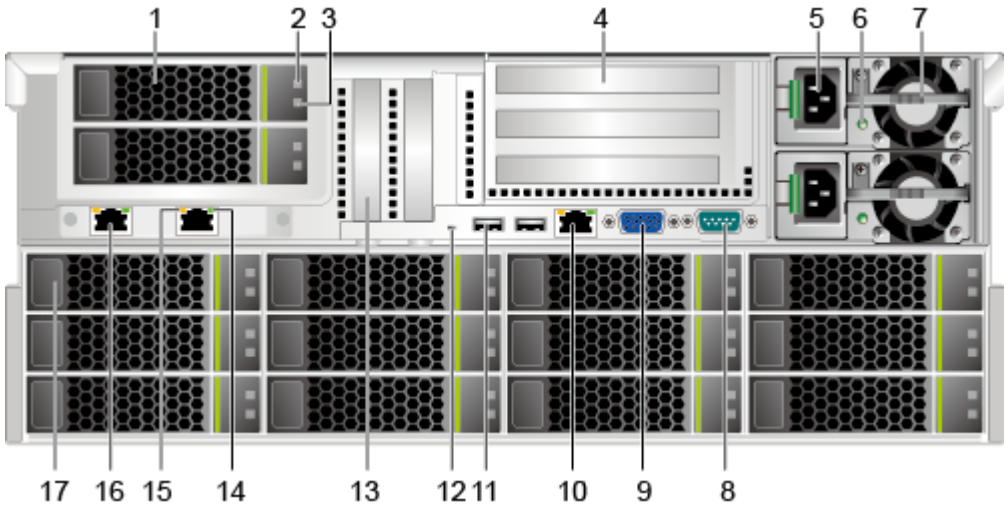
1	Ethernet port indicators	2	USB 2.0 port
3	Hard disk fault indicators	4	Hard disk active indicators
5	Hard disks (numbered 0 to 23 from top down and from left to right	6	Fault diagnosis LED
7	Health status indicator	8	UID button/indicator

9	Power button/indicator

Rear Panel

Figure 4-2 shows the 5288 V3 rear panel.

Figure 4-2 5288 V3 rear panel



1	Rear hard disks (corresponding to processor 1)	2	Hard disk fault indicators
3	Hard disk active indicators	4	I/O module 2 (corresponding to processor 2)
5	Power sockets	6	PSU indicators
7	PSUs	8	Serial port
9	VGA port	10	Management network port (Mgmt)
11	USB 3.0 ports	12	UID indicator
13	PCIe slots	14	Connection status indicators
15	Data transmission status indicators	16	Service network port
17	Rear hard disks		

NOTE

- You can configure two rear 2.5-inch or 3.5-inch hard disks in position 1 shown in Figure 4-2. You can configure one riser card and two rear 2.5-inch hard disks, or two rear 3.5-inch hard disks in position 4 shown in Figure 4-2.
- I/O module 2 supports only one riser card if the server in dual-CPU configuration is not equipped with rear hard disks. One riser card provides two or three PCIe slots.

- The rear hard disks in position 17 shown in Figure 4-2 are numbered as follows:
- Numbered 24 to 35 from top down and from left to right when the 5288 V3 is equipped with one RAID controller card
- Numbered 0 to 11 from top down and from left to right when the 5288 V3 is equipped with two RAID controller cards

4.2 Ports

Table 4-1 and Table 4-2 describe the external ports on the 5288 V3.

Table 4-1 Ports on the front panel

Port	Type	Quantity	Description
USB port	USB 2.0	2	The USB ports allow USB devices to connect to the server. **NOTICE** Before connecting a 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	The port is connected to a monitor or keyboard, video, and mouse (KVM).
USB port	USB 3.0	2	The USB ports allow USB devices to connect to the server. **NOTICE** Before connecting a USB device, check that the USB device operates properly. A server may fail if it is connected to an abnormal USB device.
Management network port (Mgmt)	Ethernet port	1	The 1000 Mbit/s Ethernet port is used to manage the server.
Serial port	DB9	1	The port is used as the default system serial port. It is used for commissioning. You can set it as the iBMC serial port using the iBMC CLI.
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 status of the 5288 V3.

Table 4-3 describes the indicators and buttons on the 5288 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 starting. • Steady yellow: The server is on standby. • 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 remotely running a command on the iBMC CLI. • 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	• 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 is faulty or not detected.

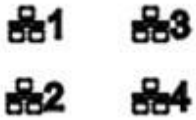
Silk Screen	Meaning	Color	State Description
			• Blinking green: Data read, write, or synchronization is being performed. • Steady green: The hard disk is inactive.
-	Hard disk fault indicator	Yellow	• Off: The hard disk is operating properly or not detected in the RAID group. • Blinking yellow: The hard disk is located, or RAID is being rebuilt. • Steady yellow: The hard disk is faulty or not detected.
	Network port link status indicators	Green	Each indicator shows the status of an Ethernet port on the NIC. • Green: The port is properly connected. • Off: The port is faulty or not in use. **NOTE** If the NIC provides only two network ports, they correspond to network port indicators 1 and 2 on the front panel.

Table 4-4 describes the indicators on the 5288 V3 rear panel.

Table 4-4 Indicators on the rear panel

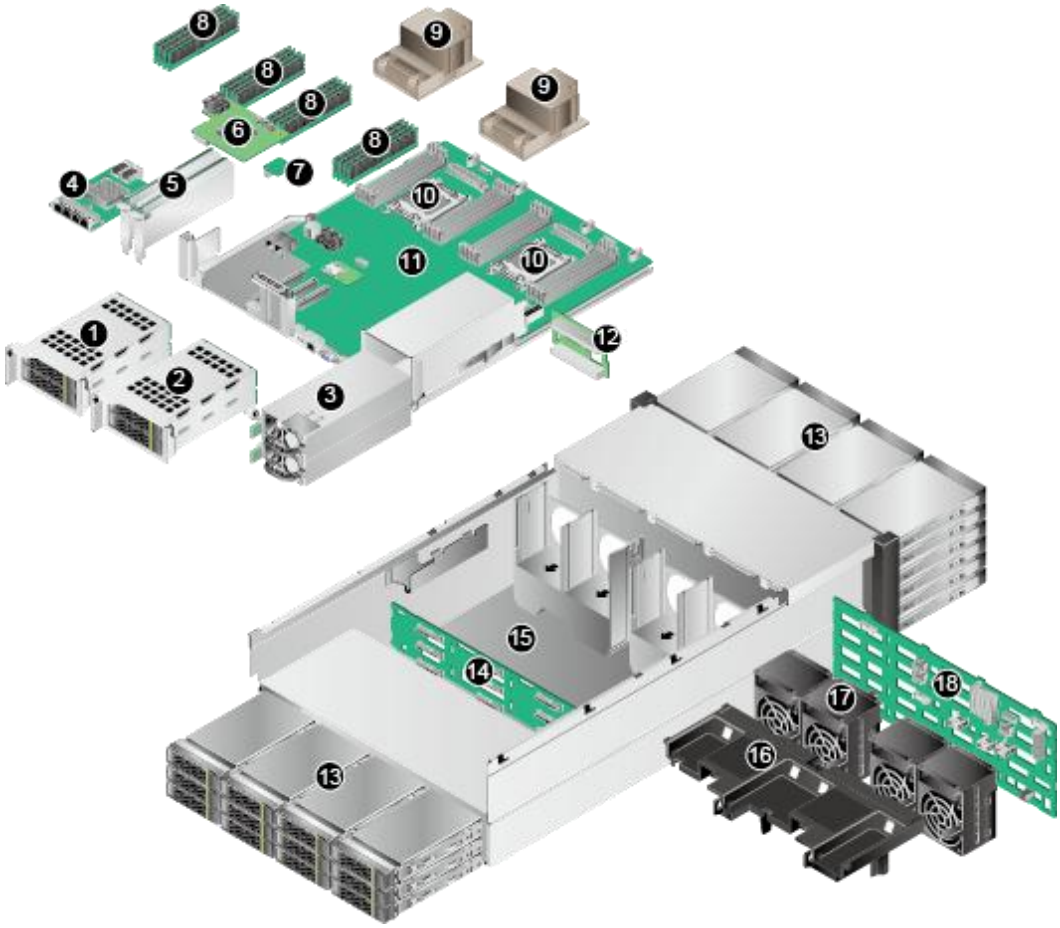
Indicator	Color	State Description
Data transmission status indicator	Orange	• Off: No data is being transmitted. • Blinking: Data is being transmitted.
Connection status indicator	Green	• On: The network port is properly connected. • Off: The network port is not connected.
UID indicator	Blue	• On: The server is located. • Off: The server is not located.
PSU indicator	Green	• On: Both active output and standby output are normal. • Off: No AC power is supplied, input

Indicator	Color	State Description
		overvoltage or undervoltage occurs, or the PSU is faulty or not detected.
Hard disk active indicator	Green	• Off: The hard disk is not detected or is faulty. • Blinking green: Data read, write, or synchronization is being performed. • Steady green: The hard disk is inactive.
Hard disk fault indicator	Yellow	• Off: The hard disk is operating properly or not detected in the RAID group. • Blinking yellow: The hard disk is located, or RAID is being rebuilt. • Steady yellow: The hard disk is faulty or not detected.

4.4 Physical Structure

Figure 4-3 shows the components of a 5288 V3 with 36 hard disks.

Figure 4-3 5288 V3 components



1	Rear hard disk module	2	I/O module 2 (corresponding to processor 2)
3	PSUs	4	LOM
5	PCIe card	6	RAID controller card
7	TPM (optional)	8	DIMMs
9	Heat sinks	10	Processors
11	Mainboard	12	PSU backplane
13	Hard disks	14	Rear hard disk backplane for 12 disks
15	Chassis	16	Air duct
17	Fan modules	18	Front hard disk backplane

Table 4-5 describes the 5288 V3 components.

Table 4-5 5288 V3 components

No.	Component	Description
1	Rear hard disk module	The rear hard disk module supports the following slots: • Two 2.5-inch hard disk slots • Two 3.5-inch hard disk slots
2	I/O module 2 (corresponding to processor 2)	I/O module 2 supports the following slots: • Two full-height full-length standard PCIe 3.0 x8 slots 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 • Two 3.5-inch hard disk slots **NOTE** PCIe slot signals on I/O module 2 come from processor 2. When the server is equipped with only one CPU, I/O module 2 does not support a standard PCIe card.
3	PSUs	The server uses two hot-swappable PSUs in 1+1 redundancy mode. You can use the following types of PSUs based on the input power: • AC PSUs: 110 V or 220 V • DC PSUs: –48 V • High-voltage (HV) DC PSUs: 240 V or 380 V **NOTE** The PSUs support double-pole/neutral fusing.
4	LOM	The 5288 V3 supports one GE NIC with two or four GE ports, or supports one 10GE NIC with two 10GE electrical or optical ports. Both NICs support the NC-SI function.
5	PCIe cards (installed on the mainboard)	The 5288 V3 provides two half-height half-length standard PCIe 3.0 x8 slots for PCIe cards.
6	RAID controller card	The 5288 V3 supports the following RAID controller cards: • SR130: – Uses the LSISAS3008 chip. – Supports RAID 0, 1, 10, and 1E. • SR120: – Uses the LSISAS2308 chip. – Supports RAID 0, 1, 10, and 1E. • SR430C: – Uses the LSISAS3108 chip. – Supports RAID 0, 1, 10, 5, 50, 6, and 60. – Provides a supercapacitor to protect cache data from power

No.	Component	Description
		failures. – Supports up to 32 hard disks. – Provides a cache of 1 GB or 2 GB. • SR630C: – Uses the LSISAS3108 chip. – Supports RAID 0, 1, 10, 5, 50, 6, and 60. – Provides a supercapacitor to protect cache data from power failures. – Supports up to 40 hard disks. – Provides a cache of 1 GB or 2 GB. These RAID controllers cards support RAID level migration and RAID configuration memory. **NOTE** When you configure two SAS cards or SAS RAID controller cards for the server, one of them must be a standard PCIe SAS card or SAS RAID controller card.
7	TPM (optional)	The Trusted Platform Module (TPM) complies with the Trusted Computing Group (TCG) standards and protects the platform from viruses or unauthorized operations.
8	DIMMs	• Maximum number of DDR4 RDIMMs or LRDIMMs: 16 (in dual-CPU configuration) or 8 (in single-processor configuration) • Maximum memory capacity: 512 GB (in dual-CPU configuration) or 256 GB (in single-processor configuration) • Capacity per DIMM: 8 GB, 16 GB, or 32 GB • Memory speed: DDR4 1600 MHz, 1866 MHz, and 2133 MHz
9	Heat sinks	The heat sinks dissipate heat from processors. Each processor is configured with one heat sink.
10	Processors	To provide powerful data processing functions, the 5288 V3 has processors integrated with memory controllers and PCIe controllers. The server supports Intel® Haswell-EP® E5-2600 v3 4-core, 6-core, 8-core, 10-core, 12-core, 14-core, or 16-core processors with up to 135 W power. **NOTE** The server in dual-processor configuration supports a maximum of two E5-2600 v3 series processors. The server in single-processor configuration supports only one E5-2600 v3 series processor.
11	Mainboard	As the most important component of the server, the mainboard integrates basic components, including the BIOS chip, Platform Controller Hub (PCH) chip, and PCIe slots, and provides processor sockets, DIMM slots, and slots for installing other components. The mainboard integrates a display chip with 32 MB display memory. The maximum resolution is 1920 x 1200 at 60 Hz with 16 M colors.

No.	Component	Description
12	PSU backplane	The PSU backplane connects PSUs to the mainboard.
13	Hard disks	The 5288 V3 uses hot-swappable hard disks to store data. It supports the following hard disk configurations: • 5288 V3 with 24 hard disks – 24 front 3.5-inch SAS HDDs, SATA HDDs, or SSDs – Four internal 3.5-inch or 2.5-inch SAS HDDs, SATA HDDs, or SSDs (optional) – One SAS card or SAS RAID controller card • 5288 V3 with 36 hard disks and one SAS card SAS RAID controller card – 24 front 3.5-inch SAS HDDs, SATA HDDs, or SSDs – 12 rear 3.5-inch SAS HDDs, SATA HDDs, or SSDs – Four internal 3.5-inch or 2.5-inch SAS HDDs, SATA HDDs, or SSDs (optional) – One SAS card or SAS RAID controller card • 5288 V3 with 36 hard disks and two SAS cards or SAS RAID controller cards – 24 front 3.5-inch SAS HDDs, SATA HDDs, or SSDs – 12 rear 3.5-inch SAS HDDs, SATA HDDs, or SSDs – Four internal 3.5-inch or 2.5-inch SAS HDDs, SATA HDDs, or SSDs (optional) – Two SAS cards or SAS RAID controller cards The 24 front hard disks and four internal hard disks are controlled by one SAS card or SAS RAID controller card. The 12 rear hard disks are controlled by another SAS card or SAS RAID controller card.
14	Rear hard disk backplane for 12 disks	The hard disk backplane supplies power to rear hard disks and provides data transmission channels.
15	Chassis	A chassis houses all components.
16	Air duct	The air duct facilitates ventilation for the chassis.
17	Fan modules	Fan modules dissipate server heat and support hot swaps and one-fan failures. A faulty fan will trigger speed adjustment of other fans by area, maintaining optimal heat dissipation.
18	Front hard disk backplane	The hard disk backplane supplies power to front hard disks and provides data transmission channels.

5 Technical Specifications

Table 5-1 lists the 5288 V3 technical specifications.

Table 5-1 Technical specifications

Item	Specifications
Form factor	4 U rack server
Processor	• The 5288 V3 in dual-processor configuration supports one or two Intel® Xeon® E5-2600 v3 series processors: – Number of cores per processor: 16 cores (2.3 GHz), 14 cores (2.6 GHz), 12 cores (2.6 GHz), 10 cores (2.6 GHz), 8 cores (3.2 GHz), 6 cores (3.4 GHz), and 4 cores (3.5 GHz) – Number of QPI links: 2 – Maximum transmission speed per QPI link: 9.6 GT/s – Maximum thermal design power (TDP): 135 W – Maximum memory speed: 2133 MHz – Maximum L3 cache capacity: 35 MB • The 5288 V3 in single-processor configuration supports only one Intel® Xeon® E5-2600 v3 series processor: – 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 TDP: 120 W – Maximum memory speed: 2133 MHz – Maximum L3 cache capacity: 35 MB
Chipset	Intel C612
Memory	• Maximum number of slots: – Dual-processor configuration: 16 (8 per processor) – Single-processor configuration: 8

Item	Specifications
	– Types of DIMMs supported: DDR4 RDIMMs or LRDIMMs • Maximum memory speed: 2133 MHz • Maximum memory capacity: – Dual-processor configuration: 256 GB (16 x 16 GB RDIMMs) or 512 GB (16 x 32 GB LRDIMMs) – Single-processor configuration: 128 GB (8 x 16 GB RDIMMs) or 256 GB (8 x 32 GB LRDIMMs) • Memory protection measures: ECC, memory mirroring, Single Device Data Correction (SDDC), memory sparing, and lockstep
Storage	• The 5288 V3 supports different types of hard disk configurations: – 5288 V3 with 24 hard disks and one or two processors 24 front 3.5-inch SAS HDDs, SATA HDDs, or SSDs Four internal 3.5-inch or 2.5-inch SAS HDDs, SATA HDDs, or SSDs (optional) One SAS card or SAS RAID controller card – 5288 V3 with 36 hard disks, only one SAS card or SAS RAID controller card, and one or two processors 24 front 3.5-inch SAS HDDs, SATA HDDs, or SSDs 12 rear 3.5-inch SAS HDDs, SATA HDDs, or SSDs Four internal 3.5-inch or 2.5-inch SAS HDDs, SATA HDDs, or SSDs (optional) One SAS card or SAS RAID controller card – 5288 V3 with 36 hard disks, two SAS cards or SAS RAID controller cards, and one or two processors 24 front 3.5-inch SAS HDDs, SATA HDDs, or SSDs 12 rear 3.5-inch SAS HDDs, SATA HDDs, or SSDs Four internal 3.5-inch or 2.5-inch SAS HDDs, SATA HDDs, or SSDs (optional) Two SAS cards or SAS RAID controller cards The 24 front 3.5-inch hard disks and four internal 3.5-inch or 2.5-inch hard disks are controlled by one SAS card or SAS RAID controller card. The 12 rear 3.5-inch hard disks are controlled by another SAS card or SAS RAID controller card. • Hard disks are hot-swappable. • The 5288 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 cache of 2 GB) to improve hard disk storage performance and ensure user data security. **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

Item	Specifications
	the server, contact your local Huawei sales representatives.
Network port	The 5288 V3 supports four types of NICs, which provide the following network ports: • Two GE electrical ports, supporting NC-SI, Wake on LAN (WOL), and Preboot Execution Environment (PXE) • Four GE electrical ports, supporting NC-SI, WOL, and PXE • Two 10GE optical ports, supporting NC-SI and PXE • Two 10GE electrical ports, supporting NC-SI, WOL, and PXE
PCIe slot	• The RH5288 V3 provides one PCIe 3.0 x8 slot dedicated for a RAID controller card and five standard PCIe 3.0 x8 slots. The five standard PCIe slots are described as follows: – 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 on I/O module 2 (PCIe slot signals on I/O module 2 come from processor 2.) – Two half-height half-length standard PCIe 3.0 x8 slots on the mainboard (PCIe slot signals come from processor 1.) • The PCIe slots on I/O module 2 can house a maximum of two Huawei-developed ES3000 V2 SSD cards, which greatly improve I/O performance for search, cache, and download services • PCIe slots can house K2000 and NVS 315 graphics processing units (GPUs). **NOTE** • For details about the PCIe cards supported by the 5288 V3, see the *Compatibility List*. If the PCIe cards that you use are not included in the *Compatibility List*, contact your local Huawei sales representatives or technical support. • Slots on I/O module 1: Two 2.5-inch hard disk slots Two 3.5-inch hard disk slots • Slots on 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 2.5-inch hard disk slots Two 3.5-inch hard disk slots For details about the PCIe slot configuration, contact your local Huawei sales representatives.
Port	• Front ports: two USB 2.0 ports • Rear ports: two USB 3.0 ports, one DB15 VGA port, one DB9 serial port, and one RJ45 system management port • One internal USB 3.0 port • Two internal miniSSD (SATADOM) ports, supporting softRAID 1 • One internal dual-SD card port, supporting hardware RAID 1 **NOTE**

Item	Specifications
	The server with two internal miniSSDs (SATADOMs) and softRAID 1 does not support the installation of a virtualization OS.
Fan module	Four hot-swappable fan modules compensate for the failure of a single fan module. **NOTE** The fan module configuration depends on the server configuration. For details, contact your local Huawei sales representatives.
PSU	Two hot-swappable PSUs in 1+1 redundancy mode: • 750 W AC Platinum PSUs, supporting 240 V HV DC • 750 W AC Titanium PSUs • 1200 W AC Platinum PSUs • 1200 W 380 V HV DC PSUs • 800 W –48 V or –60 V DC PSUs **NOTE** For details about the PSUs supported by the 5288 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. – Provides one 10/100/1000M RJ45 management network port. • NC-SI
Security	• Power-on password • Administrator password • Chassis-opening logging • Front bezel
Video card	The mainboard integrates a display chip with 32 MB display memory. The maximum resolution is 1920 x 1200 at 60 Hz with 16 M colors.
OSs supported	• 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)	175 mm (4U) x 447 mm x 748 mm (6.89 in. x 17.60 in. x 29.45 in.)
Weight of the server in full configurati	• 5288 V3 with 36 hard disks: 57 kg (125.69 lb) • 5288 V3 with 24 hard disks: 48 kg (105.84 lb) Packing material weight: 15 kg (33.08 lb)

Item	Specifications
on	

6 Component Compatibility

6.1 Processor

The 5288 V3 supports one or two Intel® Xeon® E5-2600 v3 series processors. If only one processor is required, install it in socket CPU1shown in Figure 6-1. Table 6-1 lists the processors supported by the 5288 V3.

NOTE

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

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	
41020484	X86 series-FCLGA2011-2300MHz-1.8V-64bit-75000mW-Haswell EP Xeon E5-2618L v3-8Core	Embed CPU

Part Number	Description	Remarks
41020498	X86 series-FCLGA2011-2400MHz-1.8V-64bit-85000mW-Haswell 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	
41020501	X86 series-FCLGA2011-3500MHz-1.8V-64bit-135000mW-Haswell EP Xeon E5-2637 v3-4Core	
41020496	X86 series-FCLGA2011-2600MHz-1.8V-64bit-90000mW-Haswell EP Xeon E5-2640 v3-8Core	
41020510	X86 series-FCLGA2011-3400MHz-1.8V-64bit-135000mW-Haswell EP Xeon E5-2643 v3-6Core	
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	
41020483	X86 series-FCLGA2011-2200MHz-1.8V-64bit-105000mW-Haswell EP Xeon E5-2658A v3-12Core	
41020489	X86 series-FCLGA2011-2600MHz-1.8V-64bit-105000mW-Haswell EP Xeon E5-2660 v3-10Core	
41020500	X86 series-FCLGA2011-3200MHz-1.8V-64bit-135000mW-Haswell EP Xeon E5-2667 v3-8Core	
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	

Part Number	Description	Remarks
41020495	X86 series-FCLGA2011-2000MHz-1.8V-64bit-120000mW-Haswell EP Xeon E5-2683 v3-14Core	
41020486	X86 series-FCLGA2011-2600MHz-1.8V-64bit-135000mW-Haswell EP Xeon E5-2690 v3-12Core	
41020509	X86 series-FCLGA2011-2300MHz-1.8V-64bit-120000mW-Haswell EP Xeon E5-2695 v3-14Core	
41020494	X86 series-FCLGA2011-2300MHz-1.8V-64bit-135000mW-Haswell EP Xeon E5-2698 v3-16Core	

6.2 Memory

Memory Capacity Configuration Rules

The 5288 V3 supports up to eight DIMMs when only one processor is installed, and 16 DIMMs when two processors are installed. Each processor has four memory channels, and each memory channel supports two DIMMs.

Observe the following rules when configuring DIMMs:

- The 5288 V3 does not support mixed use of RDIMMs and LRDIMMs.
- 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.

- The maximum number of DIMMs supported by a server varies depending on the processor type, DIMM type, number of ranks, and operating voltage. For details, see "Maximum number of DIMMs" in Table 6-2 and Table 6-3.

NOTE
Maximum number of DIMMs supported by each channel ≤ Number of ranks supported by each channel/Number of ranks supported by each DIMM

- All DIMMs on a 5288 V3 server operate at the same speed, which is determined as the smaller value of the following:
  - 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 6-2 and Table 6-3.

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 channel	2133	2133
NOTE The maximum number of RDIMMs listed in Table 6-2 is based on 2-processor configuration. If the server has only one processor, the maximum number of RDIMMs is half the value in Table 6-2.			

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 RDIMMs		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 RDIMM per channel	2133
	Two RDIMMs per channel	2133

Item	LRDIMM
NOTE The maximum number of LRDIMMs listed in Table 6-3 is based on 2-processor configuration. If the server has only one processor, the maximum number of LRDIMMs is half the value in Table 6-3.	

Memory Slot Configuration Rules

- The 5288 V3 supports DIMMs of 8 GB, 16 GB, and 32 GB. A 5288 V3 server fully configured with DIMMs offers a maximum memory of 512 GB (16 x 32 GB) in dual-processor configuration or 256 GB in single-processor configuration (8 x 32 GB).
- The 5288 V3 provides 16 DDR4 DIMM slots in dual-processor configuration or eight DDR4 DIMM slots in single-processor configuration. Each processor integrates four memory channels. The 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 and #EN-US_TOPIC_0013117733/fig2214212715550 show 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 (dual-processor configuration)

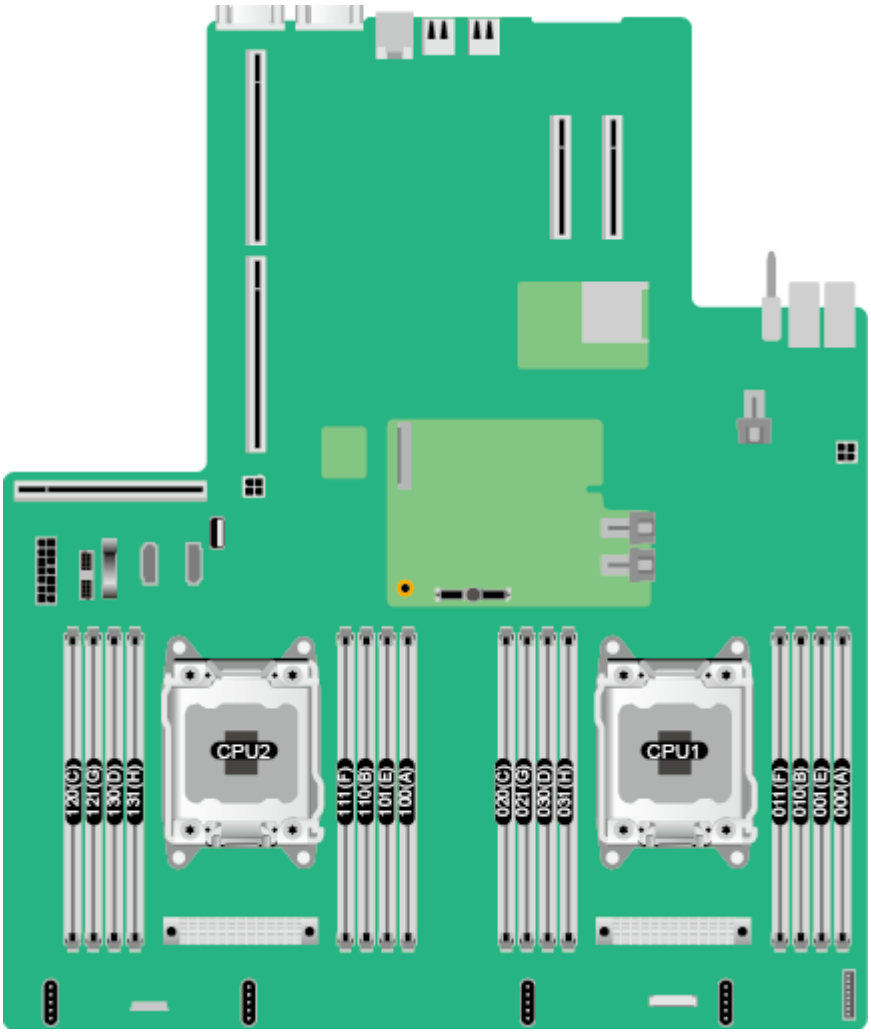


Table 6-5 describes the DIMM installation sequence.

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)

Data Protection Technologies

The 5288 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 5288 V3.

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

Table 6-6 Supported DIMMs

Part Number	Description	Remarks
06200190	DDR4 RDIMM-8GB 2Rx8 1.2V 2133	
06200176	DDR4 RDIMM-16GB-2Rx4 1.2V 2133	

6.3 Storage

The 5288 V3 supports the following hard disk configurations:

- 24 + 4 hard disks
  - 24 front 3.5-inch SAS HDDs, SATA HDDs, or SSDs
  - Four internal 3.5-inch or 2.5-inch SAS HDDs, SATA HDDs, or SSDs (optional)
- 36 + 4 hard disks
  - 24 front 3.5-inch SAS HDDs, SATA HDDs, or SSDs
  - 12 rear 3.5-inch SAS HDDs, SATA HDDs, or SSDs
  - Four internal 3.5-inch or 2.5-inch SAS HDDs, SATA HDDs, or SSDs (optional)

Table 6-7 lists the hard disks supported by the 5288 V3.

NOTE
Table 6-7 is for reference only. For details about the hard disks available, contact your local Huawei sales representatives.

Table 6-7 Supported hard disks

Part Number	Description	Remarks
02311HAK	10000 RPM - 2.5' SAS 12Gbps - 300GB HDD	
02311HAP	10000 RPM - 2.5' SAS 12Gbps - 600GB HDD	
02311HAL	10000 RPM - 2.5' SAS 12Gbps - 900GB HDD	
02311HAN	10000 RPM - 2.5' SAS 12Gbps - 1200GB HDD	
02311FMR	10000 RPM - 2.5' SAS 12Gbps - 1800GB HDD	
02311EXX	15000 RPM - 2.5' SAS 12Gbps - 300GB HDD	
02311AYF	15000 RPM - 2.5' SAS 12Gbps - 600GB HDD	
02310YCH	7200 RPM - 2.5' SATA 6Gbps - 1000GB HDD	
02311HGX	7200 RPM - 2.5' SATA 6Gbps - 2000GB 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	
02311FNH	7200 RPM - 3.5' NL SAS 12Gbps - 6000GB 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	
02311DYQ	7200 RPM - 3.5' SATA 6Gbps - 6000GB HDD	
02311HAS	10000 RPM - 2.5' SAS 12Gbps - 300GB HDD - 3.5inch Handle	
02311HAT	10000 RPM - 2.5' SAS 12Gbps - 600GB HDD - 3.5inch Handle	
02311EEL	15000 RPM - 2.5' SAS 12Gbps - 300GB HDD - 3.5inch Handle	
02311EEM	15000 RPM - 2.5' SAS 12Gbps - 600GB HDD - 3.5inch Handle	
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	
02311HAH	eMLC 2.5' SAS 12Gbps - 400GB-ME SSD	
02311HAG	eMLC 2.5' SAS 12Gbps - 800GB-ME SSD	

Part Number	Description	Remarks
02311HAJ	eMLC 2.5' SAS 12Gbps - 1600GB-ME SSD	

Table 6-8 lists the RAID controller cards supported by the 5288 V3.

NOTE
Table 6-8 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	IOVP Certification
03021ENL	SR120 Server Raid Controller- LSI 2308 - SAS 6G/SATA 6G - RAID0 / RAID1 / RAID1E / RAID10	Yes Certification URL: *Link*
03022CDE	SR130 Server Raid Controller- LSI 3008 - SAS 12G/SATA 6G - RAID0 / RAID1 / RAID1E /RAID10	Yes Certification URL: *Link*
02311GSF	SR630C Server Raid Controller-LSI 3108 - SAS 12G/SATA 6G - Cache 1GB -240 Disk- RAID0 / RAID1 / RAID10 /RAID5 / RAID6 /RAID50 /RAID60 - Support SuperCap	
02311GSG	SR630C Server Raid Controller-LSI 3108 - SAS 12G/SATA 6G - Cache 2GB -240 Disk- RAID0 / RAID1 / RAID10 /RAID5 / RAID6 /RAID50 /RAID60 - Support SuperCap	
02310UUB	SR430C Server Raid Controller- LSI 3108 - SAS 12G/SATA 6G - Cache 1GB -32 Disk- RAID0 / RAID1 / RAID10 /RAID5 / RAID6 /RAID50 /RAID60 - Support SuperCap	Yes Certification URL: *Link*
02310UUA	SR430C Server Raid Controller- LSI 3108 - SAS 12G/SATA 6G - Cache 2GB -32 Disk- RAID0 / RAID1 / RAID10 /RAID5 / RAID6 /RAID50 /RAID60 - Support SuperCap	Yes Certification URL: *Link*
06030300	Other Cards - PCIE 3.0 X8 - 12G SAS HBA - LSI 3008 - RAID0 / RAID1 / RAID1E / RAID10	
06030322	Other Cards - PCIE 3.0 X8 - 12G SAS RAID card - LSI 3108 - 1GB cache - RAID0 / RAID1 / RAID10 /RAID5 / RAID6 /RAID50 /RAID60 - hot spare - RAID level migration - Capacity Expansion	

Table 6-9 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	Medium	High	Medium	3	(*N* - 1)/*N*
RAID 6	Medium	High	Medium	4	(*N* - 2)/*N*
RAID 10	High	Medium	Medium	4	*M*/*N*
RAID 50	High	High	Better than medium	6	(*N* - *M*)/*N*
RAID 60	High	High	Better than medium	8	(*N* - *M* x 2)/*N*

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

6.4 I/O Expansion

The 5288 V3 supports a wide range of PCIe cards. You can select the following PCIe cards based on the card type and transmission speed:

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

Table 6-10 to Table 6-16 list the PCIe cards supported by the 5288 V3.

NOTE
Table 6-10 to Table 6-16 are for reference only. For details about the PCIe cards available, contact your local Huawei sales representatives.

Table 6-10 Supported PCIe cards (FC HBAs)

Part Number	Vendor	Model	Description	OS	Storage	Switch	Driver	Remarks

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: Link			URL: Link	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: Link			URL: Link	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: Link			URL: Link	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: Link			URL: Link	With SFP+ Optics itself See[1]
06030277	Qlogic	QLE2670	Single Port-16Gbps,PCIE 3.0 -Vendor ID 1077-Device ID 2031-1,English Doc,Multimode optical module,half width half length	Compatibility List URL: Link			URL: Link	With SFP+ 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: Link			URL: Link	With SFP+ Optics itself See[1]
06030275	Emulex	LPe16000B	Single Port-16Gbps,PCIE 3.0 -Vendor ID 10df-Device ID	Compatibility List URL: Link			URL: Link	With SFP+ Optics

Part Number	Vendor	Model	Description	OS	Storage	Switch	Driver	Remarks
			e200-1,English Doc,Multimode optical module,half width half length					itself See[1]
06030276	Emulex	LPe16002B	Double Ports-16Gbps,PCIE 3.0 -Vendor ID 10df-Device ID e200-2,English Doc,Multimode optical module,half width half length	Compatibility List URL: Link			URL: Link	With SFP+ Optics itself See[1]

NOTE
[1]. The drivers are provided by original vendors.

Table 6-11 Supported PCIe cards (CNAs)

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

NOTE
[1]. The drivers are provided by original vendors.

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

Part Number	Vendor	Model	Description	OS	Storage	Switch	Driver	Remarks
06030284	Mellanox	MCX354A-FCBT	Infiniband MCX354A-FCBT,FDR Dual port-56Gb/s,PCIE 3.0 X8-Device ID 1003-1,English Doc,half width half length	OS Compatibility List URL: Link			URL: Link	See[1] See[2]
06030285	Mellanox	MCX353A-FCBT	Infiniband MCX353A-FCBT,FDR Single port-56Gb/s,PCI	OS Compatibility List URL: Link			URL: Link	See[1] See[2]

Part Number	Vendor	Model	Description	OS	Storage	Switch	Driver	Remarks
			E 3.0 X8-Device ID 1003-1,English Doc,half width half length					

NOTE
[1]. The drivers are provided by original vendors.
[2]. The IB cards are made in Israel and cannot be sold to League of Arab States (LAS).

Table 6-13 Supported PCIe cards (NICs)

Part Number	Vendor	Card Model	Chip Model	Description	Driver	SFP+ Directly Attached 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: Link			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: Link			RJ45 copper See[1]
06310026	Intel	E10G42BFSR	82599	Dual Port 10 Gigabit Ethernet Server Adapter,LC Fiber Optic, PCIE 2.0 X8 -Half-height half-length	URL: Link			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: Link	04050233; 04050185	34060494; 34060495	See[1,3]
06310058	Intel	I350F2G1P20914215	I350	Dual Port Gigabit Ethernet Server Adapter,LC Fiber Optic, PCIE 2.0 X4 -Half-height half-length	URL: Link			With SFP+ Optics itself See[1]
06310070	Intel	I350T2G1P20914225	I350	Dual Port Gigabit Ethernet Server Adapter,RJ45 Copper, PCIE 2.0 X4	URL: Link			RJ45 copper See[1]

Part Number	Vendor	Card Model	Chip Model	Description	Driver	SFP+ Directly Attached Copper	SFP+ Optics	Remarks
				-Half-height half-length				
03022TSC	Huawei	SP210	I350	Manufactured Board,X6000,CN21ITGB,I350 2*GE PCIE Card,PCIE 2.0 X4-Vendor ID 8086-Device ID 1521-2,1*2	URL: Link			RJ45 copper See[1] N
03022UTK	Huawei	SP212	I350	Manufactured Board,X6000,CN21ITGC,I350 4*GE PCIE Card,PCIE 2.0 X4-Vendor ID 8086-Device ID 1521-4,1*2	URL: Link			RJ45 copper See[1] N
06310068	Mellanox	MCX312A-XCBT	CX312A	Dual Port 10 Gigabit Ethernet Server Adapter,LC Fiber Optic,PCIE 3.0 X8 -Half-height half-length	URL: Link			With SFP+ Optics itself See[1] See[2]
06310083	Mellanox	MCX311A-XCAT	CX311A	Network Card,10 Gigabit-64-SFP+-1 port-PCI-E 3.0-15B3-1003,Without driver CD	URL: Link			With SFP+ Optics itself See[1] See[2]
06310081	Intel	X540T2 914248	X540	Network Card,10GE,RJ45,2 ports,PCIE 2.0 X8-8086-1528-2,with Driver CD	URL: Link			RJ45 copper See[1] See[2]
06310080	Silicom	PE210G2i40E-T-HU	X540	Network Card,10GE,RJ45,2 ports,PCIE 2.0 X8-8086-1528-2,without Driver CD	URL: Link			RJ45 copper See[1] See[2]
02310YHP	Huawei	SP310	82599	Function Module,X6000,CN21ITGAA12,PCIE 2.0 X8-Vendor ID 8086-Device ID				See[4]

Part Number	Vendor	Card Model	Chip Model	Description	Driver	SFP+ Directly Attached Copper	SFP+ Optics	Remarks
				10FB-2,NCSI Supported				
02311CVV	Huawei	SP210	I350	Function Module,Server,CN21ITGB01,Intel I350 2*GE Half-height Half-length,Full Handlebars,Ethernet Card,PCIE 2.0 X4-Vendor ID 8086-Device ID 1521-2				See[4]
02311CWM	Huawei	SP212	I350	Function Module,Server,CN21ITGC01,Intel I350 4*GE Half-height Half-length,Full Handlebars,Ethernet Card,PCIE 2.0 X4-Vendor ID 8086-Device ID 1521-4				See[4]

NOTE

[1]. The drivers are provided by original vendors.

[2]. It cannot be obtained from Unistar.

[3]. The following table describes SPF+ optical modules.

Part Number	Uplink Type	Description	Remarks
34060494	10GbE MMF	Optical transceiver,SFP+,850nm,10Gb/s,-7.3~-1dBm,-9.9dBm,LC, MM,0.3km	Multi-mode fiber
34060495	10GbE SMF	XFP|SFP+ Transceiver,SFP+,1310nm,10Gb/s,-8.2dBm,0.5dBm,-12.6dBm,LC,SM,10km	Single-mode fiber
04050233	10GbE Passive DAC Cable	High Speed Cable,Passive SFP+ Cable,1.0m,SFP+20M,CC2P0.254B,SFP+20M,LSFRZH For Indoor	Passive SFP+ cable, 1.0 m
04050185	10GbE Passive DAC Cable	High Speed Cable,Passive SFP+ Cable,3.0m,SFP+20M,CC2P0.254B,SFP+20M,LSFRZH For Indoor	Passive SFP+ cable, 3.0 m

Table 6-14 Supported PCIe cards (PCIe SSD cards)

Part Number	Card Vendor	Card Model	Description	OS	Driver	Remarks
03022UUA	Huawei	ES3000 V2	ES3000 V2-600 PCIe SSD card (600 GB)	• WMware 5.0 • Windows Server 2008 r2 x64 • SUSE Linux Enterprise Server (SLES) 11 SP2 x64	URL: Link	Independent packing and shipment using the 02311BSK code Online expansion. If the server manufacture date is before 2015-05-30, contact Huawei engineers first.
03022XWV	Huawei	ES3000 V2	ES3000 V2-800 PCIe SSD card (800 GB)	• WMware 5.0 • Windows Server 2008 r2 x64 • SLES 11 SP2 x64	URL: Link	Independent packing and shipment using the 02311DLV code Online expansion. If the server manufacture date is before 2015-05-30, contact Huawei engineers first.
03022XVW	Huawei	ES3000 V2	ES3000 V2-1200 PCIe SSD card (1.2 TB)	• WMware 5.0 • Windows Server 2008 r2 x64 • SLES 11 SP2 x64	URL: Link	Independent packing and shipment using the 02311DLW code Online expansion. If the

Part Number	Card Vendor	Card Model	Description	OS	Driver	Remarks
						server manufacture date is before 2015-05-30, contact Huawei engineers first.
03022YJR	Huawei	ES3000 V2	ES3000 V2-1600 PCIe SSD card (1.6 TB)	• WMware 5.0 • Windows Server 2008 r2 x64 • SLES 11 SP2 x64	URL: Link	Independent packing and shipment using the 02311BSL code Online expansion. If the server manufacture date is before 2015-05-30, contact Huawei engineers first.
03022PEL	Huawei	ES3000 V2	ES3000 V2-1200H PCIe SSD card (1.2 TB)	• WMware 5.0 • Windows Server 2008 r2 x64 • SLES 11 SP2 x64	URL: Link	Independent packing and shipment using the 02311BSJ code Online expansion. If the server manufacture date is before 2015-05-30, contact Huawei engineers first.
03022PEK	Huawei	ES3000 V2	ES3000 V2-2400H PCIe SSD card (2.4 TB)	• WMware 5.0	URL:	Independent packing

Part Number	Card Vendor	Card Model	Description	OS	Driver	Remarks
				• Windows Server 2008 r2 x64 • SLES 11 SP2 x64	Link	and shipment using the 02311BSH code Online expansion. If the server manufacture date is before 2015-05-30, contact Huawei engineers first.
03022MDC	Huawei	ES3000 V2	ES3000 V2-3200H PCIe SSD card (3.2 TB)	• WMware 5.0 • Windows Server 2008 r2 x64 • SLES 11 SP2 x64	URL: Link	Independent packing and shipment using the 02311BSG code Online expansion. If the server manufacture date is before 2015-05-30, contact Huawei engineers first.

Table 6-15 Supported PCIe cards (GPUs)

Part Number	GPU Vendor	GPU Model	Description	OS	Driver	Certification Link	Remarks
06320064	Nvidia	NVS 315	Video Card,GPU Card, 1GB DDR3,14GB/s bandwidth,x16-10DE-107C,PCIE 2.0,Active Cooling	• SLES 11 Service Pack 3 for Intel EM64T • Red Hat	URL: Link		See[2] See[3]

Part Number	GPU Vendor	GPU Model	Description	OS	Driver	Certification Link	Remarks
				Enterprise Linux (RHEL) 6 Update 5 Server for Intel EM64T • Windows Server 2012 R2			

NOTE
[1]. Only one card is supported.
[2]. Up to two cards are supported.
[3]. The drivers are provided by original vendors.

Table 6-16 Supported NIC mezzanine cards

Part Number	Vendor	Card Model	Chip Model	Description	OS	SFP+ Directly Attached Copper	SFP+ Optics	Remarks
03021XTQ	Huawei	SM210	5719	Manufactured Board,BC11FGEA,4*GE Interface Card,Servers, PCIE 1.0 X4-Vendor ID 14e4-Device ID 00-4-Board ID 0X14,4*1	• Windows Server 2012 or Windows Server 2012 R2 • RHEL 6.5, 6.6, or 7.0 • CentOS 6.5 or 6.6 • SLES 11 SP3 • Debian 7.0 or 7.7 • Ubuntu 14.04 • VMware ESXi 5.5 • Citrix 6.2			
03022CKQ	Huawei	SM211	I350	Manufactured Board,BC11FGEB,2*GE Interface Card--PCIE 2.0 X4-Vendor	• Windows Server 2012 or Windows Server 2012 R2 • RHEL 6.5, 6.6, or 7.0			

Part Number	Vendor	Card Model	Chip Model	Description	OS	SFP+ Directly Attached Copper	SFP+ Optics	Remarks
				ID 8086-Device ID 1521-2-Board ID 0X17-4*1	• CentOS 6.5 or 6.6 • SLES 11 SP3 • Debian 7.0 or 7.7 • Ubuntu 14.04 • 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 or Windows Server 2012 R2 • RHEL 6.5, 6.6, or 7.0 • CentOS 6.5 or 6.6 • SLES 11 SP3 • Debian 7.0 or 7.7 • Ubuntu 14.04 • VMware ESXi 5.5 • Citrix 6.2	04050233; 04050185;	34060494; 34060495;	See[1]
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 or Windows Server 2012 R2 • RHEL 6.5, 6.6, or 7.0 • CentOS 6.5 or 6.6 • SLES 11 SP3 • Debian 7.0 or 7.7 • Ubuntu 14.04 • VMware ESXi 5.5			

Part Number	Vendor	Card Model	Chip Model	Description	OS	SFP+ Directly Attached Copper	SFP+ Optics	Remarks
					• Citrix 6.2			
03022TQY	Huawei	SM212	I350	Manufactured Board,BC11FGEC,I350 4*GE Interface Card,PCIE 2.0 X4-4-Board ID 0X18,4*1	• Windows Server 2012 or Windows Server 2012 R2 • RHEL 6.5, 6.6, or 7.0 • CentOS 6.5 or 6.6 • SLES 11 SP3 • Debian 7.0 or 7.7 • Ubuntu 14.04 • 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 • RHEL 6.5 or 7.0 • SLES 11 SP3 • VMware ESXi 5.5 • Citrix 6.2			

NOTE
The following table describes SPF+ optical modules.

Part Number	Uplink Type	Description	Remarks
34060494	10GbE MMF	Optical transceiver,SFP+,850nm,10Gb/s,-7.3~-1dBm,-9.9dBm,LC, MM,0.3km	Multi-mode fiber
34060495	10GbE SMF	XFP|SFP+ Transceiver,SFP+,1310nm,10Gb/s,-8.2dBm,	Single-mode fiber

Part Number	Uplink Type	Description	Remarks
		0.5dBm,-12.6dBm,LC,SM,10km	
04050233	10GbE Passive DAC Cable	High Speed Cable,Passive SFP+ Cable,1.0m,SFP+20M,CC2P0.254B,SFP+20M,LSFRZH For Indoor	Passive SFP+ cable, 1.0 m
04050185	10GbE Passive DAC Cable	High Speed Cable,Passive SFP+ Cable,3.0m,SFP+20M,CC2P0.254B,SFP+20M,LSFRZH For Indoor	Passive SFP+ cable, 3.0 m

6.5 PSU

Table 6-17 lists the PSUs supported by the 5288 V3.

NOTE

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

Table 6-17 Supported PSUs

Part Number	Description	Remarks
02310QWX	AC/DC Power Module 750W 100V-240V/9.0~4.5A OR 240V DC/5A +12V/62.5A 94.0% Platinum. 2559BTU/hr	
02270113	DC/DC Power Module 824W -38V--75V/26A +12V/65A 93.5% Gold. 2811BTU/hr	
02270146	DC/DC Power Module 1200W 260-400V/6A +12V/100A 94% Platinum. 4094 BTU/hr	Only for China
02130985	AC/DC Power Module 1200W 100V-240V/6.6~9.3A OR 240V DC/8A +12V/100A 94.0% Platinum. 2731 BTU/hr (at 100 VAC);3071 BTU/hr (at 110~120 VAC);4094 BTU/hr (at 200~240 VAC)	
02131167	AC/DC Power Module 750W 200V-240V~4.1A +12V/62.5A 96.0% Titanium. 2559BTU/hr	

6.6 OS and Software

Table 6-18 lists the OSs supported by the 5288 V3.

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

Table 6-18 Supported OSs

Version	Description	Remarks
Windows Server 2008 R2 SP1	Microsoft Windows Server 2008 R2 SP1 64-bit Windows certification URL: Link	See[1] See[5]
Windows Server 2012	Microsoft Windows Server 2012 64-bit Windows certification URL: Link	See[1] See[5]
Windows Server 2012 R2	Microsoft Windows Server 2012 R2 64-bit Windows certification URL: Link	See[1] See[5]
SLES 11.3	SUSE Linux Enterprise Server 11 Service Pack 3 for x86/Intel EM64T	See[2] See[5]
RHEL 6U5	Red Hat Enterprise Linux 6 Update 5 Server for x86/Intel EM64T	See[2] See[5]
RHEL 6U6	Red Hat Enterprise Linux 6 Update 6 Server for Intel EM64T	See[2] See[5]
RHEL 7.0	Red Hat Enterprise Linux 7 Server for Intel EM64T	See[2] See[5]
Ubuntu 14.04 LTS	Ubuntu 14.04 LTS Server Edition for x86/Intel EM64T	SR130 See[4] Others See[2]
CentOS 6.5	CentOS Linux 6 Update 5 for Intel EM64T	See[2] See[5]
CentOS 6.6	CentOS Linux 6 Update 6 for Intel EM64T	See[2] See[5]
CentOS 7.0	CentOS Linux 7 for Intel EM64T	See[2] See[5]
Debian 7.0	Debian 7.0 for Intel EM64T	SR130 See[4] Others See[2]
Debian 7.7	Debian 7.7 for Intel EM64T	SR130 See[4] Others See[2]
Debian 7.8	Debian 7.8 for Intel EM64T	SR130 See[4] Others See[2]

NOTE

The server OS can be installed by using any of the following methods:

- [1]. Install an OS by using the ServiceCD: Use the ServiceCD or image file to install the OS. The latest ServiceCD is available at *Link*.
- [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.

For details about the OSs supported by a server component, see the OS compatibility list of the component. Such server components include the PCIe FC HBA, PCIe CNA, PCIe IB card, PCIe SAS HBA, PCIe NIC, PCIe SSD card, PCIe GPU, PCIe network mezzanine card, PCIe FC mezzanine card, PCIe IB mezzanine card, and PCIe CNA mezzanine card.

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 6-19 lists the virtualization software supported by the 5288 V3.

Table 6-19 Supported virtualization software

Version	Description	Remarks
Windows Server 2008 R2 SP1 Hyper-V	Windows Server 2008 R2 SP1 Hyper-V Windows certification URL: Link	See[1] See[5]
Windows Server 2012 Hyper-V	Windows Server 2012 Hyper-V Windows certification URL: Link	See[1] See[5]
Windows Server 2012 R2 Hyper-V	Windows Server 2012 R2 Hyper-V Windows certification URL: Link	See[1] See[5]
RHEL 6.5 KVM	Red Hat Enterprise Linux 6 Server update 5 for Intel EM64T	See[2] See[5]
RHEL 7.0 KVM	Red Hat Enterprise Linux 7 Server for Intel EM64T	See[2] See[5]
VMware 5.1	VMware ESXi 5.1.2 or later	See[4] See[5]
VMware 5.5	VMware ESXi 5.5.2 or later	SR120 See[4] Others See[2]
VMware 6.0	VMware ESXi 6.0.0 or later	See[2] See[5]
Citrix 6.2	Citrix XenServer 6.2.0	SR130 See[4] Others See[2]

Version	Description	Remarks
Citrix 6.5	Citrix XenServer 6.5.0	See[2] See[5]

NOTE

The server OS can be installed by using any of the following methods:

- [1]. Install an OS by using the ServiceCD: Use the ServiceCD or image file to install the OS. The latest ServiceCD is available at *Link*.
- [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.

For details about the OSs supported by a server component, see the OS compatibility list of the component. Such server components include the PCIe FC HBA, PCIe CNA, PCIe IB card, PCIe SAS HBA, PCIe NIC, PCIe SSD card, PCIe GPU, PCIe network mezzanine card, PCIe FC mezzanine card, PCIe IB mezzanine card, and PCIe CNA mezzanine card.

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 Huawei proprietary intelligent baseboard management system (iBMC) is used 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
- Login using a web browser
- Common information model (CIM)
- IPMI V2.0
- Simple Network Management Protocol version 3 (SNMPv3)

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.
Integrated virtual KVM	iBMC provides remote maintenance measures for troubleshooting the system, and supports a maximum resolution of 1920 x 1200.
Integrated	iBMC virtualizes local media devices, images, USB keys, and folders into

Item	Specifications
virtual media	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 web user interface (WebUI), which simplifies users' configuration and query operations. OSs supported by the iBMC WebUI: • Windows 7 32-bit/64-bit • Windows 8 32-bit/64-bit • Windows Server 2008 R2 64-bit • Windows Server 2012 64-bit • RHEL 4.3 64-bit • RHEL 6.0 64-bit • Mac OS X v10.7 Browsers supported by the iBMC WebUI: • Internet Explorer 8.0/10.0 (applies only to Windows) • Mozilla Firefox 9.0/23.0 • Chrome 13.0/31.0 (applies only to Windows) • Safari 5.1 (applies only to Mac) Java Runtime Environment (JRE) supported by the iBMC WebUI: JRE 1.6.0 U25/1.7.0 U40
Fault reproduction	iBMC allows you to reproduce faults, which facilitates fault diagnosis.
Screenshots and 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.
NC-SI	iBMC supports NC-SI, 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.

For details about warranty, log in to http://e.huawei.com and choose **Support** > **Service Solutions** > **Warranty** to obtain warranty documents.

9 Physical Specifications

Table 9-1 describes the physical specifications of the 5288 V3.

Table 9-1 Physical specifications

Item	Specifications
Dimensions (H x W x D)	175 mm (4U) x 447 mm x 748 mm (6.89 in. x 17.60 in. x 29.45 in.)
Installation dimensions	The 5288 V3 fits into a common rack complying with the IEC 297 standard. • Rack width: 19 in. • Rack depth: > 1000 mm (39.37 in.)
Power ratings of PSUs	The PSUs support the following power ratings: • 750 W AC Platinum PSUs • 750 W AC Titanium PSUs • 1200 W AC Platinum PSUs • 1200 W 380 V HV DC PSUs • 800 W –48 V DC PSUs **NOTE** For more information, see the *Compatibility List*.
Weight of the server in full configuration	Maximum weight: • With 36 hard disks: 57 kg (125.69 lb) • With 24 hard disks: 48 kg (105.84 lb) Packing material weight: 15 kg (33.08 lb)
Input voltage	• 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 AC Platinum PSUs: 100–240 V AC or 192–288 V DC • 1200 W 380 V HV DC PSUs:

Item	Specifications
	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 5288 V3 is 32 A.
Temperature	• Operating temperature: 5 ℃ to 40 ℃ (41 ℉ to 104 ℉) • Storage temperature: –40 ℃ to +65 ℃ (–40 ℉ to 149 ℉) • Temperature change rate: < 20 ℃/hour (36 ℉/hour). **NOTE** • The 5288 V3 can operate at the highest temperature of 35 ℃ (95 ℉) when configured with rear hard disks. • The operating performance of hard disks may deteriorate when one fan fails. • The 5288 V3 can operate at the highest temperature of 35 ℃ (95 ℉) when configured with Huawei PCIe SSD cards. • The 5288 V3 can operate at the highest temperature of 35 ℃ (95 ℉) when configured with 135 W processors.
Altitude	≤ 3000 m (9842.40 ft) When the 5288 V3 is used at an altitude of higher than 900 m (2952.72 ft), the highest operating temperature decreases by 1 ℃ (1.8 ℉) for every increase of 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: 48.2 Bels – LpAm: 65.5 dBA • Operating: – LWAd: 53.0 Bels – LpAm: 70.3 dBA **NOTE** The actual sound levels generated during server operating vary depending on the server configuration, load, and ambient temperature.

10 Certifications

Table 10-1

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
3	Europe	CE	Safety: IEC 60950-1:2005 (2nd Edition)+A1:2009 and/or EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013 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:

No.	Country/Region	Certification	Standards
			2002/96/EC, 2012/19/EU
4	America	FCC	FCC CFR47 Part 15:2005 Class A
5	America	UL	UL 60950-1, 2nd Edition;CAN/CSA C22.2 No. 60950-1-07, 2nd Edition
6	Canada	IC	ICES-003:2004 Class A
7	Australia	RCM	AS/NZS CISPR 22:2009
8	Japan	VCCI	VCCI V-3:2012