meta brain® Server NF5266M6

White Paper

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Technical Support

Global Service Hotline:	(+1) 844-860-0011/(+1) 325-880-0011
Address:	East side of Floor 9, No. 801, Caoshanling South Road, High-tech Zone, Jinan, Shandong, P.R.China
Website:	https://en.ieisystem.com
Email:	serversupport@ieisystem.com

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Preface

Abstract

This white paper describes the NF5266M6 server's appearance, features, performance parameters, and software and hardware compatibility, providing in-depth information of the server.

Intended Audience

This white paper is intended for pre-sales engineers.

Symbol Conventions

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

Symbol	Description
 DANGER	A potential for serious injury, or even death if not properly handled
 WARNING	A potential for minor or moderate injury if not properly handled
 CAUTION	A potential loss of data or damage to equipment if not properly handled
 IMPORTANT	Operations or information that requires special attention to ensure successful installation or configuration
 NOTE	Supplementary description of document information

Revision History

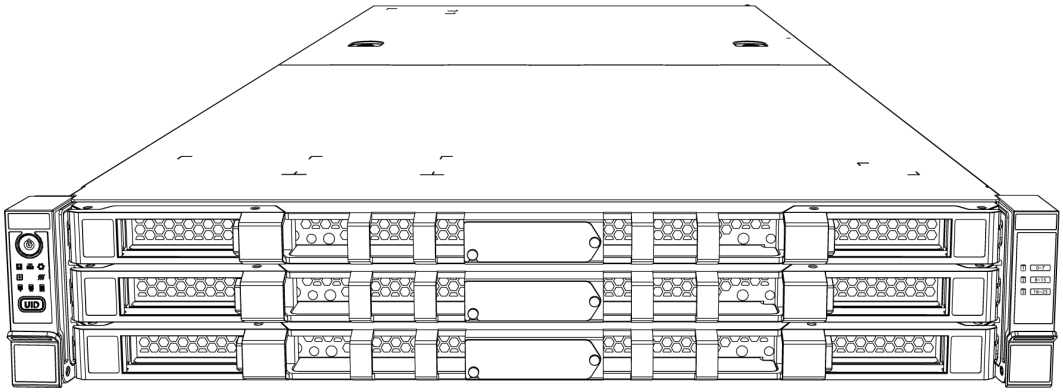
Version	Date	Description of Changes
V1.0	2024/04/17	Initial release

Table of Contents

1 Product Overview

The NF5266M6 is a 2-socket rack server for cloud service, large-scale data centers, communications, finance, and other fields. Built on the Intel Whitley platform, the server can host twenty-six 3.5-inch hot-swap drives in a compact 2U chassis, outperforming many 4U multi-drive servers in storage density. The NF5266M6 is a differentiated server with both storage capacity and computing power. It supports 2 Ice Lake CPUs and features excellent storage performance, high I/O throughput and superior PCIe scalability to cater to customer demands for high-density storage. Despite the ever-changing IT architecture, the NF5266M6 can always be adaptable to more fields and business segments with the most demanding workloads.

Figure 1-1 NF5266M6



2 Features

2.1 Scalability and Performance

- Features up to two 3rd Gen Intel Xeon Scalable processors with up to 36 cores, 72 threads per processor, TDP up to 225 W, a max Turbo frequency of 3.7 GHz, 1.5 MB L3 cache per core and 3 UPI links per CPU at up to 11.2 GT/s, providing powerful processing capabilities.
- Up to 16 DDR4 ECC DIMMs (3,200 MT/s, LRDIMM/RDIMM/NVDIMM/BPS), delivering superior speed, high availability, and a memory capacity up to 2 TB.
- Up to 8 BPS DIMMs (3,200 MHz, max capacity of 256 GB per BPS), preserving data in case of power failures without compromising memory capacity and bandwidth.
- Up to 8 NVDIMMs, with a maximum rate of 3,200 MT/s.
- Up to 26 hot-swap 3.5-inch HDDs.
- Storage expansion configuration: The front panel accommodates up to twenty-four 3.5-inch drives (or 2.5-inch drives), and the rear panel supports up to eight 2.5-inch drives (NVMe, E1.S NVMe and SAS/SATA) and 2 PCIe expansion slots.
- Computing expansion configuration: The front panel accommodates up to twenty-four 3.5-inch SAS/SATA drives (or 2.5-inch drives), and the rear panel supports up to four 2.5-inch drives (all-NVMe, or mixing SAS, SATA and NVMe) and 7 PCIe expansion slots.
- Up to 2 optional OCP 3.0 cards with multiple network port options (1/10/25/100/200 Gb), offering a more flexible network architecture for different application scenarios.
- Optional internal/external/AIC RAID M.2 SSDs for diverse storage demands.
- Supports trusted platform module (TPM) or trusted cryptography module (TCM), offering secure key storage and cryptographic operations for platforms
- CPU TDP of 225 W, with custom heatsinks and six 6038 or 6056 fan modules.

2.2 Availability and Serviceability

- Based on humanization design, the server allows tool-less maintenance. With enhanced and optimized structural parts, the system enables quick component removal/installation, greatly reducing the O&M time.

- Our unique intelligent control technology combined with the cutting-edge air-cooling technology creates an optimum working environment to ensure stable running of the server.
- The server supports hot-swap drives and RAID controller cards with RAID levels 0/1/10/5/50/6/60, RAID cache and data protection enabled by the super-capacitor in case of power failures.
- The UID LED enables technicians to identify the failed system and the BMC Web GUI and LEDs for fault diagnosis quickly lead technicians to failed (or failing) components, simplifying maintenance, speeding up troubleshooting, and enhancing system availability.
- The BMC can monitor system parameters and send alerts in advance, so that technicians can take appropriate measures in time to ensure stable running of the server and reduce the downtime.

For documentation of the NF5266M6 system, such as product marketing materials, user manuals, product drivers, firmware, and product certifications, visit our website.

2.3 Manageability and Security

- Professional hardware and software monitor the server's operating temperature and air pressure in real time, and intelligently adjust the thermal control strategy to improve the lifespan of drives and ensure the optimal operating condition.
- The server supports grouped power control of 3.5-inch HDDs. You can freely specify the members of each drive group and set power-on latency.
- Supports ISBMC, an intelligent management system.
    - ISBMC supports such mainstream management specifications in the industry as IPMI 2.0 and Redfish 1.8.
    - ISBMC improves operational reliability.
    - ISBMC features easy serviceability for different business scenarios.
    - ISBMC provides comprehensive and accurate fault diagnosis capabilities.
    - ISBMC offers industry-leading security reinforcement capabilities.
- The intelligent management software InManage allows centralized management of the server and full lifecycle management covering part-level asset management, intelligent monitoring and alerting, automatic inspection, fault diagnosis and reporting, energy consumption management, and firmware update/configuration.

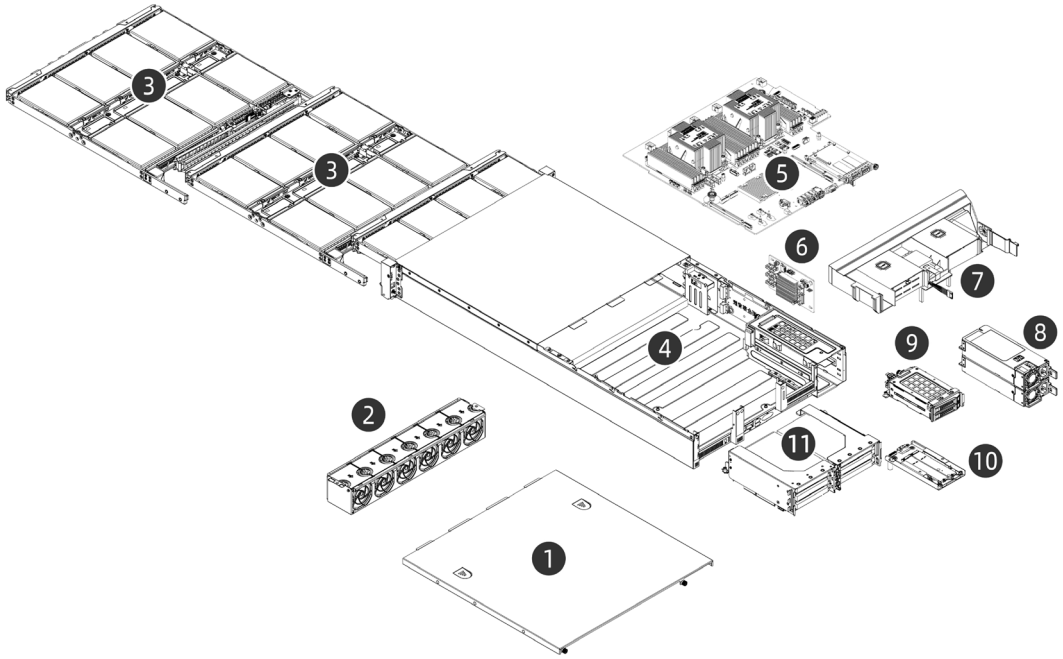
- The InManage Boot system enables rapid server initialization and supports batch RAID configuration and OS deployment.
- Supports Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM) provide advanced encryption.
- Supports Intel Trusted Execution Technology that provides hardware-based resistance to malicious software attacks.
- Supports Intel Software Guard Extensions (SGX) technology that allows applications to run in its own isolated space, helping prevent malicious theft and modification of critical codes and data.
- Supports the firmware update mechanism based on digital signatures to prevent unauthorized firmware updates.
- Supports UEFI Secure Boot to protect the system from malicious boot loaders.
- Supports hierarchical password protection in BIOS, ensuring system boot and management security.
- Supports BIOS Secure Flash and BIOS Lock Enable (BLE), reducing attacks from malicious software on the BIOS flash region.
- Supports dual-image mechanism for BMC and BIOS recovers firmware upon detection of corrupted firmware.
- Supports BMC Secure Boot to protect BMC from malicious tampering.
- Supports flexible BMC access control policies, improving BMC management security.
- Supports chassis intrusion detection and drive drawer presence detection, enhancing physical security.

2.4 Energy Efficiency

- Equipped with 80 Plus Platinum level (800/1,300/1,600 W) and Titanium level (1,300 W) PSUs with the power efficiency up to 94% at a load of 50%.
- Offers 1+1 redundant power supplies with AC/DC input supported for optimized power conversion efficiency.
- Features high-efficiency single-board voltage regulator down (VRD) solutions, reducing DC-DC conversion loss.
- Supports intelligent fan speed control and intelligent CPU frequency scaling, conserving energy.
- Offers a fully-optimized system cooling design with energy-efficient cooling fans, lowering energy consumption from system cooling.

3 System Parts Breakdown

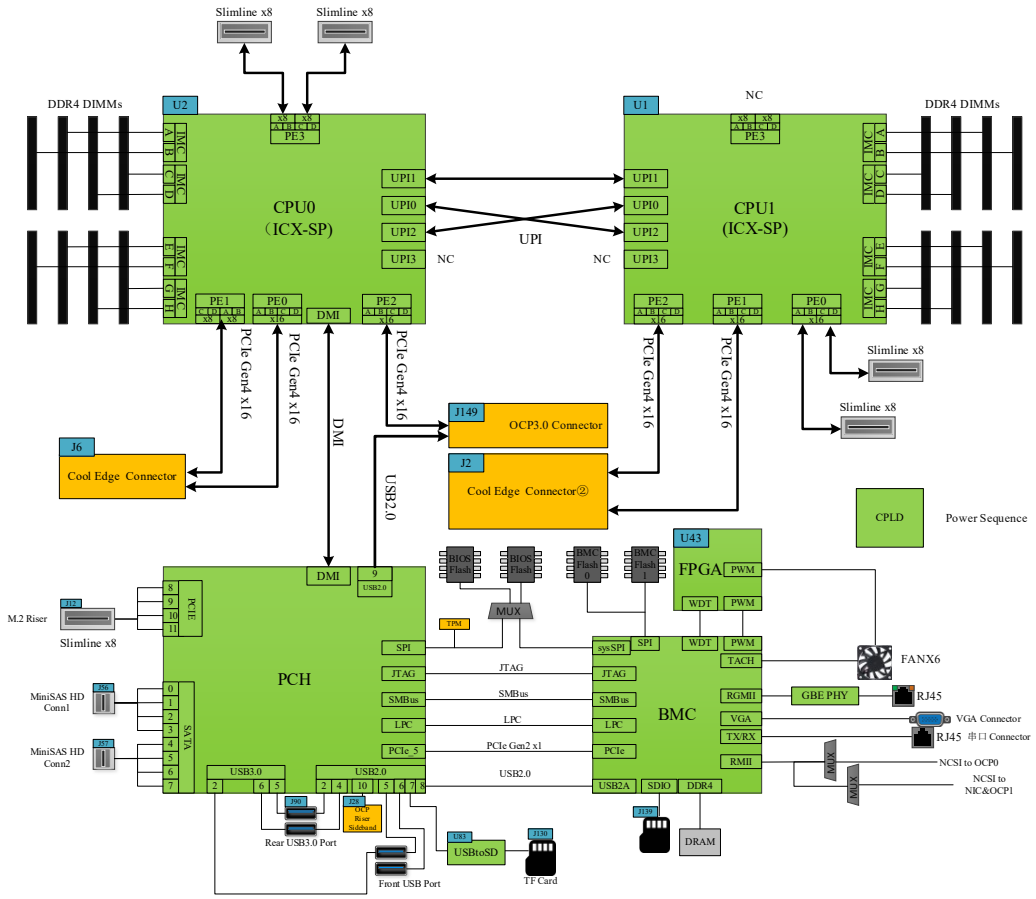
Figure 3-1 Exploded View



Item	Feature	Item	Feature
1	Top Cover	2	Fan Modules
3	Front Drives	4	Chassis
5	Motherboard	6	Expander Card
7	Air Duct	8	PSUs
9	Rear Drives	10	OCP 3.0 Card
11	PCIe Riser Modules		

4 System Logical Diagram

Figure 4-1 NF5266M6 System Logical Diagram



- Supports up to two 3rd Gen Intel Xeon Scalable processors (Ice Lake).
- Supports up to 16 DIMMs.
- Processors are interconnected via 3 UPI links at up to 11.2 GT/s.
- Up to 7 PCIe 3.0 expansion slots, with CPU0 supporting 1 OCP 3.0 card.
- The RAID controller card is connected to CPU1 through the PCIe bus, and is connected to the drive backplane through the SAS signal cable. Multiple local storage configurations are supported through different drive backplanes.
- The motherboard is integrated with the LBG-R Platform Controller Hub (PCH) supporting 5 USB 3.0 ports, 4 SATA 3.0 drives, 2 SATA/PCIe M.2 SSDs, and 1 TF card.

- The motherboard is integrated with an AST2500 management chip supporting a Video Graphics Array (VGA) port, a management network port, a serial port, and other ports.

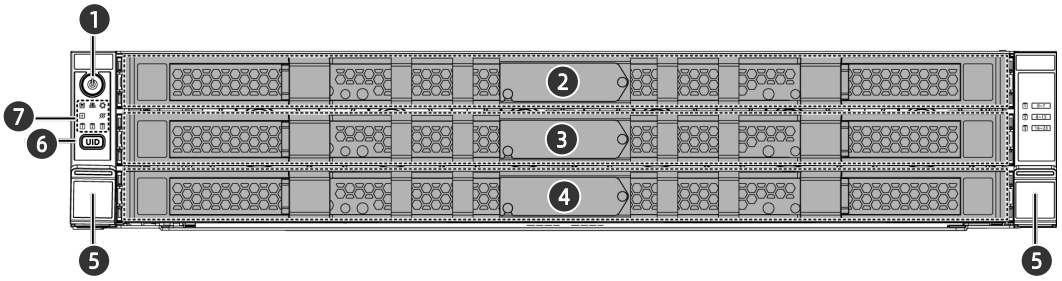
5 Hardware Description

5.1 Front Panel

5.1.1 Front View

1. 24 × 3.5-inch Drive Configuration (compatible with 2.5-inch drives)

Figure 5-1 Front View

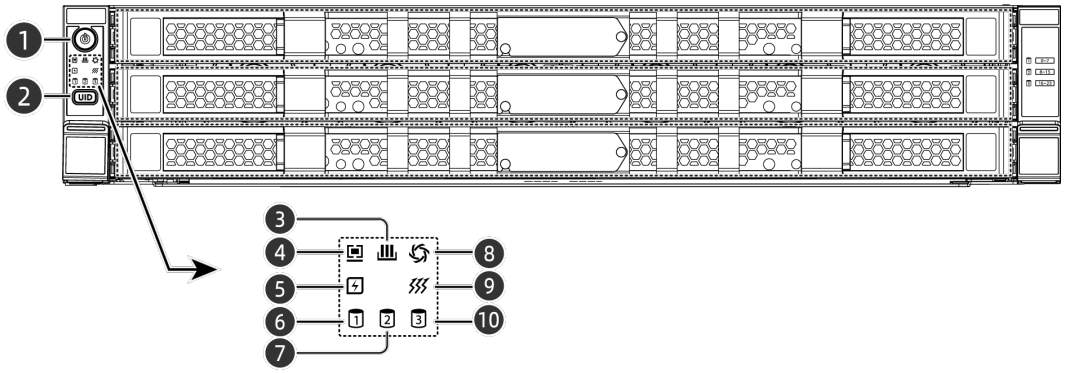


Item	Feature	Item	Feature
1	Power Button and LED	2	Top-Layer Drive Drawer
3	Mid-Layer Drive Drawer	4	Bottom-Layer Drive Drawer
5	Ear Latch × 2	6	UID/BMC RST Button and LED
7	Front Panel LEDs		

5.1.2 LEDs and Buttons

1. 24 × 3.5-inch Drive Configuration (compatible with 2.5-inch drives)

Figure 5-2 LEDs and Buttons



Item	Feature	Item	Feature
1	Power Button and LED	2	UID/BMC RST Button and LED
3	Memory Status LED	4	System Status LED
5	Power Status LED	6	Top-Layer Drive Activity LED
7	Mid-Layer Drive Activity LED	8	Fan Status LED
9	System Overheat LED	10	Bottom-Layer Drive Activity LED

2. LED and Button Description

Table 5-1 Front Panel LED and Button Description

Icon	LED & Button	Description
⏻	Power Button and LED	Power LED: • Off = No power • Solid green = Power-on state • Solid orange = Standby state Power button: • Long press 4 seconds to force a shutdown from the power-on state. Notes:

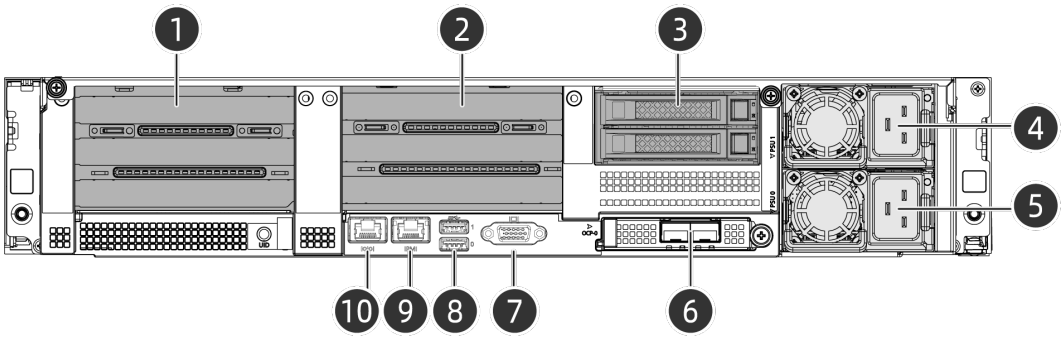
		• Follow the prompt under the OS to shut it down. • Short press the power button to power on the system in standby state.
UID	UID/BMC RST Button and LED	The UID LED is used to identify the device to be operated: • Off = System unit not identified • Solid blue = System unit identified • Flashing blue = System unit being operated remotely Notes: • The UID LED turns on when activated by the UID button or via ISBMC remotely. • Long press the UID button for over 6 seconds to reset the BMC.
	Memory Status LED	• Off = Normal • Flashing red (1 Hz) = A non-critical warning occurs • Solid red = A critical warning occurs
	System Status LED	• Off = Normal • Flashing red (1 Hz) = A non-critical warning occurs • Solid red = A critical warning occurs
	Power Status LED	• Off = Normal • Flashing red (1 Hz) = A non-critical warning occurs • Solid red = A critical warning occurs
	System Overheat LED	• Off = Normal • Flashing red (1 Hz) = A non-critical warning occurs • Solid red = A critical warning occurs

	Fan Status LED	• Off = Normal • Flashing red (1 Hz) = A non-critical warning occurs • Solid red = A critical warning occurs

5.2 Rear Panel

5.2.1 Rear View

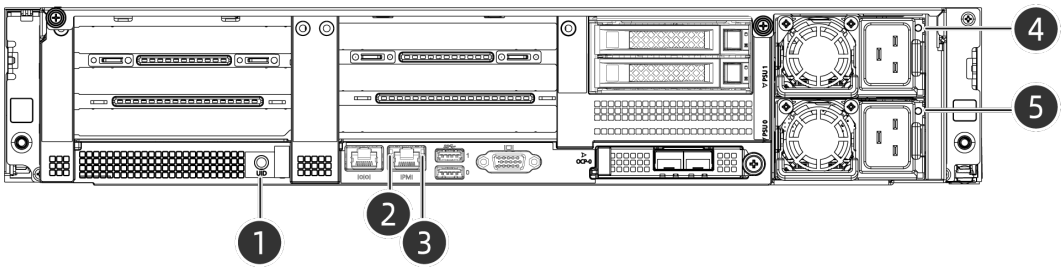
Figure 5-3 Rear View



Item	Feature	Item	Feature
1	PCIe Riser Module 1	2	PCIe Riser Module 0
3	Rear Drive Bays	4	PSU1
5	PSU0	6	OCP 3.0 Card
7	VGA Port	8	USB 3.0 Port × 2
9	BMC Management Network Port	10	Debug Serial Port

5.2.2 LEDs and Buttons

Figure 5-4 Rear Panel LEDs and Buttons



Item	Feature	Item	Feature
1	UID/BMC RST Button and LED	2	Management Network Port Link Speed LED
3	Management Network Port Link Activity LED	4	PSU1 Status LED
5	PSU0 LED		

5.2.3 Ports

1. Port Description

Table 5-2 Rear Panel Port Description

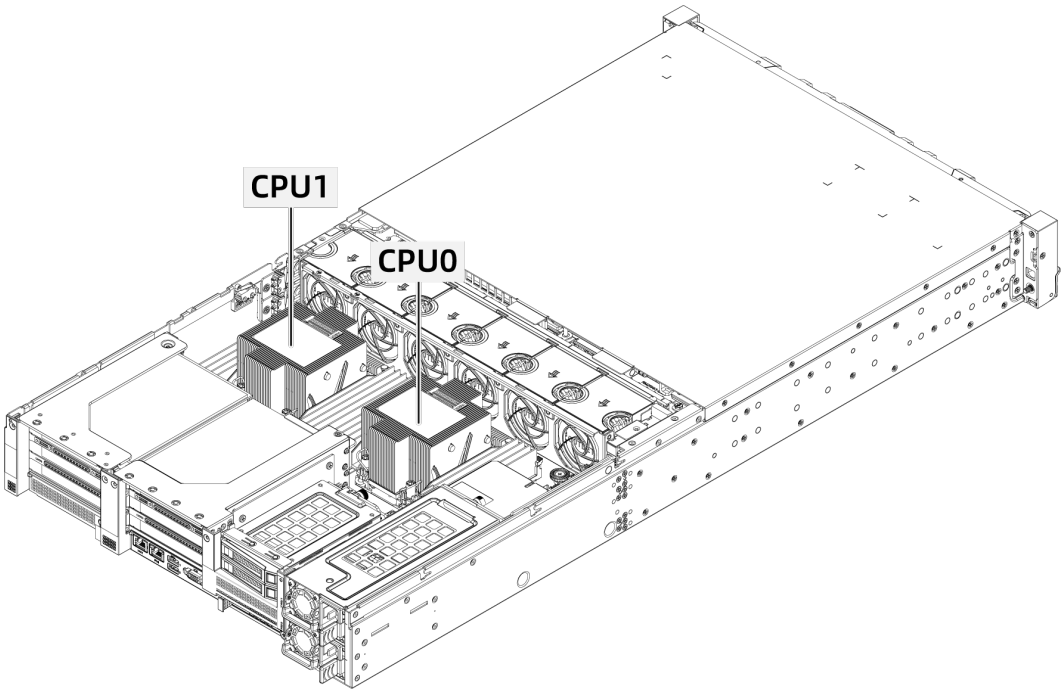
Feature	Type	Quantity	Description
Debug Serial Port	Headphone jack	1	Enables you to capture system and BMC logs and debug the BMC. Note: • The serial port uses a standard 3.5 mm jack with a default baud rate of 115,200 bit/s.
USB Port	USB 3.0	2	Enables you to connect a USB 3.0 device to the system. Notes: • The maximum current supported by the USB port is 0.9 A. • Make sure the USB device is in good condition or it may cause the server to work abnormally.
Management Network Port	RJ45	1	ISBMC management network port to manage the server Note: • It is a GbE port of 100/1,000 Mbps auto-negotiation.
VGA Port	DB15	1	Enables you to connect a display terminal, for example, a monitor or KVM, to the system.
PSU Socket	-	2	Connected through a power cord. User can select the PSUs as needed. Note: • Make sure that the rated power of one PSU is greater than that of the server.

5.3 Processors

- Supports 1 or 2 processors.
- When configuring only 1 processor, CPU0 socket should be preferred.
- The processors used in the same server must be of the same model.

For specific processor options, consult us or refer to 7.2 Hardware Compatibility.

Figure 5-5 Processor Locations



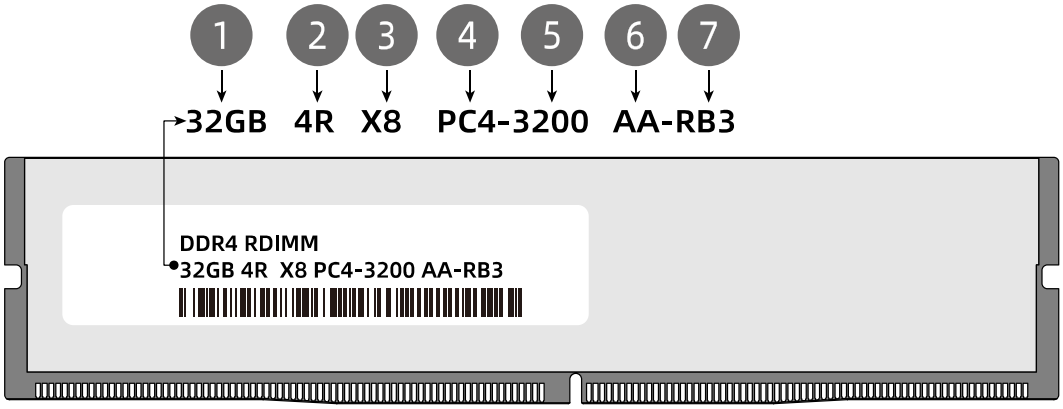
5.4 Memory

5.4.1 DDR4 DIMM

1. Identification

To determine DIMM characteristics, refer to the label attached to the DIMM and the following figure and table.

Figure 5-6 DIMM Identification



Item	Description	Example
1	Capacity	• 16 GB • 32 GB • 64 GB • 128 GB • 256 GB
2	Rank(s)	• 1R = Single rank • 2R = Dual rank • 2S2R = Two ranks of two high stacked 3DS DRAM • 4DR = Four ranks of dual die packaged DRAM • 4R = Quad rank
3	Data width on the DRAM	• x4 = 4 bits • x8 = 8 bits
4	DIMM slot type	PC4 = DDR4
5	Maximum memory speed	• 2,933 MT/s • 3,200 MT/s
6	CAS latency	SDP-chip-based • V = CAS-19-19-19

Item	Description	Example
		• Y = CAS-21-21-21 • AA = CAS-22-22-22 3DS-chip-based • V = CAS-22-19-19 • Y = CAS-24-21-21 • AA = CAS-26-22-22
7	DIMM type	R = RDIMM

2. Memory Subsystem Architecture

The NF5266M6 supports 16 DIMM slots with 8 memory channels per processor.

3. Compatibility

Refer to the following rules to select the DDR4 DIMMs.

IMPORTANT

- A server must use DDR4 DIMMs with the same part number (P/N code). All DDR4 DIMMs operate at the same speed, which is the lowest of:
  - Memory speed supported by a specific CPU
  - Maximum operating speed of a specific memory configuration
- Mixing DDR4 DIMM specifications (capacity, bit width, rank, height, etc) is not supported.
- For specific system memory options, consult us or refer to 7.2 Hardware Compatibility.

- DDR4 DIMMs can be used with the 3rd Gen Intel Xeon Scalable processors (Ice Lake). The maximum memory capacity supported is identical for different CPU models.
- The total memory capacity is the sum of the capacity of all DDR4 DIMMs.
- The total memory capacity cannot exceed the maximum memory capacity supported by the CPUs.
- The maximum number of DIMMs supported is a function of the CPU type, DIMM type and the rank quantity.

NOTE

- An RDIMM supports up to 4 ranks.
- Maximum number of DIMMs supported per channel ≤ Maximum number of ranks supported per channel/Number of ranks per DIMM.

Table 5-3 DDR4 DIMM Specifications

Item		Value			
Capacity per DDR4 DIMM (GB)		16	32	64	128
Type		RDIMM	RDIMM	RDIMM	RDIMM
Rated speed (MT/s)		3,200	3,200	3,200	3,200
Operating voltage (V)		1.2	1.2	1.2	1.2
Maximum number of DDR4 DIMMs supported in a server[a]		16	16	16	16
Maximum capacity of DDR4 DIMMs supported in a server (GB)[b]		256	512	1,024	2,048
Actual speed (MT/s)	1DPC[c]	3,200	3,200	3,200	3,200
	2DPC	3,200	3,200	3,200	3,200
a: The maximum number of DDR4 DIMMs supported is based on the 2-processor configuration. For the 1-processor configuration, the number should be halved. b: It indicates the maximum DDR4 memory capacity supported when all DDR4 DIMMs are populated. The maximum DDR4 capacity varies with the CPU type. c: DIMM Per Channel (DPC) is the number of DIMMs per memory channel. The information above is for reference only, consult us for details.					

4. Population Rules

General population rules for DDR4 DIMMs:

- Install DIMMs only when the corresponding processor has been installed.
- Do not mix LRDIMMs and RDIMMs.
- Install dummies in the empty DIMM slots

Population rules for DDR4 DIMMs in specific modes:

- Memory sparing
  - Follow the general population rules.
  - Each channel must have a valid online spare configuration.
  - Each channel can have a different valid online spare configuration.
- Memory mirroring

- Follow the general population rules.
- Each processor supports 2 integrated memory controllers (iMCs) and each iMC has two channels to be populated with DIMMs. DIMMs installed must be of the same capacity and organization.
- In a multi-processor configuration, each processor must have a valid memory mirroring configuration.

5. DIMM Slot Layout

Up to 16 DDR4 DIMMs can be installed in the server, and a balanced DIMM configuration is recommended for optimal memory performance. DIMM configuration must be compliant with the DIMM population rules.

Figure 5-7 DIMM Slot Layout

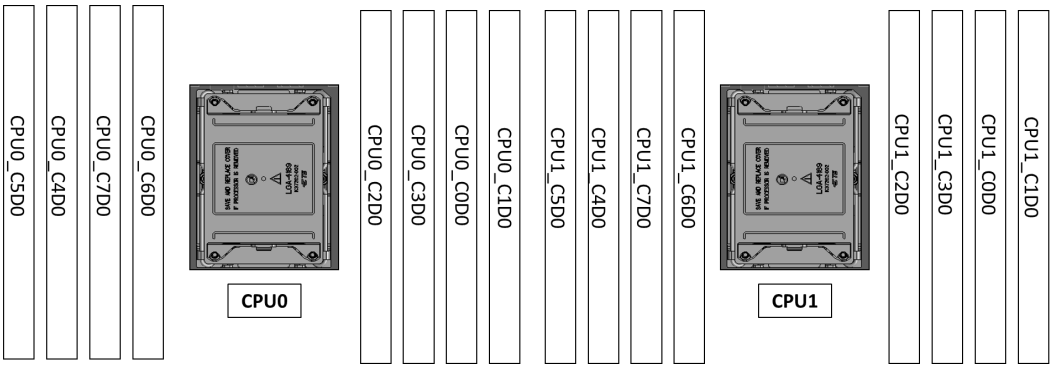


Table 5-4 DDR4 DIMM Population Rules (1-Processor Configuration)

DDR4 Qty	CPU0							
	C0D0	C1D0	C2D0	C3D0	C4D0	C5D0	C6D0	C7D0
1	√							
2	√				√			
4	√		√		√		√	
6	√	√	√		√	√	√	
8	√	√	√	√	√	√	√	√

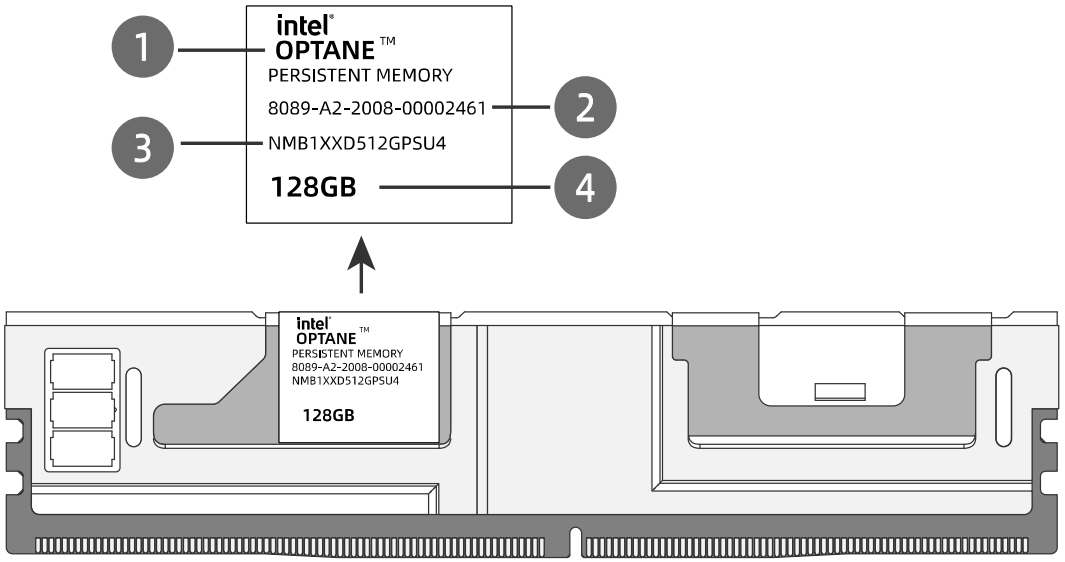
Table 5-5 DDR4 DIMM Population Rule (2-Processor Configuration)

DDR4 Qty	CPU0								CPU1							
	C0D0	C1D0	C2D0	C3D0	C4D0	C5D0	C6D0	C7D0	C0D0	C1D0	C2D0	C3D0	C4D0	C5D0	C6D0	C7D0
2	√								√							
4	√				√				√				√			
8	√		√		√		√		√		√		√		√	
12	√	√	√		√	√	√		√	√	√		√	√	√	
16	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√

5.4.2 PMem

1. Identification

Figure 5-8 PMem Identification



Item	Description	Example
1	Component name	Intel Optane Persistent Memory
2	Serial number	8089-A2-2008-00002461
3	Model	NMB1XXD512GPSU4
4	Capacity	128 GB

2. Memory Subsystem Architecture

The NF5266M6 supports 16 DIMM slots with 8 memory channels per processor. Up to 4 PMems can be populated per processor.

PMems must be used with DDR4 DIMMs.

3. Compatibility

Refer to the following rules to configure PMems:

IMPORTANT

- PMems must be used with DDR4 DIMMs.
- For specific system PMem options, consult your local sales representative.
- PMems must be used with the 3rd Gen Intel Xeon Scalable processors (Ice Lake). The maximum memory capacity supported is identical for all CPU models.
- PMems can only be configured in two modes: App Direct Mode (AD) and Memory Mode (MM), and the calculation formula for the total memory capacity is as follows:
  - AD: Total memory capacity = Sum of all PMem capacities + Sum of all DDR4 DIMM capacities.
  - MM: Total memory capacity = Sum of all PMem capacities (DDR4 DIMMs operate as cache only and do not count toward the total memory capacity).
- For detailed information of the capacity and type for a single DIMM, consult us.
- The maximum number of PMems supported is a function of the DIMM type and rank quantity.

Table 5-6 PMem Specifications

Item	Value	
Capacity per PMem (GB)	128	256
Rated speed (MT/s)	3,200	3,200
Operating voltage (V)	1.2	1.2
Maximum number of PMems supported in a server[a]	8	8
Maximum capacity of PMems supported in a server (GB)[b]	1,024	2,048
Actual speed (MT/s)	3,200	3,200
a: The maximum number of PMems supported is based on the 2-processor configuration. For the 1-processor configuration, the number should be halved. b: The maximum capacity of PMems supported varies with the operating modes of PMem. The information above is for reference only, consult your Customer Service for details.		

4. Population Rules

- General population rules for PMems:

- PMems must be used with DDR4 DIMMs.
- A server must use PMems with the same part number (P/N code).
- In a server, DDR4 DIMMs used with PMems must have the same part number (P/N code).

- Population rules for PMems in specific modes:
  - AD: In a server, the recommended capacity ratio of DDR4 DIMMs to PMems is between 1:4 and 1:8.
  - MM: In a server, the recommended capacity ratio of DDR4 DIMMs to PMems is between 1:4 and 1:16.

5. DIMM Slot Layout

Up to 8 PMems can be installed in a server, and PMems must be used with DDR4 DIMMs. PMem configuration must be compliant with the PMem population rules. Consult us for details.

Figure 5-9 DIMM Slot Layout

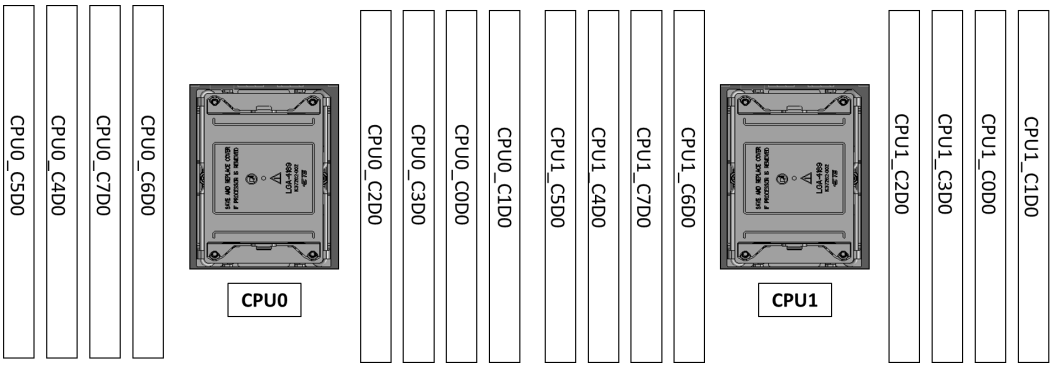


Table 5-7 PMem Population Rules (1-Processor Configuration)

DDR4 Qty	PMem Qty	CPU0							
		C0D0	C1D0	C2D0	C3D0	C4D0	C5D0	C6D0	C7D0
4	4	D	P	D	P	D	P	D	P
6	1	D	D	D	P	D	D	D	

Table 5-8 PMem Population Rules (2-Processor Configuration)

DDR4 Qty	PMem Qty	CPU0								CPU1							
		C0D0	C1D0	C2D0	C3D0	C4D0	C5D0	C6D0	C7D0	C0D0	C1D0	C2D0	C3D0	C4D0	C5D0	C6D0	C7D0
8	8	D	P	D	P	D	P	D	P	D	P	D	P	D	P	D	P
12	2	D	D	D	P	D	D	D		D	D	D	P	D	D	D	

NOTE

In the tables above, D denotes DDR4 DIMMs and P denotes PMems.

5.5 Storage

5.5.1 Drive Configurations

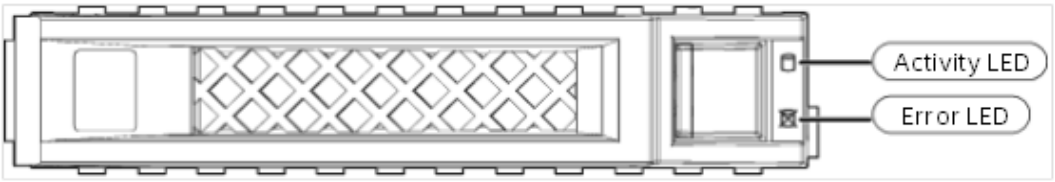
Table 5-9 Drive Configurations

Configuration	Front Drives	Rear Drives	Drive Management Mode
26 × 3.5-inch SAS/SATA Drive Configuration	8 × 3.5-inch drive (or 2.5-inch drive) on each of the 3 layers	2 × 3.5-inch drive	Expander - 1 × 8i RAID controller card
24 × 3.5-inch SAS/SATA Drive Configuration	8 × 3.5-inch drive (or 2.5-inch drive) on each of the 3 layers	Up to 8 × 2.5-inch NVMe SSD	1. SAS/SATA drive: Expander - 1 × 8i RAID controller card 2. NVMe drive: Directly connected to the CPU

5.5.2 Drive LEDs

1. SAS/SATA Drive LEDs

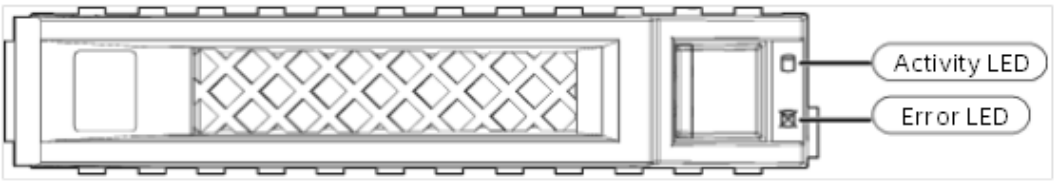
Figure 5-10 SAS/ SATA Drive LEDs



Activity LED (Green)	Error LED (Blue/Red)			Description
	Blue	Red		
Off	Off	With RAID created	Without RAID created	Drive is absent
		Solid on	Off	
Solid on	Off	Off		Drive is present but not in use
Flashing	Off	Off		Drive is present and in use
Flashing	Solid pink			Copyback/Rebuild in progress
Solid on	Solid on	Off		Drive is selected but not in use
Flashing	Solid on	Off		Drive is selected and in use
Off	Solid on	Off		Drive is selected and has failed
-	Off	Solid on		Drive has failed

2. NVMe Drive LEDs

Figure 5-11 NVMe Drive LEDs



When the VMD function is enabled and the latest VMD driver is installed, the NVMe drive supports RAID.

Table 5-10 NVMe LED Description

Activity LED (Green)	Error LED (Blue/Red)		Description
	Blue	Red	
Off	Off	Off	Drive is absent
Solid on	Off	Off	Drive is present but not in use
Flashing	Off	Off	Drive is present and in use
Flashing	Solid pink		Copyback/Rebuild/Initializing/ Verifying in progress
Solid on	Solid on	Off	Drive is selected but not in use

Activity LED (Green)	Error LED (Blue/Red)		Description
	Blue	Red	
Flashing	Solid on	Off	Drive is selected and in use
Off	Solid on	Off	Drive is selected and failed
-	Off	Solid on	Drive has failed

5.5.3 RAID Controller Card

The RAID controller card provides functions such as RAID configuration, RAID level migration, and disk roaming. For specific RAID controller card options, consult us or refer to 7.2 Hardware Compatibility.

5.6 Network

NICs provide network expansion capabilities.

- The OCP I/O slot supports the OCP 3.0 card. Users can select the OCP 3.0 card based on their needs.
- The PCIe expansion slots support PCIe NICs. Users can select the PCIe NICs based on their needs.
- For specific NIC options, consult us or refer to 7.2 Hardware Compatibility.

5.7 I/O Expansion

5.7.1 PCIe Cards

The PCIe cards provide system expansion capabilities.

- The server supports up to 7 PCIe 3.0 expansion slots, including 1 dedicated slot for the OCP 3.0 card.
- For specific PCIe card options, consult us or refer to 7.2 Hardware Compatibility.

5.7.2 PCIe Slots

PCIe Slot Locations:

Figure 5-12 6 × PCIe Slot Configuration

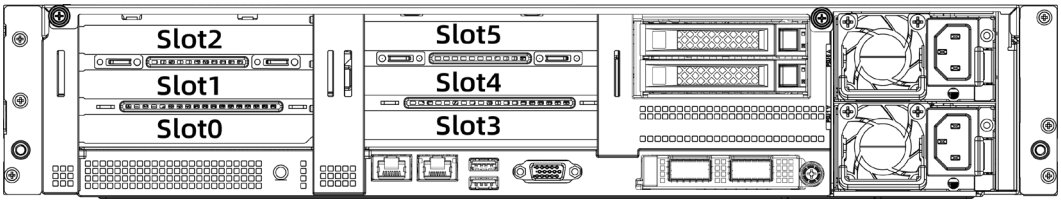


Figure 5-13 3 × PCIe Slot Configuration

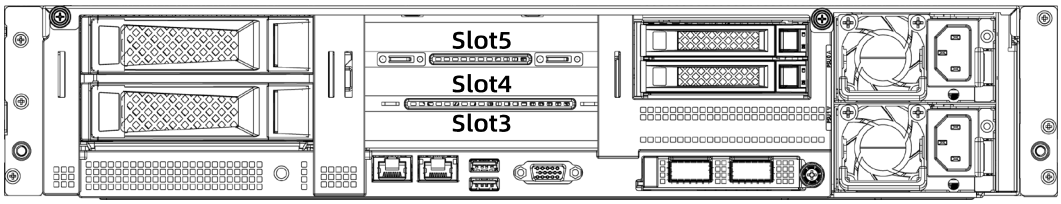


Figure 5-14 4 × PCIe Slot Configuration

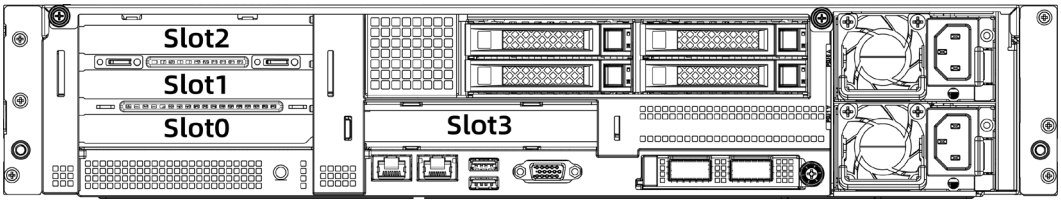
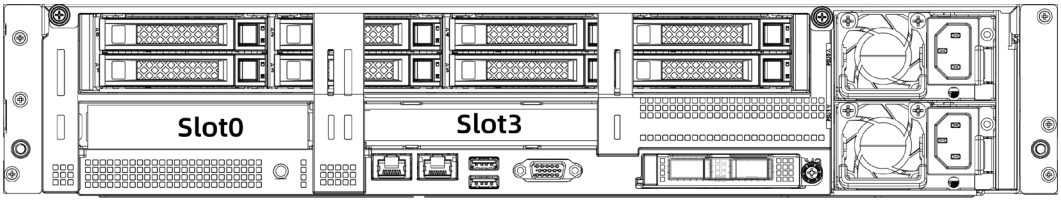


Figure 5-15 2 × PCIe Slot Configuration



5.7.3 PCIe Slot Description

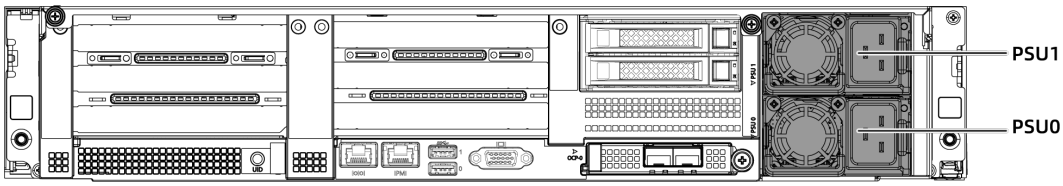
NOTE

When CPU1 is absent, its corresponding PCIe slots cannot be used.

5.8 PSUs

- The server supports 1 or 2 PSUs.
- The server supports AC or DC power input.
- The PSUs are hot-swappable.
- The server supports 1+1 redundancy when 2 PSUs are configured.
- The server must use PSUs with the same part number (P/N code).
- The server provides short-circuit protection and dual-live-wire input.

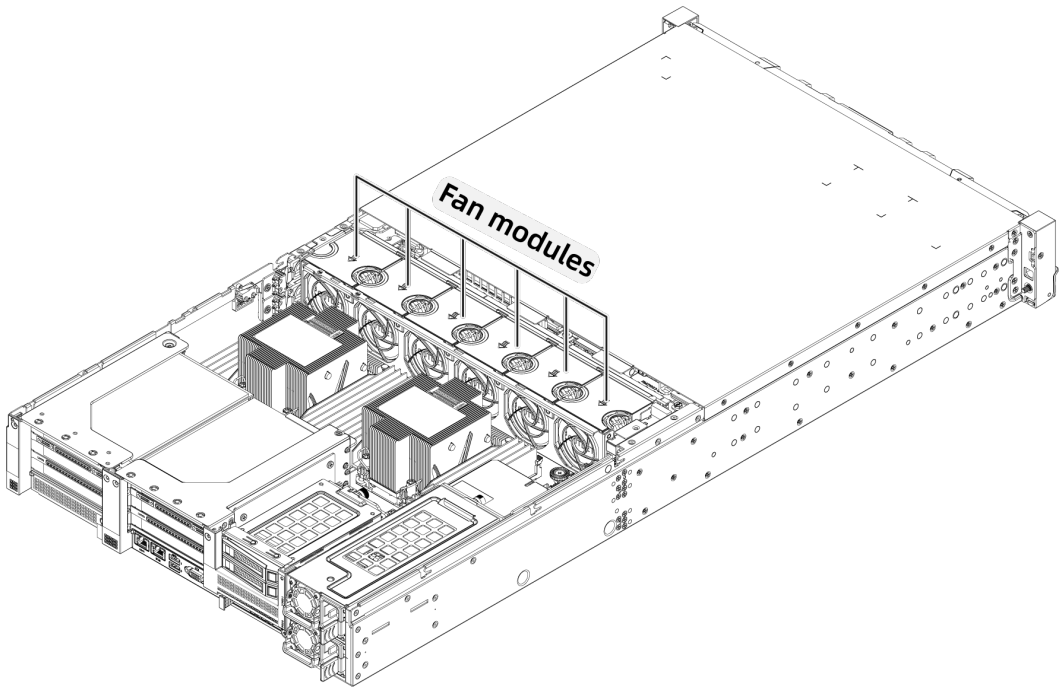
Figure 5-16 PSU Locations



5.9 Fans

- The server supports 6 fan modules. You can select 6038 and 6056 fans based on different configurations.
- The fans are hot-swappable.
- The server supports fans in N+1 redundancy, which means that the server can continue working properly when a single fan fails.
- The server supports intelligent fan speed control.
- The server must use fans with the same part number (P/N code).

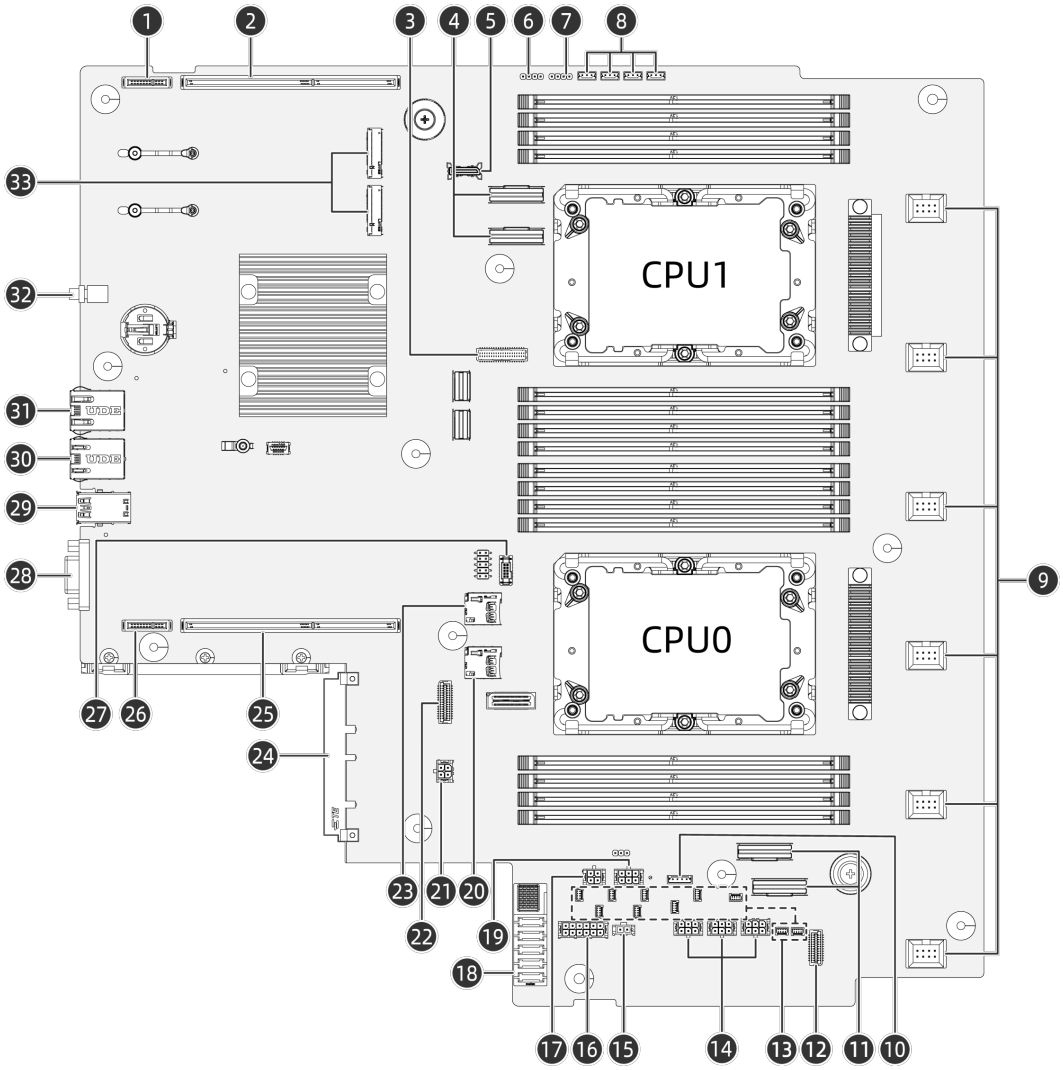
Figure 5-17 Fan Module Locations



5.10 Boards

5.10.1 Motherboard

Figure 5-18 Motherboard Layout



Item	Feature	Item	Feature
1	CPU1 Riser Card Power Connector	18	PSU Connector
2	CPU1 Riser Card High-Speed Signal Connector	19	FPGA Card Power Connector
3	CPU1 OCP Riser Card Sideband Connector or Smart NIC NC-SI Connector	20	BMC TF Card Connector
4	Slimline x8 Connector (SFF 8654 Connector) × 2	21	CPU1 OCP Riser Card Power Connector or MOC Power Connector

Item	Feature	Item	Feature
5	Intrusion Switch Connector	22	Rear M.2 Connector
6	BMC Serial Port Connector	23	PCH TF Card Connector
7	System Serial Port Connector	24	CPU0 OCP 3.0 Card Connector
8	Drive Drawer Pull Sensing Connector × 3	25	CPU0 Riser Card High-Speed Signal Connector
9	Fan Connector × 6	26	CPU0 Riser Card Power Connector
10	RAID Key Connector	27	VPP Bus Connector
11	Slimline x8 Connector (SFF 8654 Connector) × 2	28	VGA Port
12	Left Control Panel Connector	29	USB 3.0 Port × 2
13	I^2C Connector × 10	30	1,000 Mb Network Port
14	8 × 3.5-inch Front Backplane Power Connector × 3	31	Debug Serial Port
15	EXP Card Power Connector	32	UID/BMC RST Button and LED
16	MISC Power Connector	33	SATA/PCIe M.2 Connector × 2
17	2.5-inch Rear Backplane Power Connector		

6 Product Specifications

6.1 Technical Specifications

Table 6-1 Technical Specifications

Item	Description
Launch Time	2021
Chipset	Intel C621A
Form Factor	2U rack server
Processor	Supports one or two 3rd Gen Intel Xeon Scalable 4300, 5300, 6300 and 8300 series processors • Up to 36 cores • Max Turbo frequency at 3.7 GHz • 3 UPI links per CPU at up to 11.2 GT/s • L3 cache up to 1.5 MB per core • TDP up to 225 W Note: The above information is for reference only, see 7.2 Hardware Compatibility for details.
Memory	Up to 16 DIMM slots • Each processor supports 8 memory channels and each channel supports up to 1 DIMM slot • Up to 3,200 MT/s • Supports RDIMMs, LRDIMMs, NVDIMMs and BPS DIMMs • ECC, memory mirroring, and memory rank sparing Note: The above information is for reference only, see 7.2 Hardware Compatibility for details.
Storage	Front: • 24 × 3.5-inch hot-swap SATA/SAS drive (compatible with 2.5-inch drives) Rear: • 2-drive chassis supports 2 × NVMe drive or 2 × SAS/SATA drive

Item	Description
	• 4-drive chassis supports 4 × NVMe drive or 4 × SAS/SATA drive or 2 × NVMe drive + 2 × SAS/SATA drive or 8 × E1.S drive • 8-drive chassis supports 8 × NVMe drive or 4 × NVMe drive + 4 × SAS/SATA drive For more details, refer to 5.5.1 Drives
Network	Supports multiple types of network expansion • OCP 3.0 card - 2 slots support OCP 3.0 cards, which can be selected as needed (1 PCIe slot supports 1 OCP 3.0 card) - Hot-swappable Note: RHEL 7.9 supports hot-swap; Windows Server 2019 supports hot-swap when it starts up with the OCP 3.0 card installed; RHEL 8.x does not support hot-swap
I/O Expansion	• 2-drive chassis: Up to 7 standard PCIe expansion slots and up to 2 OCP 3.0 cards - 2 FHHL PCIe 4.0 x16 slots (1 PCIe slot supports 1 OCP 3.0 card) - 4 FHHL PCIe 3.0 x8 slots - 1 OCP 3.0 slot • 4-drive chassis: Up to 5 standard PCIe expansion slots and up to 2 OCP 3.0 cards - 2 FHHL PCIe 4.0 x16 slots (1 PCIe slot supports 1 OCP 3.0 card) - 2 FHHL PCIe 4.0 x8 slots - 1 OCP 3.0 slot • 8-drive chassis: Up to 3 standard PCIe expansion slots and up to 1 OCP 3.0 card - 2 FHHL PCIe 3.0 x8 slots - 1 OCP 3.0 slot
Port	Supports multiple ports • Rear:

Item	Description
	- 2 × USB 3.0 port - 1 × DB15 VGA port - 1 × BMC management network port Note: OS installation on the USB storage media is not recommended.
Storage Controller	• The RAID controller card controls all SAS/SATA drives • NVMe drives are directly connected to the CPU
Power Supply	• 1+1 redundant power supplies with the output power at 1,600 W/1,300 W/800W • 110 VAC to 230 VAC: 90 V to 264 V 240 VDC: 180 V to 320 V • 336 VDC: 260 V to 400 V • -48 VDC: -40 V to -72 V
System Management	Integrated with 1 independent 1,000 Mbps network port, dedicated to IPMI remote management

6.2 Environmental Specifications

Table 6-2 Environmental Specifications

Parameter	Description
Temperature[1,2,3]	• Operating: 5°C to 40°C (41°F to 104°F) • Storage (packed): -40°C to 70°C (-40°F to 158°F) • Storage (unpacked): -40°C to 55°C (-40°F to 131°F)
Relative Humidity (RH, non-condensing)	• Operating: 5% to 90% RH • Storage (packed): 5% to 93% RH • Storage (unpacked): 5% to 93% RH
Operating Altitude	≤ 3,050 m (10,007 ft)

Parameter	Description
	• 0 - 1,000 m (0 - 3,281 ft): The operating temperature ranges from 5°C to 40°C (41°F to 104°F). • 1,000 - 3,050 m (3,281 - 10,007 ft): The operating temperature ranges from 5°C to 32°C (41°F to 89.6°F).
Corrosive Airborne Contaminants	Maximum growth rate of corrosion film thickness: • Copper coupon: 300 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013) • Silver coupon: 200 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013)
Acoustic Noise[4,5,6]	Noise emissions are measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). Listed are the declared average bystander position A-weighted sound pressure levels (LpAm) at a server operating temperature of 23°C (73.4°F): • Idle: - LpAm: 79 dBA • Operating: - LpAm: 89 dBA

Notes:

1. Not all configurations support an operating temperature range of 5°C to 40°C (41°F to 104°F). The GPU configuration supports an operating temperature range of 10°C to 30°C (50°F to 86°F).
2. Standard operating temperature:
    - For temperatures between 10°C and 35°C (50°F and 95°F), de-rate the maximum allowable temperature by 1°C per 305 m (1°F per 556 ft) above sea level. Please keep the product away from direct sunlight. The maximum temperature gradient is 20°C/h (36°F/h) and the maximum operating altitude is 3,050 m (10,007 ft), both varying with server configuration.

- Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.

3. Expanded operating temperature:
   - As for certain approved configurations, the supported system inlet ambient temperature can be expanded to 5°C to 10°C (41°F to 50°F) and 35°C to 40°C (95°F to 104°F) at sea level. At an altitude of 900 to 3,050 m (2,953 to 10,007 ft), the maximum allowable operating temperature is reduced by 1°C per 175 m (1°F per 319 ft).
   - As for certain approved configurations, the supported system inlet ambient temperature can be expanded to 35°C to 40°C (95°F to 104°F) at sea level. At an altitude of 900 to 3,050 m (2,953 to 10,007 ft), the maximum allowable temperature is reduced by 1°C per 125 m (1°F per 228 ft).
   - Any fan failure or operations under expanded environments may lead to system performance degradation.
4. This document lists the LpAm of the product at a 23°C (73.4°F) ambient environment. All measurements are conducted in conformance with ISO 7779 (ECMA 74) and declared in conformance with ISO 9296 (ECMA 109). The listed sound levels apply to the standard configuration. Additional options may result in increased sound levels. Contact your sales representative for more information.
5. The sound levels shown here were measured based on the specific configuration of a server. Sound levels vary with server configuration. These values are for reference only and subject to change without notice.
6. Product conformance to cited normative standards is based on sample testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

6.3 Physical Specifications

Table 6-3 Physical Specifications

Item	Description
Dimensions	• With mounting ears: 482 × 87.5 × 891.2 mm (18.98 × 3.44 × 35.09 in.) (W × H × D) • Without mounting ears: 447 × 87.5 × 866 mm (17.60 × 3.44 × 34.09 in.) (W × H × D) • Packaging: 1,168 × 721 × 279 mm (45.98 × 28.39 × 10.98 in.) (L × W × H)

Item	Description
Weight	24 × 3.5-inch configuration • Net weight (unpacked): 45 kg (99.21 lbs) • Gross weight (including chassis, packaging, rails, and accessory box): 58 kg (127.87 lbs)

7 Operating System and Hardware Compatibility

This section describes the OS and hardware compatibility of the NF5266M6. For the latest compatibility configuration and the component models not listed in this document, contact your local sales representative.

IMPORTANT

- Using incompatible components may cause the server to work abnormally, and such failures are not covered by technical support or warranty.
- The server performance is strongly influenced by application software, middleware and hardware. The subtle differences in them may lead to performance variation in the application and test software.
  - For requirements on the performance of specific application software, contact your sales representatives to confirm the detailed hardware and software configurations during the pre-sales phase.
  - For requirements on hardware performance consistency, define specific configuration requirements (for example, specific drive models, RAID controller cards, or firmware versions) during the pre-sales phase.

7.1 Supported Operating Systems

Table 7-1 Supported Operating Systems

OS Vendor	Version
Microsoft	Windows Server 2016
	Windows Server 2019
Red Hat	Red Hat Enterprise Linux 7.9
	Red Hat Enterprise Linux 8.2
SUSE	SUSE Linux Enterprise Server 15.2
	SUSE Linux Enterprise Server 12.5
Oracle	Oracle Linux 7.9
	Oracle Linux 8.2
CentOS	CentOS 7.9
	CentOS 8.2
	CentOS 8.3

7.2 Hardware Compatibility

7.2.1 CPU Specifications

The NF5266M6 supports up to 2 Intel Xeon Scalable processors. The 83XX series supports a max memory speed of 3,200 MHz, 63XX series supports a max memory speed of 2,933 MHz, and 53XX series supports a max memory speed of 2,666 MHz.

Table 7-2 CPU Specifications

Model	Cores	Threads	Base Frequency (GHz)	Max Turbo Frequency (GHz)	Cache (MB)	TDP (W)
4310	12	24	2.1	3.3	18	120
4314	16	32	2.4	3.4	24	135
4316	20	40	2.3	3.4	30	150
5317	12	24	3	3.6	18	150
5320	26	52	2.2	3.4	39	185
6326	16	32	2.9	3.5	24	185
6330	28	56	2	3.1	42	205
6334	8	16	3.6	3.7	18	165
6338	32	64	2	3.2	48	205
6346	16	32	3.1	3.6	36	205
6354	18	36	3	3.6	39	205
4309Y	8	16	2.8	3.6	12	105
4310T	10	20	2.3	3.4	15	105
5315Y	8	16	3.2	3.6	12	140
5318N	24	48	2.1	3.4	36	150
5318S	24	48	2.1	3.4	36	165
5318Y	24	48	2.1	3.4	36	165
5320T	20	40	2.3	3.5	30	150
6330N	28	56	2.2	3.4	42	165
6336Y	24	48	2.4	3.6	36	185
6338N	32	64	2.2	3.5	48	185
6338T	24	48	2.1	3.4	36	165
8351N	36	72	2.4	3.5	54	225
8352S	32	64	2.2	3.4	48	205
8352V	36	72	2.1	3.5	54	195
8352Y	32	64	2.2	3.4	48	205

7.2.2 DIMM Specifications

The NF5266M6 supports up to 16 DDR4 DIMMs. Each processor supports 8 memory

channels and each channel supports 1 DIMM slot. The server supports RDIMMs/BPS DIMMs.

Table 7-3 DIMM Specifications

Type	Max Memory Capacity (GB)	Description
RDIMM	256	16 × 16 GB RDIMM at 3,200 MT/s
	512	16 × 32 GB RDIMM at 3,200 MT/s
	1,024	16 × 64 GB RDIMM at 3,200 MT/s
	2,048	16 × 128 GB RDIMM at 3,200 MT/s
BPS	1,024	8 × 128 GB BPS at 2,666 MT/s
	2,048	8 × 256 GB BPS at 2,666 MT/s

7.2.3 NIC Specifications

Table 7-4 OCP Card Specifications

Type	Model & Description	Speed	Network Port Qty.
OCP	X710 OCP 3.0 Card	Gen3	2
	SND X550 OCP 3.0 Card	Gen3	2
	I350 Dual Port OCP 3.0 Card	Gen3	2
	Mellanox CX6 LX Dual Port OCP 3.0 Card	Gen4	2
	BRCM 57414 OCP 3.0 Card	Gen3	2
	Mellanox CX5 Dual Port OCP 3.0 Card	Gen3	2
	E810 Dual Port OCP 3.0 Card	Gen4	2
	Intel E810 Dual Port OCP 3.0 Card	Gen4	2
	Mellanox OCP 3.0 200 Gb NIC	Gen4	2

Table 7-5 PCIe NIC Specifications

Type	Model & Description	Speed	Network Port Qty.
PCIe NIC	82599 Dual Port Standard NIC	Gen3	2
	Intel 82599 Dual Port Standard NIC	Gen3	2
	Intel X710 Dual Port Standard NIC	Gen3	2
	X710 Dual Port Standard NIC	Gen3	2
	MCX4121A Dual Port Standard NIC	Gen3	2
	X2522 Low Latency NIC	Gen3	2
	X550 Dual Port Standard NIC	Gen3	2
	Intel X550 Dual Port Standard NIC	Gen3	2
	SND Dual Port I350 Standard NIC	Gen3	2
	I350 Four Port Standard NIC	Gen3	4

Type	Model & Description	Speed	Network Port Qty.
	Mellanox CX4 LX Dual Port Standard NIC	Gen3	2
	Mellanox CX5 Dual Port Standard NIC	Gen3	2
	Intel E810 Dual Port Standard NIC	Gen4	2
	BRCM 57414 Standard NIC	Gen3	2
	Intel XL710 Standard NIC	Gen3	2
	BRCM Dual Port 25 Gb Stingray-2 NIC	Gen5	2
	Mellanox Bluefield-2 25 Gb NIC	Gen4	2
	Mellanox CX5 Dual Port Standard NIC	Gen4	2
	BRCM 57508 Dual Port Standard NIC	Gen4	2
	Intel E810 Dual Port Standard NIC	Gen4	2

7.2.4 Drive Specifications

Table 7-6 SAS/SATA HDD Specifications

Form Factor and Type	Speed (rpm)	Capacity
2.5-inch SAS HDD	10k	600 GB/1.2 TB/1.8 TB/2.4 TB
2.5-inch SAS HDD	15k	300 GB/600 GB/900 GB
3.5-inch SATA HDD	7.2k	2 TB - 18 TB
3.5-inch SAS HDD	7.2k	2 TB - 18 TB

Table 7-7 SAS/SATA SSD Specifications

SSD Using Different Interfaces	Type	Capacity
SAS SSD	Read-intensive SSD	240 GB/480 GB/960 GB/1.92 TB/3.84 TB/7.68 TB
	Write-intensive SSD	1.6 TB/3.2 TB/6.4 TB
SATA SSD	M.2 SSD	240 GB/480 GB/960 GB/1.92 TB

Table 7-8 U.2 NVMe SSD Specifications

SSD Type	Type	Capacity
NVMe SSD	U.2 read-intensive SSD	960 GB/1.92 TB/3.84 TB/7.68 TB
	U.2 write-intensive SSD	1.6 TB/3.2 TB/6.4 TB

7.2.5 SAS/RAID Controller Card Specifications

Table 7-9 SAS/RAID Controller Card Specifications

Type	Model & Description
SAS Controller Card	PM8222-HBA/SHBA
	3008IR/IT/IMR
	Broadcom SAS9500-8i
	Broadcom SAS9400-8i
RAID Controller Card	PM8204 - 2 GB/4 GB
	Broadcom SAS9560-8i 4 GB
	Broadcom SAS9460-8i 2 GB
	Broadcom SAS9361-8i 1 GB/2 GB
	Broadcom SAS9460-16i 4 GB
	Marvell 9230 M.2 RAID Controller Card

7.2.6 HBA/HCA Card Specifications

Table 7-10 HBA Card Specifications

Type	Model & Description	Speed
HBA Card	8 Gb Single and Dual Port	Gen3
	16 Gb Single and Dual Port	Gen3
	32 Gb Single and Dual Port	Gen4

Table 7-11 HCA Card Specifications

Type	Model & Description	Speed
HCA Card	8 Gb Single and Dual Port	Gen3
	200 Gb MCX6 Single and Dual Port	Gen4

7.2.7 PSU Specifications

The PSUs follow the Intel Common Redundant Power Supply (CRPS) specification. The PSUs share a common electrical and structural design that allows for hot-swap and tool-less installation into the server with the PSUs locking automatically after being inserted into the power bay. Up to 2 PSUs are supported. The PSUs are 80 Plus Platinum certified. The server offers various output powers, allowing customers to choose based on the actual configuration.

- The following rated 110 VAC to 230 VAC and 240 VDC power supplies are supported:

- 800 W Platinum level PSUs: 800 W (230 VAC), 800 W (240 VDC for China)
- 1,300 W Platinum level PSUs: 1,000 W (110 VAC), 1,300 W (230 VAC), 1,300 W (240 VDC for China)
- 1,600 W Platinum level PSUs: 1,000 W (110 VAC), 1,600 W (230 VAC), 1,600 W (240 VDC for China)
- 1,300 W Titanium level PSUs: 1,000 W (110 VAC), 1,300 W (230 VAC), 1,300 W (240 VDC for China)

IMPORTANT

At a rated voltage of 110 VAC, a 1,300 W or higher power supply will be derated to 1,000 W.

Input voltage range:

- 110 VAC to 230 VAC: 90 V to 264 V
- 240 VDC: 180 V to 320 V

- The following rated 336 VDC power supplies are supported:
  - 1300 W 336 VDC PSUs: 1300 W (336 VDC)

  Input voltage range:

  - 336 VDC: 260 V to 400 V
  - 230 VAC: 176 V to 264 V
- The following rated -48 VDC power supplies are supported:
  - 1300 W -48 VDC PSUs: 1300 W (-48 VDC)

  Input voltage range:

  - -48 VDC: -40 V to -72 V

8 Regulatory Information

8.1 Safety

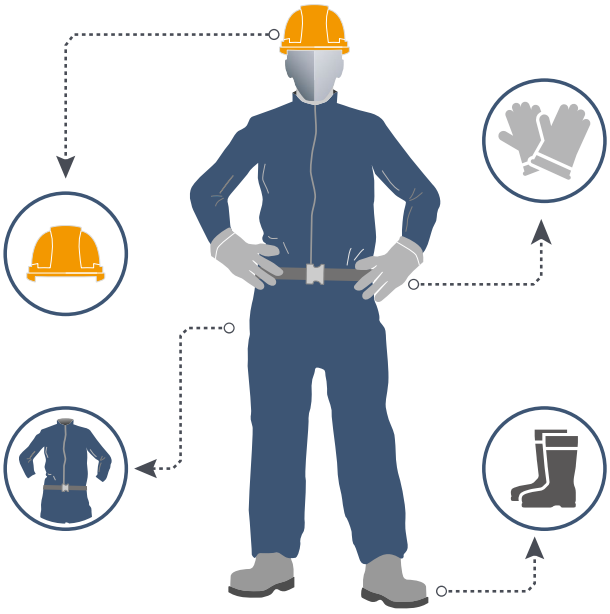
8.1.1 General

- Strictly comply with local laws and regulations while installing the equipment. The safety instructions in this section are only a supplement to local safety regulations.
- To ensure personal safety and to prevent damage to the equipment, all personnel must strictly observe the safety instructions in this section and on the device labels.
- People performing specialized activities, such as electricians and electric forklift operators, must possess qualifications recognized by the local government or authorities.

8.1.2 Personal Safety

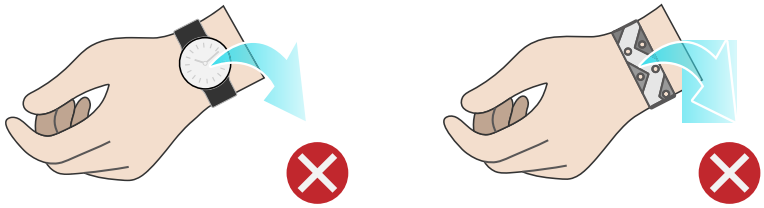
- Only personnel certified or authorized by us are allowed to perform the installation procedures.
- Stop any operation that could cause personal injury or equipment damage. Report to the project manager and take effective protective measures.
- Working during thunderstorms, including but not limited to handling equipment, installing cabinets and installing power cords, is forbidden.
- Do not carry the weight over the maximum load per person allowed by local laws or regulations. Arrange appropriate installation personnel and do not overburden them.
- Installation personnel must wear clean work clothes, work gloves, safety helmets and safety shoes, as shown in Figure 8-1

Figure 8-1 Protective Clothing



- Before touching the equipment, put on ESD clothes and ESD gloves or an ESD wrist strap, and remove any conductive objects such as wrist watches or metal jewelry, as shown in Figure 8-2, in order to avoid electric shock or burns.

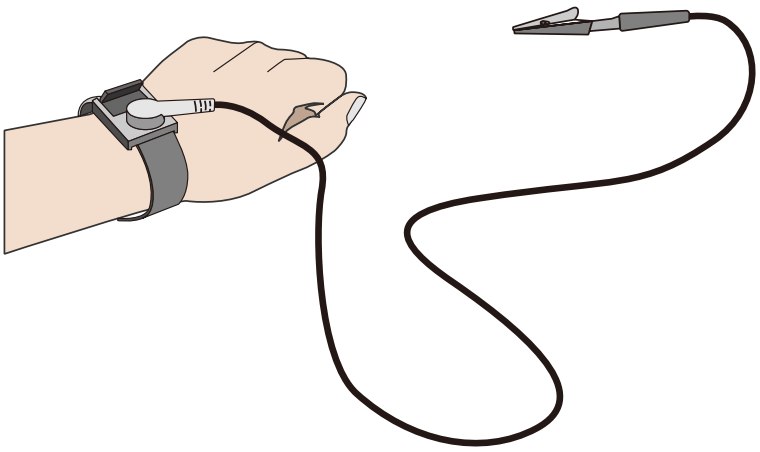
  Figure 8-2 Removing Conductive Objects



How to put on an ESD strap (Figure 8-3)

1. Put your hand through an ESD wrist strap.
2. Tighten the strap buckle to ensure a snug fit.
3. Plug the alligator clip of the ESD wrist strap into the corresponding jack on the grounded cabinet or grounded chassis.

Figure 8-3 Wearing an ESD Wrist Strap



- Use tools correctly to avoid personal injury.
- When moving or lifting equipment above shoulder height, use lifting devices and other tools as necessary to avoid personal injury or equipment damage due to equipment slippage.
- The power sources of the server carry a high voltage. Direct contact or indirect contact through damp objects with the high-voltage power source is fatal.
- To ensure personal safety, ground the server before connecting power.
- When using ladders, always have someone hold and guard the bottom of the ladders. In order to prevent injury, never use a ladder alone.
- When connecting, testing or replacing optical fiber cable, avoid looking into the optical port without eye protection in order to prevent eye damage from laser light.

8.1.3 Equipment Safety

- To ensure personal safety and prevent equipment damage, use only the power cords and cables that come with the server. Do not use them with any other equipment.
- Before touching the equipment, put on ESD clothing and ESD gloves to prevent static electricity from damaging the equipment.
- When moving the server, hold the bottom of the server. Do not hold the handles of any module installed in the server, such as PSUs, fan modules, drive modules, or motherboard. Handle the equipment with care at all times.
- Use tools correctly to avoid damage to the equipment.
- Connect the power cords of active and standby PSUs to different PDUs to ensure high system reliability.

- To ensure equipment safety, always ground the equipment before powering it on.

8.1.4 Transportation Precautions

Contact the manufacturer for precautions before transportation as improper transportation may damage the equipment. The precautions include but not limited to:

- Hire a trusted logistics company to move all equipment. The transportation process must comply with international transportation standards for electronic equipment. Always keep the equipment being transported right-side up. Avoid collision, moisture, corrosion, packaging damage or contamination.
- Transport the equipment in its original packaging.
- If the original packaging is unavailable, separately package heavy and bulky components (such as chassis, blade servers and blade switches), and fragile components (such as optical modules and PCIe cards).
- Power off all equipment before shipping.

8.1.5 Manual Handling Weight Limits

 CAUTION

Observe local laws or regulations regarding the manual handling weight limits per person. The limits shown on the equipment and in the document are recommendations only.

Table 8-1 lists the manual handling weight limits per person specified by some organizations.

Table 8-1 Manual Handling Weight Limits per Person

Organization	Weight Limit (kg/lbs)
European Committee for Standardization (CEN)	25/55.13
International Organization for Standardization (ISO)	25/55.13
National Institute for Occupational Safety and Health (NIOSH)	23/50.72
Health and Safety Executive (HSE)	25/55.13
General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ)	• Male: 15/33.08 • Female: 10/22.05

9 Limited Warranty

This limited warranty applies only to the original purchasers of our products who are direct customers or distributors of us (“Customer”).

We warrant all our hardware products, if properly used and installed, to be free from defects in material and workmanship within the warranty period. The term “Hardware Product” is limited to the hardware components and required firmware. The term “Hardware Product” DOES NOT include software applications or programs, and DOES NOT include products or peripherals that are not supplied by us. We may, at our discretion, repair or replace the defective parts. Repair or replacement parts may be new, used, or equivalent to new in performance and reliability. Repair or replacement parts are warranted to be free of defects in material or workmanship for ninety (90) calendar days or for the remainder of the warranty period of the product, whichever is longer.

Service offerings may vary by geographic region. Please contact your representative to identify service levels and needs for your region.

9.1 Warranty Service

Our warranty service includes 24 × 7 remote technical support, RMA (Return Material Authorization) Service, ARMA (Advanced Return Material Authorization) Service, 9 × 5 × NBD (Next Business Day) Onsite Service and 24 × 7 × 4 Onsite Service.

9.1.1 Remote Technical Support

The 24 × 7 remote technical support can be obtained through hotline, e-mail, and Service Portal*[1]. Through hotline and e-mail support, our engineers help customers diagnose the causes of malfunctions and provide solutions. Service Portal*[1] provides access to firmware, customized update files, and related manuals for Hardware Products. Customer may also access the Service Portal*[1] to submit an RMA request or an ARMA request for parts replacement or repair.

Information needed when requesting support:

- Contact name, phone number, e-mail address
- System serial number, part number, model and location (address) of the product needing service
- Detailed description of problem, logs (SELs and blackbox logs, and any other related logs from OS), screenshot of issue, pictures of damaged/faulty parts, etc.

9.1.2 RMA Service

Standard Replacement: When a hardware failure occurs, Customer may submit an RMA request to us via e-mail or Service Portal*[1]. We will review and approve the RMA submission at our own discretion, and provide an RMA number and return information that Customer may use to return the defective part(s) for the RMA service. We will ship out replacement part(s) within one (1) business day after receiving the defective part(s) and cover one-way shipment.

NOTE

- Customer should return the defective parts in their original packaging to our designated service center at their own expense.
- After our further diagnosing and testing, if the defective parts conform to our repair policy, we will ship out the repair or replacement parts at our own expense; otherwise, we will return the defective parts at Customer's expense.
- If Customer needs to designate a logistics company, allocation of the shipping cost to us/Customer will be redefined.

9.1.3 ARMA Service

Advanced Replacement: If a problem with our hardware products cannot be resolved via hotline or e-mail support and replacement part(s) are required, we will ship out replacement part(s) in advance within one (1) business day. Customer should return defective part(s) within five (5) business days after receiving the replacement(s).The shipping cost coverage varies by region. Contact your sales representative for details.

NOTE

- Customer should return the defective parts in their original packaging to our designated service center.
- We will ship out the replacement parts at our own expense after completing remote diagnosis.
- If Customer needs to designate a logistics company, allocation of the shipping cost to us/Customer will be redefined.

9.1.4 9 × 5 × NBD Onsite Service

When we ultimately determine that an onsite service call is required to repair or replace a defect, the call will be scheduled in accordance with the Response Time Commitment. The response time is measured from the time when the remote troubleshooting is completed and logged to the arrival of a service engineer and parts to Customer location for repair.

NOTE

9 × 5 × NBD: Our service engineer typically arrives at the customer's data center on the next business day. Service engineers are available on local business day from 9:00 am to 6:00 pm local time. Calls received/dispatches after 5:00 pm local time will require an additional day for the service engineer to arrive.

9.1.5 24 × 7 × 4 Onsite Service

When we ultimately determine that an onsite service call is required to repair or replace a defect, the call will be scheduled in accordance with the Response Time Commitment. The response time is measured from the time when the remote troubleshooting is completed and logged to the arrival of a service engineer and parts to Customer location for repair.

NOTE

24 × 7 × 4: Our service engineer typically arrives at the customer site within 4 hours. Service engineers are available at any time, including weekends and local national holidays.

9.2 Our Service SLA

We offer a variety of Service Level Agreements (SLA)*[2] to meet customer requirements.

- RMA Service
- ARMA Service
- 9 × 5 × NBD Onsite Service
- 24 × 7 × 4 Onsite Service

9.3 Warranty Exclusions

We do not guarantee that there will be no interruptions or mistakes during the use of the products. We will not undertake any responsibility for the losses arising from any operation not conducted according to instructions intended for Hardware Products.

The Limited Warranty does not apply to

- expendable or consumable parts, such as, but not limited to, batteries or protective coatings that are designed to diminish over time, unless failure has occurred during DOA period due to a defect in material or workmanship;
- any cosmetic damage, such as, but not limited to, scratches, dents, broken plastics, metal corrosion, or mechanical damage, unless failure has occurred during DOA period due to a defect in material or workmanship;
- damage or defects caused by accident, misuse, abuse, contamination, improper or inadequate maintenance or calibration or other external causes;
- damage or defects caused by operation beyond the parameters as stipulated in the user documentation;
- damage or defects by software, interfacing, parts or supplies not provided by us;
- damage or defects by improper storage, usage, or maintenance;
- damage or defects by virus infection;
- loss or damage in transit which is not arranged by us;
- Hardware Products that have been modified or serviced by non-authorized personnel;
- any damage to or loss of any personal data, programs, or removable storage media;
- the restoration or reinstallation of any data or programs except the software installed by us when the product is manufactured;
- any engineering sample, evaluation unit, or non-mass production product that is not covered under warranty service;
- any solid-state drive (SSD) which has reached its write endurance limit.

In no event will we be liable for any direct loss of use, interruption of business, lost profits, lost data, or indirect, special, incidental or consequential damages of any kind regardless of the form of action, whether in contract, tort (including negligence), strict liability or otherwise, even if we have been advised of the possibility of such damage, and whether or not any remedy provided should fail of

its essential purpose.

*1 Service Portal availability is subject to customer type and customer location. Please contact your representative to learn more.

*2 Not all SLA offerings are available at all customer locations. Some SLA offerings may be limited to geolocation and/or customer type. Please contact your representative to learn more.

10 System Management

10.1 Intelligent Management System ISBMC

ISBMC, a remote server management system, supports mainstream management specifications in the industry such as IPMI 2.0 and Redfish 1.8. ISBMC features high operational reliability, easy serviceability for different business scenarios, accurate and comprehensive fault diagnosis capabilities, and industry-leading security reinforcement capabilities.

ISBMC supports:

- IPMI 2.0
- Redfish 1.8
- SNMP v1/v2c/v3
- HTML5/Java remote consoles (Keyboard Video Mouse)
- remote virtual media
- login via web browsers
- intelligent fault diagnosis

Table 10-1 ISBMC Features

Feature	Description
Management Interface	Supports extensive remote management interfaces for various server O&M scenarios. The supported interfaces include: • IPMI • SSH CLI • SNMP • HTTPS • Web GUI • Redfish • RESTFul • DCMI • Syslog

Feature	Description
Accurate and Intelligent Fault Location	IDL, a fault diagnosis system, offers accurate and comprehensive hardware fault location capabilities, and outputs detailed fault causes and handling suggestions.
Alert Management	Supports rich automatic remote alert capabilities, including proactive alerting mechanisms such as SNMP Trap (v1/v2c/v3), email alerts and syslog remote alerts to ensure 24 × 7 reliability.
Remote Console KVM	Supports HTML5- and Java-based remote console to remotely control and operate the monitor/mouse/keyboard of the server, providing highly available remote management capabilities without on-site operation.
Virtual Network Console (VNC)	Supports mainstream third-party VNC clients without relying on Java, improving management flexibility.
Remote Virtual Media	Supports virtualizing images, USB devices, folders and local media devices as media devices of remote servers, simplifying OS installation, file sharing, and other O&M tasks.
Web GUI	Supports the visual management interface developed by us, displaying abundant information of the server and components, and offers easy-to-use Web GUIs.
Crash Screenshot and Manual Screenshot	• Supports automatic crash screenshot with the last screen before crash saved. • Provides manual screenshot, which can quickly capture the screen for easy inspection at scheduled time.
Dual Flash and Dual Image	Supports dual flash and dual image, enabling automatic flash failover in case of software or flash corruption, improving operational reliability.
Power Capping	Supports power capping, increasing deployment density and reducing energy consumption.
IPv4/IPv6	Supports both IPv4 and IPv6, enhancing network deployment flexibility.
Auto-Switching of Management Network Port	Supports auto-switching between the dedicated management network port and shared management network port, providing customers with flexible network deployment solutions for different management network deployment scenarios.
ISBMC Self-Diagnosis and Self-Recovery System	• Supports the reliable dual watchdog mechanism for hardware and software, enabling automatic restoration of BMC in case of BMC abnormality.

Feature	Description
	• Provides a thermal protection mechanism, which is automatically triggered when the BMC is abnormal to ensure that the fan operates at safe speeds to avoid system overheating. • Supports self-diagnosis of processors, memory modules, and storage devices of ISBMC, and automatically cleans the workload to restore to normal when the device usage rate is too high.
Power Control	Supports virtual power buttons for power on/off, power cycle and reset.
UID LED	• Supports remote lighting of the UID LED for locating the server in the server room.
Secure Firmware Update	• Supports firmware update based on secure digital signatures. • Supports mismatch prevention mechanism for firmware from different manufacturers and firmware for different server models. • Supports firmware update of BMC/BIOS/CPLD/PSU.
Serial Port Redirection	Supports remote redirection of the system serial port, BMC serial port and other serial ports, and directs the server-side serial port output to the local administrator via the network for server debugging.
Storage Information Display	• Displays RAID logical array information and drive information. • Supports remote RAID creation for improved deployment efficiency.
User Role Management	Supports user detail management based on user roles and flexible creation of user roles with different privileges, and provides more user roles to allow administrators to grant different privileges to O&M personnel.
Security Features	Adopts the industry-leading server security baseline standard V2.0. SSH, HTTPS, SNMP and IPMI use secure and reliable algorithms. ISBMC offers capabilities including secure update and boot and security reinforcement mechanisms such as anti-replay, anti-injection, and anti-brute force.

10.2 InManage

The server is compatible with the latest version of InManage, a new-generation infrastructure O&M management platform for data centers.

Built on cutting-edge O&M concepts, InManage provides users with leading and efficient overall management solutions for data centers to ensure advanced infrastructure management. This platform provides a rich set of functions such as centralized asset management, in-depth fault diagnosis, component fault early warning, intelligent energy consumption management, 3D automatic topologies, and stateless automatic deployment. With these functions, users can implement centralized O&M of servers, storage devices, network devices, security devices, and edge devices, effectively improving O&M efficiency, reducing O&M costs, and ensuring the secure, reliable, and stable operation of data centers. InManage offers:

- lightweight deployment in multiple scenarios and full lifecycle management of devices
- high reliability and on-demand scalability enabled by 1 to N data collectors
- intelligent asset management and real-time tracking of asset changes
- comprehensive monitoring for overall business control
- intelligent fault diagnosis for reduced maintenance time
- second-level performance monitoring for real-time status of devices
- batch configuration, deployment and update, shortening the time needed to bring the production environment online
- improved firmware version management efficiency
- standardized northbound interfaces for easy integration and interfacing

Table 10-1 InManage Features

Feature	Description
Home	• Display of basic information (data centers, server rooms, cabinets, assets and alerts), quick addition of devices and custom home page

Feature	Description
Assets	• Batch asset import, automatic asset discovery, and full lifecycle management of assets • Management of the full range of our server family, including general-purpose rack servers, AI servers, multi-node servers, edge servers and all-in-one servers • Management of our general-purpose disk arrays and distributed storage devices • Management of network devices (switches, routers, etc.), security devices (firewalls, load balancers, etc.), cabinets and clouds • Management of data centers • Asset warranty information management, asset inventory reports for server acceptance, asset attribute expansion, etc.
Monitor	• Display of real-time alerts, history alerts, blocked alerts and events • Fault prediction of drives and memories • Custom inspection plan and inspection result management • Notification record viewing • Intelligent fault diagnosis and analysis, automatic fault reporting and repair ticket viewing • Trap management and Redfish management • Management of monitoring rules, such as alert rules, notification rules, blocking rules, alert noise reduction rules, compression rules and fault reporting rules, and redefinition of the above rules.
Control	• Quick start of firmware update, OS installation, power management, drive data erasing and stress test

Feature	Description
	• Batch firmware update (BMC/BIOS/RAID Card/NIC/Drive/HBA Card/MB CPLD/BP CPLD/PSU) • Batch firmware configuration (BMC/BIOS) • Batch RAID configuration and OS deployment for servers • Secure and quick drive data erasing • CPU and memory stress test • Automatic firmware baseline management • BMC and BIOS snapshot management • Repositories for update files
Energy Efficiency	• Overview of data center power consumption trend chart and carbon emission trend chart • Setting of server dynamic power consumption policies and minimum power consumption policies • Server temperature optimization, utilization optimization, power consumption characteristics analysis, power consumption prediction, load distribution, etc. • Carbon asset and carbon emission management
Log	• Fault log record management • Diagnosis record and diagnosis rule management
Topologies	• Centralized management of multiple data centers and panoramic 3D views, including dynamic display of power consumption, temperature, alerts and cabinet capacity of the data center • Network topologies
Reports	• Management of warranty information reports, alert reports, asset reports, hardware reports and performance reports • Export of reports in .xlsx format

Feature	Description
System	• Password management, alert forwarding and data dump • Customized InManage parameters
Security	Security control of InManage via a set of security policies such as user management, role management, authentication management (local authentication and LDAP authentication) and certificate management.

10.3 InManage Tools

Table 10-2 Features of InManage Tools

Feature	Description
InManage Kits	A lightweight automatic batch O&M tool for servers, mainly used for server deployment, routine maintenance, firmware update, fault handling, etc.
InManage Boot	A unified batch management platform for bare metals, with features including firmware management, hardware configuration, system deployment and migration, stress test and in-band management
InManage Server CLI	Fast integration with third-party management platforms, delivering a new O&M mode of Infrastructure as Code (IaC)
InManage Driver	Operates under the OS and gets system asset and performance information via the in-band mode, providing users with more comprehensive server management capabilities
InManage Server Provisioning	Offers users with RAID configuration, intelligent OS installation, firmware update, hardware diagnosis, secure erasing and software upgrade, using the TF card as the carrier

11 Certifications

Table 11-1 Certifications

Country/Region	Certification	Mandatory/Voluntary
International Mutual Recognition	CB	Voluntary

12 Appendix A

12.1 Operating Temperature Specification Limits

Table 12-1 Operating Temperature Specification Limits

Configuration	Max. Operating Temp.: 30°C (86°F)	Max. Operating Temp.: 35°C (95°F)	Max. Operating Temp.: 40°C (104°F)
2SFF + 6PCIe	All configurations supported	• Rear LFF not supported • NVMe drives of more than 4 TB and CPUs with TDP higher than 185 W not supported at the same time	• Rear LFF not supported • NVMe drives of more than 4 TB and CPUs with TDP higher than 165 W not supported
4SFF + 4PCIe	All configurations supported	Rear 8 × E1.S not supported	Rear 8 × E1.S not supported
8SFF + 2PCIe	All configurations supported	NVMe drives of more than 4 TB and CPUs with TDP higher than 185 W not supported at the same time	NVMe drives of more than 4 TB and CPUs with TDP higher than 185 W not supported at the same time

12.2 Model

Table 12-2 Model

Certified Model	Description
NF5266M6	Global

12.3 RAS Features

The NF5266M6 supports a variety of RAS (Reliability, Availability, and Serviceability) features. By configuring these features, the NF5266M6 can provide greater reliability, availability, and serviceability.

12.4 Sensor List

Table 12-3 Sensor List

Sensor	Description	Sensor Location
Inlet_Temp	Air inlet temperature	Right mounting ear
Outlet_Temp	Air outlet temperature	BMC
PCH_Temp	PCH bridge chip temperature	Motherboard
CPUn_Temp	CPUn core temperature	CPUn n indicates the CPU number with a value of 0 - 1
CPUn_DTS	CPUn DTS value	CPUn n indicates the CPU number with a value of 0 - 1
CPUn_DDR_DIMM_T	CPUn DIMM temperature	DIMM (CPUn) n indicates the CPU number with a value of 0 - 1
CPUn_NVDIMM_T	CPUn NVDIMM temperature	NVDIMM (CPUn) n indicates the CPU number with a value of 0 - 1
PSUn_Temp	PSUn temperature	The corresponding power supply for PSUn n indicates the PSU number with a value of 0 - 1
HDD_MAX_Temp	The maximum temperature among all drives	Drives attached to the drive backplane
NVME_R_MAX_T	The maximum temperature among all rear NVMe drives	Rear NVMe drives
OCP_NICn_Temp	OCP NICn temperature	The corresponding OCP card for NICn n indicates the OCP number with a value of 0 - 1
OCP_RAID_Temp	RAID mezz card temperature	RAID mezz card
PCIe_NIC_Temp	The maximum temperature among the PCIe NICs	PCIe NIC

Sensor	Description	Sensor Location
RAID_Temp	The maximum temperature among all PCIe RAID controller cards	PCIe RAID controller card
PCIe_SSD_Temp	The maximum temperature among the PCIe SSDs	PCIe SSD
SYS_12V	12 V voltage supplied by motherboard to CPU	Motherboard
SYS_5V	5 V voltage supplied by motherboard to BMC	Motherboard
SYS_3V3	3.3 V voltage supplied by motherboard to BMC	Motherboard
CPUn_DDR_VDDQ1	1.2 V DIMM voltage	Motherboard n indicates the CPU number with a value of 0 - 1
CPUn_DDR_VDDQ2	1.2 V DIMM voltage	Motherboard n indicates the CPU number with a value of 0 - 1
CPUn_DDR_VPP1	VPP1 DIMM voltage	Motherboard n indicates the CPU number with a value of 0 - 1
CPUn_DDR_VPP2	VPP2 DIMM voltage	Motherboard n indicates the CPU number with a value of 0 - 1
CPUn_Vcore	CPUn Vcore voltage	Motherboard n indicates the CPU number with a value of 0 - 1
CPUn_VCCIO	CPUn VCCIO voltage	Motherboard n indicates the CPU number with a value of 0 - 1
PSUn_VIN	PSUn input voltage	Motherboard n indicates the PSU number with a value of 0 - 1
PSUn_VOUT	PSUn output voltage	Motherboard n indicates the PSU number with a value of 0 - 1
RTC_Battery	Motherboard RTC battery voltage	RTC battery on motherboard
FANn_F_Speed	Fan speed	FANn n indicates the fan module number with a value of 0 - 5
FANn_R_Speed		
Total_Power	Total power	PSU
PSUn_PIN	PSUn input power	PSUn

Sensor	Description	Sensor Location
		n indicates the PSU number with a value of 0 - 1
PSUn_POUT	PSUn output power	PSUn n indicates the PSU number with a value of 0 - 1
FAN_Power	Total fan power	Fans
CPU_Power	Total CPU power	Motherboard
Memory_Power	Total memory power	Motherboard
CPUn_Status	CPUn status detection	CPUn n indicates the CPU number with a value of 0 - 1
CPU_Config	CPU configuration status: mixed use of CPU, main CPU not installed	CPU
CPUn_MEMGm_Hot	CPUn DIMM overtemperature	CPUn • n indicates the CPU number with a value of 0 - 1 MEMGm • m indicates the memory of corresponding channel with a value of 1 - 2 - 1 indicates memory of 0/1/2 channel - 2 indicates memory of 3/4/5 channel
Air_Pressure	Air pressure sensor	Mounting ears
CPUn_CxDy	CPUn DIMM status	The corresponding DIMM for CPUn • n indicates the CPU number with a value of 0 - 1 • x indicates the memory channel number under the CPU with a value of 0 - 7

Sensor	Description	Sensor Location
		• y indicates the DIMM number with a value of 0
Diskn_Status	Front drive status	Front drive of diskn n indicates the front drive number with a value of 0 - 23
DiskRn_Status	Rear drive status	Rear drive of diskn n indicates the rear drive number with a value of 0 - 7
FANn_Status	FANn failure status	FANn n indicates the fan number with a value of 0 - 5
FAN_Redundant	Fan redundancy lost alert status	Fans
PCIe_Status	PCIe card status error	PCIe card
Power_Button	Power button pressed	Motherboard and power button
Watchdog2	Watchdog	Motherboard
Sys_Health	BMC health status	BMC
UID_Button	UID button status	Motherboard
PWR_Drop	Voltage drop status	Motherboard
PWR_On_TMOUT	Power-on timeout	Motherboard
PWR_CAP_Fail	Power capping status	Motherboard
PSU_Redundant	PSU redundancy lost alert status	PSU
PSU_Mismatch	Power supply model mismatch	PSU
PSUn_Status	PSUn failure status	PSUn n indicates the PSU number with a value of 0 - 1
Intrusion	Chassis-opening activity	Motherboard
SysShutdown	Reason for system shutdown	/
ACPI_PWR	ACPI status	
ME_FW_Status	ME status	
SysRestart	Reason for system restart	
BIOS_Boot_Up	BIOS boot up complete	
System_Error	Emergency system failure	
POST_Status	POST status	
BMC_Boot_Up	Record the BMC boot event	/

Sensor	Description	Sensor Location
SEL_Status	Record the event that system event logs are almost full/cleared	
BMC_Status	BMC status	/
SysRuntimeStop	Reason for system shutdown (MeSeg)	/
PCIe_IERR_Status	Precise failure location for an IERR fault diagnosis	PCIe device
MB_IERR_Status	Precise failure location for an fault diagnosis after IERR	Motherboard
Hdd_U_Drawer	Drive drawer intrusion detection	Top driver drawer
Hdd_M_Drawer		Middle driver drawer
Hdd_L_Drawer		Bottom driver drawer

13 Appendix B Abbreviations and Acronyms

13.1 A - E

A

AC	Alternating Current
ACPI	Advanced Configuration and Power Interface
ADDDC	Adaptive Double Device Data Correction
AI	Artificial Intelligence
AIC	Add-in Card
ANSI	American National Standards Institute
AQSIQ	General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China
ARMA	Advanced Return Material Authorization

B

BIOS	Basic Input Output System
BLE	BIOS Lock Enable
BMC	Baseboard Management Controller
BPS	Barlow Pass

C

CAS	Column Address Strobe
CB	Certification Body
CCC	China Compulsory Certificate

CE	Conformite Europeenne
CEN	European Committee for Standardization
CLI	Command-Line Interface
CPLD	Complex Programmable Logic Device
CPU	Central Processing Unit
CRPS	Common Redundant Power Supply

D

DC	Direct Current
DCMI	Data Center Manageability Interface
DDR4	Double Data Rate 4
DIMM	Dual In-line Memory Module
DOA	Dead On Arrival
DPC	DIMM Per Channel
DRAM	Dynamic Random Access Memory
DTS	Digital Thermal Sensor

E

ECC	Error Correcting Code
ECMA	European Computer Manufacturers Association
ESD	Electrostatic Discharge

13.2 F - J

F

FCC	Federal Communications Commission

FHHL	Full-Height Half-Length
FPGA	Field Programmable Gate Array
FW	Firmware

G

GPU	Graphics Processing Unit
GUI	Graphical User Interface

H

HBA	Host Bus Adapter
HCA	Host Channel Adapter
HDD	Hard Disk Drive
HSE	Health and Safety Executive
HTML	HyperText Markup Language
HTTPS	HyperText Transfer Protocol Secure

I

I/O	Input/Output
I^2C	Inter-Integrated Circuit
IERR	Internal Error
iMC	Integrated Memory Controller
IP	Internet Protocol
ISA	Industry Subversive Alliance
IPMI	Intelligent Platform Management Interface
ISO	International Organization for Standardization

13.3 K - O

K

KVM	Keyboard Video Mouse

L

LDAP	Lightweight Directory Access Protocol
LED	Light Emitting Diode

N

NBD	Next Business Day
NC-SI	Network Controller Sideband Interface
NIC	Network Interface Card
NIOSH	National Institute for Occupational Safety and Health
NVDIMM	Non-volatile Dual In-line Memory Module
NVMe	Non-Volatile Memory Express

O

OCP	Open Compute Project
O&M	Operations and Maintenance
OS	Operating System

13.4 P - T

P

PCH	Platform Controller Hub

PCIe	Peripheral Component Interconnect express
PDU	Power Distribution Unit
PMem	Persistent Memory
POST	Power-On Self-Test
PPR	Post Package Repair
PSU	Power Supply Unit
PXE	Pre-boot Execution Environment

R

RAID	Redundant Arrays of Independent Disks
RAS	Reliability, Availability, Serviceability
RDIMM	Registered Dual In-line Memory Module
RH	Relative Humidity
RHEL	Red Hat Enterprise Linux
RJ45	Registered Jack 45
RMA	Return Material Authorization
RST	Reset
RTC	Real Time Clock

S

SAS	Serial Attached SCSI
SATA	Serial Advanced Technology Attachment
SCSI	Small Computer System Interface
SDDC	Single Device Data Correction
SEL	System Event Log
SGX	Software Guard Extensions

SLA	Service Level Agreement
SNMP	Simple Network Management Protocol
SSD	Solid State Drive
SSH	Secure Shell

T

TCM	Trusted Cryptography Module
TDP	Thermal Design Power
TF	TransFlash
TPM	Trusted Platform Module

13.5 U - Z

U

UEFI	Unified Extensible Firmware Interface
UID	Unit Identification
UL	Underwriters Laboratories
UPI	Ultra Path Interconnect
USB	Universal Serial Bus

V

VGA	Video Graphics Array
VMD	Volume Management Device
VNC	Virtual Network Console
VPP	Virtual Pin Port
VRD	Voltage Regulator Down