Huawei CH225 V5 Compute Node V100R001

White Paper

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About This Document

Purpose

This document describes the appearance, features, technical specifications, and configuration of the new-generation CH225 V5 compute node of the Huawei E9000 server.

Intended Audience

This document is intended for:

- Huawei presales engineers
- Channel partner presales engineers
- Enterprise presales engineers

Symbol Conventions

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

Symbol	Description
DANGER	Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.
WARNING	Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.
CAUTION	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.
NOTICE	Indicates a potentially hazardous situation which, if not avoided, could result in equipment damage, data loss, performance deterioration, or unanticipated results. NOTICE is used to address practices not related to personal injury.

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

Change History

Issue	Date	Description
02	2018-11-28	This issue is the second official release. ● Modified **1.4 Hardware Structure**. ● Modified **1.5 Logical Structure**. ● Modified **1.6 Technical Specifications**. ● Modified **3 Components**.
01	2018-07-02	This issue is the first official release.

Contents

1 Introduction

1.1 Functions

The CH225 V5 is a full-width storage expansion compute node that uses the new-generation Intel® Xeon® scalable processors (Purley platform Skylake processors). It provides high speed storage density with supreme computing power.

● The CH225 V5 supports a maximum of 12 SAS/SATA/NVMe drives. The HDDs and SSDs can be used together, and the drives are hot-swappable. (The NVMe PCIe SSDs support scheduled hot swap but not surprise hot swap.)

● The CH225 V5 supports two 2.5-inch SAS/SATA drives or M.2 modules.

The CH225 V5 is a storage node suitable for scenarios requiring large storage capacity, high storage performance, and high computing performance, for example, HANA or Oracle appliance for analysis and processing of massive data.

The CH225 V5 compute nodes are installed in an E9000 chassis and are managed by the management module MM910 in a centralized manner.

1.2 Appearance

Appearance

Figure 1-1 Appearance

Installation Positions

The CH225 V5 is installed in a full-width slot at the front of the E9000 chassis. A chassis can house a maximum of eight CH225 V5 compute nodes.

Figure 1-2 Installation positions and slot numbering
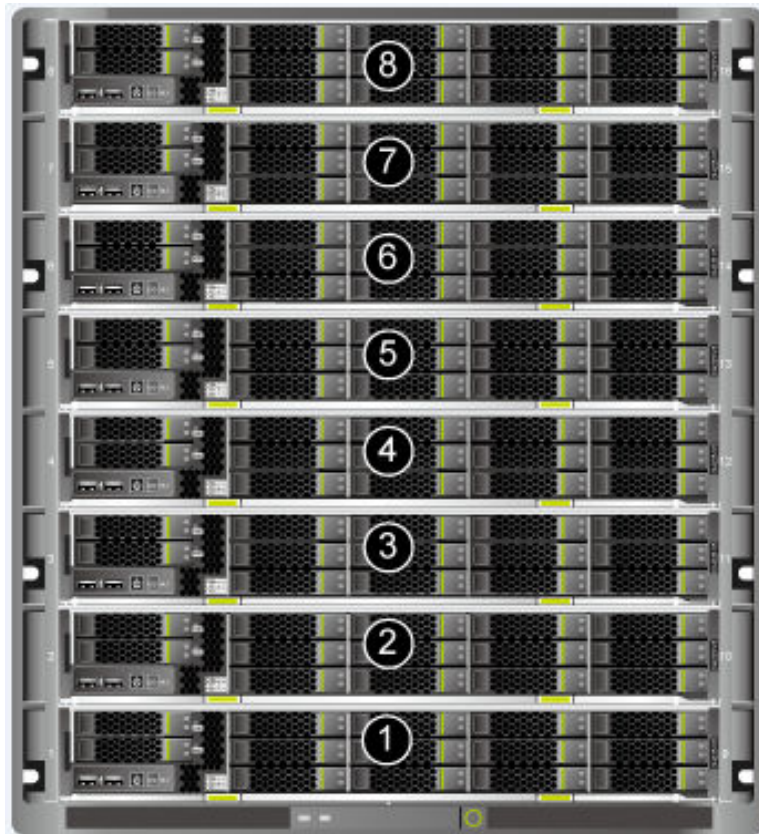
Front panel

Figure 1-3 Front panel
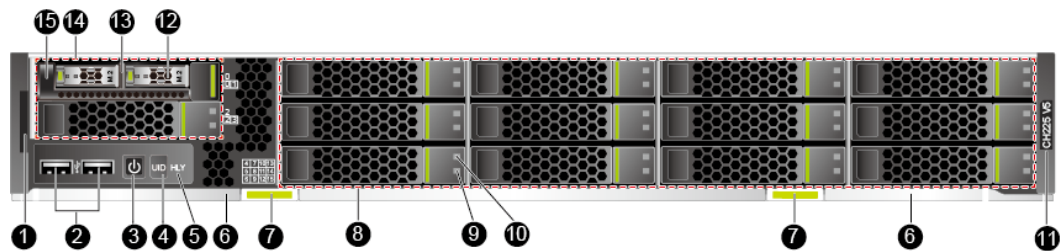
1	Slide-out label plate (with an ESN label)	2	USB 3.0 ports
3	Power button/indicator	4	UID button/indicator
5	HLY indicator	6	Ejector levers
7	Ejector release buttons	8	2.5-inch SAS/SATA/NVMe drive[a]
9	Drive activity indicator	10	Drive fault indicator
11	Product model	12	M.2 FRUs

13	M.2 adapter	14	2.5-inch SAS/SATA drive or M.2 module[b]
15	M.2 module (consisting of one M.2 adapter and two M.2 FRUs)	-	-
● a: The 12 slots support the SAS/SATA/NVMe drives, and these drives can be used together. ● b: The two slots support 2.5-inch SAS/SATA drives or M.2 modules. Each 2.5-inch M.2 module supports two M.2 FRUs.			

ESN

An Equipment Serial Number (ESN) uniquely identifies a compute node. An ESN is required when you apply for technical support from Huawei.

Figure 1-4 ESN example

Callout No.	Description
1	ESN ID (two characters), which is 21 by default.
2	Material identification code (eight characters), that is, processing code.
3	Vendor code (two characters). The code **10** indicates Huawei, and other values indicate outsourcing vendors.

4	Year and month (two characters).
	● The first character indicates the year, where:
	– Digits 1 to 9 indicate 2001 to 2009, respectively.
	– Letters A to H indicate 2010 to 2017, respectively.
	– Letters J to N indicate 2018 to 2022, respectively.
	– Letters P to Y indicate 2023 to 2032, respectively.
	NOTE The years from 2010 are represented by upper-case letters excluding I, O, and Z because the three letters are similar to digits 1, 0, and 2.
	● The second character indicates the month, where:
	– Digits 1 to 9 indicate January to September, respectively.
	– Letters A to C indicate October to December, respectively.
5	Serial number (six characters).
6	RoHS compliance (one character). **Y** indicates environmental protection processing.
7	Internal model, that is, product name.

1.3 Indicators

Table 1-1 Indicators on the front panel

Indicator	Meaning	Color	State Description
PWR ⏻	Power button/ indicator	Yellow and green	● Off: The compute node is not powered on. ● Blinking yellow: The power button is locked. When iBMC is being started during the compute node power-on process, the power button is locked. ● Steady yellow: The compute node is to be powered on. ● Steady green: The compute node is properly powered on. **NOTE** 　● When the compute node is powered on, pressing the power button will shut down the OS properly or cause the compute node to become unresponsive. 　● When the compute node is powered on, holding down the power button for 6 seconds will power off the compute node. 　● When the compute node is ready to be powered on, you can press the power button to power on the compute node.
UID	UID button/ indicator	Blue	The Unit Identification (UID) indicator helps locate a compute node in a chassis. ● On: indicates that the compute node has been located. ● Blinking: distinguishes the compute node from multiple compute nodes that have also been located. ● Off: the compute node has not been powered on or is not being located. **NOTE** 　● You can remotely control the UID indicator status (off, on, or blinking) by using the MM910. 　● Press the UID button to turn on or off the UID indicator. 　● Hold down the UID button for 4 to 6 seconds to reset iBMC.

Indicator	Meaning	Color	State Description
HLY	Health status indicator	Red and green	● Off: The compute node is not powered on. ● Steady green: The compute node hardware is operating properly. ● Blinking red (at 1 Hz): A major alarm is generated for the compute node. ● Blinking red (at 5 Hz): A critical alarm is generated for the compute node, or the compute node is not securely installed.
(drive icon)	Activity indicator of an NVMe PCIe SSD	Green	● Off: The drive is not detected or is faulty. ● Blinking green: Data is being read from or written to the drive. ● Steady green: The drive is inactive.
(drive icon)	Fault indicator of an NVMe PCIe SSD	Yellow	● Off: The drive is operating properly. ● Blinking yellow (at 0.5 Hz): The drive completes the hot swap process and is ready to be removed. ● Blinking yellow (at 2 Hz): The drive is being located or hot-swapped. ● Steady yellow: The drive is not detected or is faulty.
(drive icon)	Activity indicator of a drive or M.2 module	Green	● Off: The drive is not detected or is faulty. ● Blinking green: Data is being read from or written to the drive. ● Steady green: The drive is inactive.
(drive icon)	Fault indicator of a drive or M.2 module	Yellow	● Off: The drive is operating properly. ● Blinking yellow: The drive is being located, or RAID is being rebuilt. ● Steady yellow: The drive is not detected or is faulty.

1.4 Hardware Structure

Components

Figure 1-5 Components of the CH225 V5
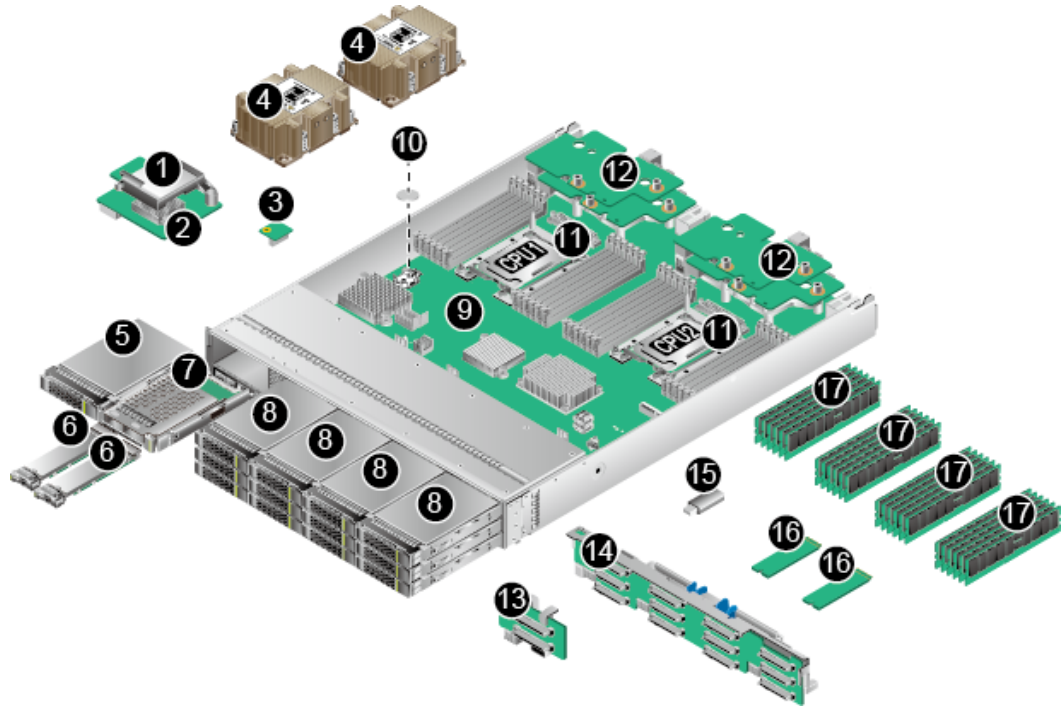
1	(Optional) Supercapacitor	2	RAID controller card
3	(Optional) TPM card	4	Heat sinks
5	2.5-inch SAS/SATA drive[a]	6	(Optional) M.2 FRUs
7	(Optional) M.2 adapter	8	2.5-inch SAS/SATA/NVMe drive[b]
9	Mainboard	10	BIOS battery
11	CPUs	12	Mezzanine cards
13	2.5-inch SAS/SATA/M.2 drive backplane	14	2.5-inch SAS/SATA/NVMe drive backplane
15	(Optional) USB flash drive	16	(Optional) M.2 SSDs
17	DIMMs	-	-
● a: The two slots support 2.5-inch SAS/SATA drives or M.2 modules. Each 2.5-inch M.2 module supports two M.2 FRUs.			
● b: The 12 slots support the SAS/SATA/NVMe drives, and these drives can be used together.			

Table 1-2 Component description

No.	Name	Description
1	(Optional) Supercapacitor	The supercapacitor protects cache data from power failures of the CH225 V5 for the Avago SAS3508 RAID controller card.
2	RAID controller card	The RAID controller card provides eight SAS or SATA ports to connect to external drives to expand the storage capacity of the compute node. The CH225 V5 supports the following RAID controller cards: ● The LSI SAS 3008 supports RAID 0 and RAID 1. ● The Avago SAS 3408 supports RAID 0 and RAID 1. ● The Avago SAS 3508 supports RAID 0, 1, 5, 6, 10, 50, and 60. For details, use the **Huawei Server Compatibility Checker**.
3	(Optional) TPM card	TPM 2.0 is supported. The TPM is a security card that complies with the Trusted Computing Group (TCG) standards. It enhances platform security by preventing viruses or unauthorized operations.
4	Heat sink	A heat sink cools a CPU. Each CPU is configured with one heat sink.
5	2.5-inch SAS/SATA drive	Two 2.5-inch SAS/SATA drives, or two 2.5-inch M.2 modules (with each module supporting two M.2 FRUs) can be configured. These drives and modules can be installed, removed, and hot-swapped independently.
6	(Optional) M.2 FRU	● An M.2 SATA 3.0 SSD is a high-performance, compact, and high-stability storage component. ● The M.2 of the 2280 (22 mm x 80 mm or 0.87 in. x 3.15 in.) or 2242 (22 mm x 42 mm or 0.87 in. x 1.65 in.) standard size is supported. ● Each 2.5-inch drive slot can be configured with two M.2 FRUs, which require one M.2 adapter. A drive slot cannot be configured with 2.5-inch drives and M.2 FRUs at the same time. A maximum of four M.2 FRUs are supported. ● Each M.2 FRU is hot-swappable and can be installed and removed separately.
7	(Optional) M.2 adapter	An M.2 adapter can be installed into a 2.5-inch drive slot to provide two SATA 3.0 ports, which are used for connecting to two M.2 FRUs.

No.	Name	Description
8	2.5-inch SAS/SATA/ NVMe drive	Twelve 2.5-inch SAS/SATA/NVMe drives can be configured. Twelve external SAS/SATA drives (HDDs or SSDs), or twelve external PCIe 3.0 x4 interfaces for connecting external NVMe PCIe SSDs, are supported.
		The SAS/SATA drives can be installed, removed, and hot-swapped independently.
		The NVMe drives can be installed and removed independently and support scheduled hot swap but not surprise hot swap.
9	Mainboard	The mainboard holds the CPUs, DIMMs, hard drive interface module, power control module, iBMC (integrated baseboard management controller), logic module, chipset, LOM, and display adapter.
		The compute node chipset is the Platform Controller Hub (PCH) using the Intel$^®$ C622 chip.
		The LOM (X722) is integrated in the PCH and provides two 10 Gbit/s Ethernet ports to connect to the Base network ports on the switch modules in slots 2X and 3X. The LOM supports WOL and PXE functions.
		A video chip with 32 MB display memory is integrated into the Hi1710 chip of iBMC. The maximum resolution is 1600 x 1200 at 60 Hz with 16 M colors.
10	BIOS battery	When the compute node is not powered on, the BIOS battery supplies power to the real time clock (RTC).
11	CPU	The CH225 V5 supports two CPUs.
		● Supported models: Intel$^®$ Xeon$^®$ scalable processors (Bronze 3100, Silver 4100, Gold 5100/6100, and Platinum 8100) with a maximum of 28 cores
		● Built-in memory controllers: supports six DDR4 memory channels (two DIMMs per channel) and memory speeds of 2400 MT/s and 2666 MT/s
		● Built-in PCIe controllers: supports PCIe 3.0 and 48 lanes per CPU
		● Three Ultra Path Interconnect (UPI) links, each of which provides 10.4 GT/s transmission speed between the CPUs
		● Maximum frequency: 3.6 GHz

No.	Name	Description
12	Mezzanine card	The mainboard provides four mezzanine card connectors to connect to the switch or pass-through modules through the midplane. ● Mezzanine cards 1 and 3 are on the upper layer; mezzanine cards 2 and 4 are on the lower layer. ● CPU1 provides two PCIe 3.0 x16 ports to connect to mezzanine cards 1 and 2. CPU2 provides two PCIe 3.0 x16 ports to connect to mezzanine cards 3 and 4. ● Mezzanine cards 1 and 3 connect to slots 2X and 3X at the rear of the E9000 chassis. ● Mezzanine cards 2 and 4 connect to slots 1E and 4E at the rear of the E9000 chassis.
13	2.5-inch SAS/ SATA/M.2 drive backplane	The backplane is used to expand the storage capacity and control SAS/SATA/M.2 drives in real time.
14	2.5-inch SAS/SATA/ NVMe drive backplane	The backplane is used to expand the storage capacity and control SAS/SATA/NVMe drives in real time.
15	(Optional) USB flash drive	The mainboard provides a built-in USB port for connecting to a USB 3.0 device.
16	(Optional) M.2 SSD	The bridge chip provides two SATA ports for connecting to two M.2 SSDs. The M.2 2242 and 2280 SSDs are supported.
17	DIMM	● Maximum number of DIMM slots: 24 (12 for each CPU) ● DIMM types: registered dual in-line memory module (RDIMM) and load-reduced DIMM (LRDIMM) ● Maximum memory speed: 2666 MT/s ● Memory protection technology for reliability, availability, serviceability (RAS): advanced error-correcting code (ECC), memory mirroring, and memory sparing

PCIe Devices

Table 1-3 PCIe devices

PCIe Device	Displayed on the BMC User Interface	CPU Socket	PCIe Standard	Connector Width	Bus Width	Port No.	Slot Size
RAID controller card	\	CPU1	PCIe 3.0	x8	x8	Port 1A	Non-standard device
Mezz1	\	CPU1	PCIe 3.0	x16 or (x8 + x8)	x16 or (x8 + x8)	Port 2A or (Port 2A + Port 2C)	Non-standard device
Mezz2	\	CPU1	PCIe 3.0	x16 or (x8 + x8)	x16 or (x8 + x8)	Port 3A(Port 3A+Port 3C	Non-standard device
Mezz3	\	CPU2	PCIe 3.0	x16 or (x8 + x8)	x16 or (x8 + x8)	Port 2A or (Port 2A + Port 2C)	Non-standard device
Mezz4	\	CPU2	PCIe 3.0	x16 or (x8 + x8)	x16 or (x8 + x8)	Port 3A(Port 3A+Port 3C)	Non-standard device
PCIe SSD4	disk 4	CPU1	PCIe 3.0	x4	x4	Port 1C (passing through the PCIe switch)	2.5-inch drive
PCIe SSD5	disk 5	CPU1	PCIe 3.0	x4	x4	Port 1C (passing through the PCIe switch)	2.5-inch drive
PCIe SSD6	disk 6	CPU2	PCIe 3.0	x4	x4	Port 1C (passing through the PCIe switch)	2.5-inch drive

PCIe Device	Displayed on the BMC User Interface	CPU Socket	PCIe Standard	Connector Width	Bus Width	Port No.	Slot Size
PCIe SSD7	disk 7	CPU1	PCIe 3.0	x4	x4	Port 1C (passing through the PCIe switch)	2.5-inch drive
PCIe SSD8	disk 8	CPU1	PCIe 3.0	x4	x4	Port 1C (passing through the PCIe switch)	2.5-inch drive
PCIe SSD9	disk 9	CPU2	PCIe 3.0	x4	x4	Port 1A (passing through the PCIe switch)	2.5-inch drive
PCIe SSD10	disk 10	CPU2	PCIe 3.0	x4	x4	Port 1C (passing through the PCIe switch)	2.5-inch drive
PCIe SSD11	disk 11	CPU2	PCIe 3.0	x4	x4	Port 1C (passing through the PCIe switch)	2.5-inch drive
PCIe SSD12	disk 12	CPU2	PCIe 3.0	x4	x4	Port 1C (passing through the PCIe switch)	2.5-inch drive
PCIe SSD13	disk 13	CPU2	PCIe 3.0	x4	x4	Port 1A (passing through the PCIe switch)	2.5-inch drive
PCIe SSD14	disk 14	CPU2	PCIe 3.0	x4	x4	Port 1A (passing through the PCIe switch)	2.5-inch drive

PCIe Device	Displayed on the BMC User Interface	CPU Socket	PCIe Standard	Connector Width	Bus Width	Port No.	Slot Size
PCIe SSD15	disk 15	CPU2	PCIe 3.0	x4	x4	Port 1A (passing through the PCIe switch)	2.5-inch drive

Mainboard Layout

Figure 1-6 Positions of the connectors and other components
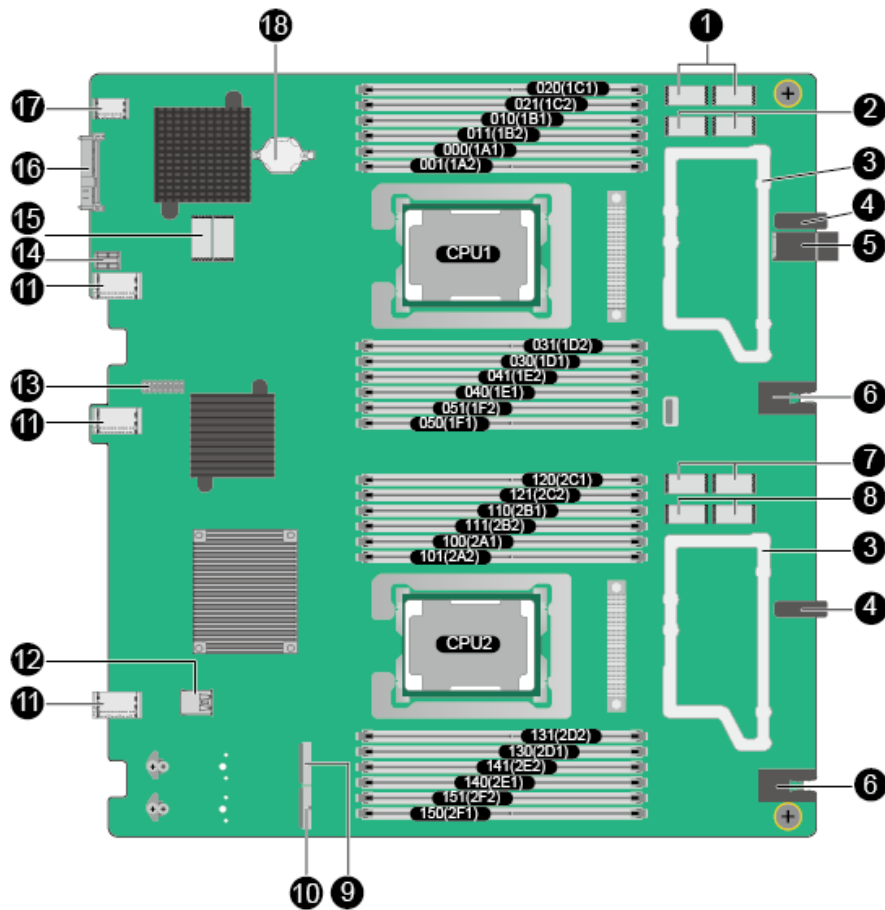
1	Mezzanine card 1 connector	2	Mezzanine card 2 connector
3	Mezzanine card tray	4	Positioning pin

5	Midplane signal connector	6	Backplane power connector
7	Mezzanine card 3 connector	8	Mezzanine card 4 connector
9	M.2 1 connector	10	M.2 2 connector
11	SAS/SATA/NVMe drive backplane connector	12	USB connector[a]
13	TPM card connector	14	SAS/SATA/NVMe drive backplane power connector
15	RAID controller card connector	16	User interface board connector
17	SAS/SATA/M.2 drive backplane connector	18	BIOS battery
a: USB connector, which can be used only by upper-layer ports and cannot be used by lower-layer ports			

1.5 Logical Structure

Figure 1-7 Logical structure of the CH225 V5
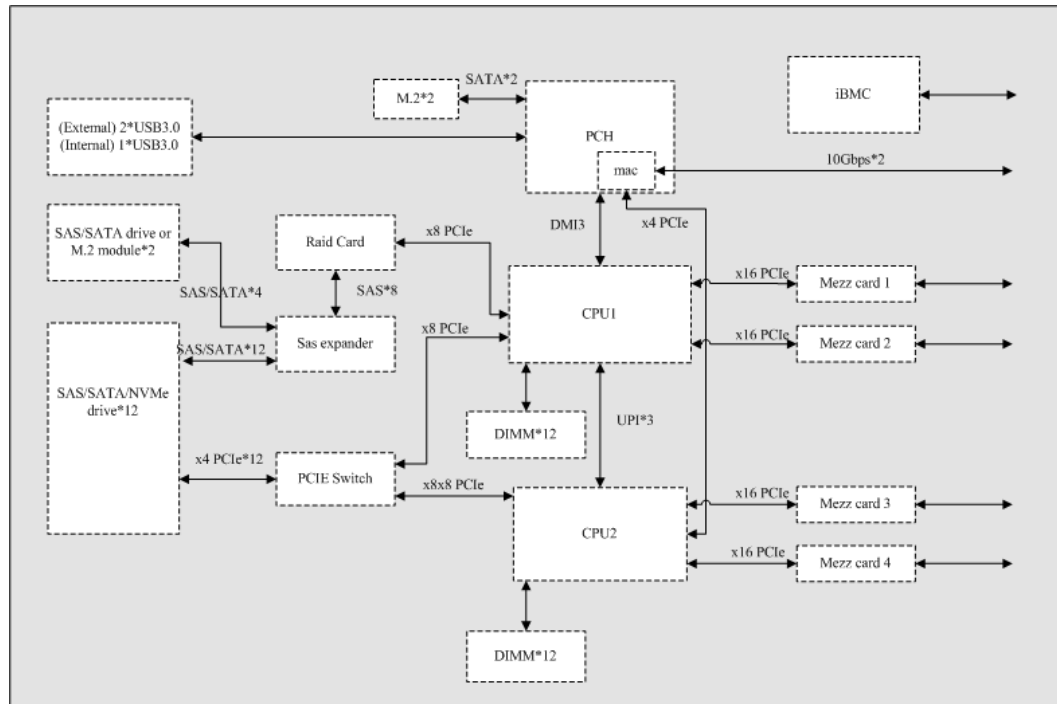
Intel® Xeon® Scalable new-generation CPUs are adopted. Each CPU supports 12 DIMMs. The CPUs are interconnected through UPI links at a speed of up to 10.4 GT/s. CPU 1 connects to the Lewisburg chip through the DMI3 link at a speed of 8 GT/s. Through PCIe links, both CPUs connect to mezzanine cards that provide service ports.

The Lewisburg PCH is a next-generation Intel® southbridge chip used on server platforms and supports external I/O interfaces and bus expansion. The PCH is integrated with two MAC chips to provide two 10 Gbit/s interfaces.

The CPU, PCIe switch, and SAS/SATA/NVMe drive backplane form a drive interface module. The CPU uses the PCIe switch to expand 12 PCIe x4 slots, and supports 12 NVMe PCIe SSDs on the drive backplane.

The RAID controller card, SAS expander, and SAS/SATA/NVMe drive backplane form a drive interface module, which connects to the CPU using a PCIe port. The RAID controller card provides eight SAS or SATA ports and uses the SAS expander to expand I/O ports. Four ports are connected to the SAS/SATA/M.2 drive backplane, and the other 12 ports are connected to the SAS/SATA/NVMe drive backplane. The SAS/SATA HDDs and SSDs are supported. The RAID controller card determines RAID properties of the drives. The drive backplane serves only as a physical channel and does not process drive data.

iBMC provides device management functions, such as compute node power control, slot ID query, power supply monitoring, and KVM over IP.

1.6 Technical Specifications

Table 1-4 Technical Specifications

Category	Item	Specifications
Physical specifications	Dimensions (H x W x D)	60.46 mm x 423 mm x 537.2 mm (2.38 in. x 16.65 in. x 21.15 in.)
	Color	● Front panel: black ● Cover: silver
	Weight	Net weight: 14 kg (30.87 lb) when the CH225 V5 is fully configured with 14 drives Packing materials: 3.35 kg (7.39 lb)
Environmental specifications	Temperature	● Operating temperature: 5°C to 40°C (41°F to 104°F) (ASHRAE Class A3 compliant) ● Storage temperature: -40°C to +65°C (-40°F to +149°F) ● Maximum change rate: 20°C/h (36°F/h) **NOTE** If Intel® Xeon® Platinum 8180, Platinum 8180M, Platinum 8168, Gold 6144, Gold 6146, or Gold 6154 CPUs are used, the maximum operating temperature is 35°C (95°F).
	Relative humidity (RH, non-condensing)	● Operating humidity: 5% RH to 85% RH (non-condensing) ● Storage humidity: 5% RH to 95% RH (non-condensing) ● Maximum change rate: 20%/h

Category	Item	Specifications
	Altitude	At an altitude of 900 m (2952.72 ft), the highest operating temperature is 40°C (104°F). When the compute node is used at an altitude of 900 m to 5000 m (2952.8 ft to 16404.2 ft), the highest operating temperature decreases by 1°C (1.8°F) for every increase of 300 m (984.24 ft). HDDs cannot be configured if the altitude is higher than 3000 m (9842.5 ft).
	Corrosive air pollutant	Maximum growth rate of the corrosion product thickness: ● Copper test piece: 300 Å/month (in compliance with the ANSI/ISA-71.04-2013 gaseous corrosion level G1) ● Silver test piece: 200 Å/month
	Particulate pollutant	● The ISO14664-1 Class 8 requirements are met. You are advised to ask a professional organization to monitor particulate pollutants in the equipment room. ● There is no explosive, conductive, magnetic, or corrosive dust in the equipment room.
Input power supply	Rated input voltage	12 V DC
Power consumption	Maximum power consumption	1000 W

2 Features

Performance and Scalability

- Each Intel® Xeon® Scalable CPU (Bronze 3100, Silver 4100, Gold 5100/6100, or Platinum 8100) ensures high system performance by providing up to 28 cores, 3.6 GHz frequency, 38.5 MB L3 cache, and three 10.4 GT/s UPI links.

- Each compute node supports two CPUs, 56 cores, and 112 threads to maximize the concurrent execution of multithreaded applications.

- Intel® Turbo Boost Technology 2.0 provides the intelligent adaptation function to enable the CPU cores to run at the maximum speed during peak workloads by temporarily going beyond the CPU thermal design power (TDP).

- Intel® Hyper-Threading Technology boosts performance for multithreaded applications by allowing each core to concurrently process up to two threads.

- Intel® virtualization technology integrates hardware-level virtualization functions to allow OS vendors to better use hardware for addressing virtualization workloads.

- Intel® advanced vector extensions (AVX) improves floating-point computing performance for compute-intensive applications.

- A total of 24 load-reduced DIMMs (LRDIMMs) provides quick speed, high availability, and a maximum memory capacity of 3 TB.

- Two Intel® Xeon® Scalable CPUs provide a theoretical maximum memory bandwidth of 256 GB/s (64 bits/8 x 2666 MHz x 6 channels x 2), 66.7% higher than the previous generation.

- The I/O performance of a system configured with only solid-state drives (SSDs) is much higher than that of a system configured with only HDDs or both SSDs and HDDs. An SSD supports up to 100 times I/O operations per second (IOPS) of a typical HDD.

- The compute node supports 96-lane PCIe 3.0 (8 GT/s per lane), which improves the maximum bandwidth by 20% over the previous 80-lane PCIe generation.

- Intel® integrated I/O technology enables the PCIe 3.0 controller to be integrated into the Intel® Xeon® Scalable CPUs, shortening I/O latency and enhancing overall system performance.

- A compute node supports multiple network ports and mezzanine cards to provide a variety of ports.

- A LOM with two 10GE ports is supported.

- The CH225 V5 supports flexible drive configurations to provide elastic, expandable storage capacity. It supports the SAS/SATA/NVMe drives, providing high storage performance. It supports a maximum of twelve 2.5-inch drives, meeting varied storage and upgrade requirements. The CH225 V5 also provides two 2.5-inch SAS/SATA/M.2 drives, which can be used to install the local OS.

Availability and Serviceability

- A compute node provides the memory mirroring and memory backup functions to avoid system shutdown caused by uncorrectable memory errors.

- A compute node supports hot-swappable hard drives for configuring RAID properties to protect data and prolong system running time.

- The UID and HLY indicators on the panel and the key component status displayed on the iBMC WebUI help technical support personnel quickly locate faulty components. This simplifies maintenance, shortens troubleshooting time, and improves system availability.

- The compute node supports SSDs to provide higher reliability than HDDs and prolong system operating time.

- The integrated iBMC module continuously monitors system parameters, triggers alarms, and performs recovery actions to minimize system downtime.

Manageability and Security

- The iBMC module monitors the compute node operating status and provides remote management.

- An integrated industry-standard unified extensible firmware interface (UEFI) increases setting, configuring, and updating efficiencies, and simplifies error handling.

- The optional TPM 2.0 provides advanced encryption functions, such as digital signatures and remote authentication.

- The industry-standard advanced encryption standard–new instruction (AES NI) implements faster and stronger encryption.

- Intel$^®$ Execute Disable Bit (EDB) works with a supported OS to prevent certain types of malicious buffer overflow attacks.

- Intel$^®$ Trusted Execution technology enhances security by using hardware-based resistance against malicious software attacks, allowing applications to run in isolated mode to avoid any interference from the other applications running on the OS.

Energy Efficiency

- The Intel$^®$ Xeon$^®$ Scalable Platinum 8100 CPUs provide significantly better performance than the previous generation. The maximum CPU TDP supported by the compute node is increased by 60 W.

- Intel$^®$ intelligent power capability powers on and off a single CPU based on the site requirements to reduce power consumption.

- Low-voltage Intel$^®$ Xeon$^®$ CPUs consume less energy to satisfy demands of power and thermally constrained data centers and telecommunication environments.

- Low-voltage 1.2 V DDR4 registered DIMMs (RDIMMs) consume 20% to 30% less energy than 1.35 V DDR3 RDIMMs.

- SSDs consume 80% less power than HDDs.

- A compute node uses hexagonal ventilation holes to enable higher ventilation density than round holes, remarkably increasing the system cooling efficiency.

- The efficient voltage regulator down (VRD) PSUs reduce the loss in the mainboard DC power conversion.
- Power capping and power control are supported.

3 Components

This topic describes the software and hardware supported by the CH225 V5.

For more details, use the **Huawei Server Compatibility Checker**.

CPU

The mainboard supports two CPUs.

- Supported models: Intel® Xeon® scalable processors (Bronze 3100, Silver 4100, Gold 5100/6100, and Platinum 8100) with a maximum of 28 cores
- Built-in memory controllers: supports six DDR4 memory channels (two DIMMs per channel) and memory speeds of 2400 MT/s and 2666 MT/s
- Built-in PCIe controllers: supports PCIe 3.0 and 48 lanes per CPU
- Three Ultra Path Interconnect (UPI) links, each of which provides 10.4 GT/s transmission speed between the CPUs
- Maximum frequency: 3.6 GHz

Memory

Up to 24 DIMM slots for installing DIMMs (12 DIMMs for each CPU). At least one DIMM must be configured.

DIMM Configuration Rules

Observe the following rules to configure DIMMs:

- The CH225 V5 supports the DIMMs with the capacity of 8 GB, 16 GB, 32 GB, 64 GB, or 128 GB. A compute node provides a maximum memory capacity of 3 TB when DIMMs are fully configured.
- The maximum number of DIMMs supported by one compute node depends on the CPU type, DIMM type, and rank quantity. See **Maximum number of DIMMs** in **Table 3-1**.

  > **NOTE**
  >
  > - CPU 1 must be configured with DIMMs. If DIMMs are configured only for CPU 2, the compute node cannot be powered on. **Figure 1-6** shows the positions of CPUs 1 and 2.
  > - Note the following rule:
  >
  >   Maximum number of DIMMs per channel ≤ Maximum number of ranks per channel/Number of ranks per DIMM.

● Mixed use of RDIMMs or LRDIMMs of different capacities is supported during capacity expansion but may affect the DIMM RAS feature.

DIMM mixing complies with the following rules:

    – RDIMMs and LRIMMs cannot be mixed.

    – 128 GB DIMMs cannot be used with DIMMs of other capacities.

    – To install DIMMs with different rank quantities in the same channel, install those with more ranks in slots farther away from the CPU. For example, to install single-rank and dual-rank DIMMs in slots 1A1 and 1A2, install the dual-rank DIMM in slot 1A1 and the single-rank DIMM in slot 1A2.

    – DIMMs of different speeds can be mixed in any way. In this case, the lowest speed among the configured DIMMs is used as the system memory speed.

    – If x4 DIMMs and x8 DIMMs are used together, they do not support certain RAS features, such as memory mirroring, SDDC, SDDC+1, and DDDC.

● The speed of any DIMM is the smaller value of the following:

    – Memory speed supported by the connected CPU.

    – Lowest maximum operating speed of a specific memory configuration. See **Maximum operating speed** in **Table 3-1**.

Table 3-1 DIMM configuration rules for Intel® Xeon® Scalable CPUs

Parameter		DIMM		
Rank		Dual rank	Quad rank	Octal rank
Rated speed (MT/s)		2666	2666	2666
Rated voltage (V)		1.2	1.2	1.2
Operating voltage (V)		1.2	1.2	1.2
Maximum number of DIMMs		24	24	24[a]
Maximum capacity per DIMM (GB)		32	64	128
Maximum memory capacity[a] (GB)		768	1536	3072[a]
Maximum memory capacity at the maximum operating speed (GB)		768	1536	3072[a]
Maximum operating speed (MT/s)	One DIMM per channel	2666	2666	2666
	Two DIMMs per channel	2666	2666	2666
a: Each Intel® Core® M processor supports up to 1.5 TB memory, while each non-M processor supports up to 768 GB memory. The maximum number of 128 GB DIMMs varies according to the CPU type.				

NOTE

> This table is for reference only. For details about the components that can be purchased, consult the local Huawei sales representatives.

DIMM Slot Configuration Rules

For details about DIMM slot configuration rules, see **Huawei Server Product Memory Configuration Assistant**.

Figure 3-1 lists the DIMM slot installation rule. For details about the DIMM slot numbers, see **Figure 1-6**.

Unbalanced memory configuration is not recommended.

Figure 3-1 DIMM installation sequence

DIMM Installation Rules for 2-Socket Compute Nodes

Number of DIMMs (✓: recommended ○: not recommended)

CPU	Channel	DIMM Slot	○1	✓2	○3	✓4	○5	✓6	○7	✓8	○9	○10	○11	✓12	○13	○14	○15	✓16	○17	○18	○19	○20	○21	○22	○23	✓24
CPU1	A	DIMM000(1A1)	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		DIMM001(1A2)													●	●	●	●	●	●	●	●	●	●	●	●
	B	DIMM010(1B1)			●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		DIMM011(1B2)															●	●	●	●	●	●	●	●	●	●
	C	DIMM020(1C1)					●	●			●	●	●	●	●	●	●	●			●	●	●	●	●	●
		DIMM021(1C2)																	●	●			●	●	●	●
	D	DIMM030(1D1)							●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		DIMM031(1D2)															●	●			●	●	●	●	●	●
	E	DIMM040(1E1)							●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		DIMM041(1E2)															●	●			●	●	●	●	●	●
	F	DIMM050(1F1)									●	●	●	●			●	●			●	●	●	●	●	●
		DIMM051(1F2)																							●	●
CPU2	A	DIMM100(2A1)		●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		DIMM101(2A2)													●	●	●	●	●	●	●	●	●	●	●	●
	B	DIMM110(2B1)				●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		DIMM111(2B2)															●	●	●	●	●	●	●	●	●	●
	C	DIMM120(2C1)						●	●			●	●	●	●	●	●	●			●	●	●	●	●	●
		DIMM121(2C2)																	●	●			●	●	●	●
	D	DIMM130(2D1)								●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		DIMM131(2D2)															●	●			●	●	●	●	●	●
	E	DIMM140(2E1)								●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
		DIMM141(2E2)															●	●			●	●	●	●	●	●
	F	DIMM150(2F1)											●	●			●	●			●	●	●	●	●	●
		DIMM151(2F2)																								●

The CH225 V5 provides 24 DDR4 DIMM slots. Each CPU integrates six memory channels. **Table 3-2** lists the memory channels for each CPU.

- DIMM channels of CPU1: 1A, 1B, 1C, 1D, 1E, and 1F
- DIMM channels of CPU2: 2A, 2B, 2C, 2D, 2E, and 2F

Slots 1A1, 1B1, 1C1, 1D1, 1E1, 1F1, 2A1, 2B1, 2C1, 2D1, 2E1 and 2F1 are the primary slots of channels 1A, 1B, 1C, 1D, 1E. 1F, 2A, 2B, 2C, 2D, 2E and 2F respectively. When installing DIMMs in a channel, choose the primary slot first. If you do not install a DIMM in the primary slot, the DIMM in the standby slot cannot work.

Table 3-2 Memory channels for each CPU

Channel Location	Memory Channel	DIMM Slot
CPU1	1A	DIMM000(1A1)

Channel Location	Memory Channel	DIMM Slot
		DIMM001(1A2)
	1B	DIMM010(1B1)
		DIMM011(1B2)
	1C	DIMM020(1C1)
		DIMM021(1C2)
	1D	DIMM030(1D1)
		DIMM031(1D2)
	1E	DIMM040(1E1)
		DIMM041(1E2)
	1F	DIMM050(1F1)
		DIMM051(1F2)
CPU2	2A	DIMM100(2A1)
		DIMM101(2A2)
	2B	DIMM110(2B1)
		DIMM111(2B2)
	2C	DIMM120(2C1)
		DIMM121(2C2)
	2D	DIMM130(2D1)
		DIMM131(2D2)
	2E	DIMM140(2E1)
		DIMM141(2E2)
	2F	DIMM150(2F1)
		DIMM151(2F2)

Storage

A maximum of twelve 2.5-inch SAS/SATA/NVMe drives can be configured, and HDDs and SSDs can be used together. Two 2.5-inch SAS/SATA/M.2 drives are also supported. All drives can be installed, removed, and hot-swapped independently. (The NVMe PCIe SSDs support scheduled hot swap but not surprise hot swap.)

📖 **NOTE**

After the OS is installed on a hard drive, do not move the hard drive to another compute node; otherwise, mounting a virtual flash drive or CD/DVD-ROM on the KVM screen may fail.

The CH225 V5 supports the following RAID controller cards:

- The LSI SAS 3008 supports RAID 0 and RAID 1.
- The Avago SAS 3408 supports RAID 0 and RAID 1.
- The Avago SAS 3508 supports RAID 0, 1, 5, 6, 10, 50, and 60.

Table 3-3 RAID level comparison

| RAID Level	Reliability	Read Performance	Write Performance	Minimum Number of Hard Drives	Hard Drive Utilization
RAID 0	Low	High	High	2	100%
RAID 1	High	Low	Low	2	50%
RAID 5	Better than medium	High	Medium	3	(N-1)/N
RAID 6	Better than medium	High	Medium	4	(N-2)/N
RAID 10	High	Medium	Medium	4	50%
RAID 50	High	High	Better than medium	6	(N-M)/N
RAID 60	High	High	Better than medium	8	(N-M*2)/N
Note: N indicates the number of RAID member drives. M indicates the number of RAID arrays.					

I/O Expansion

The CH225 V5 supports the following types of PCIe mezzanine cards for connecting to switch modules through the midplane. You can choose a mezzanine card based on the I/O card type and rate requirements.

- GE expansion card
- 10GE expansion card
- 40GE expansion card
- FC or FCoE expansion card
- RoCE expansion card
- IB expansion card
- OPA expansion card

I/O Modules Supported by the LOM

The LOM can connect to I/O modules (switch modules).

Figure 3-2 Connections between NICs on a full-width compute node and I/O modules
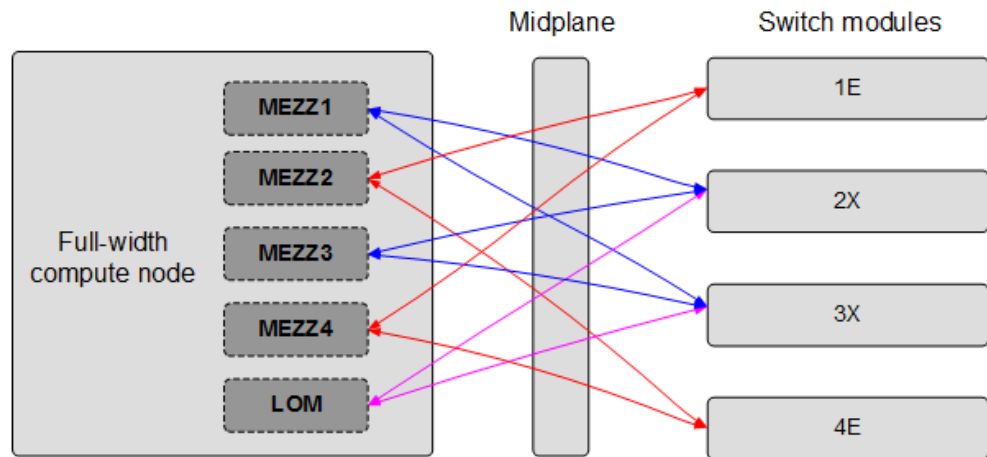
Mezzanine cards on the compute node connect to switch modules. Mezzanine card 1 and mezzanine card 3 connect to Fabric ports of switch module slots 2X and 3X; mezzanine card 2 and mezzanine card 4 connect to Fabric ports of switch module slots 1E and 4E. The mezzanine card port types vary with the mezzanine card model.

The LOM (X722) is integrated in the PCH and provides two 10 Gbit/s Ethernet ports to connect to the Base network ports on the switch modules in slots 2X and 3X. The LOM supports WOL and PXE functions.

◻**NOTE**

● Before enabling the flow control function of the LOM ports, enable the flow control function of the corresponding Base plane ports of switch modules.

● Forcibly powering off the compute node will cause the WOL (Wake-on-LAN) function of the LOM ports to be unavailable.

Table 3-4 I/O modules supported by the LOM

I/O Module	I/O Slot	LOM	Remarks
CX916	2X/3X	√	N/A
	1E/4E	×	The LOM cannot communicate with I/O modules in slots 1E and 4E.
CX920	2X/3X	√	N/A
	1E/4E	×	The LOM cannot communicate with I/O modules in slots 1E and 4E.

Power Supply

The CH225 V5 is powered by the power supply units (PSUs) in the E9000 chassis, without any independent power supply.

Peripherals

The CH225 V5 supports peripherals such as a USB DVD-ROM drive.

OSs and Software

For details about the OSs and virtualization software supported by the CH225 V5, see **Huawei Server Compatibility Checker**.

4 Management

Huawei iBMC, a remote management system for servers, is integrated on the E9000 compute nodes. It complies with the IPMI V2.0 standards and provides reliable hardware monitoring and management functions. Huawei iBMC implements seamless communications with chassis management modules. The management modules can also be used to manage compute nodes in a chassis.

iBMC supports the followings:

- KVM and text console redirection
- Remote virtual media
- IPMI V2.0
- Common information model (CIM)
- Web-based browser login

Table 4-1 iBMC specifications

Item	Description
Management interface	iBMC supports various management interfaces to implement system integration. iBMC can be integrated with any standard management systems through the following interfaces: ● IPMI V2.0 ● CLI ● HTTPS ● Redfish ● SNMP
Fault detection	iBMC helps to detect faults and accurately locate hardware faults.
System watchdog	iBMC supports BIOS POST, OS watchdog, and fault timeout automatic system reset. You can enable or disable these functions in the iBMC.
Boot device configuration	iBMC supports out-of-band configuration for boot devices.

Item	Description
Alarm management	iBMC supports alarm management and reports alarms in various ways such as the (SMTP), and syslog service to ensure that the compute node runs properly without interruption.
Integrated KVM	iBMC provides remote maintenance measures, such as KVM and KVM over IP, for troubleshooting. The maximum resolution is 1600 x 1200. **NOTE** If a resolution higher than 1280 x 1024 is required, a dedicated video card driver needs to be installed.
Integrated virtual media	iBMC virtualizes local media devices or images for remote compute nodes to facilitate OS installation. The virtual DVD-ROM drive supports a transmission rate of up to 8 MB/s.
WebUI	iBMC provides a visual WebUI for quick configuration and information queries. The following web browsers are supported: ● Internet Explorer 8.0 ● Firefox 9.0 ● Chrome 13.0 ● Safari
Fault reproduction	iBMC reproduces faults to diagnose the faults quickly.
Screenshots and videos	iBMC allows you to view screenshots and videos without login, which facilitates preventive maintenance inspection (PMI).
DNS/LDAP	iBMC supports domain management and directory services, which significantly simplifies network and configuration management.
Dual-image backup	If iBMC software fails, it starts again from a backup image.
Asset management	iBMC provides intelligent asset management to facilitate asset management.
Intelligent power management	iBMC supports power capping to increase deployment density and uses dynamic energy saving technology to lower the operating expense (OPEX).

5 Warranty

According to the *Huawei Warranty Policy for Servers & Storage Products* (*Warranty Policy* for short), Huawei provides a three-year warranty for servers, 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 your local Huawei representative office.

6 Certifications

Table 6-1 Certifications

Country/Region	Certification	Standard
Europe	WEEE	2002/96/EC, 2012/19/EU
Europe	RoHS	2002/95/EC, 2011/65/EU, EN 50581: 2012
Europe	REACH	EC NO. 1907/2006
Europe	CE	Safety: 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
China	RoHS	SJ/T-11363-20006 SJ/T-11364-20006 GB/T 26572-2011
China	China Environmental Labeling	GB/T24024:2001 idt ISO14024:1999 HJ 2507-2011
Australia	C-tick	AS/NZS CISPR22: 2009
America	UL	UL 60950-1
America	FCC	FCC Part 15 (Class A)

Country/Region	Certification	Standard
America	NTRL-UL	UL 60950-1, 2nd Edition, 2011-12-19 (Information Technology Equipment - Safety - Part 1: General Requirements) CSA C22.2 No.60950-1-07, 2nd Edition, 2011-12 (Information Technology Equipment-Safety-Part 1:General Requirements)
Canada	IC	ICES-003 Class A
Nigeria	SONCAP	IEC 60950-1: 2005 (2nd Edition) + A1:2009 EN 60950-1:2006+A11:2009+A1:2010 + A12:2011
Kingdom of Saudi Arabia (KSA)	SASO	IEC 60950-1: 2005 (2nd Edition) + A1:2009 EN 60950-1:2006+A11:2009+A1:2010 + A12:2011
Global	CB	IEC 60950-1
Japan	VCCI	VCCI V-4:2012