HUAWEI X6800 Server V100R005

Technical White Paper

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About This Document

Purpose

This document describes the X6800 server in terms of appearance, features, system architecture, components, security management, system management, and technical specifications.

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	Release Date	Description
02	2019-03-13	This issue is the second release.
01	2018-08-27	This issue is the first official release.

Contents

1 Overview

1.1 Product Positioning

The HUAWEI X6800 high-density server is a new-generation server designed for high-performance computing (HPC), cloud computing, Internet, and data center applications.

The X6800 architecture is optimized for software-defined storage (SDS), big data, and software-defined infrastructure (SDI). It is an ideal choice for large-scale server deployments.

The X6800 is oriented towards the following applications:

- Internet and data center applications

  The X6800 provides customized server solutions that offer low power consumption, easy maintenance, and quick deployment.

- HPC and cloud computing applications

  The X6800 provides a hardware platform that features high reliability and virtualization performance.

- SDS and big data applications

  The X6800 provides a modular architecture that features high density and flexible configuration for the computing and storage.

Figure 1-1 shows an X6800 holding four server nodes.

Figure 1-1 X6800 holding four server nodes

1.2 Features

The X6800 provides the following features:

Flexible Configuration

- The basic 4U architecture incorporates blade server advantages, allowing you to configure one to four nodes flexibly.

- The server nodes combine high-performance computing and large storage to support various application scenarios, such as distributed and software-defined storage.

High Computing Density

- The X6800 provides computing density twice that of a conventional 1U rack server and four times that of a conventional 2U rack server in a rack, which improves space utilization in equipment rooms.

- The X6800 provides storage density twice that of a conventional 2U rack server in a rack. When fully configured with 4U4 server nodes (each node occupies two slots in a chassis), a cabinet supports up to 480 3.5-inch hard disks.

- A cabinet supports a maximum of 40 dual-slot storage server nodes, 80 processors, and 80 TB memory capacity.

Simplified Management and Easy Maintenance

- The X6800 uses the integrated baseboard management controller (iBMC) and Hyper management module (HMM) to implement unified management. By incorporating advantages of rack and blade servers, the X6800 allows nodes to be maintained from the front of the cabinet and supports both front and rear cabling. This meets deployment requirements of traditional equipment rooms (requiring rear cabling) and new equipment rooms (requiring front cabling) and facilitates maintenance of the cool wind area.

- The X6800 adopts a modular design and supports hot-swappable components, greatly increasing O&M efficiency.

Shared Architecture and High Energy Efficiency

- The server nodes share four PSUs and five fan modules, which simplifies deployment and increases PSU and fan module utilization.
- The X6800 uses Huawei Dynamic Energy Management Technology (DEMT) to control system energy consumption, which maximizes the energy efficiency.

Redundancy and Reliability

- The X6800 uses a passive backplane to protect the system from single point of failures (SPOFs), delivering higher reliability and security than an active backplane.
- The X6800 supports redundant fan modules and PSUs and RAID configuration, preventing data loss and service interruption.
- The X6800 uses carrier-class components and manufacturing processes to provide higher stability and longer lifecycle.

2 System Design

2.1 Architecture Design

The X6800 uses the new-generation Huawei-proprietary system architecture. The architecture design has the following features:

- The 4 U chassis can hold different models of server nodes.
- All server nodes in an X6800 share the PSUs in 1+1 or 2+2 redundancy.
- All fan modules in an X6800 share the fan modules in N+1 redundancy.
- The X6800 provides service and management ports from the front and service ports from the rear of the server.

Figure 2-1 shows the X6800 system architecture.

Figure 2-1 X6800 system architecture
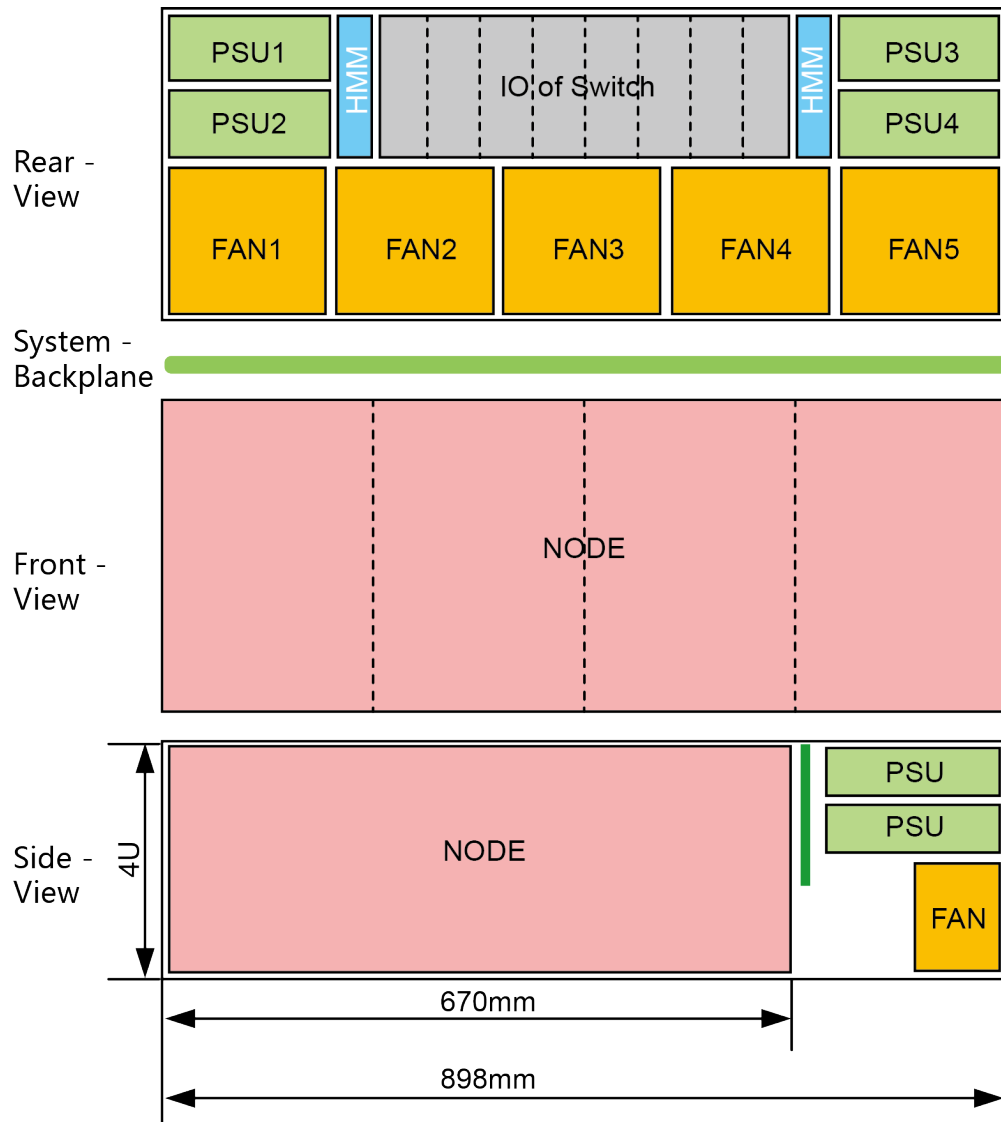
2.2 Heat Dissipation

- The system draws in air from the front of the chassis, delivers the cool air to the server nodes, hard disks, processors, dual in-line memory modules (DIMMs), backplane, and fan modules, and then discharges warm air through the rear of the chassis.

- Two PSUs are installed in each side of the server chassis. Separated ventilation channels are reserved to deliver the return air from the PSU fans for cooling.

- The system fans implement cooling of the management boards and I/O boards on the fan modules.

- The high-pressure counter-rotating fans offer 10% higher air volume than common fans. The refined air channels implement concentrated cooling of heat-sensitive devices. The optimal distribution of temperature sensors covers all areas of high heat concentration (server hotspots), facilitating accurate fan speed adjustment. The cellular design on the panel offers a porosity of 66%, which is 10% higher than that of square holes. The fans

use the PID algorithm to adjust the fan speed smoothly and efficiently. All these heat dissipation designs ensure long-term stable running of the server at 40ºC.

Figure 2-2 shows the X6800 ventilation channels.

Figure 2-2 Ventilation channels
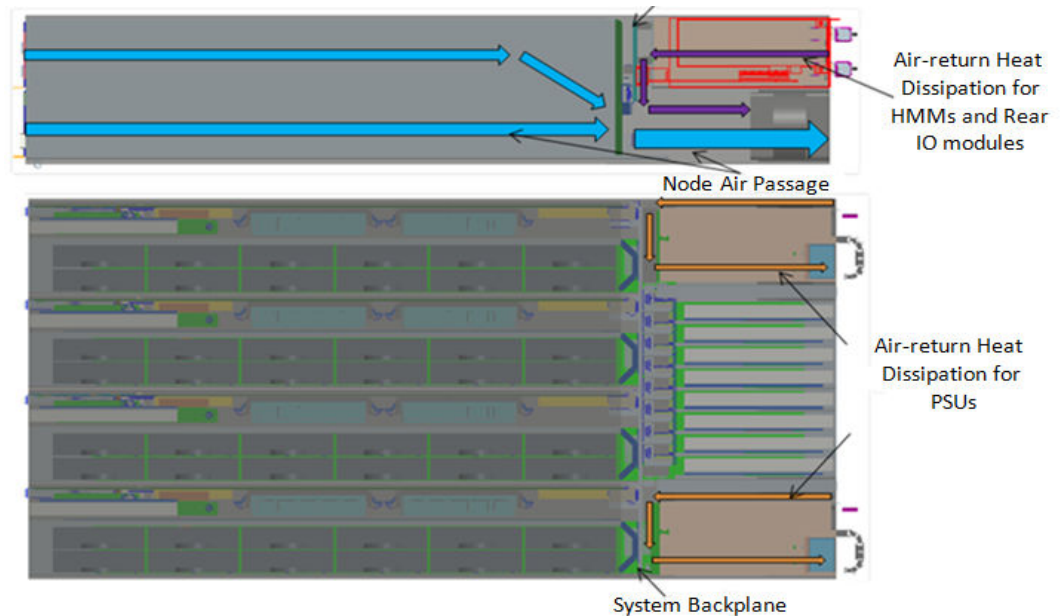
> **NOTICE**
>
> Do not block air vents to prevent device damage due to poor heat dissipation.

2.3 Management and Monitoring

- The iBMC and HMM implement management and monitoring of the X6800. The iBMC on each node implements node management through the Intelligent Platform Management Interface (IPMI), KVM, or virtual DVD-ROM drive. The HMM implements chassis management, which includes fan management, PSU management, and chassis asset management.

- The HMM and iBMC implement aggregation management through LAN switches (LSWs). The LSWs provide external GE port, through which users can access the HMM and iBMC to manage the chassis and server nodes.

- The HMM works with the fan switch boards to implements fan management. The fan switch board provides five independent pulse-width modulation (PWM) control signals to control the fan speed and ten tachometer (TACH) signals to detect the fan speed.

  Based on the ambient temperature and temperature of the temperature-sensitive components on the boards, the HMM uses Huawei speed adjustment algorithms to determine a proper rotation speed, and then sends it to the fan switch board. The fan switch board receives fan speed signals from the fan modules and reports the fan module status to the HMM.

- PSU monitoring and management: The HMM provides one inter-integrated circuit (I^2C) for managing the PSUs and general purpose input/output (GPIO) pins for detecting the

PSU installation status and PwrOk state. The HMM supports queries on PSU output power, PSU installation status, and PSU alarms.

Figure 2-3 shows the X6800 management and monitoring design.

Figure 2-3 X6800 monitoring and management design
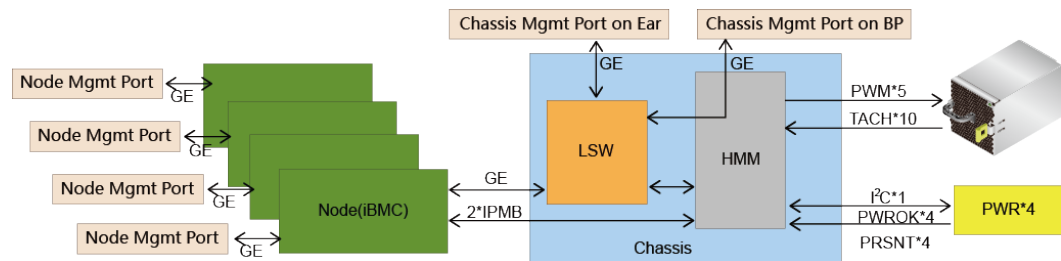
2.4 Advantages

- The X6800 uses Huawei proprietary system architecture with front maintenance and front and rear access cabling, providing easy maintenance of the cool wind area.

- The X6800 provides four slots for installing 4U4 server nodes. This unified architecture allows flexible configuration of computing and storage resources and easy upgrades and maintenance.

- The X6800 uses a modular design and supports hot-swappable server nodes, hard disks, PSUs, fan module, and I/O module, which increases maintenance efficiency.

- The X6800 uses the iBMC and HMM to implement management. The iBMC manages server nodes, and the MMC manages the fan modules, PSUs, and chassis.

- All server nodes share the PSUs and heat dissipation, improving PSU conversion efficiency and reducing system power consumption.

3 Hardware Description

3.1 Appearance

The X6800 is 4U (176.0 mm or 7.0 in.) high. It uses a modular design to separate its chassis from the server nodes. The X6800 can hold server nodes of different widths and types.

Figure 3-1 shows an X6800 holding four server nodes.

Figure 3-1 X6800 holding four server nodes

Front View

Figure 3-2 shows the front view of an X6800 that houses four XH628 V5 server nodes.

Figure 3-2 Front view of an X6800
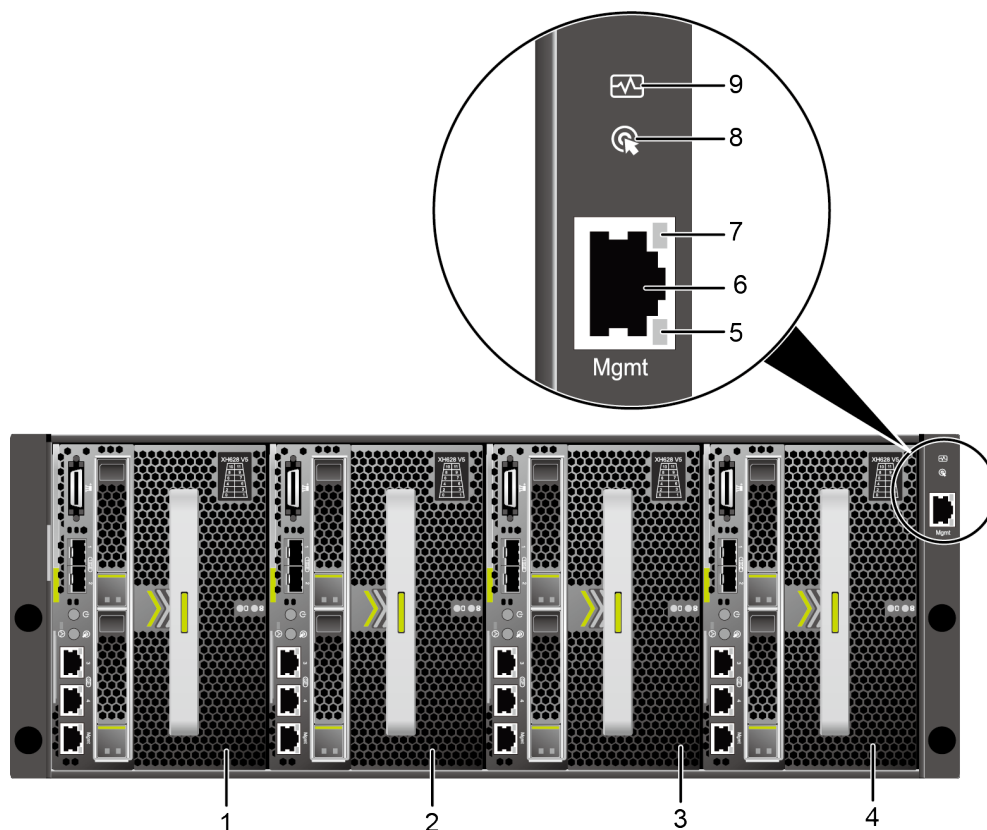
1	Server node slot 1	2	Server node slot 3
3	Server node slot 5	4	Server node slot 7
5	Converged management network port link indicator	6	Converged management network port
7	Converged management network port activity indicator	8	UID indicator
9	Operating status indicator	-	-

Table 3-1 describes the indicators on the panel.

Table 3-1 Indicators on the panel

Item	Color	State	Description
Operating status indicator	Red	Blinking at 1 Hz	A major alarm has been generated.
		Blinking at 5 Hz	A critical alarm has been generated.

Item	Color	State	Description
	Green	Off	No power is supplied, or the PSU is abnormal.
		Steady on	The PSU is operating properly.
UID indicator	Blue	Off	The chassis is not located.
		Steady on	The chassis is being located.
Management network port link indicator	Green	Off	The network cable is not connected to the management network port.
		Blinking	The network cable is connected to the management network port.
Management network port activity indicator	Orange	Off	No data is being transmitted.
		Steady on	Data is being transmitted.

Rear View

The X6800 chassis houses five fan modules, four PSUs, eight PCIe slots, and two management modules (MMs). **Figure 3-3** shows the rear view of an X6800 holding four server nodes.

Figure 3-3 Rear view of an X6800
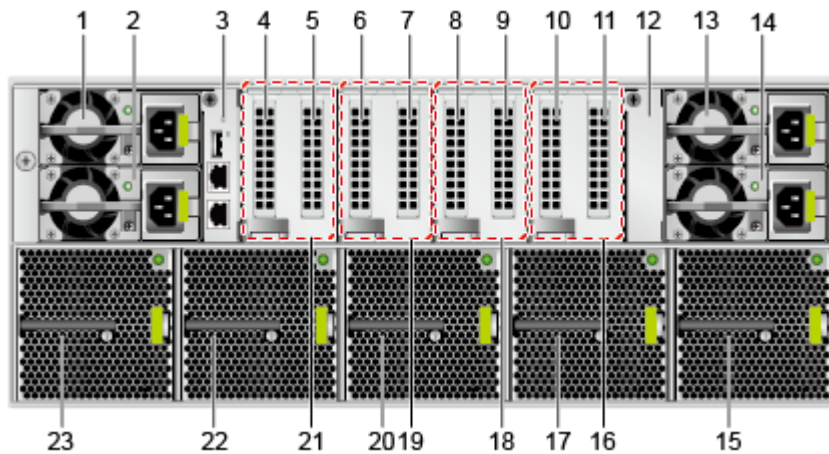
1	PSU 1	2	PSU 2
3	MM 1	4	PCIe slot 8
5	PCIe slot 7	6	PCIe slot 6
7	PCIe slot 5	8	PCIe slot 4
9	PCIe slot 3	10	PCIe slot 2

11	PCIe slot 1	12	MM 2 (reserved)
13	PSU 3	14	PSU 4
15	Fan module 5	16	I/O module 1
17	Fan module 4	18	I/O module 2
19	I/O module 3	20	Fan module 3
21	I/O module 4	22	Fan module 2
23	Fan module 1	-	-

3.2 Components

Figure 3-4 shows the system components of the X6800.

Figure 3-4 X6800 components
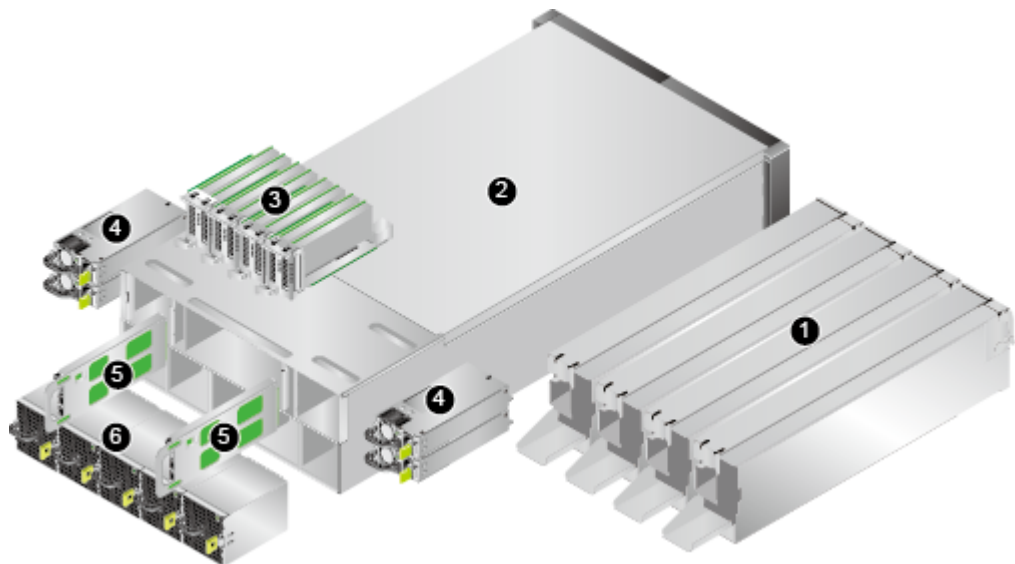
Table 3-2 describes the X6800 components.

Table 3-2 X6800 component description

No.	Item	Description
1	Server node	XH628 V5
2	Chassis	The X6800 is 4U (176.0 mm or 7.0 in.) high. It provides four dual-width slots in the front, and four PSU slots, five fan module slots, two MM slots, and eight PCIe slots in the rear.
3	I/O module	An X6800 provides up to eight standard PCIe x8 slots for eight half-height half-length PCIe cards or SSD cards, providing more external ports or high-performance storage for each server node.

No.	Item	Description
4	PSU	An X6800 can hold four AC or DC (including high-voltage DC) PSUs.
5	MM	The MMs are hot-swappable and support aggregation management.
6	Fan module	An X6800 can hold five how-swappable fan modules in N+1 redundancy.

3.3 Server Node

Appearance

The X6800 can be flexibly configured with different types of server nodes. You can choose server nodes based on service requirements.

Figure 3-5 shows an XH628 V5.

Figure 3-5 XH628 V5 appearance

📖 **NOTE**

The X6800 supports mixed configuration of XH628 V5 and XH628 V3 server nodes. In this case, the operating temperature of the server is the same as that of the XH628 V5 server node.

Installation Positions

Each XH628 V5 occupies two slots in the front of the X6800 chassis. An X6800 chassis can house a maximum of four XH628 V5 nodes.

Figure 3-6 shows the installation positions and slot numbers of the XH628 V5 nodes in the chassis.

Figure 3-6 Installation positions
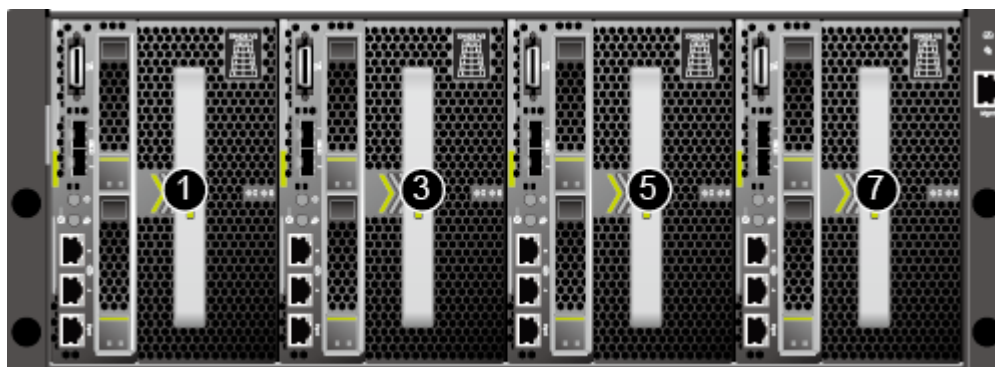
NOTE

- The X6800 provides four slots numbered 1, 3, 5, and7 from left to right.
- The rear slots for PCIe cards and RAID controller cards are connected to CPU 2.

3.4 PCIe

The I/O module in the rear of the X6800 chassis offers eight standard PCIe x8 slots for installing eight half-height half-length PCIe cards, providing more external ports for each server node.

Figure 3-7 shows the PCIe slots.

Figure 3-7 PCIe slots
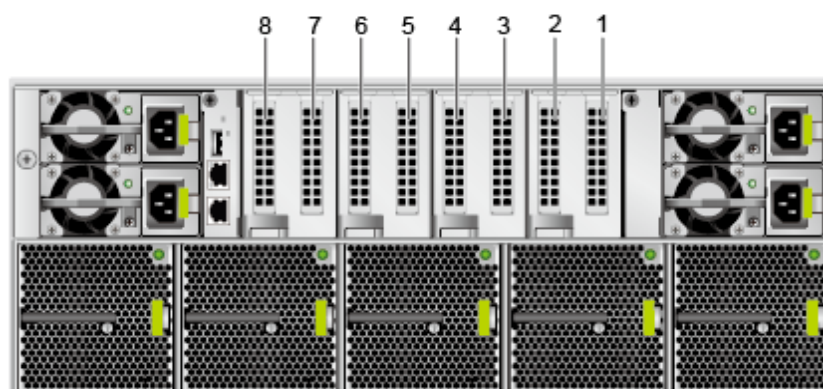
Table 3-3 lists the mapping between PCIe slots and dual-slot server nodes.

Table 3-3 Mapping between PCIe slots and dual-slot server nodes

PCIe Slot	Server Node Slot
8	7 (slot 4)
7	7 (slot 3)
6	5 (slot 4)
5	5 (slot 3)
4	3 (slot 4)
3	3 (slot 3)
2	1 (slot 4)
1	1 (slot 3)

Table 3-4 provides technical specifications of the PCIe slots.

Table 3-4 Technical specifications of PCIe slots

Item	Specifications	Remarks
Dimensions (H x L)	68.90 mm x 167.65 mm (2.71 in. x 6.60 in.)	Half-height, half-length
Maximum power consumption	25 W	Single slot

For details about the standard PCIe cards, see the Server Product Compatibility List.

3.5 Fan Module

The X6800 implements forced cooling by drawing in air from the front of the chassis and discharging air through the rear of the chassis. The MM controls the fan speed based on the server node operating status. The X6800 houses five pairs of counter-rotating fans. The heat dissipation is not affected if a single fan is faulty.

Figure 3-8 shows the installation positions of fan modules in an X6800.

Figure 3-8 Installation positions of fan modules
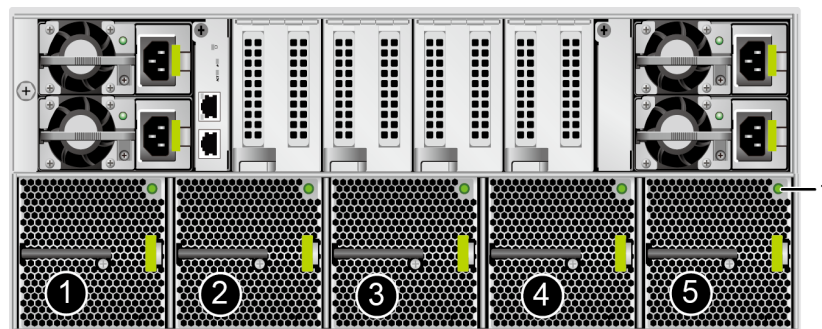
Table 3-5 describes the indicators on a fan module.

Table 3-5 Fan module indicator description

NO.	Name	Color	State	Description
1	Fan module operating status indicator	Red and green	Red	The fan module is faulty.
			Green	The fan module is operating properly.

3.6 PSU

The X6800 uses four AC or DC PSUs.

The input voltage range of the PSUs on the X6800 is as follows:

- AC PSUs: 100 V to 240 V AC (input frequency: 50 Hz or 60 Hz)
- DC PSUs: –36 V to –75 V DC
- 380 V HV DC PSUs: 260 V to 400 V DC
- 240 V HV DC PSUs: 192 V DC to 288 V DC

The output voltage of the PSUs is 12 V DC.

Figure 3-9 shows an AC PSU.

Figure 3-9 AC PSU
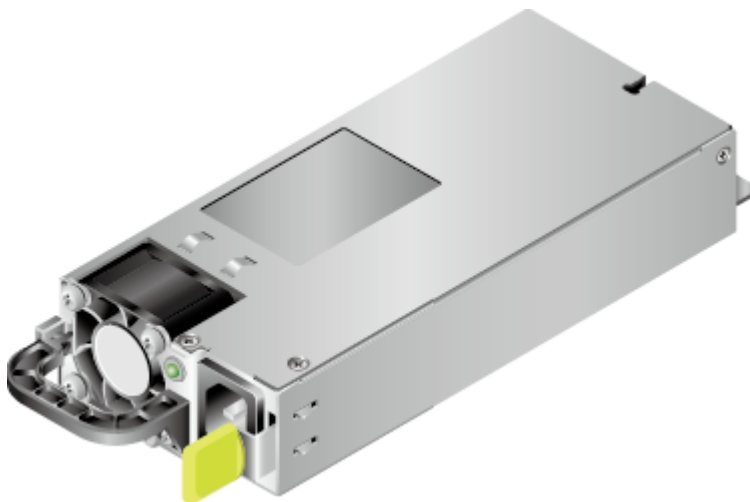
The AC PSU panel has a latch, an AC power socket, and an operating status indicator, as shown in **Figure 3-10**.

Figure 3-10 AC PSU panel 1
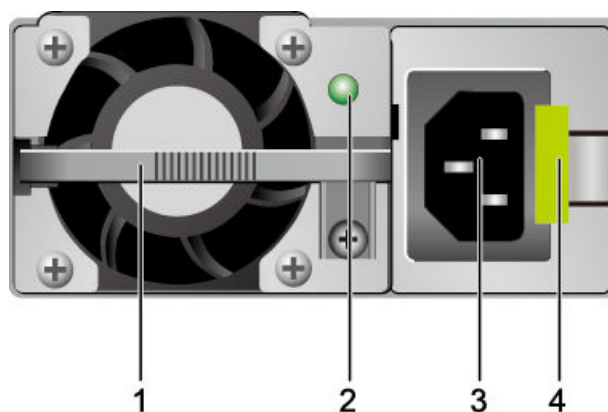
1.	Handle	2	Operating status indicator
3	AC power input socket	4	Latch

Table 3-6 describes the PSU operating status indicator on the AC PSU panel.

Table 3-6 Operating status indicator on the AC PSU

Name	Color	Status	Description
Operating status indicator	Green and yellow	Off	No power is supplied.
		Steady yellow	The PSU is abnormal.
		Blinking green	The service system has been powered off.
		Steady green	The PSU is operating properly.

Figure 3-11 shows a DC PSU.

📖**NOTE**

● A 240 V HV DC PSU has the same appearance as an AC PSU.
● A 380 V HV DC PSU has similar appearance to an AC PSU except that the power socket differs.

Figure 3-11 DC PSU
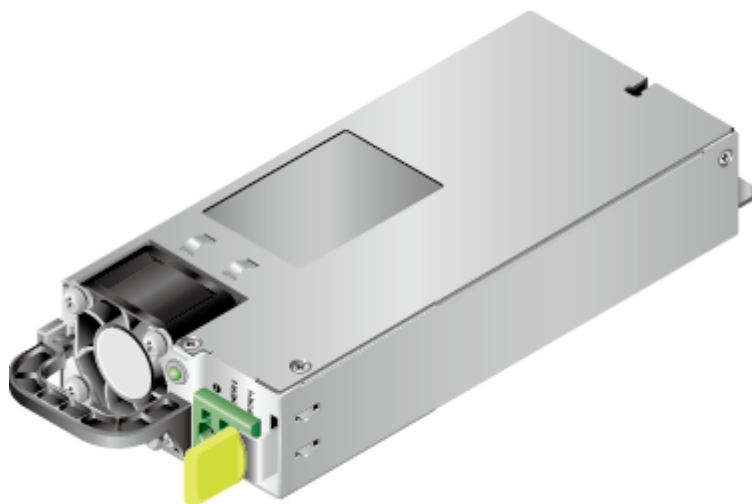
The DC PSU panel has a latch, a DC power socket, and an operating status indicator, as shown in **Figure 3-12**.

Figure 3-12 DC PSU panel
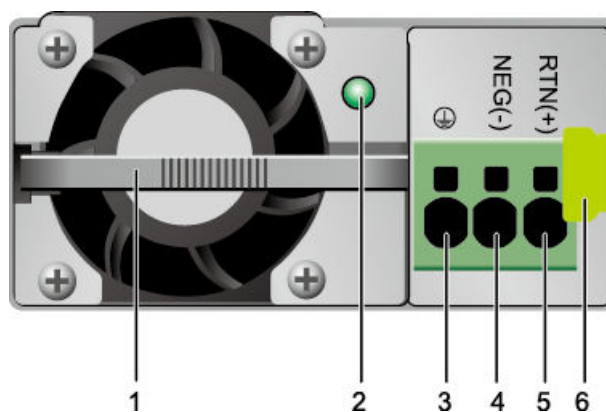
1.	Handle	2	Operating status indicator
3	Ground cable	4	NEG(-)
5	RTN(+)	6	Latch

Table 3-7 describes the PSU operating status indicator on the DC PSU panel.

Table 3-7 Description of the operating status indicator on the DC PSU

Name	Color	Status	Description
Operating status indicator	Green and yellow	Off	No power is supplied.

Name	Color	Status	Description
		Steady yellow	The PSU is abnormal.
		Blinking green	The service system has been powered off.
		Steady green	The PSU is operating properly.

Table 3-8 lists the PSUs supported by the X6800.

Table 3-8 PSUs supported by the X6800

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

□□NOTE

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

3.7 Backplane

The X6800 uses a passive backplane. The backplane connects server nodes to the HMM, rear I/O transfer board, fan switch board, and PSUs, as shown in **Figure 3-13**.

Figure 3-13 Backplane
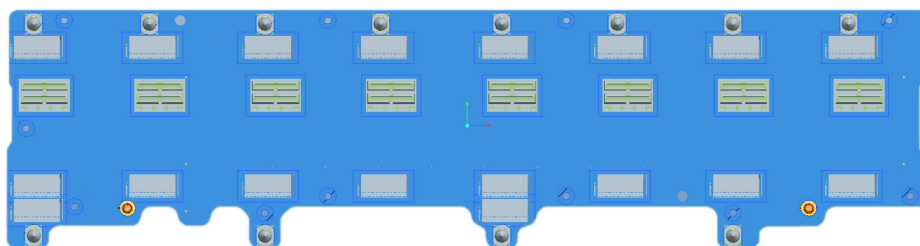
3.8 System Management Board and Fan Switch Board

The X6800 uses the HMMs and fan switch board to perform out-of-band management. The HMMs are hot-swappable and implement temperature monitoring, fan management, power management, and node management. The fan switch board provides fan management ports and system aggregation management functions.

Figure 3-14 shows the positions of the HMMs and fan switch board.

Figure 3-14 Positions of the system management board and fan switch board
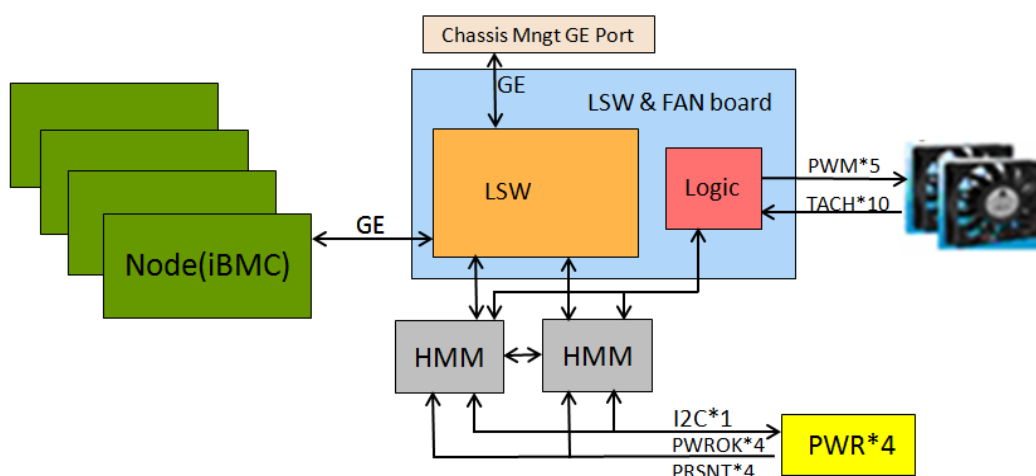
Figure 3-15 shows the front view of the MM.

Figure 3-15 Front view of the MM
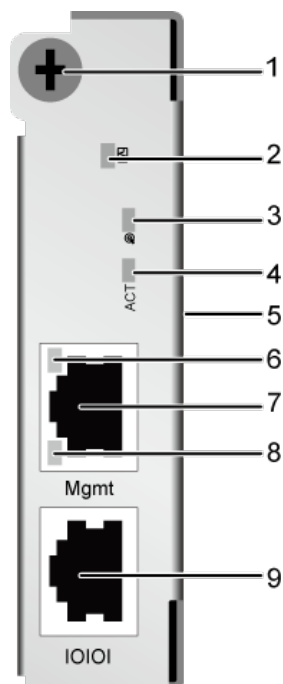
1	Captive screw	2	Operating status indicator
3	UID indicator	4	Active/Standby switchover indicator
5	Handle	6	Management network port link indicator
7	Management network port	8	Management network port activity indicator
9	Serial port	-	-

Table 3-9 describes the indicators on an MM panel.

Table 3-9 Indicators on an MM panel

Name	Color	Status	Description
Operating status indicator	Red	Blinking at 1 Hz	A major alarm has been generated.
		Blinking at 5 Hz	A critical alarm has been generated.

Name	Color	Status	Description
	Green	Off	No power is supplied, or the MM is abnormal.
		Steady on	The MM is operating properly.
UID indicator	Blue	Off	The chassis is not located.
		On	The chassis is being located.
Active/Standby switchover indicator	Orange	Off	The MM is in the standby state.
		On	The MM is in the active state.
Management network port link indicator	Green	Off	The network cable is not connected to the management network port.
		Blinking	The network cable is connected to the management network port.
Management network port activity indicator	Orange	Off	No data is being transmitted.
		On	Data is being transmitted.

4 Security Management

4.1 Compute Node

Compute nodes support security solutions based on the Trusted Platform Module (TPM).

The TPM is a security chip that complies with the Trusted Computing Group (TCG) TPM specification. The hardware-based TPM provides data encryption, password protection, authentication, and internal resource protection. The TPM is available.

The TPM is installed on a compute node and connects to the compute node through a port. You can access a compute node with the TPM only after authorization, which ensures data security based on hardware.

4.2 MM

The MM security involves hierarchical command protection, remote Secure Shell (SSH) login, and Simple Network Management Protocol (SNMP) encrypted authentication.

Hierarchical Command Protection

To ensure operation security, only the user who has passed the authentication can access the MM through an Ethernet port.

The MM provides hierarchical protection for command lines. The commands are classified into commands of the monitoring level, configuration level, and management level in ascending order. Login users are classified into common user, operator, and administrator. After logging in to the MM, a user can run only the commands corresponding to or lower than the specified level.

Remote SSH Login

The MMs support Secure Shell (SSH), which provides security protection and verification functions. SSH defends against various attacks on an insecure network. The MMs also

support Secure File Transfer Protocol (SFTP) to provide encryption protection for file transfer.

SNMP Encrypted Authentication

The MMs support the SNMPv3 and SNMP Trap v3 encrypted authentication functions. If the MMs are managed by the network management site using SNMP, the user-based security mode (USM) encryption authentication is used to ensure security of the MMs.

The MMs support MD5 or SHA SNMP V3 and SNMP Trap V3 authentication, and DES or AES encryption. The default authentication type is MD5, which is easy to crack. You are advised to set the authentication type to SHA.

NOTE

The MMs support SNMPv1, SNMPv2c, FTP, and Telnet protocol, which are disabled by default for security purposes. If you need to enable SNMPv1 or SNMPv2c, contact Huawei technical support.

5 Management

The X6800 uses the HMM and iBMC to perform node management and out-of-band aggregation management. The X6800 uses the HMM to perform management board hot swap, out-of-band aggregation management, and system power consumption managements. The X6800 uses Huawei-proprietary iBMC intelligent management system to implement remote server management. The iBMC complies with IPMI 2.0 specifications and provides reliable hardware monitoring and management.

5.1 iBMC Features

5.2 HMM Features

5.3 Management Principles

5.4 Management Modes

5.1 iBMC Features

The iBMC provides the following features:

- Keyboard, video, and mouse (KVM) and text console redirection
- Remote virtual media
- IPMI V2.0
- Simple Network Management Protocol version 3 (SNMPv3)
- Common information model (CIM)
- Web-based logins
- Black box function

Table 5-1 describes the iBMC specifications.

Table 5-1 iBMC specifications

Item	Specifications
Management interface	Supports integration with any standard management system through the following interfaces: ● IPMI V2.0 ● CLI ● HTTPS ● SNMPv3 ● Web
Node fault detection	Detects faults and accurately locates faults in hardware.
Node alarm management	Supports alarm management and reports alarms in various ways, such as the SNMP trap, SMTP, and syslog service, to ensure uninterrupted system operation.
Integrated virtual KVM	Provides remote maintenance for troubleshooting. The maximum resolution is 1280 x 1024.
Integrated virtual media	Virtualizes local media devices or images to media devices on a remote server, which simplifies OS installation. The virtual DVD-ROM drive supports a transmission rate of up to 8 MB/s.
WebUI	Provides a visual WebUI for quick configuration and information queries. The following web browsers are supported: ● Internet Explorer 9.0/10.0/11.0 ● Mozilla Firefox 26.0/39.0 ● Chrome 21.0/44.0 ● Safari 8.0 ● JRE 1.7.0 U40 ● JRE 1.8.0 U45
Fault reproduction	Reproduces faults to facilitate rapid fault diagnosis.
Screenshots and videos	Allows you to view screenshots and videos without login, which facilitates preventive maintenance inspection (PMI).
DNS/directory service	Supports domain management and directory services, which significantly simplifies network and configuration management.
Dual-image backup	Starts from an image backup if the software fails.
IPv6	Supports IPv6 to ensure sufficient IP addresses.

5.2 HMM Features

The Hyper management module (HMM) supports the following specifications and features:

- IPMI V2.0.
- CLI-based logins.
- Out-of-band aggregation management.

Table 5-2 describes the HMM specifications.

Table 5-2 HMM specifications

Item	Specifications
Management interface	Supports integration with any standard management system through the following interfaces: - IPMI V2.0 - CLI
Hot-swap of MMs	Allows the faulty MM to be replaced without interrupting system operating and restores the working mode of the MM in short time.
Asset management	Provides intelligent asset management to increase efficiency.
Intelligent power management	Uses the power capping technology to increase deployment density and dynamic energy saving technology to lower operating costs.
Out-of-band aggregation management	Integrates the out-of-band management of all server nodes in the chassis, reduces the cabling of the management network, and shortens maintenance time.

5.3 Management Principles

Management principles of the X6800 are as follows:

- The Integrated Baseboard Management Controller (iBMC) and the Hyper Management Module (HMM) implement management and monitoring of the X6800. The iBMC on each node implements node management through the Intelligent Platform Management Interface (IPMI), KVM, or virtual DVD-ROM drive. The HMM implements chassis management, which includes management of fan modules, PSUs, and chassis assets.

- The HMM and iBMC implement converged management over the LAN switch (LSM) chip in the chassis. The LSM provides an external GE port. You can log in to the HMM and iBMC over the external GE port to manage the chassis and server nodes.

- The HMM works with the fan switch boards to implements fan management. The fan switch board provides five independent pulse-width modulation (PWM) control signals to control the fan speed and ten tachometer (TACH) signals to detect the fan speed.

  Based on the ambient temperature and temperature of the temperature-sensitive components on server blades, HMM uses Huawei speed adjustment algorithms to

determine a proper rotation speed, and then sends it to the fan switch board. The fan switch board receives fan speed signals from the fan modules and reports the fan module status to the HMM.

- PSU monitoring and management: The HMM provides one inter-integrated circuit (I^2C) for managing the PSUs and general purpose input/output (GPIO) pins for detecting the PSU installation status and PwrOk state. The HMM supports queries on PSU output power, PSU installation status, and PSU alarms.

The following shows the X6800 management plane.

Figure 5-1 X6800 management plane
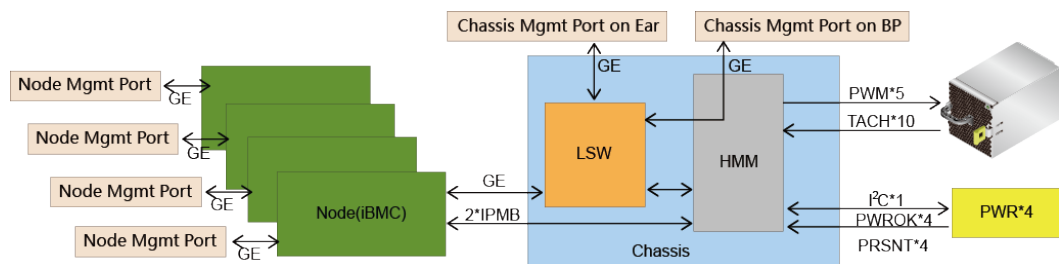
5.4 Management Modes

Access Modes

The X6800 server nodes and Hyper Management Module (HMM) are configured with independent IP addresses. You can access the Intelligent Baseboard Management Controller (iBMC) of a server node or the HMM to manage the X6800.

- On a server node, you can:
    - Directly access the iBMC through the iBMC management network port on the server node.
    - Access the iBMC through a service network port on a network interface card (NIC) over a network controller sideband interface (NC-SI).
    - Access the HMM in transparent transmission mode through the iBMC management network port. For details, see Configuring Transparent Transmission.
- Through the converged management network port on the chassis mounting ear or on the HMM, you can:
    - Directly access the HMM.
    - Access the iBMC in converged management node. For details, see Configuring Network Port Aggregation.

Networking

The X6800 provides flexible networking of the management network:

- Point-to-point networking

The server nodes are directly connected to the switch outside the X6800 chassis to form an out-of-band management network plane. You must set **LAN Port Configuration** to **Dedicated** on the BIOS. You also can connect Data plane network and transfer management message through NC-SI. **Figure 5-2** shows the cable connections.

Figure 5-2 Point-to-point networking
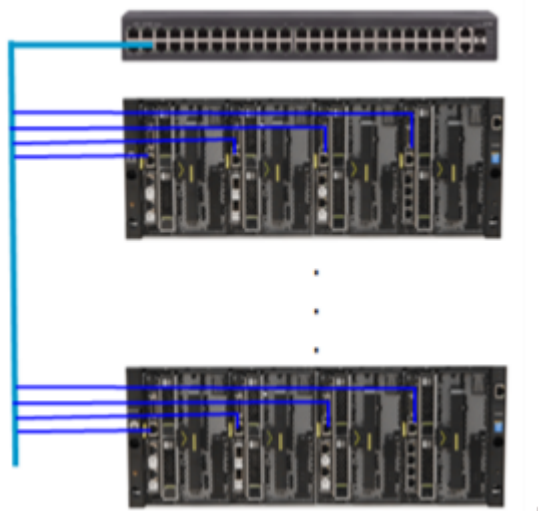
- Cabling from the mounting ear for converged management

The X6800 is connected to the switch outside the X6800 chassis through a cable led out from the front mounting ear on the X6800 chassis. The out-of-band management network communicates with the X6800 server nodes through the LAN switch (LSW) chip in the X6800 chassis. You need to change **LAN Port Configuration** (**Dedicated** by default) to Shared on the BIOS. **Figure 5-3** shows the cable connections.

Figure 5-3 Cabling from the mounting ear (converged management)
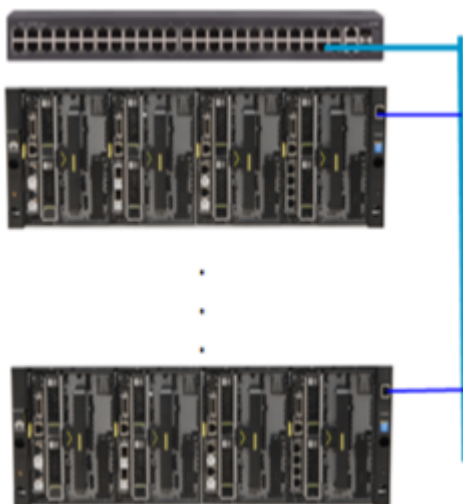
- Cabling from the HMM for converged management

The X6800 is connected to the switch outside the X6800 chassis through a cable led out from the converged management port on the HMM in the X6800 chassis. The out-of-band management network communicates with the X6800 server nodes through the LSW chip in the X6800 chassis. You need to change **LAN Port Configuration** (**Dedicated** by default) to Shared on the BIOS. **Figure 5-4** shows the cable connections.

Figure 5-4 Cabling from the HMM (converged management)
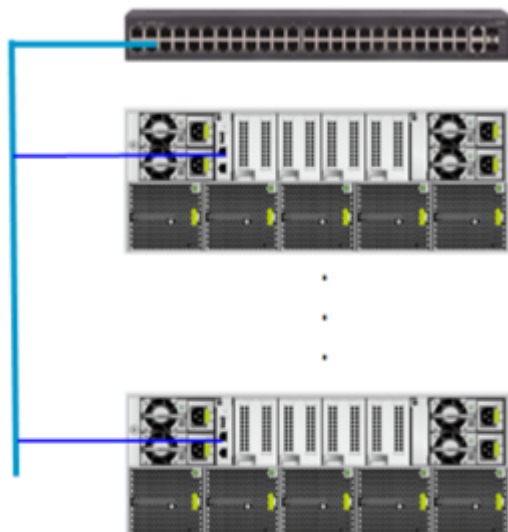
NOTICE

- The active/standby switchover feature of the X6800 HMMs is not available at present. Therefore, the X6800 comes with only one HMM.

- The converged management network port on the HMM provides an external interface for the LSW. The HMM is different from the management module (MM) of blade servers. The MM integrates a management plane switching chip, while the HMM only provides an external port for the management plane switch.

- Enhancement has been made on the management network ports on the mounting ear and on the HMM to prevent self-loop between the LSW and management switches in the equipment room. If both of the ports are connected to the management network, the port on the mounting ear has higher priority and the port on the HMM will be disabled by software.

6 Technical Specifications

6.1 Chassis Specifications

Chassis Specifications

Table 6-1 provides the X6800 technical specifications.

Table 6-1 Chassis specifications

Component	Description
Form factor	The X6800 is a 4U multi-node server.
Supported nodes	4 dual-sot nodes
PCIe slot	The rear panel of the X6800 provides a maximum of eight PCIe x8 slots.
Management interface	● One converged management port on the mounting ear ● One converged management port provided by each HMM

Component	Description
PSU	- Number of PSUs: 4 - Type of PSUs supported: 750 W, or 1200 W AC PSU 800 W DC (including HVDC) PSU **NOTE** - The X6800 PSUs support 1+1 and 2+2 redundancy modes. Select the PSUs based on the X6800 configuration and the PSU redundancy requirements. - If the X6800 is configured with the XH628 V5 server nodes, calculate the server power consumption by using the **Huawei Server Power Calculator** to determine whether the server supports N+N redundancy.
Fan module	Five fan modules working in N+1 redundancy
Dimensions (H x W x D)	175 mm x 447 mm x 898 mm x 175 mm (6.89 in. x 17.60 in. x 35.35 in.)
Weight	- Net weight: 29 kg (63.95 lb) - Fully-configured with XH628 V5: 109 kg (240.35 lb) - Package weight: 6.5 kg (14.33 lb)

Cabinet requirements

The depth of an X6800 chassis is 898 mm, and therefore the cabinet depth must be no less than 1200 mm. For details, see **Figure 6-1**.

Figure 6-1 Cabinet requirements
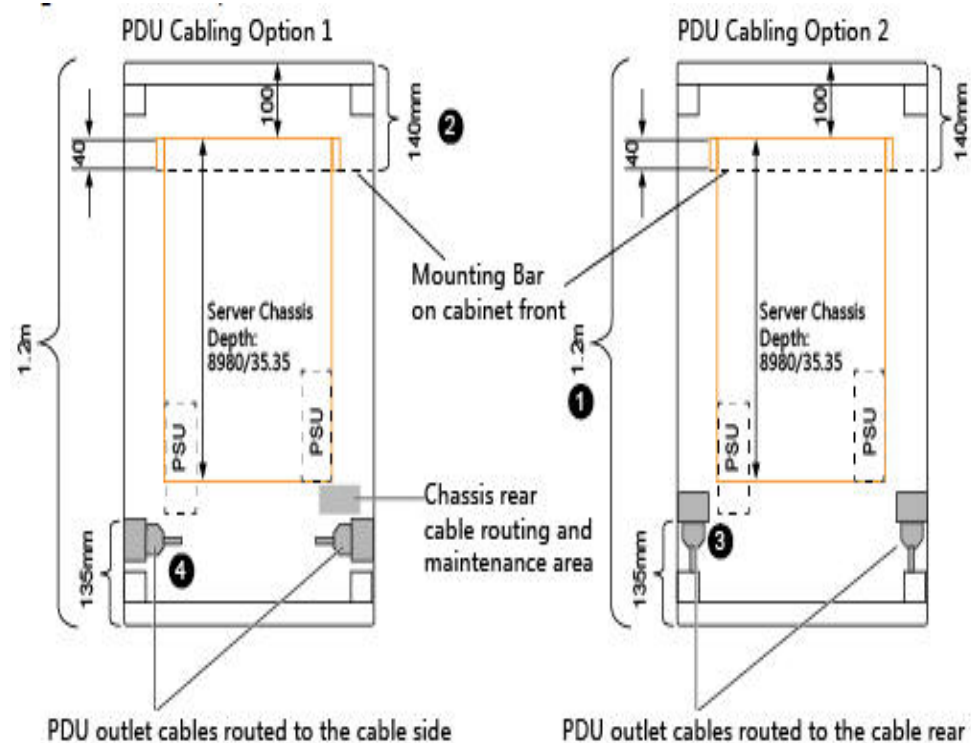
☷**NOTE**

- The minimum cabinet depth is 1.2 m (47.2 in.).
- The minimum distance between the front mounting bar and the front cabinet door is 140 mm (5.51 in.) if cables are routed from the front of the X6800 chassis, and is 90 mm (3.54 in.) if cables are routed form the rear of the chassis.
- Cabling option 2 is recommended because routing PDU cables from the chassis rear avoids tangling with the server cabling.
- If cabling option 1 is used, ensure that the maximum gap between the PDU and rear door is 135 mm (5.31 in.).
- Adjust all positioning distances to allow for cable bend radius, while always ensuring front cabling security and unobstructed installation and use of PDU plus.

6.2 Node Specifications

Table 6-2 provides the models and specifications of the X6800 server nodes.

Table 6-2 Hardware

Type	Model	Item
Chassis	X6800	An X6800 chassis is 4U. It provides four dual-slot server nodes.
Server node	XH628 V5	The XH628 V5 is a dual-slot storage node that supports: - Up to two Intel® Xeon® Scalable 3100, 4100, 5100, 6100, 8100 (some models) series processors - Up to 16 DDR4 DIMMs - 12 x 2.5-inch/3.5-inch SAS/SATA HDDs or SSDs in the disk drawer - 2 x 2.5-inch front SAS/SATA HDDs or SSDs - Four half-height half-length (HHHL) standard PCIe cards (or two 2.5-inch SATA HDDs or SSDs and two HHHL standard PCIe cards)

6.3 Power Supply and Power

The X6800 provides four PSU slots. Table 6-3 lists the PSU and power specifications.

Table 6-3 Power supply specifications

PSU Type	Input Voltage	Maximum Output Power	Output Voltage	Power Cable
750 W AC PSU	100 V to 127 V AC 50 Hz/60 Hz 9 A	The output power of each AC PSU is 750 W. The X6800 supports four PSUs in N + N	12.3 V DC	The AC PSU uses 10 A power cables with the C13 connector.

PSU Type	Input Voltage	Maximum Output Power	Output Voltage	Power Cable
	200 V to 240 V AC 50 Hz/60 Hz 5 A	(2+2) redundancy mode, with a maximum output power of 1500 W.		Cold pressure of power cables: 4 mm^2.
	192 V to 288 V DC 4 A			
1200 W AC PSU	100 V to 127 V AC 50 Hz/60 Hz 9.2 A	The output power of each AC PSU is 1200 W. The X6800 supports four PSUs in N + N redundancy mode, with a maximum output power of 2400 W.		
	200 V to 240 V AC 50 Hz/60 Hz 6.6 A			
	192 V to 288 V DC 6 A			
1200 W 380 V HVDC PSU	260 V to 400 V DC 6A	The output power of each AC PSU is 1200 W. The X6800 supports four PSUs in N + N redundancy mode, with a maximum output power of 2400 W.		
800 W DC PSU	-36 V to -75 V DC 26 A	The output power of each DC PSU is 800 W. The X6800 supports four PSUs in N + N redundancy mode, with a maximum output power of 1600 W.		

◫**NOTE**

For details about PSU part numbers, see the **Huawei Server Compatibility Checker**.

6.4 Environmental Specifications

Table 6-4 describes the environmental specifications for the X6800 V5.

Table 6-4 Environmental specifications

Item	Specifications
Temperature	- Operating temperature: 5°C to 40°C (41°F to 104°F) - Storage temperature: –40°C to +65°C (–40°F to +149°F) - Long-term storage temperature: 21°C to 27°C (69.8°F to 80.6°F) **NOTE** - The maximum temperature of the supercapacitor is 33°C (CPU power = 165 W), 35°C (150W ≤ CPU power < 165 W), and 40°C (CPU power < 150 W). - The maximum operating temperature of the server is 35°C (95°F) if 6144, 6146, 8176, 8170, or 6150 CPUs are used. - If one fan fails, the maximum operating temperature of the server is 5°C (9°F) lower than that in normal cases. - The XH628 V5 supports mixed configuration with only the XH628 V3 nodes in one chassis. In this case, the supported operating environment temperature is the same as that of the XH628 V5.
Maximum temperature change rate	20°C/h (36°F/h)
Relative humidity (RH, non-condensing)	- Operating: 10% to 85% - Storage: 5% to 95% - Long-term storage humidity: 30% RH to 69% RH (non-condensing)
Altitude	- Operating altitude: ≤ 3000 m (9842.4 ft) - Storage altitude: ≤ 12,000 m (39369.6 ft) **NOTE** When the altitude is higher than 900 m (2952.72 ft), the operating temperature decreases by 1°C (1.8°F) for every altitude increase of 300 m (984.24 ft). - At an altitude of over 3000 m (9842.4 ft), only Titanium PSUs can be used. - HDDs are not supported at an altitude of over 3000 m (9842.4 ft).
Vibration	One cyclical sweep in each axial direction at the rate of 0.1 oct/min, with a total of three axial directions 5 Hz to 10 Hz: 5 mm (0.20 in., peak-to-peak value) 10 Hz to 100 Hz: 1 m/s^2
Shock	Half sine wave, peak acceleration of 2 G, 11 ms, 3 times for each surface, and a total of three axial directions

Item	Specifications
Acoustic noise	The following data 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 at 23°C (73.4°F). Noise emissions are measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). Idle: ● LWAd: 7.1 Bels ● LpAm: 57.3 dBA Operating: ● LWAd: 7.2 Bels ● LpAm: 58.4 dBA **NOTE** The actual sound levels generated when the server is operating vary depending on the server configuration, workload, and ambient temperature.
Corrosive gaseous contaminant	● Copper corrosion rate test requirements: The corrosion product thickness growth rate is lower than 300 Å/month (meeting level G1 requirements of the ANSI/ISA-71.04-2013 standard on gaseous corrosion). ● Silver corrosion rate test requirements: The corrosion product thickness growth rate is lower than 200 Å/month.
Particulate pollutant	● The equipment room environment meets the requirements of ISO 14664-1 Class 8. 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.

7 Warranty

According to the *Huawei Warranty Policy for Servers & Storage Products* (Warranty Policy for short), the X6800 has a three-year warranty, the DVD-ROM drives and BBUs have a one-year warranty, and the software media have a three-month warranty. The *Warranty Policy* is a series of warranty maintenance upgrades and post-warranty maintenance agreements with a well-defined scope of services, including service hours, response time, terms of service, and service agreement terms and conditions.

The *Warranty Policy* is country-specific. The service types, service levels, response time, and terms and conditions may vary with the countries where the product is used. Not all services described in the *Warranty Policy* are provided to users in all countries. For more information about warranty services in your country, contact Huawei technical support or your local representative office.

Table 7-1 describes the warranty service response time.

Table 7-1 Response time

Service	Response Time	Description	Remarks
Help Desk	24 x 7	Available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	None
Remote troubleshooting	24 x 7	Available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	Response time starts from the moment the technical support accepts a customer's service request to the time technical support contacts the customer to provide remote trouble shooting service.

Service	Response Time		Description	Remarks
Online technical support	24 x 7		Huawei support website: available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	None
Licensing of software updates	24 x 7		Huawei support website: available 24 hours a day, 7 days a week (00:00 to 24:00, Monday to Sunday)	None
Return for repair	Outside China	45 calendar days shipment (CDS), 9 hours a day, 5 days a week	Available 9 hours a day, 5 days a week, excluding official holidays(09:00 to 18:00, Monday to Friday).	The repaired or replacement parts will be shipped within 45 calendar days after Huawei receives the defective parts.
	In China	9 x 5 x NBD	Available 9 hours a day, 5 days a week, excluding official holidays(09:00 to 18:00, Monday to Friday).	Service requests submitted after 15:30 will be handled the next workday.

Table 7-2 describes warranty services provided by Huawei.

Table 7-2 Warranty services

Service	Description
Help Desk	Huawei provides 24-hour after-sales technical support such as handling customers requests for troubleshooting or hardware replacement, responding to customer inquiries, handling customer complaints, and collecting suggestions using the dedicated hotline.
Remote troubleshooting	After receiving a service request for rectifying a network or system fault, Huawei technical support engineers first analyze and handle the fault remotely and then resolve the issue as soon as possible. There are two remote troubleshooting methods: telephone support and remote access.
Online technical support	The Huawei support website provides product technical materials, such as product manuals, configuration guides, networking case studies, and maintenance records. Authorized users can access the website, download documents, get up-to-date maintenance and skills development information, and learn about the latest products.

Service	Description
Licensing of software updates	Huawei provides patches whenever necessary to ensure stable and reliable equipment operation.
Return for repair	Huawei provides repair or replacement services for customers within the promised time to meet customer needs for spare parts. You can return defective parts to the designated Huawei customer service center after submitting a service request. For the products with a three-year warranty used in China, Huawei provides NBD service, 9 hours a day, 5 days a week. For the products with a three-year warranty used outside China, Huawei provides CDS service, 9 hours a day, 5 days a week.

8 Certifications

8.1 Certifications

Table 8-1 lists the certifications passed by the X6800.

Table 8-1 X6800 certifications

Region	Country	Certificate Name	Label
China	China	CCC	
		RoHS	
Europe	EU	RoHS	NA
		REACH	NA
		WEEE	
		CE	
	Russia	EAC	
North America	America	NRTL-UL/MET	
	America /Canada	FCC&IC	

Asia -Pacific	Australia /New Zealand	RCM	
	Japan	VCCI	VCCI—A
Middle East West Africa North Africa	Nine-country certification (Multi-Country Certification: Saudi, Nigeria, Tanzania, Uganda, Kuwait, Algeria, Botswana, Qatar, Egypt)	Nine-Country Certification	N/A

8.2 Protocols

Table 8-2 lists the standards and protocols with which the X6800 complies.

Table 8-2 Standards and protocols the X6800 complies with

Category	Standard/Protocol	Specifications
Standards	IEEE 802.1P	QoS
	IEEE 802.1Q	VLAN
	IEEE 802.1D	Bridge/Spanning Tree
	IEEE 802.3	Ethernet
	IEEE 802.3u	FE
	IEEE 802.3x	Flow control
	IEEE 802.3z	GE
	IEEE 1149.1-2001	IEEE Standard Test Access Port and Boundary-Scan Architecture
	IEC 812	Procedure for Failure Mode and Effects Analysis (FMEA)
	IEC 863	Presentation of Reliability, Maintainability, and Availability Predictions
	IEC60297	Chassis compliance
	IEC60950	Safety
	IEC60825-1/2/6	Safety
	IEC60215	Safety
	IEC61000	EMC standard

Category	Standard/Protocol	Specifications
	UL60950	Safety (North America)
	EN60950	Safety (Europe)
	ECMA TR/70	Environment protection
	GR-929	Reliability
	Telcordia SR-332	Reliability
	ETS	European telecommunications standards
Protocols	IP	Internet Protocol
	ARP	Address Resolution Protocol
	ICMP	Internet Control Message Protocol
	IGMP	Internet Group Management Protocol
	SNMP	Simple Network Management Protocol
	TELNET	Remote terminal protocol
	HTTP	Hypertext Transfer Protocol
	TFTP	Trivial File Transfer Protocol
	FTP	File Transfer Protocol
	IPMI	Intelligent Platform Management Interface

A Acronyms and Abbreviations

A

AC	Alternating Current
AES NI	Advanced Encryption Standard New Instruction Set
ARP	Address Resolution Protocol
AVX	Advanced Vector Extensions

B

BBU	Backup Battery Unit
BMC	Baseboard Management Controller

C

CD	Calendar Day
CIM	Common Information Model
CLI	Command-line Interface

D

DC	Direct Current
DDR3	Double Data Rate 3
DEMT	Dynamic Energy Management Technology
DIMM	Dual In-line Memory Module
DVD	Digital Video Disc

E

ECC	Error Checking and Correcting
ECMA	European Computer Manufacturers Association

EDB	Execute Disable Bit
EN	European Efficiency
ETS	European Telecommunication Standards
F	
FC	Fiber Channel
FTP	File Transfer Protocol
G	
GE	Gigabit Ethernet
GPIO	General Purpose Input/Output
H	
HDD	Hard Disk Drive
HMM	Hyper Management Module
HPC	High-performance Computing
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
HVDC	High Voltage Direct Current
I	
ICMP	Internet Control Message Protocol
IDC	Internet Data Center
IEC	International Electrotechnical Commission
IEEE	Institute of Electrical and Electronics Engineers
IGMP	Internet Group Message Protocol
iBMC	Integrated Baseboard Management Controller
IOPS	Input/Output Operations per Second
IP	Internet Protocol
IPC	Intelligent Power Capability
IPMB	Intelligent Platform Management Bus
IPMI	Intelligent Platform Management Interface
K	
KVM	Keyboard Video and Mouse

L

LC	Lucent Connector
LDIMM	Local Dual In-line Memory Module
LED	Light Emitting Diode

M

MAC	Media Access Control

N

NBD	Next Business Day
NC-SI	Network Controller Sideband Interface

P

PCIe	Peripheral Component Interconnect Express
PHY	Physical Layer
PMBUS	Power Management Bus
POK	Power OK
PWM	Pulse-width Modulation

Q

QPI	QuickPath Interconnect

R

RAID	Redundant Array of Independent Disks
RDIMM	Registered Dual In-line Memory Module
RJ45	Registered Jack 45

S

SAS	Serial Attached Small Computer System Interface
SATA	Serial Advanced Technology Attachment
SGMII	Serial Gigabit Media Independent Interface
SMTP	Simple Mail Transfer Protocol
SM_CLP	Server Management Command Line Protocol
SNMP	Simple Network Management Protocol
SSD	Solid-state Drive

T

TACH	Tachometer signal
TBT	Turbo Boost Technology
TCG	Trusted Computing Group
TDP	Thermal Design Power
TELNET	Telecommunication Network Protocol
TET	Trusted Execution Technology
TFTP	Trivial File Transfer Protocol
TPM	Trusted Platform Module

U

UDIMM	Unbuffered Dual In-line Memory Module
UEFI	Unified Extensible Firmware Interface
UID	Unit Identification Light
UL	Underwriter Laboratories Inc.
USB	Universal Serial Bus

V

VGA	Video Graphics Array
VRD	Voltage Regulator-Down

W

WSMAN	Web Service Management