White Paper for KR4268V2 Series Servers

Powered by Intel Processors

For KR4268-X2-A0-F0-00 and KR4268-X2-A0-R0-00

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Applicable Model

Model	Maintenance	Cooling
KR4268-X2-A0-F0-00	Front access	Air cooling
KR4268-X2-A0-R0-00	Rear access	Air cooling

Technical Support

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Preface

Abstract

This document describes the KR4268V2 Intel-based server's appearance, features, performance parameters, and software and hardware compatibility, providing in-depth information of the server.

Intended Audience

This document 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	2025/04/25	Initial release

Table of Contents

1 Product Overview

The KR4268V2 Intel-based system is a new generation of AI server that is designed for complex application scenarios, such as deep learning, metaverse, AI-generated content (AIGC), and AI+ Science. With diverse computing powers and flexible architectures, it can meet the needs of various applications.

It delivers improved link performance, 13 rear PCIe 5.0 expansion slots in a 4U space, and the flexible topology between CPUs and GPUs which can be switched based on application scenarios. With two 4th/5th Gen Intel Xeon Scalable processors, 56 cores per CPU, 8 TB system memory, and 300 TB local high-speed storage, the server brings breakthroughs in memory and storage, providing strong support for AI training and inference. It can be used with the AIStation, a platform for model R&D, to create a flexible computing power platform for the intelligent computing era.

1.1 24 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR4268-X2-A0-R0-00.

This configuration supports up to 24 front 2.5-inch SAS/SATA/NVMe drives, as shown in the following figure.

Figure 1-1 24 × 2.5-Inch Drive Configuration

1.2 12 × 3.5-Inch Drive Configuration

NOTE

- Applicable model: KR4268-X2-A0-R0-00.
- A 3.5-inch drive tray can accommodate a 2.5/3.5-inch drive.

This configuration supports up to 12 front 2.5/3.5-inch SAS/SATA/NVMe drives, as shown in the following figure.

Figure 1-2 12 × 3.5-Inch Drive Configuration

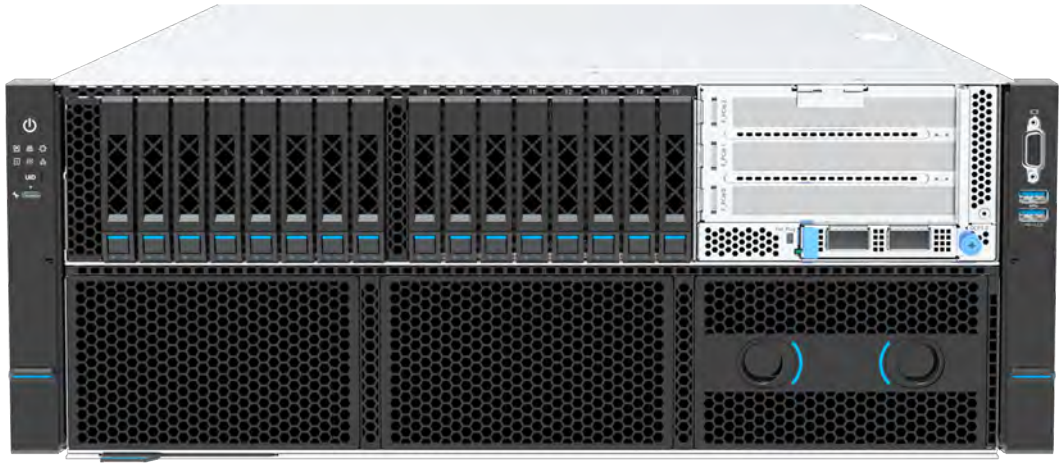
1.3 16 × 2.5-Inch Drive Configuration

NOTE

Applicable model: KR4268-X2-A0-F0-00.

This configuration supports up to 16 front 2.5-inch SAS/SATA/NVMe drives, as shown in the following figure.

Figure 1-3 16 × 2.5-Inch Drive Configuration



1.4 16 × E3.S Drive Configuration

NOTE

Applicable model: KR4268-X2-A0-F0-00.

This configuration supports up to 16 front E3.S SSDs, as shown in the following figure.

Figure 1-4 16 × E3.S Drive Configuration

2 Features

2.1 Scalability and Performance

Table 2-1 Scalability and Performance

Technical Feature	Description
4th/5th Gen Intel Xeon Scalable Processors	• Supports Intel Xeon Scalable processors (SPR/EMR) - One processor supports up to 64 cores, a TDP of up to 350 W, and 4 UPI links per CPU at up to 20 GT/s per link, delivering unrivalled processing performance. - With the processor cache hierarchy optimization, a larger L2 cache of private 1 MB per core is provided, so that memory data can be put and processed directly in L2 cache, improving the memory access performance and reducing the demand on L3 cache capacity. - Supports Intel Turbo Boost Technology 2.0 and automatically scales CPU speeds up to the max. Turbo frequency at peak workloads, allowing processor cores to exceed the thermal design power (TDP) for a limited time. - Supports Intel Hyper-Threading Technology, allowing up to 2 threads to run on each core to improve the performance of multi-threaded applications. - Supports Intel Virtualization Technology that provides hardware assist to the virtualization software, allowing the operating system to better use hardware to handle virtualization workloads. - Supports Intel Advanced Vector Extensions 512 (Intel AVX-512), significantly accelerating the workloads that are strongly floating point compute intensive. - Supports Intel DL Boost (VNNI) instructions, improving the performance for deep learning applications.

Technical Feature	Description
DIMM Form Factor	Up to 32 DDR5 ECC DIMMs (RDIMMs), delivering superior speed, high availability, and a memory capacity of up to 8 TB.
Flexible Drive Configurations	Provides elastic and expandable storage solutions to meet different capacity and upgrade requirements.
Support for All-SSD Configuration	Provides higher I/O performance over HDD+SSD configuration and all-HDD configuration.
24 Gbps Serial Attached SCSI (SAS)	Doubles the internal storage data transfer rate of 12 Gbps SAS solution, maximizing the performance of storage I/O-intensive applications.
Intel Integrated I/O Technology	The processors integrate the PCIe 5.0 controller to significantly reduce I/O latency and enhance overall system performance.
PCIe Expansion	• Front: Up to 3 PCIe 5.0 slots • Internal: Up to 2 PCIe 5.0 slots (dedicated for RAID cards) • Rear: - T configuration: Up to 11 PCIe 5.0 slots, supporting 10 dual-width + 1 single-width expansion cards - P configuration (104/144 lanes): Up to 13 PCIe 5.0 slots, supporting 8 dual-width + 5 single-width expansion cards Note: Refer to 5.9 I/O Expansion for details, and consult your local sales representative for specific configurations.
OCP Expansion	Supports 1 front or rear OCP slot that can flexibly support 1/10/25/40/100/200 Gb hot-plug OCP 3.0 cards.

2.2 Availability and Serviceability

Table 2-2 Availability and Serviceability

Technical Feature	Description
Hot-Swap SAS/SATA/NVMe Drives	Supports hot-swap drives with RAID levels 0/1/1E/10/5/50/6/60 and RAID cache provided by RAID cards, and data protection enabled by the super-capacitor in case of power failures.

Technical Feature	Description
Reliability	• SSDs are much more reliable than traditional HDDs, increasing system uptime. • The BMC integrated on the DC-SCM board monitors system parameters in time and sends alerts in advance, enabling technicians to take appropriate measures in time to ensure stable operation and minimize system downtime.
Availability	• The LEDs on front and rear panels and the BMC Web GUI indicate the status of key components and quickly lead technicians to failed (or failing) components, simplifying maintenance and speeding up troubleshooting. • Provides 4 hot-swap PSUs with 2+2 redundancy. • Provides 12 hot-swap fan modules with N+1 redundancy.
Maintenance Efficiency	The BMC management network port on the rear panel enables remote BMC O&M, improving O&M efficiency.

2.3 Manageability and Security

Table 2-3 Manageability and Security

Technical Feature	Description
Remote Management	The BMC monitors system operating status and enables remote management.
NC-SI Feature	Allows a network port to serve as a management port and a service port. The NC-SI feature is disabled by default and can be enabled/disabled through the BIOS or BMC. Notes: The service port with NC-SI enabled supports: • Being bonded to any network port of the OCP card or of the PCIe NIC that supports NC-SI. • Enablement/Disablement and configuration of Virtual Local Area Network (VLAN), which is disabled by default. • Both IPv6 and IPv4 addresses, of which the IP address, subnet mask, and default gateway can be configured, as well as the prefix length of IPv6 address.
Intel PFR	Intel Platform Firmware Resilience (PFR) technology is supported. Meeting the NIST 800-193 guidelines, Intel PFR

Technical Feature	Description
	protects platform assets, detect corrupted firmware, and even restores corrupted firmware from a protected known-good recovery image.
Unified Extensible Firmware Interface (UEFI)	The industry-standard UEFI improves the efficiency of setup, configuration and update, and simplifies the error handling process.
TPM & TCM	Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM) provide advanced encryption.
Intel Trusted Execution Technology	Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks.
Firmware Update Mechanism	The firmware update mechanism based on digital signatures prevents unauthorized firmware updates.
UEFI Secure Boot	Protects the system from malicious bootloaders.
Hierarchical Password Protection in BIOS	Ensures system boot and management security.
BIOS Secure Flash and BIOS Lock Enable (BLE)	Reduce attacks from malicious software on the BIOS flash region.
Dual-Image Mechanism for BMC and BIOS	Recovers firmware upon detection of corrupted firmware.
BMC Secure Boot	Protects BMC from being malicious tampering.
BMC Access Control Policies	Flexible BMC access control policies improve BMC management security.
BMC Management Security	Supports flexible BMC access control policies and double factor authentication.
Intel SGX Technology	Intel Software Guard Extensions (SGX) technology allows applications to run in their own isolated space, helping prevent malicious theft and modification of critical codes and data.
System Secure Erase Function	Optional system secure erase function can wipe data on the storage devices with one click.
Chassis Intrusion Detection	Enhances physical security.

2.4 Energy Efficiency

Table 2-4 Energy Efficiency

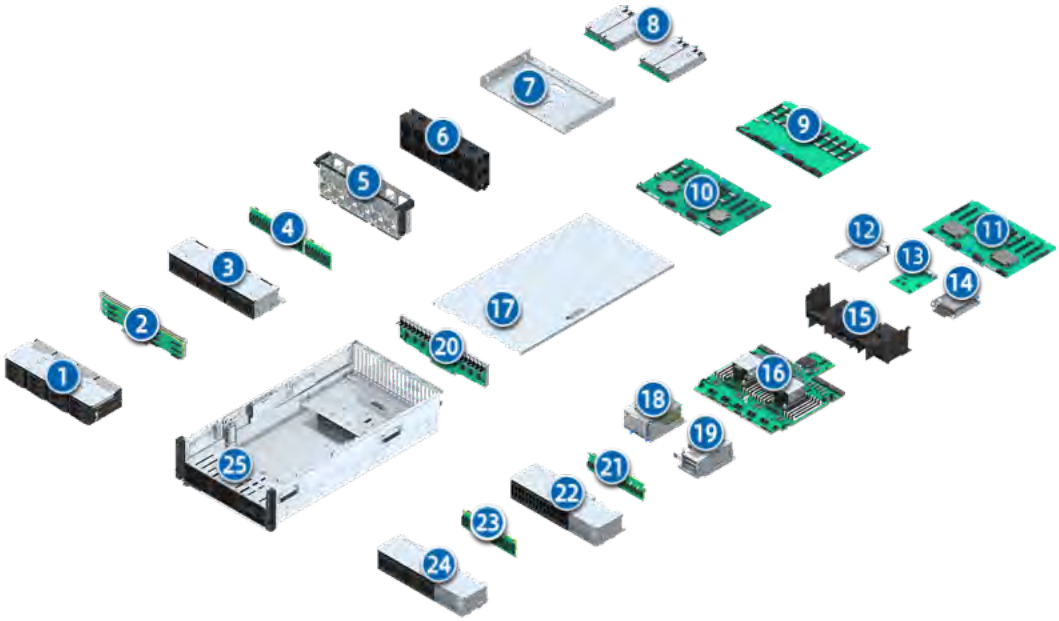
Technical Feature	Description
80 Plus Platinum/Titanium PSUs	Equipped with 80 Plus Platinum/Titanium PSUs of different power efficiency levels, with a power efficiency of up to 96% at a load of 50%.
2+2 Redundant PSUs	Support AC/DC power input with improved power conversion efficiency.
VRD Solution	Features the high-efficiency single-board voltage regulator-down (VRD) solution, reducing DC-DC conversion loss.
Intelligent Fan Speed Control and CPU Frequency Scaling	Supports Proportional-Integral-Derivative (PID) intelligent fan speed control and intelligent CPU frequency scaling, conserving energy.
System Cooling Design	Offers a fully-optimized system cooling design with energy-efficient cooling fans, lowering energy consumption from system cooling.
Power Capping and Power Control	Provides power capping and power control measures.
Staggered Spin-up of Drives	Supports staggered spin-up of drives, reducing power consumption during server startup.
Intel Intelligent Power Capability	Supports Intel Intelligent Power Capability (IIPC) to optimize energy usage in the processor cores by turning computing functions on only when needed.
Low Power Consumption	Supports low-voltage Intel Xeon Scalable processors (SPR/EMR), consuming less energy and meeting the demands of data centers and telecommunications environments constrained by power and thermal limits.

3 System Parts Breakdown

NOTE

- The system parts showed below are for some configurations and may differ from the actual configuration.

Figure 3-1 Exploded View



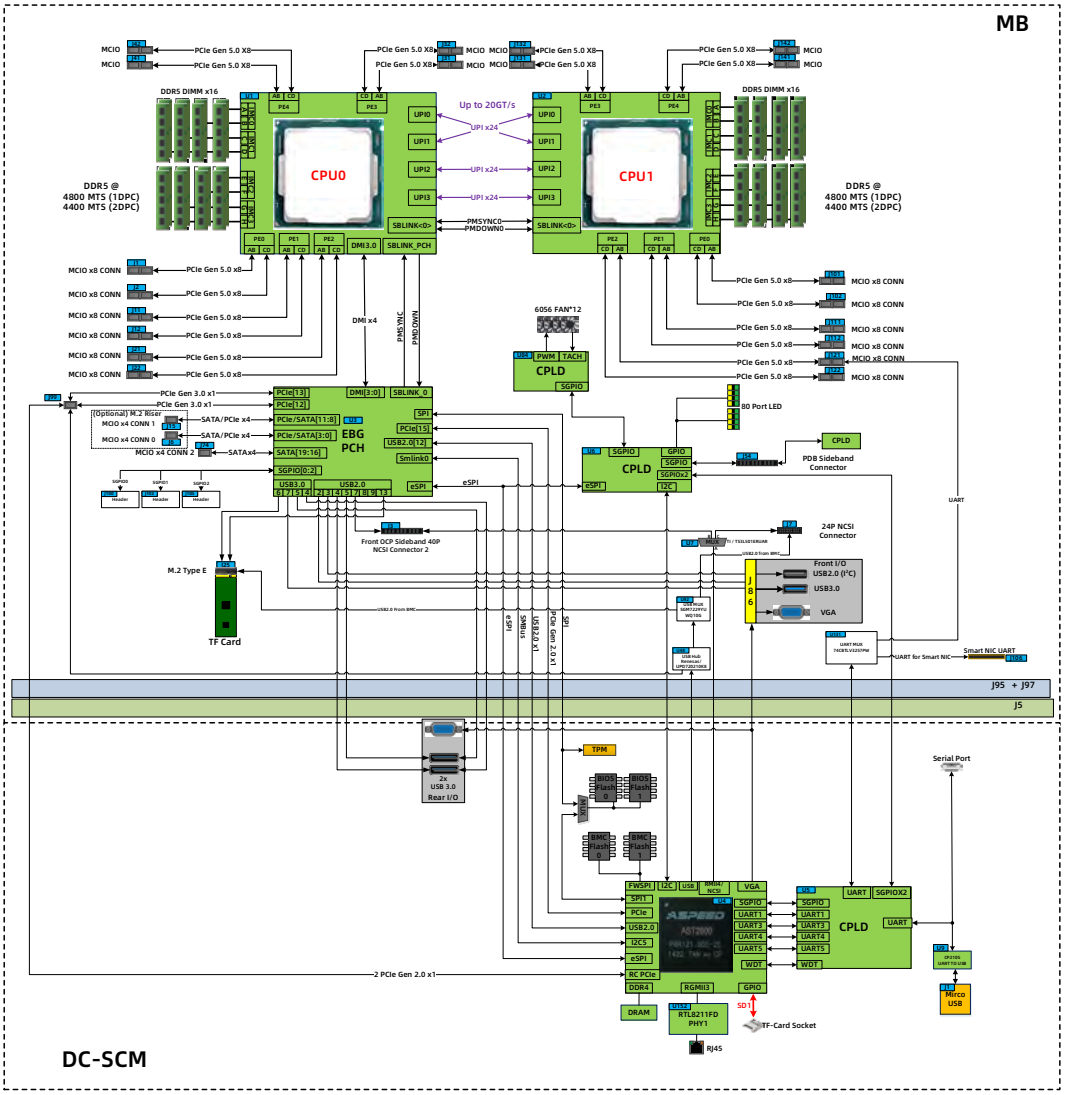
Item	Feature	Item	Feature
1	3.5-Inch Drive Module	14	OCP 3.0 Card
2	3.5-Inch Drive Backplane	15	Air Duct
3	2.5-Inch Drive Module	16	Motherboard
4	2.5-Inch Drive Backplane	17	Top Cover
5	Fan Cage	18	PCIe Riser Module
6	Fan Module	19	RAID Riser Module
7	PCIe Backplane Tray	20	Power Midplane
8	PSU	21	E3.S Drive Backplane
9	PCIe Backplane (T configuration)	22	E3.S SSD Module

Item	Feature	Item	Feature
10	PCIe Backplane (P configuration, 104 lanes)	23	2.5-Inch Drive Backplane
11	PCIe Backplane (P configuration, 144 lanes)	24	2.5-Inch Drive Module
12	DC-SCM Board Bracket	25	Chassis
13	DC-SCM Board	-	

4 Logical Diagram

4.1 System Logical Diagram Overview

Figure 4-1 Logical Diagram



- Two 4th/5th Gen Intel Xeon Scalable processors (SPR/EMR).
- Up to 32 DIMMs.
- 4 UPI links per CPU at up to 20 GT/s per link.
- Up to 18 standard PCIe slots and 1 OCP 3.0 slot (front/rear).

- The RAID controller card is connected to CPU0 via the PCIe bus, and is connected to drive backplanes via SAS signal cables. Multiple local storage configurations are supported through different drive backplanes.
- The motherboard integrates the EBG PCH (Platform Controller Hub) to support 3 USB 3.0 connectors, 1 USB 2.0 connector, 12 SATA 3.0 connectors, 2 PCIe x4 M.2 SSDs (occupying 8 SATA 3.0 connectors), and 1 TF card adapter slot.
- The DC-SCM board integrates an AST2600 management chip which supports a VGA port, a BMC management network port, a serial port, a TF card slot, and other connectors.

4.2 System PCIe Topology Overview

NOTE

- This section illustrates only some of the topologies. For details, consult our pre-sales engineers.
- There may be resource conflicts in some topologies. The actual configuration may vary.

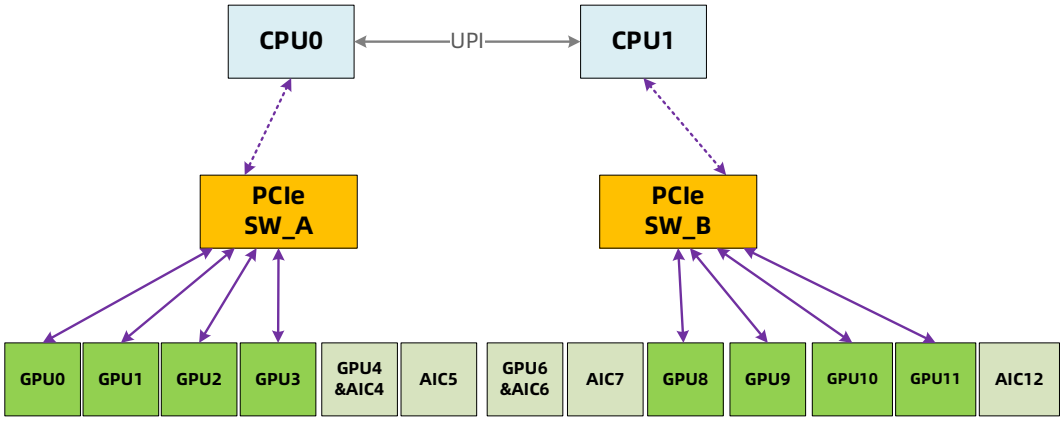
The server supports three types of PCIe backplanes of the P configuration (104/144 lanes) and the T configuration. The PCIe backplanes are connected to the motherboard through MCIO x8 connectors.

4.2.1 System PCIe Topologies of the P Configuration (104 Lanes)

The P configuration (104 lanes) supports 4 topologies, including balance, cascade, common and dual-uplink, which can be automatically switched by the PCIe switch chip based on the cable configuration to flexibly meet the needs of AI computing in different application scenarios. You can select a topology based on your requirements. For details, contact our pre-sales engineers.

1. Balance Topology

Figure 4-2 Balance Topology



- Features: Each CPU is connected to a PCIe switch chip, and each PCIe switch chip is connected to up to 5 GPUs. In this topology, the P2P communication between 2 GPUs connected to different CPUs is limited by the UPI link speed.
- Applicable scenarios: As the mainstream topology in this series, it is applicable to virtual desktop infrastructure (VDI), public cloud, AI training, and other scenarios.
- Instances of the configurations using this topology are shown below.

Figure 4-3 Balance Topology (GPU × 8 + U.2 SSD × 16)

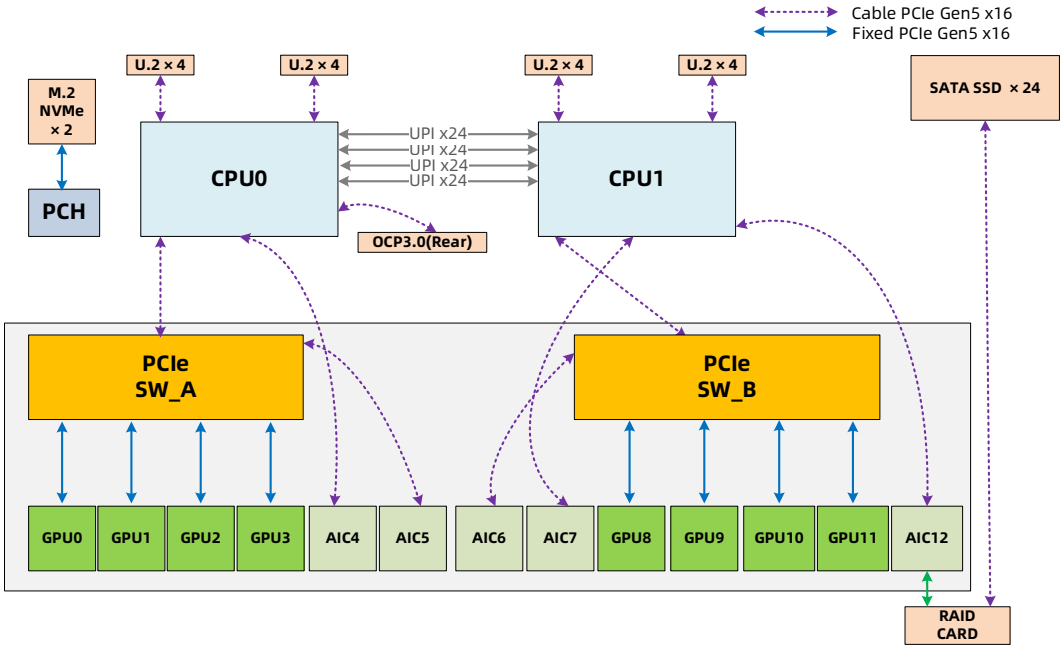
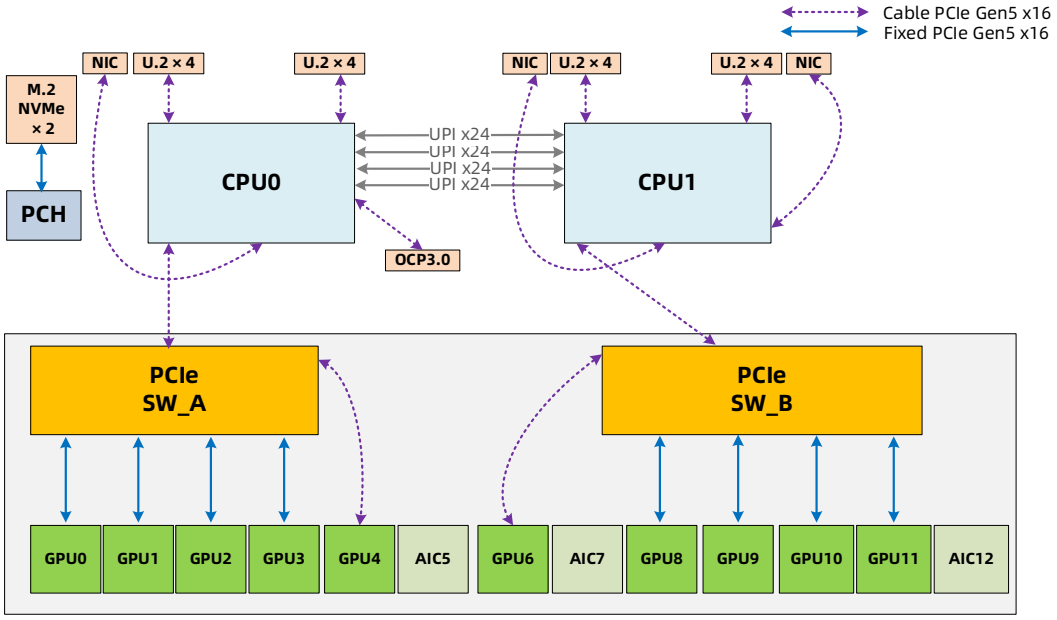
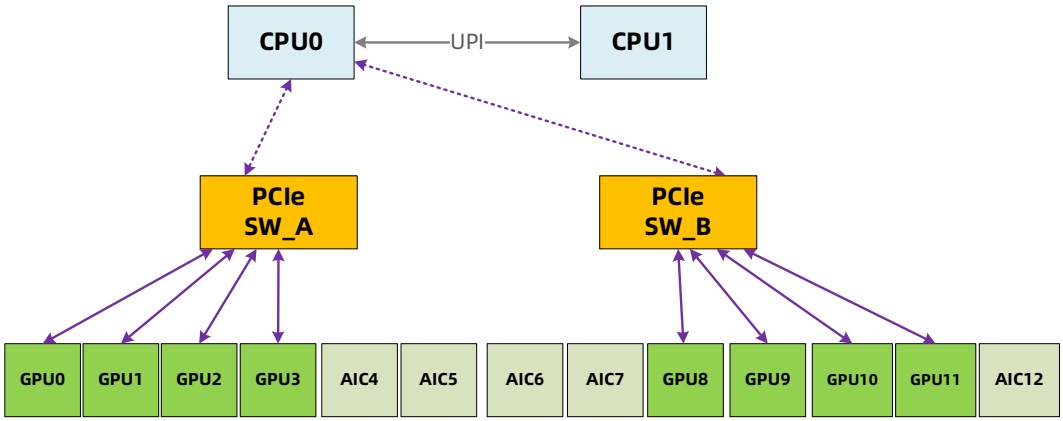


Figure 4-4 Balance Topology (GPU × 10 + U.2 SSD × 16)



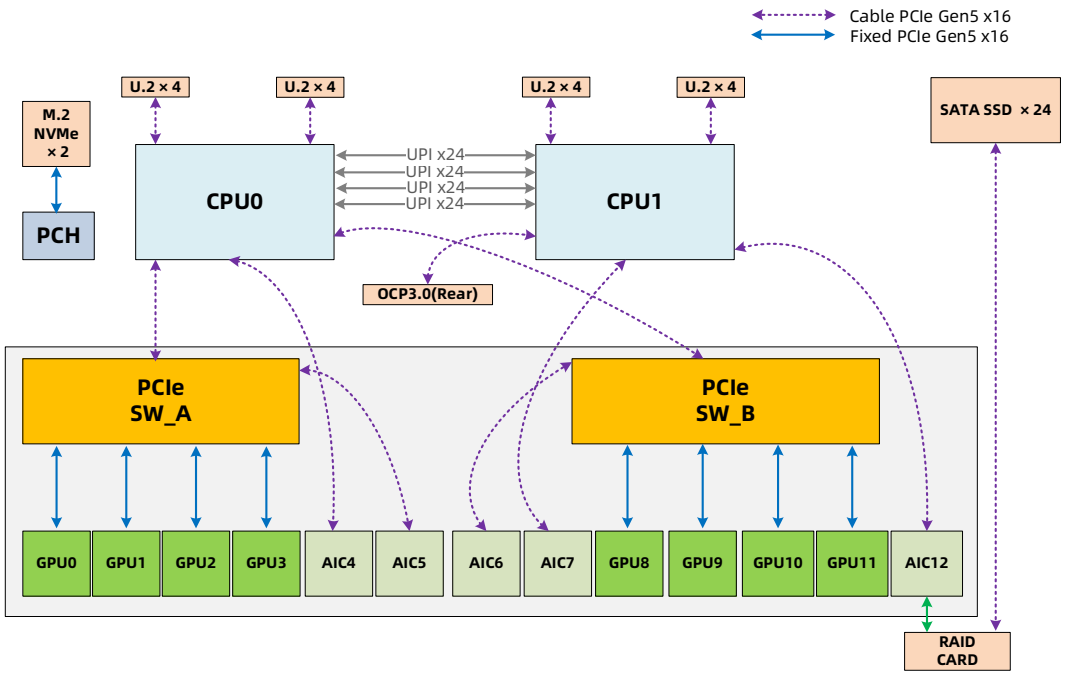
2. Common Topology

Figure 4-5 Common Topology



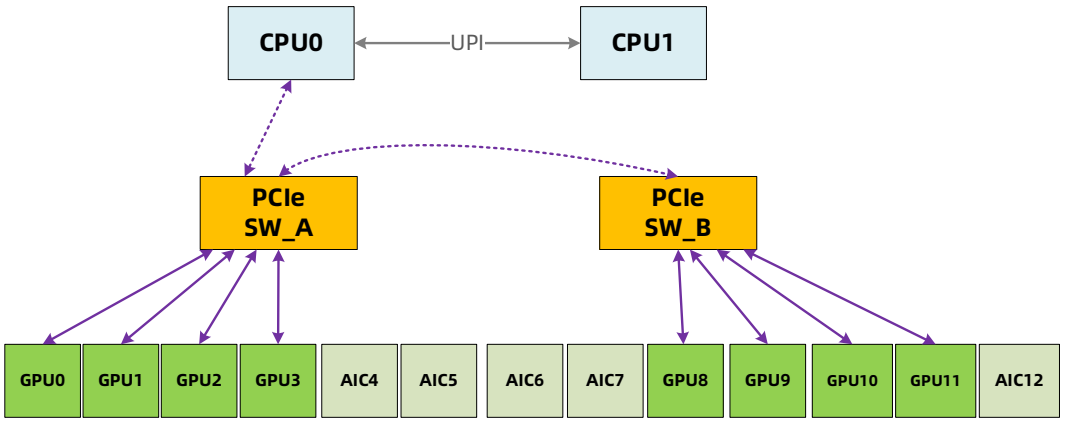
- Features: The CPU0 is connected to 2 PCIe switch chips, and each PCIe switch chip is connected to 4 GPUs. The communication between 2 GPUs connected to different PCIe switch chips can be accomplished without cross-CPU communication, delivering higher data throughput.
- Applicable scenarios: It is applicable to the P2P communication-intensive training algorithm models where CPUs are involved in many tasks, for example, ResNet 101/50.
- Instances of the configurations using this topology are shown below.

Figure 4-6 Common Topology (GPU × 8 + U.2 SSD × 16)



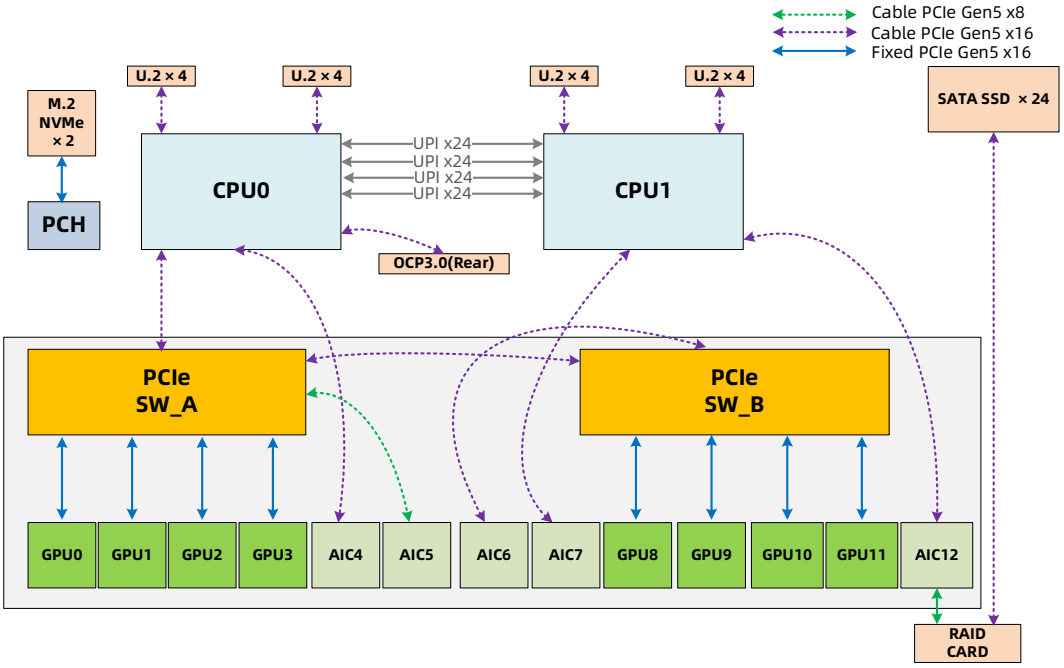
3. Cascade Topology

Figure 4-7 Cascade Topology



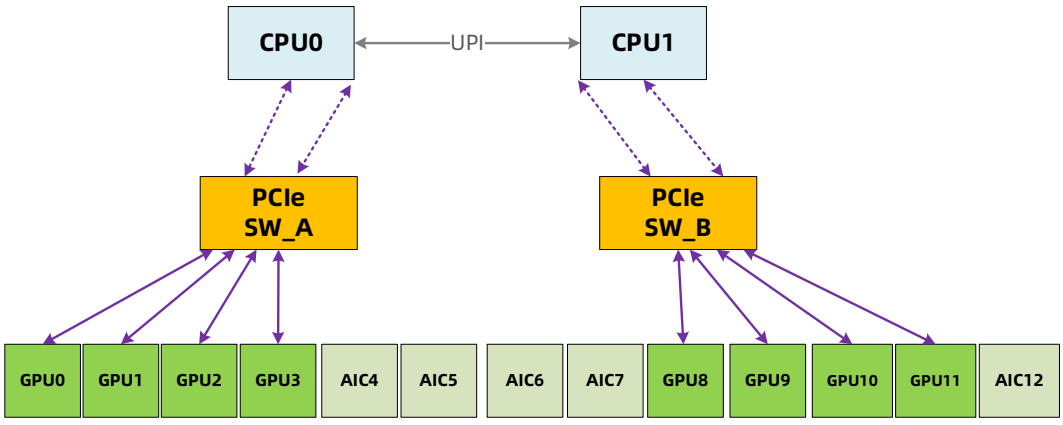
- Features: The CPU0 is directly connected to a PCIe switch chip, and this PCIe switch chip interconnects with another one. Each PCIe switch chip is connected to 4 GPUs. The PCIe switch chip interconnection provides more powerful GPU P2P communication, but low data throughput from CPU to GPU.
- Applicable scenarios: It is applicable to the P2P parameter-intensive training algorithm models where CPUs are involved in a few tasks, for example, VGG-16.
- Instances of the configurations using this topology are shown below.

Figure 4-8 Cascade Topology (GPU × 8 + U.2 SSD × 16)



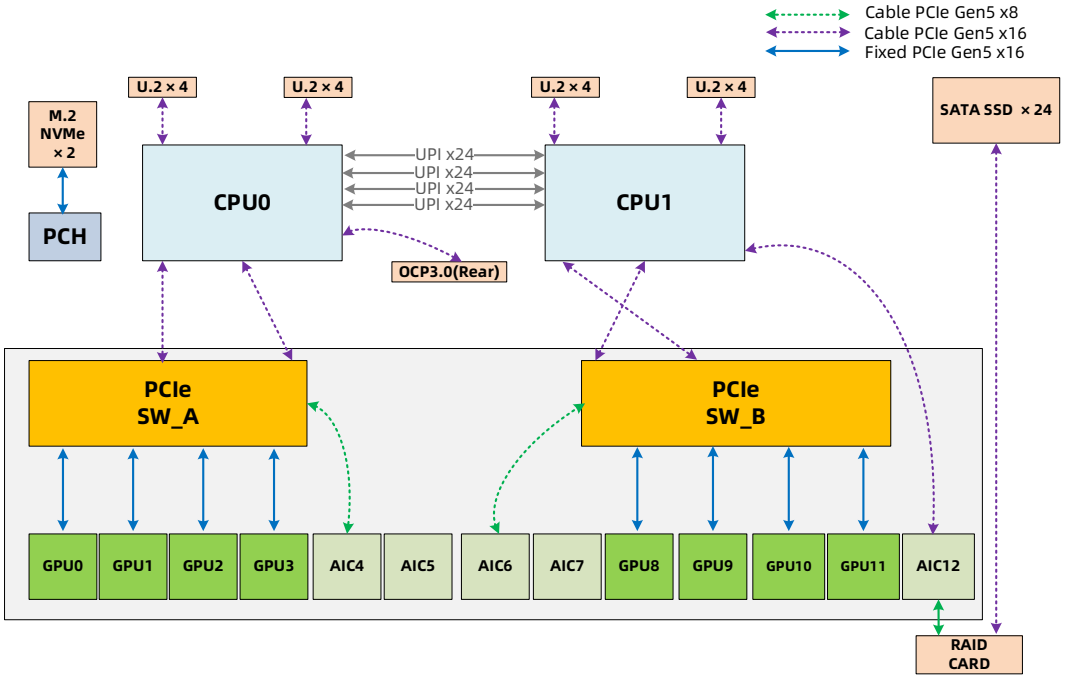
4. Dual-Uplink Topology

Figure 4-9 Dual-Uplink Topology



- Features: Each CPU is connected to a PCIe switch chip, and each PCIe switch chip is connected to 4 GPUs. This maximizes CPU utilization and provides the maximum uplink bandwidth. However, the P2P communication between 2 GPUs connected to different CPUs is limited by the UPI link speed.
- Applicable scenarios: It is applicable to VDI, public cloud, AI training, and other scenarios.
- Instances of the configurations using this topology are shown below.

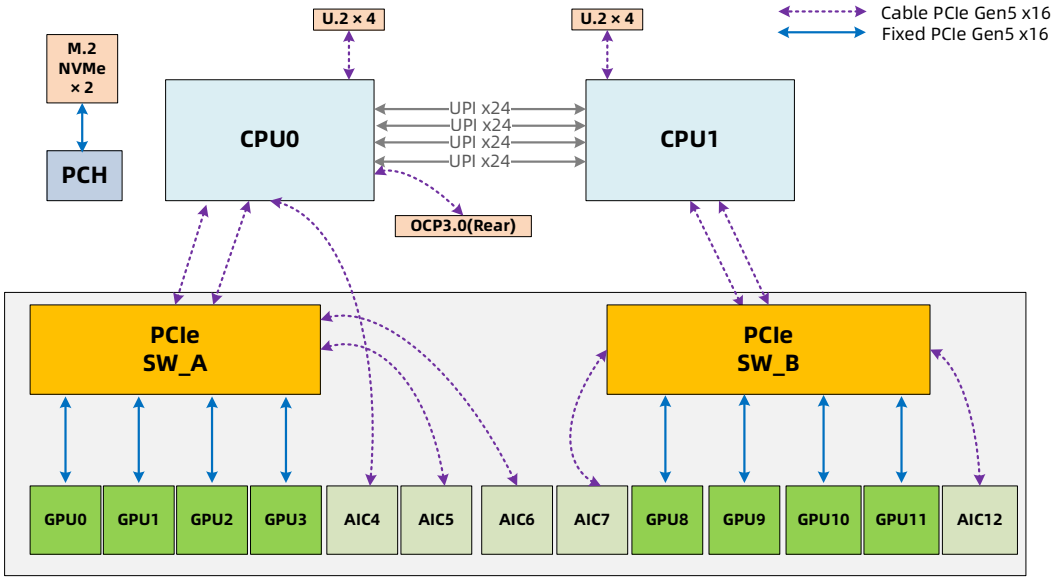
Figure 4-10 Dual-Uplink Topology (GPU × 8 + U.2 SSD × 16)



4.2.2 System PCIe Topologies of the P Configuration (144 Lanes)

The Balance topology is available to the P configuration (144 lanes). For more topologies, contact our pre-sales engineers.

Figure 4-11 Balance Topology (8 × GPU+8 × U.2)



4.2.3 System PCIe Topologies of the T Configuration

The T configuration supports multiple topologies to flexibly meet the needs of AI computing in different application scenarios. You can select a topology based on your requirements. For details, contact our pre-sales engineers.

Figure 4-12 Topology (x16 PCIe NIC + x8 PCIe NIC + RAID card)

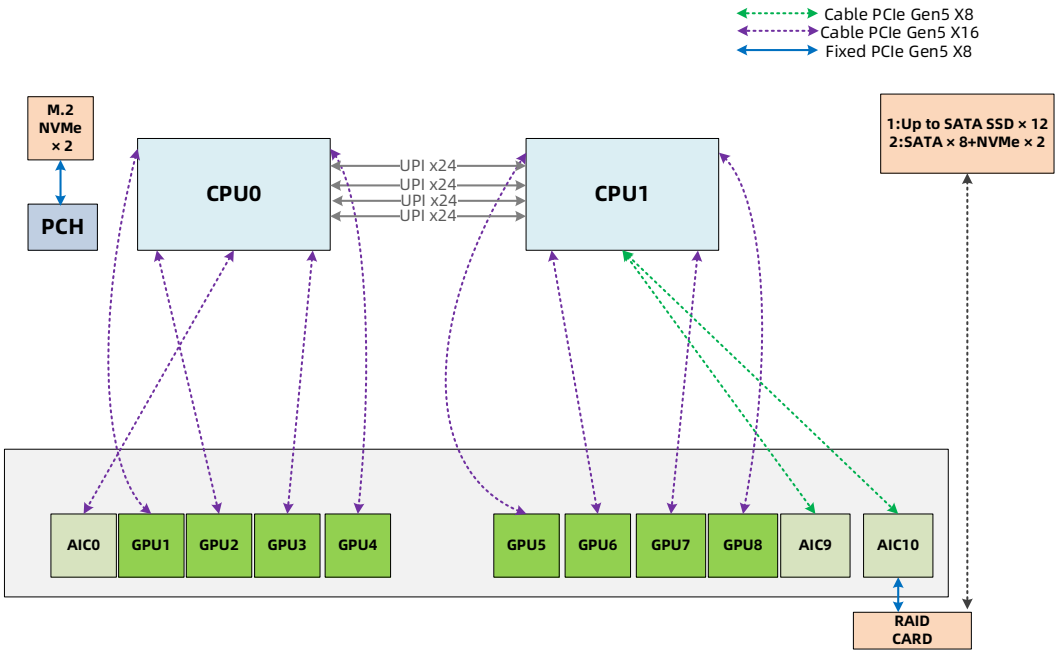


Figure 4-13 Topology (x16 PCIe NIC + RAID Card × 2)

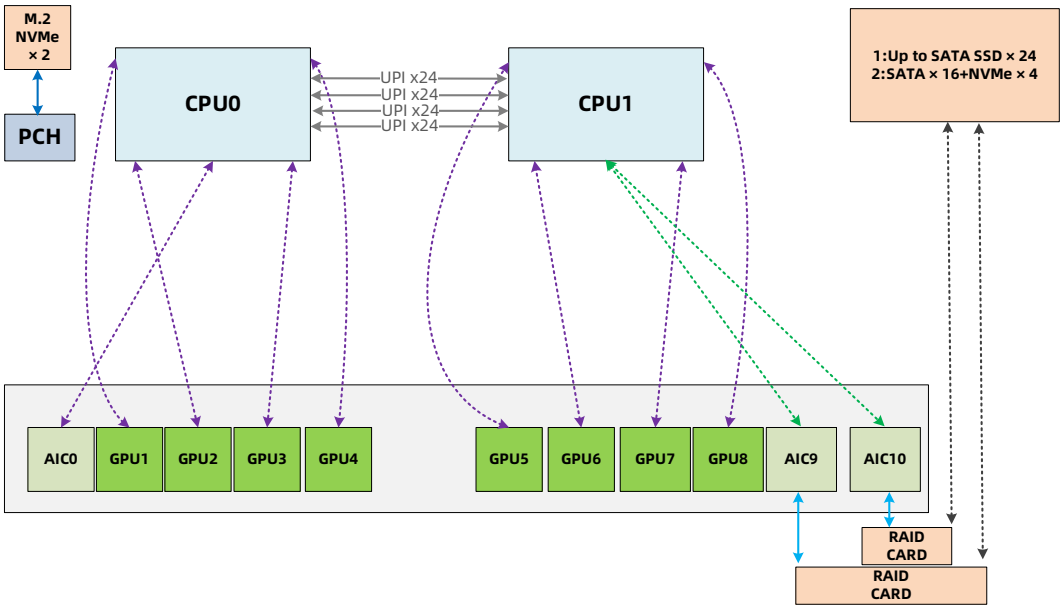


Figure 4-14 Topology (U.2 SSD × 4 + x8 PCIe NIC + RAID Card)

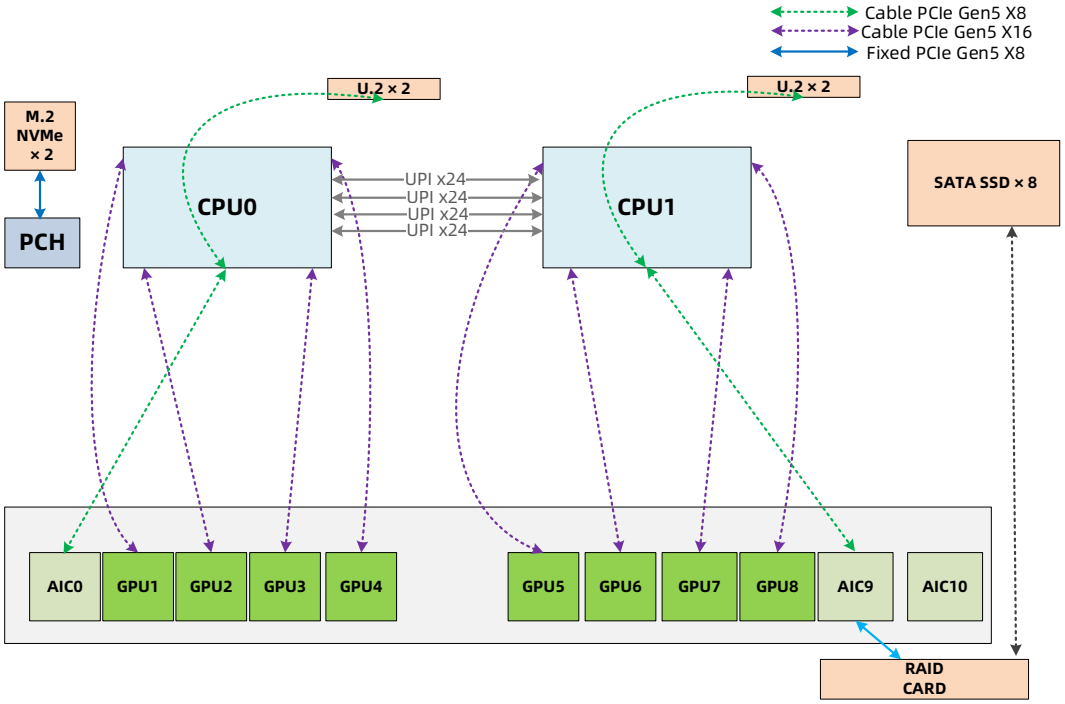


Figure 4-15 Topology (RAID Card × 2 + x16 PCIe NIC/OCP NIC + x16 PCIe NIC)

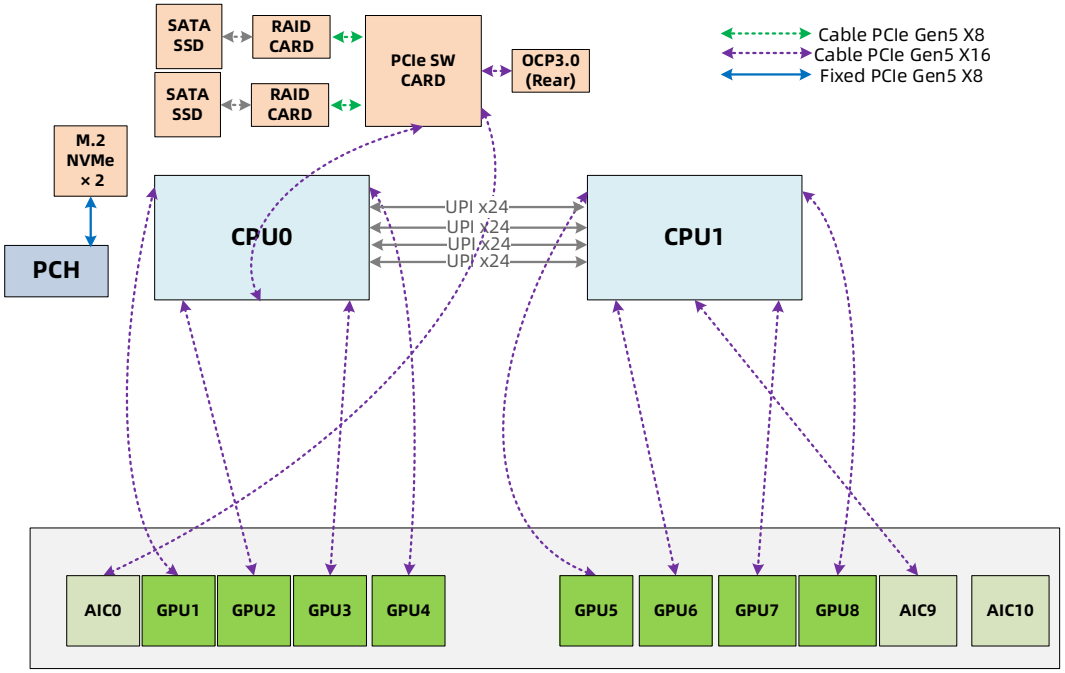


Figure 4-16 Topology (U.2 SSD × 2 + RAID Card + x16 PCIe NIC/OCP NIC + x8 PCIe NIC × 2)

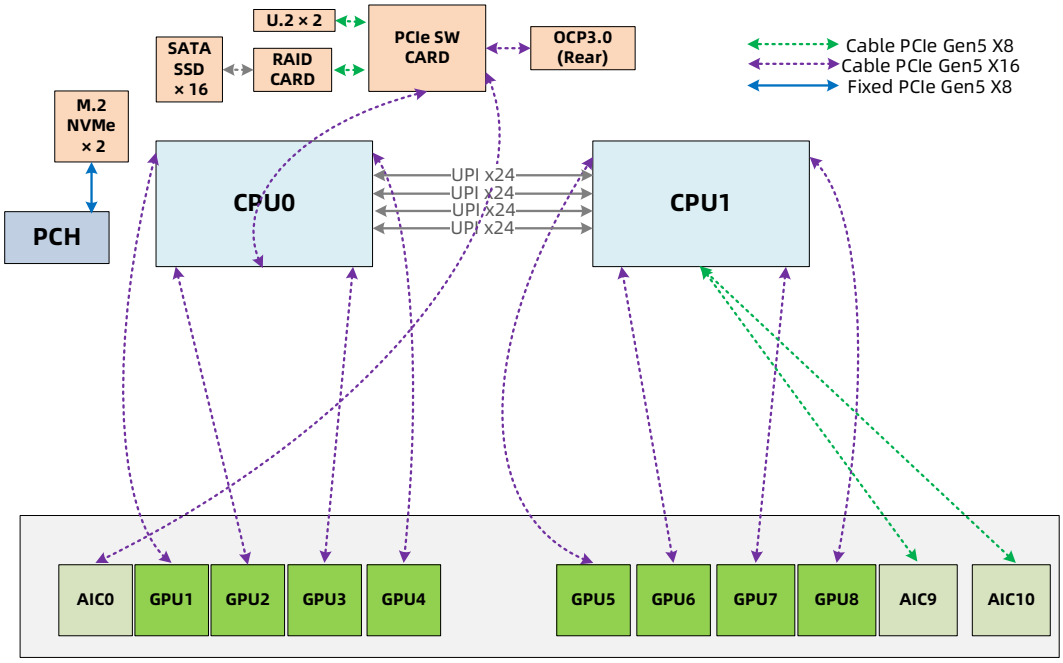


Figure 4-17 Topology (U.2 SSD × 4 + RAID Card + x8 PCIe NIC × 2)

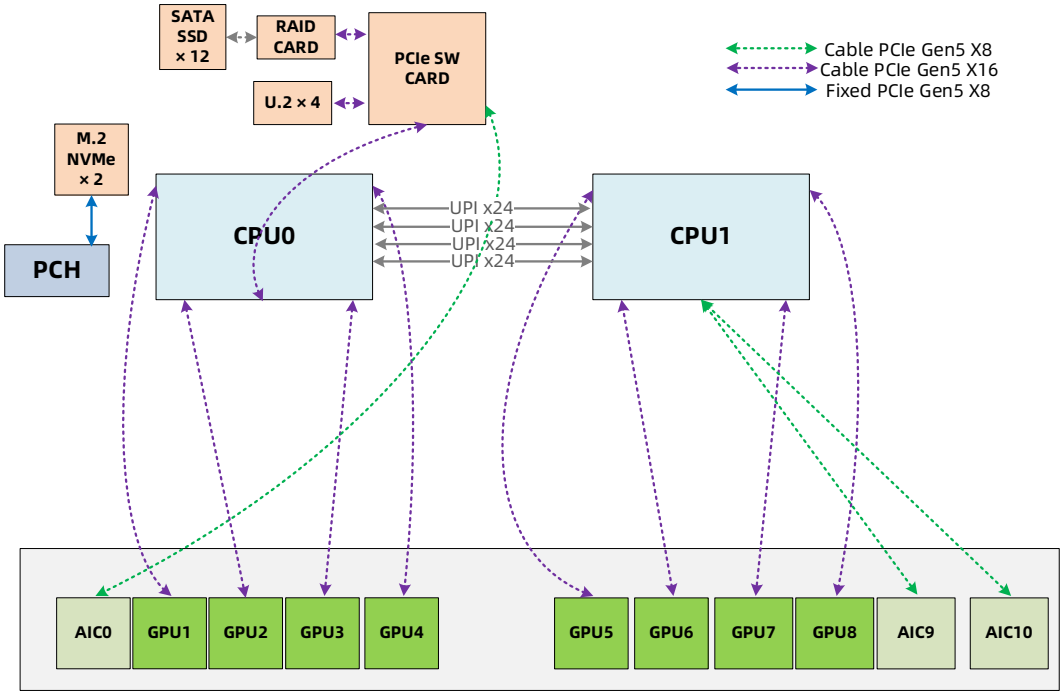
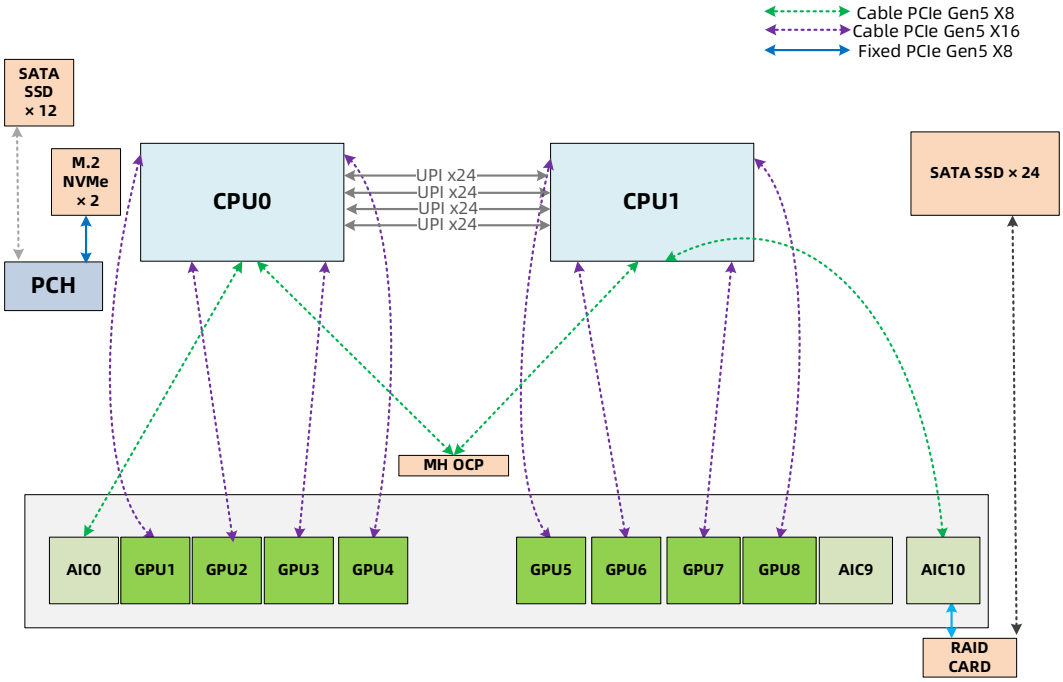


Figure 4-18 Multi-Host Topology



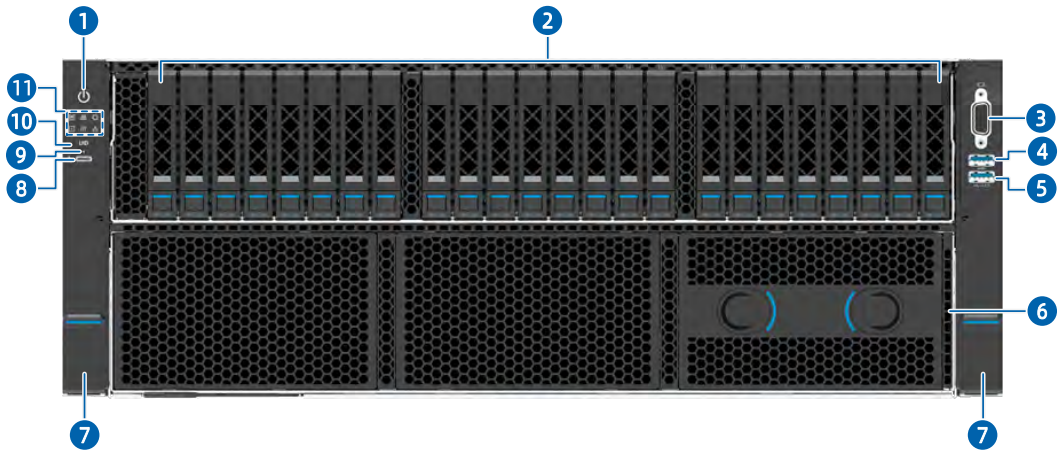
5 Hardware Description

5.1 Front Panel

5.1.1 KR4268-X2-A0-R0-00

1. 24 × 2.5-Inch Drive Configuration

Figure 5-1 Front View



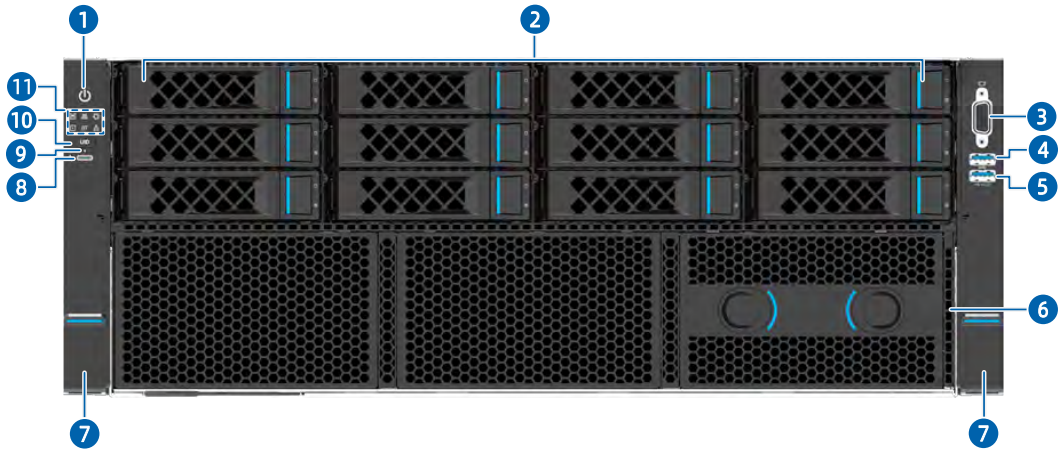
Item	Feature	Item	Feature
1	Power Button and LED	7	Ear Latch
2	2.5-Inch Drive Bay	8	USB Type-C Port
3	VGA Port	9	USB Type-C Status LED
4	USB 3.0 Port	10	UID/BMC RST Button and LED
5	USB 2.0 Port	11	LEDs
6	Front Bezel	-	-

2. 12 × 3.5-Inch Drive Configuration

NOTE

A 3.5-inch drive tray can accommodate a 2.5/3.5-inch drive.

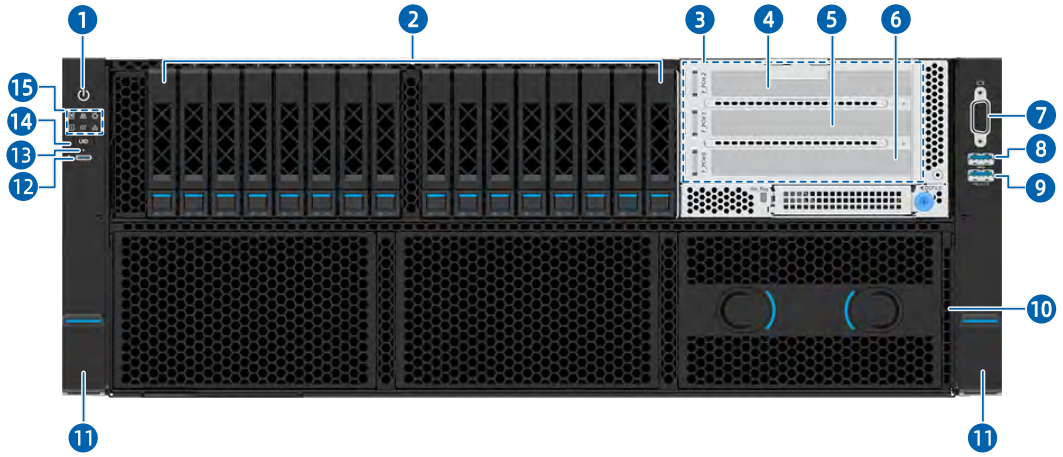
Figure 5-2 Front View



Item	Feature	Item	Feature
1	Power Button and LED	7	Ear Latch
2	3.5-Inch Drive Bay	8	USB Type-C Port
3	VGA Port	9	USB Type-C Status LED
4	USB 3.0 Port	10	UID/BMC RST Button and LED
5	USB 2.0 Port	11	LEDs
6	Front Bezel	-	-

3. 16 × 2.5-Inch Drive Configuration

Figure 5-3 Front View

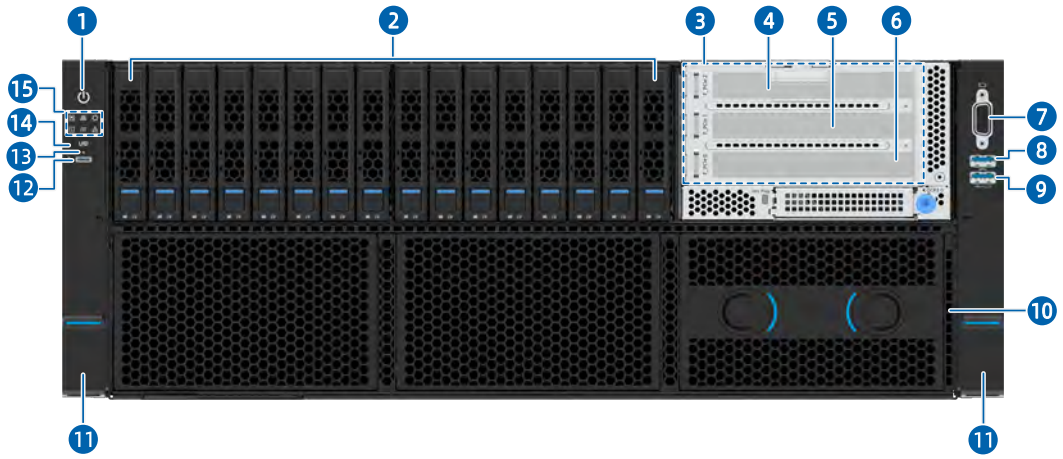


Item	Feature	Item	Feature
1	Power Button and LED	9	USB 2.0 Port
2	2.5-Inch Drive Bay	10	Front Bezel

Item	Feature	Item	Feature
3	PCIe Riser Module 0	11	Ear Latch
4	PCIe Slot 2	12	USB Type-C Port
5	PCIe Slot 1	13	USB Type-C Status LED
6	PCIe Slot 0	14	UID/BMC RST Button and LED
7	VGA Port	15	LEDs
8	USB 3.0 Port	-	-

4. 16 × E3.S Drive Configuration

Figure 5-4 Front View

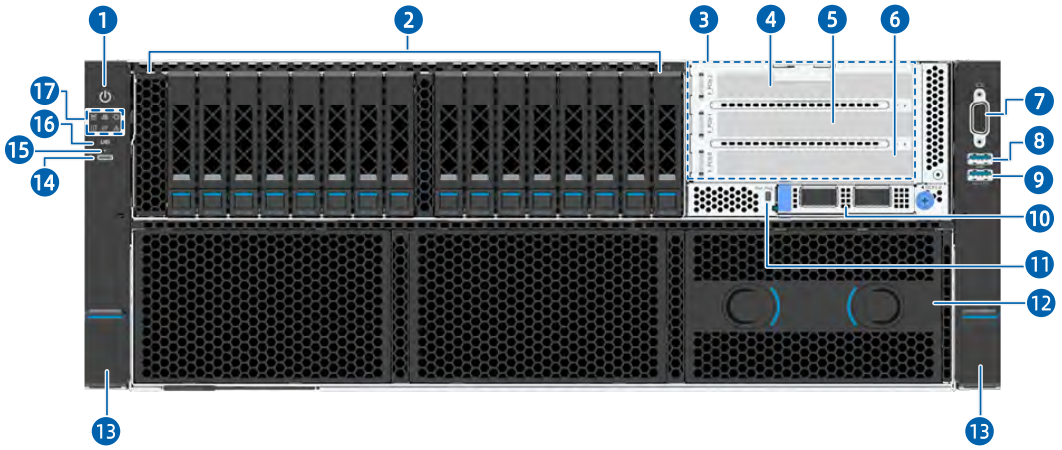


Item	Feature	Item	Feature
1	Power Button and LED	9	USB 2.0 Port
2	E3.S Drive Bay	10	Front Bezel
3	PCIe Riser Module 0	11	Ear Latch
4	PCIe Slot 2	12	USB Type-C Port
5	PCIe Slot 1	13	USB Type-C Status LED
6	PCIe Slot 0	14	UID/BMC RST Button and LED
7	VGA Port	15	LEDs
8	USB 3.0 Port	-	-

5.1.2 KR4268-X2-A0-F0-00

1. 16 × 2.5-Inch Drive Configuration

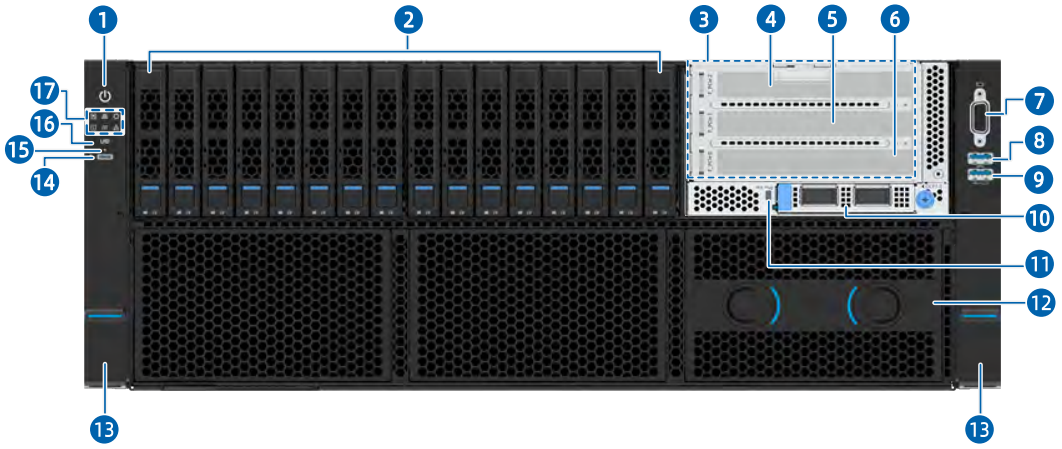
Figure 5-5 Front View



Item	Feature	Item	Feature
1	Power Button and LED	10	OCP 3.0 Card
2	2.5-Inch Drive Bay	11	OCP 3.0 Card Hot-Plug Button and LED
3	PCIe Riser Module 0	12	Front Bezel
4	PCIe Slot 2	13	Ear Latch
5	PCIe Slot 1	14	USB Type-C Port
6	PCIe Slot 0	15	USB Type-C Status LED
7	VGA Port	16	UID/BMC RST Button and LED
8	USB 3.0 Port	17	LEDs
9	USB 2.0 Port	-	-

2. 16 × E3.S Drive Configuration

Figure 5-6 Front View

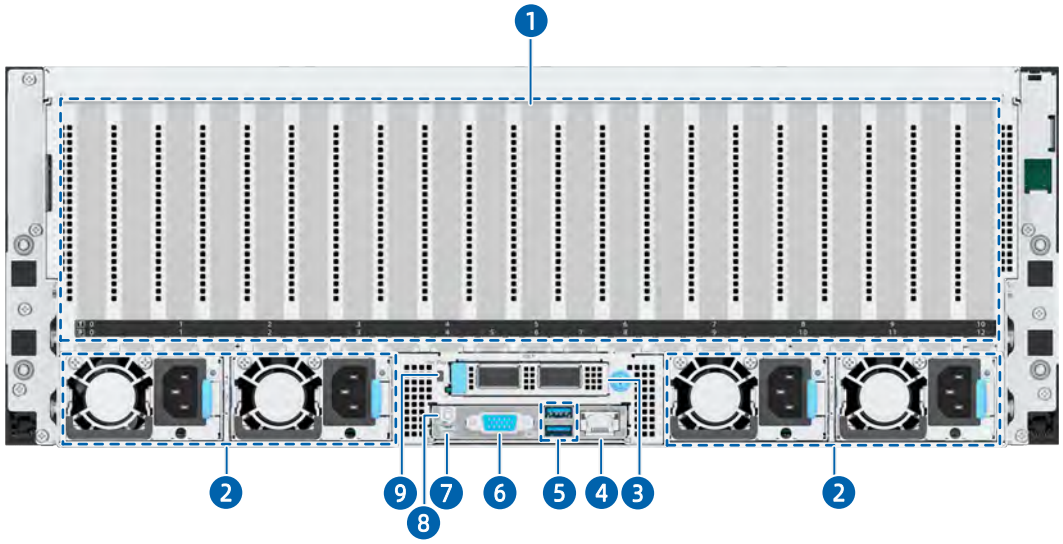


Item	Feature	Item	Feature
1	Power Button and LED	10	OCP 3.0 Card
2	E3.S Drive Bay	11	OCP 3.0 Card Hot-Plug Button and LED
3	PCIe Riser Module 0	12	Front Bezel
4	PCIe Slot 2	13	Ear Latch
5	PCIe Slot 1	14	USB Type-C Port
6	PCIe Slot 0	15	USB Type-C Status LED
7	VGA Port	16	UID/BMC RST Button and LED
8	USB 3.0 Port	17	LEDs
9	USB 2.0 Port	-	-

5.2 Rear Panel

5.2.1 KR4268-X2-A0-R0-00

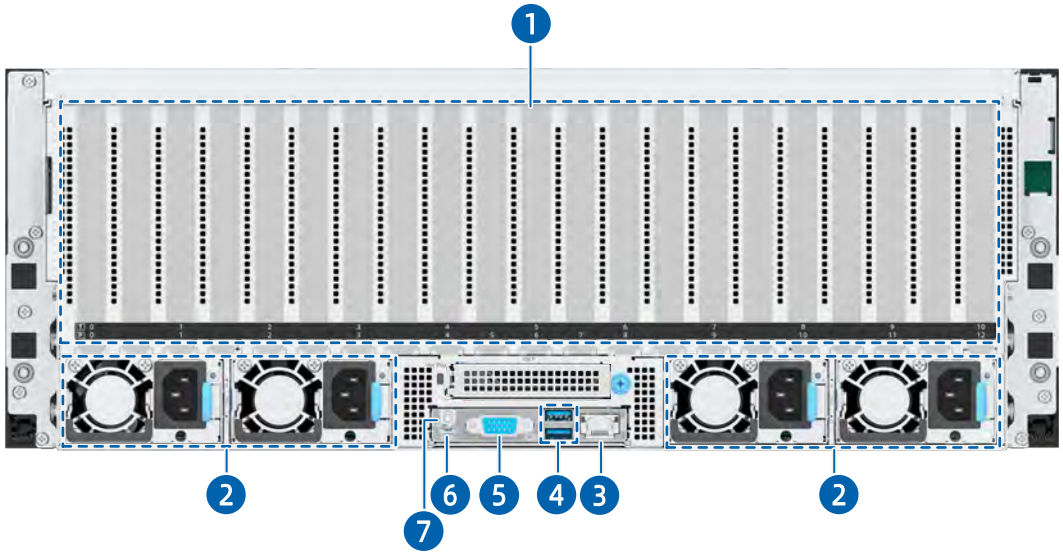
Figure 5-7 Rear View



Item	Feature	Item	Feature
1	PCIe Slot	6	VGA Port
2	PSU	7	System/BMC Serial Port
3	OCP 3.0 Card	8	UID/BMC RST Button and LED
4	BMC Management Network Port	9	OCP 3.0 Card Hot-Plug Button and LED
5	USB 3.0 Port	-	-

5.2.2 KR4268-X2-A0-F0-00

Figure 5-8 Rear View

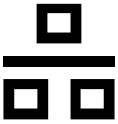


Item	Feature	Item	Feature
1	PCIe Slot	5	VGA Port
2	PSU	6	System/BMC Serial Port
3	BMC Management Network Port	7	UID/BMC RST Button and LED
4	USB 3.0 Port	-	-

5.3 LEDs and Buttons

Table 5-1 LED and Button Description

Item	Icon	Feature	Description
1		Power Button and LED	• Power LED: - Off = No power - Solid green = Power-on state - Solid orange = Standby state • Power button: - Press and release the button to power on the system from the standby state

Item	Icon	Feature	Description
			- Press and hold the button for 6 seconds to force a shutdown from the power-on state
2		System Status LED	• Off = Normal • Blinking red (1 Hz) = A warning error is detected on CPU, memory, power supply, drive, fan, etc. • Solid red = A critical error is detected on CPU, memory, power supply, drive, fan, etc.
3		Memory Status LED	• Off = Normal • Blinking red (1 Hz) = A warning error occurs • Solid red = A critical error occurs
4		Fan Status LED	• Off = Normal • Blinking red (1 Hz) = A warning error occurs • Solid red = A critical error occurs, including fan failure and fan absence
5		Power Status LED	• Off = Normal • Blinking red (1 Hz) = A warning error occurs • Solid red = A critical error occurs
6		System Overheat LED	• Off = Normal • Blinking red (1 Hz) = A warning error occurs, including Proc Hot, resulting in CPU throttling • Solid red = A critical error occurs, including CPU Thermal Trip/PCH Hot/MEM Hot, etc.
7		Network Status LED	• Off = No network connection • Blinking green = Network connected with data being transmitted • Solid green = Network connected without data being transmitted Note: The LED only indicates the status of self-developed OCP cards.
8		UID/BMC RST Button and LED	• UID/BMC RST LED: - Blinking blue (4 Hz) = PFR authentication fails and the firmware images cannot be recovered

Item	Icon	Feature	Description
			- Solid blue = The UID LED is activated by the UID button or via the BMC - Gradually turning blue within 2 seconds and then gradually turning off within 2 seconds = PFR authentication in progress (Note: The server can be powered on only after this LED turns off.) • UID/BMC RST button: - Press and release the button to activate the UID LED. - Press and hold the button for 6 seconds to force a BMC reset.
9	-	USB Type-C Status LED	• Connected to a terminal: - Off = Not connected to a terminal - Blinking green (2 Hz) for 3 seconds and then off = Port function is disabled - Solid green = Connected to a terminal • Connected to a USB storage device: - Off = Not connected to a USB storage device - Blinking red (1 Hz) = Job fails or is completed with an error reported - Blinking green (2 Hz) = Job in progress - Blinking green (2 Hz) 5 times and then off = Port function is disabled - Solid green = Job is completed successfully
10	-	OCP 3.0 Card Hot-Plug Button and LED	• OCP 3.0 card hot-plug LED: - Solid green = OCP card is powered on - Blinking green = OCP card is getting ready for hot-plugging or OCP card is being identified after being inserted - Off = OCP card is powered off • OCP 3.0 card hot-plug button: - With the LED solid on, press and release the button to power off the OCP card.

Item	Icon	Feature	Description
			- With the LED off and the OCP card installed, press and release the button to power on the OCP card. Notes: • Before unplugging or powering on the OCP 3.0 card, press and release the button. • With the LED off, hot-plugging OCP 3.0 card is enabled. • LED blinking frequency may vary due to brands and models. The actual frequency shall prevail.

5.4 Port Description

Table 5-2 Port Description

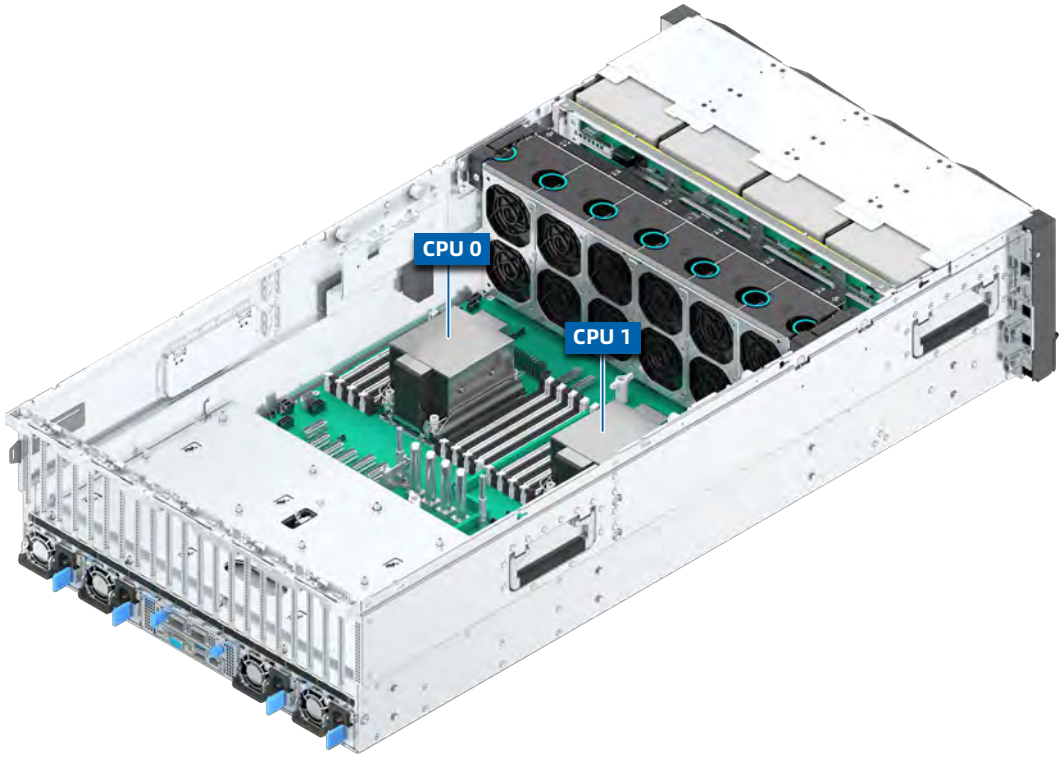
Item	Port	Description
1	VGA Port	Enables you to connect a display terminal to the system.
2	USB 3.0 Port	Enables you to connect a USB 3.0/2.0 device to the system.
3	USB 2.0 Port	Enables you to connect a USB 2.0 device to the system.
4	USB Type-C Port	• Enables you to connect to a terminal (local PCs with Windows 10 and later, or Android/iOS mobile phones) to the system for BMC local maintenance, to monitor and manage the system. • Enables you to connect a USB storage device to the system for automatic log copying to the USB device and automatic configuration importing to the BMC.
5	System/BMC Serial Port	• Enables you to debug and monitor the system. • Enables you to debug and monitor the BMC.
6	BMC Management Network Port	Enables you to manage the server. Note: It is a Gigabit Ethernet port that supports 100 Mbps and 1,000 Mbps auto-negotiation.

Item	Port	Description
7	OCP 3.0 Network Port	Enables you to connect the system to the network.
8	PCIe NIC Port	Enables you to connect the system to the network.

5.5 Processors

- Supports two 4th/5th Gen Intel Xeon Scalable processors.
- The processors used in a server must be the same model.
- For specific processor options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

Figure 5-9 Processor Locations

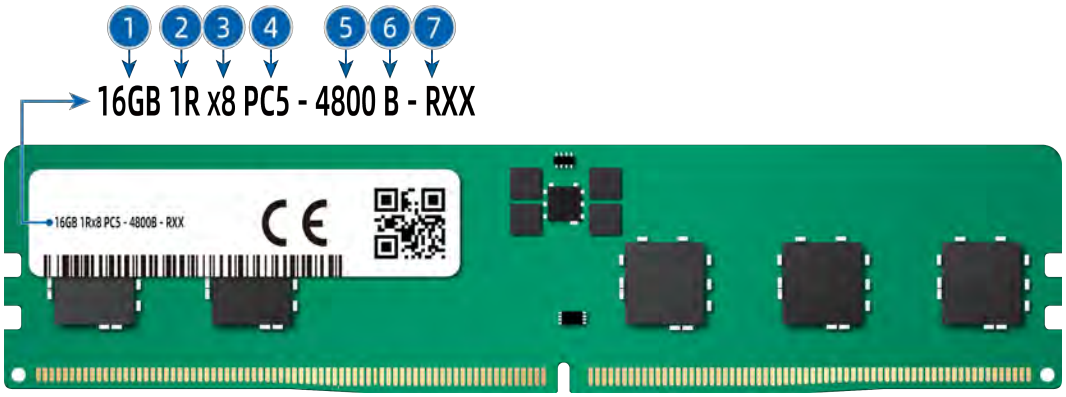


5.6 Memory

5.6.1 Identification

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

Figure 5-10 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 • 2S4R = Four ranks of two high stacked 3DS DRAM • 4R = Quad rank
3	Data width of DRAM	• x4 = 4 bits • x8 = 8 bits
4	DIMM slot type	PC5 = DDR5
5	Maximum memory speed	• 4,800 MT/s • 5,600 MT/s
6	CAS latency	• SDP 4800B = 40-39-39 • 3DS 4800B = 46-39-39 • SDP 5600B = 46-45-45 • 3DS 5600B = 52-45-45
7	DIMM type	R = RDIMM

5.6.2 Memory Subsystem Architecture

The server supports 32 DIMM slots and 8 memory channels per CPU.

Table 5-3 DIMM Slot List

CPU	Channel ID	Silk Screen
CPU0	Channel 0	CPU0_C0D0
		CPU0_C0D1
	Channel 1	CPU0_C1D0
		CPU0_C1D1
	Channel 2	CPU0_C2D0
		CPU0_C2D1
	Channel 3	CPU0_C3D0
		CPU0_C3D1
	Channel 4	CPU0_C4D0
		CPU0_C4D1
	Channel 5	CPU0_C5D0
		CPU0_C5D1
	Channel 6	CPU0_C6D0
		CPU0_C6D1
	Channel 7	CPU0_C7D0
		CPU0_C7D1
CPU1	Channel 0	CPU1_C0D0
		CPU1_C0D1
	Channel 1	CPU1_C1D0
		CPU1_C1D1
	Channel 2	CPU1_C2D0
		CPU1_C2D1
	Channel 3	CPU1_C3D0
		CPU1_C3D1
	Channel 4	CPU1_C4D0
		CPU1_C4D1

CPU	Channel ID	Silk Screen
	Channel 5	CPU1_C5D0
		CPU1_C5D1
	Channel 6	CPU1_C6D0
		CPU1_C6D1
	Channel 7	CPU1_C7D0
		CPU1_C7D1

5.6.3 Compatibility

Refer to the following rules to configure the DDR5 DIMMs.

IMPORTANT

- A server must use DDR5 DIMMs with the same part number (P/N code). All DDR5 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 DDR5 DIMMs of different specifications (capacity, bit width, rank, height, etc.) is not supported.
- For specific memory options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

- DDR5 DIMMs can be used with the 4th/5th Gen Intel Xeon Scalable processors. The maximum memory capacity supported is identical for different CPU models.
- The maximum number of DIMMs supported depends on the CPU type, memory type, and rank number.

NOTE

Maximum number of DIMMs supported per channel ≤ Maximum number of ranks supported per channel ÷ Number of ranks per DIMM.

Table 5-4 DDR5 DIMM Specifications

Item		Value				
Capacity per DDR5 DIMM (GB)		16	32	64	128	256
Type		RDIMM	RDIMM	RDIMM	RDIMM	RDIMM
Rated speed (MT/s)		5,600	5,600	5,600	5,600	5,600
Operating voltage (V)		1.1	1.1	1.1	1.1	1.1
Maximum number of DDR5 DIMMs supported in a server[a]		32	32	32	32	32
Maximum capacity of DDR5 DIMMs supported in a server (GB)[b]		512	1,024	2,048	4,096	8,192
Maximum speed (MT/s)	1 DPC[c]	5,600	5,600	5,600	5,600	5,600
	2 DPC	4,400	4,400	4,400	4,400	4,400

a. The maximum number of DDR5 DIMMs supported is based on the dual-CPU configuration. The number is halved for the single-CPU configuration.

b. It indicates the maximum memory capacity supported when all the DIMM slots are populated with DDR5 DIMMs. The maximum DDR5 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 your local sales representative for details.

5.6.4 Population Rules

General population rules for DDR5 DIMMs:

- Install DIMMs only when the corresponding processor is installed.
- Install dummies in the empty DIMM slots.

Population rules for DDR5 DIMMs in specific modes:

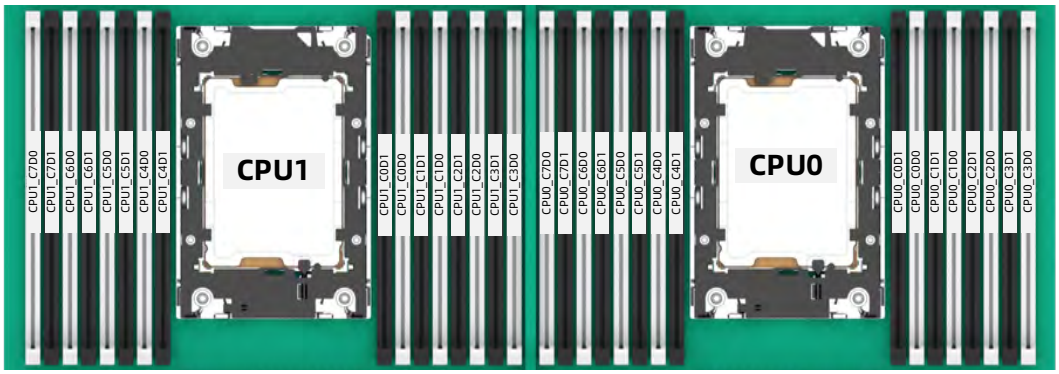
- Memory sparing mode
  - Follow the general population rules.
  - Each channel must have a valid online spare configuration.
  - Each channel can have a different online spare configuration.
  - Each channel with a DIMM installed must have a spare rank.
- Memory mirroring mode
  - Follow the general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

- Each processor supports 4 integrated memory controllers (iMCs). Each iMC has 2 channels to be populated with DIMMs. Installed DIMMs must be of the same capacity and organization.
- In a multi-processor configuration, each processor must have a valid memory mirroring configuration.

5.6.5 DIMM Slot Layout

Up to 32 DDR5 DIMMs can be installed in a server, and a balanced DIMM configuration is recommended for optimal memory performance. DIMM configuration must be compliant with the DIMM population rules.

Figure 5-11 DIMM Slot Layout



- DIMM Population Rules (Dual-CPU Configuration)

Table 5-5 DDR5 DIMM Population Rules (Dual-CPU Configuration)

DDR	CPU0																CPU1													
QTY	C0D0	C0D1	C1D0	C1D1	C2D0	C2D1	C3D0	C3D1	C4D0	C4D1	C5D0	C5D1	C6D0	C6D1	C7D0	C7D1	C0D0	C0D1	C1D0	C1D1	C2D0	C2D1	C3D0	C3D1	C4D0	C4D1	C5D0	C5D1	C6D0	C6D1	C7D0	C7D1
2	●																●															
4	●												●				●												●			
8	●				●				●				●				●				●				●				●			
12	●				●		●		●		●		●				●				●		●		●		●		●			
16	●		●		●		●		●		●		●		●		●		●		●		●		●		●		●		●	
24	●	●	●		●	●	●		●	●	●		●	●	●		●	●	●		●	●	●		●	●	●		●	●	●	
32	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

5.7 Storage

CAUTION

Mixing of storage controllers may result in drive letter drift under the system.

5.7.1 Drive Configurations

NOTE

- This section describes only some of the drive configurations. For details, consult our pre-sales engineers.
- For corresponding drive numbering of drive configurations, refer to 5.7.2 Drive Numbering.

Table 5-6 Drive Configurations

Configuration	Front Drives		Drive Management Mode	Internal Drives
	Bay	Type		
4 × 2.5-Inch SATA Drive	0-3	SATA	PCH	2 × M.2 SSD
4 × 2.5-Inch NVMe Drive	0-3	NVMe	CPU	2 × M.2 SSD
4 × 2.5-Inch SATA Drive + 2 × 2.5-Inch NVMe Drive	0-3	SATA	PCH	2 × M.2 SSD
	6-7	NVMe	CPU	
8 × 2.5-Inch NVMe Drive	0-7	NVMe	Tri-mode RAID card	2 × M.2 SSD
10/12 × 3.5-Inch SATA Drive	0-9/11	SATA	PCH	None
8 × 2.5-Inch SAS/SATA Drive + 2 × 2.5-Inch NVMe Drive	0-7	SAS/SATA	RAID card	2 × M.2 SSD
	14-15	NVMe	Switch card	
12 × 3.5-Inch SAS/SATA Drive	0-11	SAS/SATA	RAID card	2 × M.2 SSD
8/10 × 3.5-Inch SAS/SATA Drive + 2 × 2.5-Inch NVMe Drive (Used with 3.5-Inch Drive Tray)	0-7/9	SAS/SATA	RAID card	2 × M.2 SSD
	10-11	NVMe	CPU	
8/10 × 3.5-Inch SATA Drive + 2 × 2.5-Inch NVMe Drive (Used with 3.5-Inch Drive Tray)	0-7/9	SATA	PCH	None
	10-11	NVMe	CPU	
8 × 3.5-Inch SATA Drive + 4 × 2.5-Inch SATA Drive (Used with 3.5-Inch Drive Tray)	0-11	SATA	PCH	None

Configuration	Front Drives		Drive Management Mode	Internal Drives
	Bay	Type		
12 × 2.5-Inch SATA Drive (Used with 3.5-Inch Drive Tray)	0-11	SATA	PCH	None
12 × 2.5-Inch SATA Drive	0-11	SATA	PCH	None
8 × 2.5-Inch SAS/SATA Drive + 4 × 2.5-Inch NVMe Drive	0-7	SAS/SATA	RAID card	2 × M.2 SSD
	12-15	NVMe	CPU	
8 × 2.5-Inch SATA Drive + 4 × 2.5-Inch NVMe Drive	0-7	SATA	PCH	None
	12-15	NVMe	Switch card	
8 × 2.5-Inch SAS/SATA Drive + 4 × 2.5-Inch NVMe Drive	0-7	SAS/SATA	RAID card	2 × M.2 SSD
	12-15	NVMe	Switch card	
12 × 2.5-Inch SATA Drive + 2 × 2.5-Inch NVMe Drive	0-11	SATA	PCH	None
	14-15	NVMe	CPU	
12 × 2.5-Inch SAS/SATA Drive + 4 × 2.5-Inch NVMe Drive	0-11	SAS/SATA	RAID card	2 × M.2 SSD
	12-15	NVMe	CPU	
14 × 2.5-Inch SAS/SATA Drive + 2 × 2.5-Inch NVMe Drive	0-13	SAS/SATA	RAID card	2 × M.2 SSD
	14-15	NVMe	Switch card	
16 × 2.5-Inch SAS/SATA Drive	0-15	SAS/SATA	RAID card	2 × M.2 SSD
12 × 2.5-Inch SATA Drive + 4 × 2.5-Inch NVMe Drive	0-11	SATA	PCH	None
	12-15	NVMe	Switch card	
8 × 2.5-Inch SATA Drive + 8 × 2.5-Inch NVMe Drive	0-7	SATA	PCH	None
	8-15	NVMe	Switch card	
12 × 2.5-Inch SAS/SATA Drive + 4 × 2.5-Inch NVMe Drive	0-11	SAS/SATA	RAID card	2 × M.2 SSD
	12-15	NVMe	Switch card	
16 × 2.5-Inch SAS/SATA Drive + 4 × 2.5-Inch NVMe Drive	0-15	SAS/SATA	RAID card	2 × M.2 SSD
	20-23	NVMe	CPU	

Configuration	Front Drives		Drive Management Mode	Internal Drives
	Bay	Type		
24 × 2.5-Inch SAS/SATA Drive	0-23	SAS/SATA	RAID card	2 × M.2 SSD
16 × E3.S SSD	0-15	E3.S	CPU	2 × M.2 SSD

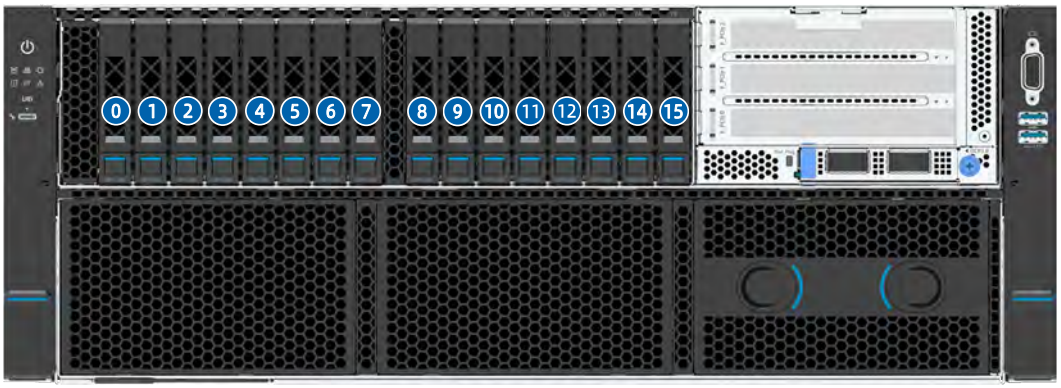
5.7.2 Drive Numbering

NOTE

Instances of drive numbering with all drives installed are shown below. Drive numbering may vary due to different drive configurations and RAID card configurations. The actual drive numbering shall prevail.

- 16 × 2.5-Inch Drive Configuration (16 × SAS/SATA Drive)

Figure 5-12 Drive Numbering



Physical Drive No.	Drive No. Identified by the BMC	Drive No. Identified by the 8i RAID Card + 8i RAID Card
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6

Physical Drive No.	Drive No. Identified by the BMC	Drive No. Identified by the 8i RAID Card + 8i RAID Card
7	7	7
8	8	0
9	9	1
10	10	2
11	11	3
12	12	4
13	13	5
14	14	6
15	15	7

- 24 × 2.5-Inch Drive Configuration (24 × SAS/SATA Drive)

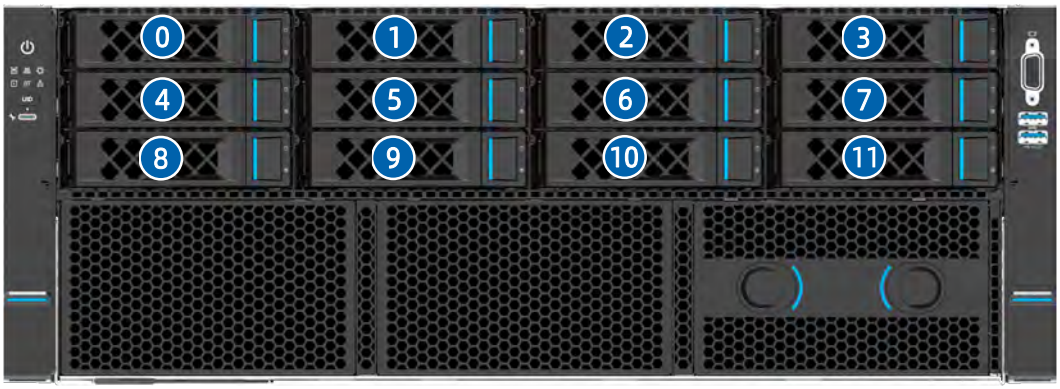
Figure 5-13 Drive Numbering

Physical Drive No.	Drive No. Identified by the BMC	Drive No. Identified by the 8i RAID Card + 16i RAID Card
0	0	0
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7

Physical Drive No.	Drive No. Identified by the BMC	Drive No. Identified by the 8i RAID Card + 16i RAID Card
8	8	0
9	9	1
10	10	2
11	11	3
12	12	4
13	13	5
14	14	6
15	15	7
16	16	8
17	17	9
18	18	10
19	19	11
20	20	12
21	21	13
22	22	14
23	23	15

- 12 × 3.5-Inch Drive Configuration (12 × SAS/SATA Drive)

Figure 5-14 Drive Numbering

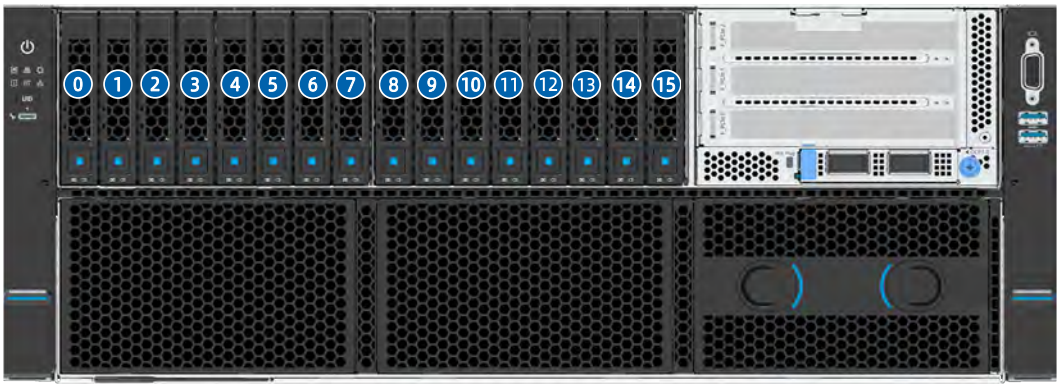


Physical Drive No.	Drive No. Identified by the BMC	Drive No. Identified by the 16i RAID Card
0	0	0

Physical Drive No.	Drive No. Identified by the BMC	Drive No. Identified by the 16i RAID Card
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
6	6	6
7	7	7
8	8	8
9	9	9
10	10	10
11	11	11

- 16 × E3.S Drive Configuration (16 × E3.S SSD)

Figure 5-15 Drive Numbering



Physical Drive No.	Drive No. Identified by the BMC
0	0
1	1
2	2
3	3
4	4
5	5
6	6

Physical Drive No.	Drive No. Identified by the BMC
7	7
8	8
9	9
10	10
11	11
12	12
13	13
14	14
15	15

5.7.3 Drive LEDs

1. SAS/SATA Drive LEDs

Figure 5-16 SAS/SATA Drive LEDs

Activity LED (①)	Locator/Error LED (②)			Description
Green	Blue	Red		
Off	Off	RAID created	RAID not created	Drive absent
		Solid on	Off	
Solid on	Off	Off		Drive present but not in use
Blinking (4Hz)	Off	Off		Drive present and in use
Blinking (4Hz)	Solid pink			Copyback/Rebuild in progress
Solid on	Solid on	Off		Drive selected but not in use
Blinking (4Hz)	Solid on	Off		Drive selected and in use
Off	Solid on	Off		Drive is selected but fails
Any status	Off	Solid on		Drive fails

2. NVMe Drive LEDs

Figure 5-17 NVMe Drive LEDs

When the VMD function is enabled and the latest VMD driver is installed, the NVMe drives support surprise hot swap, and the LEDs can be lit up.

Table 5-7 NVMe Drive LED Description

Activity LED (①)	Locator/Error LED (②)		Description
Green	Blue	Red	
Off	Off	Off	Drive absent
Solid on	Off	Off	Drive present but not in use
Blinking (4Hz)	Off	Off	Drive present and in use
Blinking (4Hz)	Solid pink		Copyback/Rebuild/Initializing/ Verifying in progress
Solid on	Solid on	Off	Drive selected but not in use
Blinking (4Hz)	Solid on	Off	Drive selected and in use
Off	Solid on	Off	Drive is selected but fails
Any status	Off	Solid on	Drive fails

5.7.4 RAID Cards

The RAID card provides functions such as RAID configuration, RAID level migration, and drive roaming. For specific RAID card options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

5.8 Network

NICs provide network expansion capabilities.

- The OCP slots support OCP 3.0 cards. Users can select the OCP 3.0 cards as needed.

- The PCIe expansion slots support PCIe NICs. Users can select the PCIe NICs as needed.
- For specific NIC options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

5.9 I/O Expansion

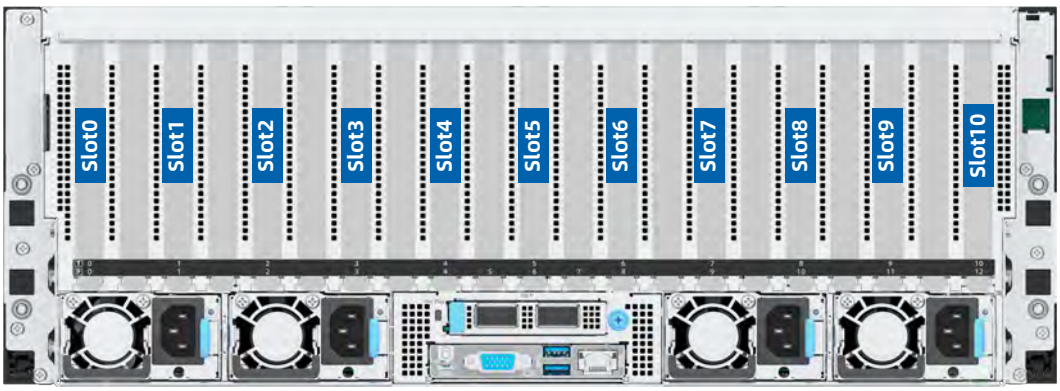
5.9.1 PCIe Expansion Cards

PCIe expansion cards provide system expansion capabilities.

- Up to 13 rear PCIe 5.0 slots.
- Up to 3 front PCIe 5.0 slots.
- Up to 2 internal PCIe 5.0 slots.
- For specific PCIe expansion card options, consult your local sales representative or refer to 7.2 Hardware Compatibility.
- There will be I/O resource conflicts if the number of PCIe expansion cards exceeds 12. Consult your local sales representative.

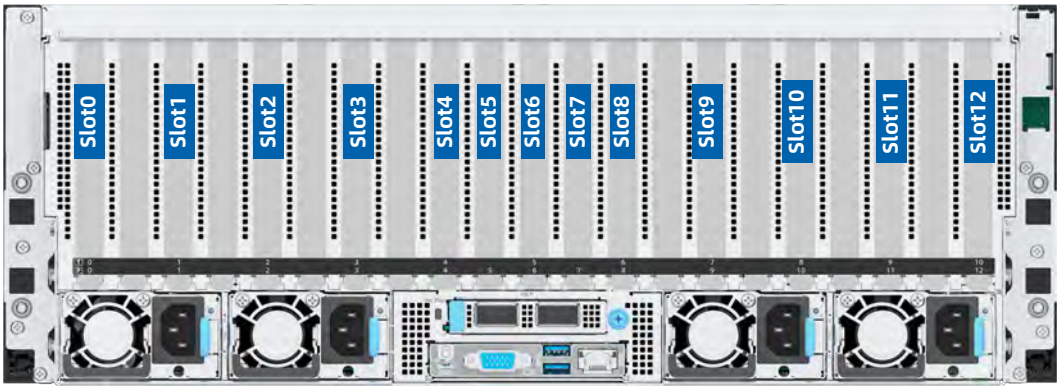
5.9.2 Rear PCIe Slot Locations

Figure 5-18 PCIe Slots - T Configuration



- For 8-GPU configuration, use slot 1 to slot 8; for 10-GPU configuration, use slot 0 to slot 9.
- Install the smart NIC into slot 0.
- Refer to 5.12.3 PCIe Backplanes for the PCIe backplane information.

Figure 5-19 PCIe Slots - P Configuration (104/144 Lanes)



- For 8-GPU configuration, use slot 0 to slot 3 and slot 8 to slot 11.
- Install the smart NIC into slot 4.
- Refer to 5.12.3 PCIe Backplanes for the PCIe backplane information.

5.9.3 Rear PCIe Slot Description

- T Configuration

Table 5-8 PCIe Slot Description 1

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port No.	Form Factor
Slot 0	CPU0	PCIe 5.0	x16	x16/x8	PE1	FHFL
Slot 1	CPU0	PCIe 5.0	x16	x16	PE4	FHFL
Slot 2	CPU0	PCIe 5.0	x16	x16	PE0	FHFL
Slot 3	CPU0	PCIe 5.0	x16	x16	PE2	FHFL
Slot 4	CPU0	PCIe 5.0	x16	x16	PE3	FHFL
Slot 5	CPU1	PCIe 5.0	x16	x16	PE4	FHFL
Slot 6	CPU1	PCIe 5.0	x16	x16	PE0	FHFL
Slot 7	CPU1	PCIe 5.0	x16	x16	PE2	FHFL
Slot 8	CPU1	PCIe 5.0	x16	x16	PE3	FHFL
Slot 9	CPU1	PCIe 5.0	x16	x16	PE1	FHFL
Slot 10	CPU1	PCIe 5.0	x16	x8	PE1	FHFL

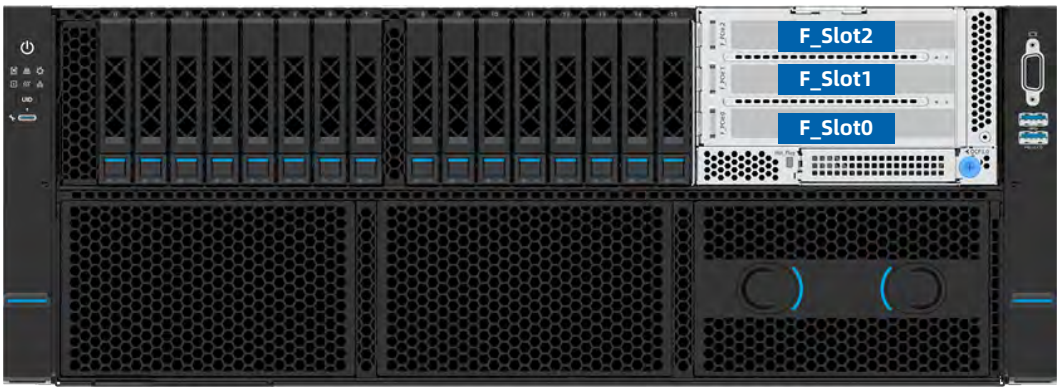
- P Configuration (104/144 Lanes)

Table 5-9 PCIe Slot Description 2

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port No.	Form Factor
Slot 0	CPU0/1	PCIe 5.0	x16	x16/x8	S7	FHFL
Slot 1	CPU0/1	PCIe 5.0	x16	x16	S2	FHFL
Slot 2	CPU0/1	PCIe 5.0	x16	x16	S1	FHFL
Slot 3	CPU0/1	PCIe 5.0	x16	x16	S0	FHFL
Slot 4	CPU0	PCIe 5.0	x16	x16	PE1	FHFL
	CPU0/1			x8	S8	
Slot 5	CPU0/1	PCIe 5.0	x16	x8	S8	FHFL
				x16	S5	
Slot 6	CPU0/1	PCIe 5.0	x16	x8	S8	FHFL
				x16	S0	
Slot 7	CPU1	PCIe 5.0	x16	x16	PE1	FHFL
Slot 8	CPU0/1	PCIe 5.0	x16	x16	S5	FHFL
Slot 9	CPU0/1	PCIe 5.0	x16	x16/x8	S6	FHFL
Slot 10	CPU0/1	PCIe 5.0	x16	x16/x8	S7	FHFL
Slot 11	CPU0/1	PCIe 5.0	x16	x16/x8	S2	FHFL
Slot 12	CPU1	PCIe 5.0	x16	x16/x8	PE2	FHFL

5.9.4 Front PCIe Slot Locations

Figure 5-20 PCIe Riser Module 0

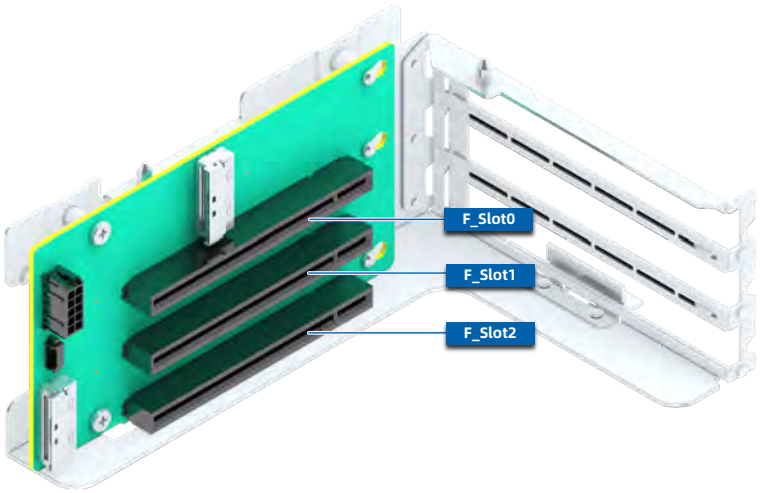


- The front PCIe riser module 0 provides 3 PCIe x16 slots, which are F_Slot 0, F_Slot 1 and F_Slot 2.
- The front (internal) RAID riser module provides 2 PCIe x8 slots, which are M_Slot 0 and M_Slot 1.

5.9.5 Front PCIe Riser Modules

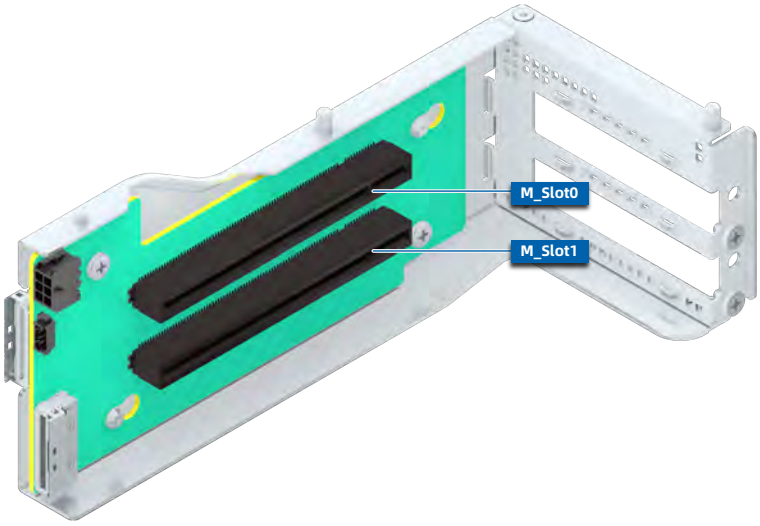
- Front PCIe riser module 0

Figure 5-21 PCIe Riser Module (3 × PCIe x16 slot)



- Front RAID riser module (internal)

Figure 5-22 RAID Riser Module (2 × PCIe x8 slot)



5.9.6 Front PCIe Slot Description

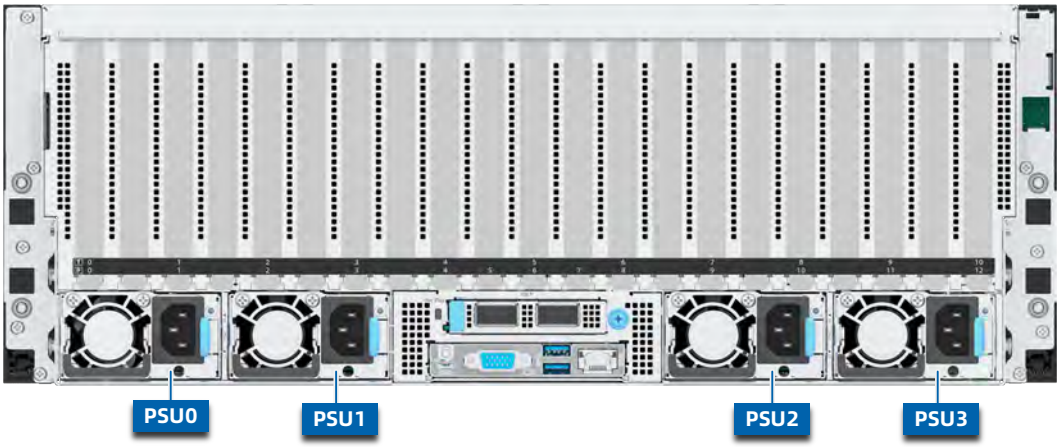
Table 5-10 Front PCIe Slot Description

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port No.	Form Factor
F_Slot 0	CPU0	PCIe 5.0	x16	x16	PE1	FHHL
F_Slot 1	CPU0/1	PCIe 5.0	x16	x16	CPU0_PE2 CPU1_PE1	FHHL
F_Slot 2	CPU1	PCIe 5.0	x16	x16	PE1/PE2	FHHL
M_Slot 0	CPU0	PCIe 5.0	x8	x8	PE1	FHHL
M_Slot 1	CPU1	PCIe 5.0	x8	x8	PE2	FHHL

5.10 PSUs

- The server supports 4 PSUs in 2+2 redundancy.
- The server supports AC or DC power input.
- The PSUs are hot-swappable.
- The server must use PSUs with the same part number (P/N code).
- The PSUs provide short-circuit protection.

Figure 5-23 PSU Locations

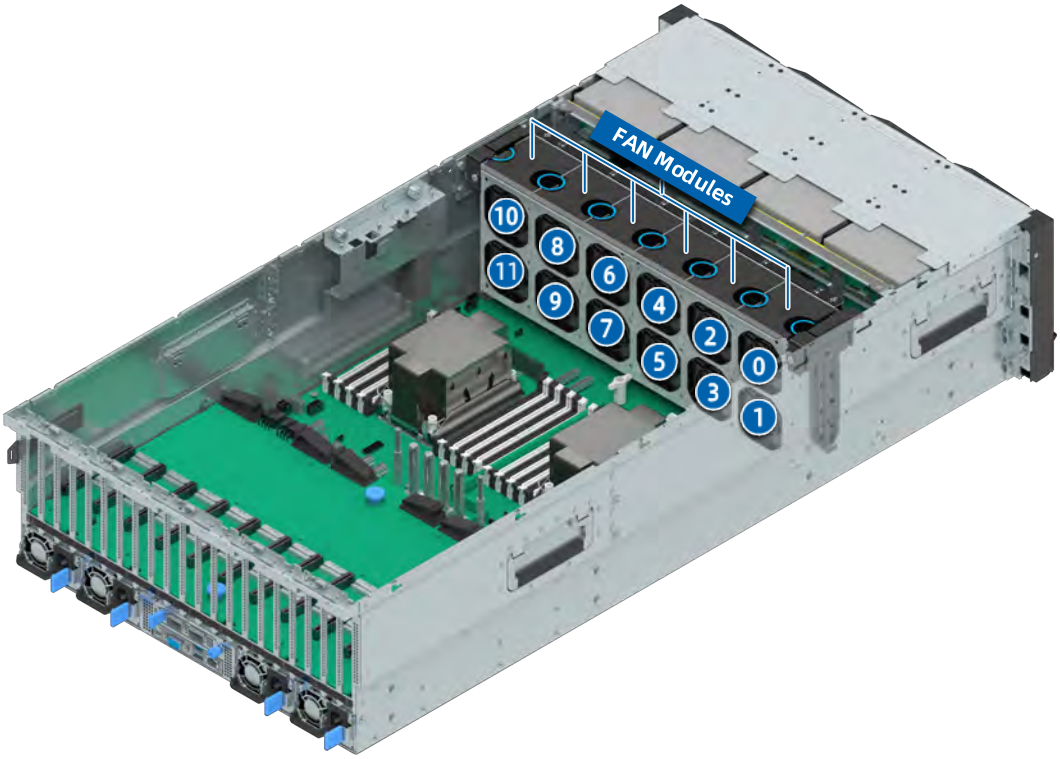


5.11 Fan Modules

- The server supports twelve 6056 fan modules.
- The fan modules 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 fan modules with the same part number (P/N code).

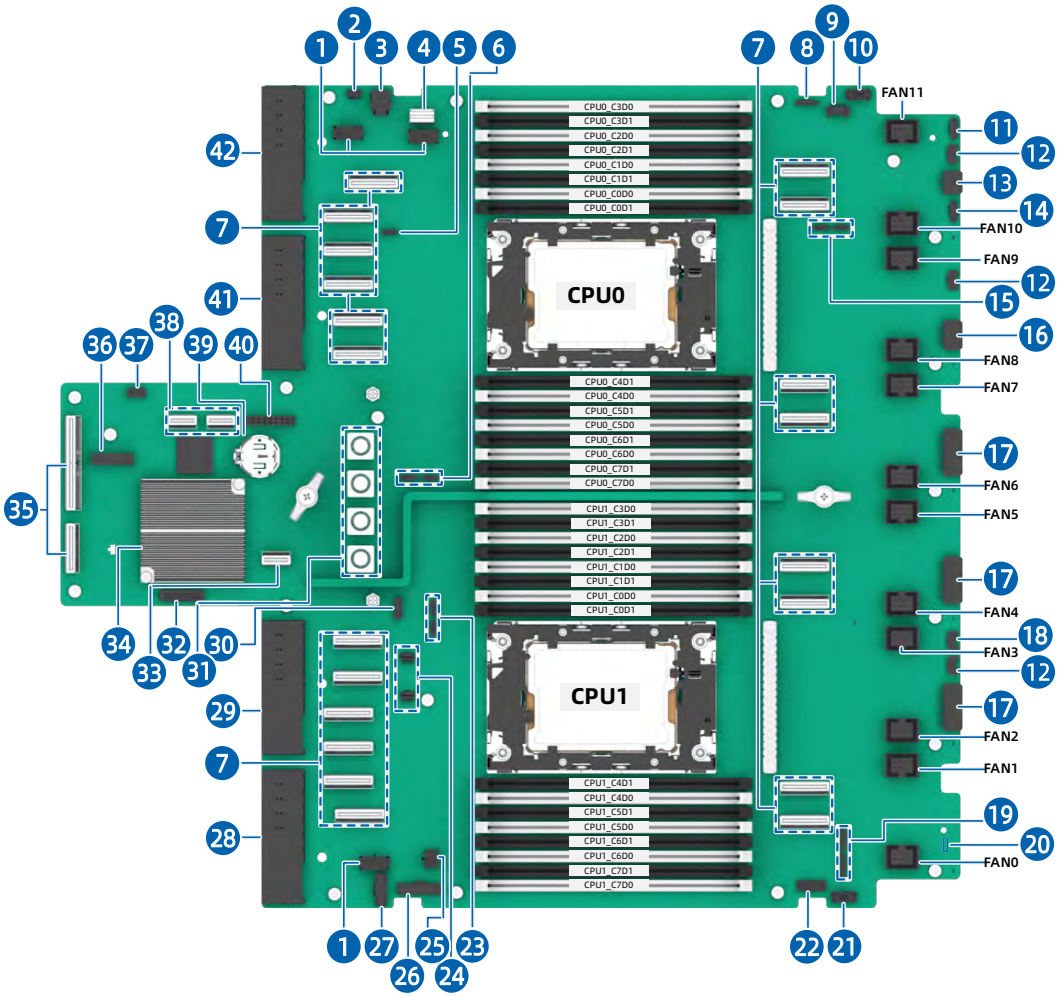
Figure 5-24 Fan Module Locations



5.12 Boards

5.12.1 Motherboard

Figure 5-25 Motherboard Layout

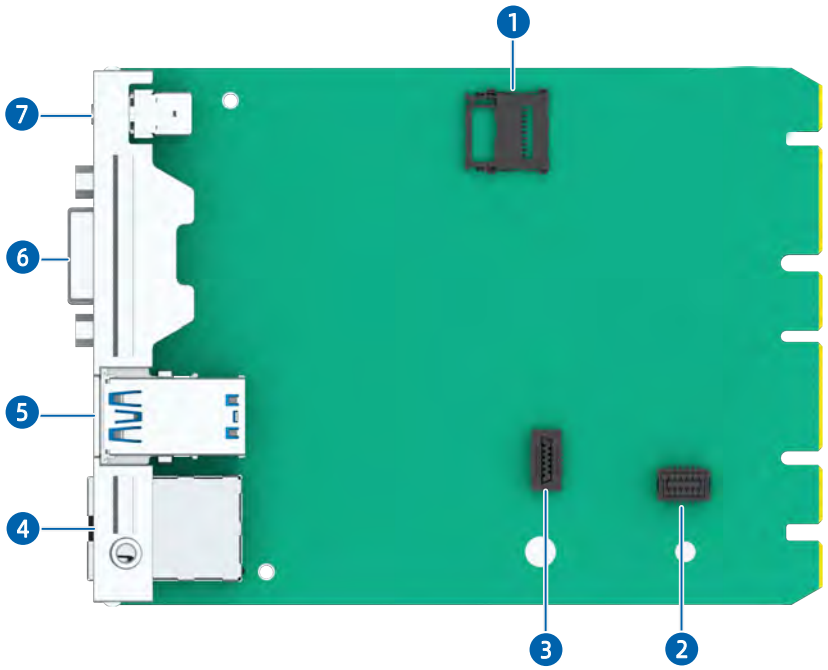


Item	Feature	Item	Feature
1	PCIe Backplane Power Connector	22	Left Control Panel Connector
2	OCP 3.0 Card Hot-Plug Button and LED Connector	23	DMPU UART Connector
3	OCP 3.0 Card Power Connector	24	Leak Detection Connector
4	Right Control Panel Connector	25	Smart NIC Power Connector
5	Smart NIC UART Connector	26	PDB Sideband Connector
6	DMPU UART Connector	27	Smart NIC Sideband Connector

Item	Feature	Item	Feature
7	MCIO x8 Connector	28	PSU3 Connector
8	Front Drive Backplane SGPIO Connector	29	PSU2 Connector
9	Inlet Temperature Sensor Connector	30	RAID Key Connector
10	VPP Connector	31	PDB RadSok Connector
11	RAID Riser I^2C Connector	32	OCP 3.0 Card Sideband Connector
12	Front Drive Backplane I^2C Connector	33	Front Drive Backplane SATA Connector
13	RAID Riser Power Connector	34	PCH Heatsink
14	RAID Riser I^2C Connector	35	DC-SCM Connector
15	DMPU UART Connector	36	System TF Card Adapter Connector
16	PCIe Riser Power Connector	37	Intrusion Detection Connector
17	Front Drive Backplane Power Connector	38	Front Drive Backplane SATA Connector/M.2 Riser Connector
18	TSOM I^2C Connector	39	Button Cell Battery Socket
19	Front Drive Backplane SGPIO Connector	40	M.2 Riser Power Connector
20	CMOS Jumper	41	PSU1 Connector
21	VPP Connector	42	PSU0 Connector

5.12.2 DC-SCM Board

Figure 5-26 DC-SCM Board

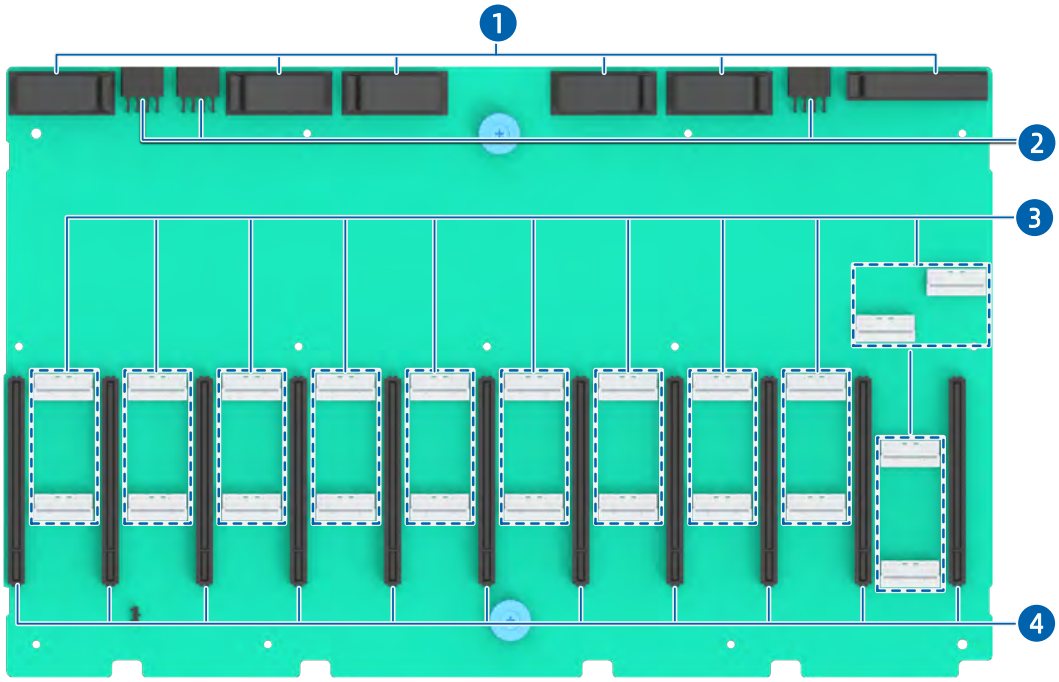


Item	Feature	Item	Feature
1	TF Card Slot	5	USB 3.0 Port
2	Front USB Type-C Port Connector	6	VGA Port
3	TCM/TPM Connector	7	UID/BMC RST Button and LED
4	BMC Management Network Port	-	-

5.12.3 PCIe Backplanes

1. T Configuration

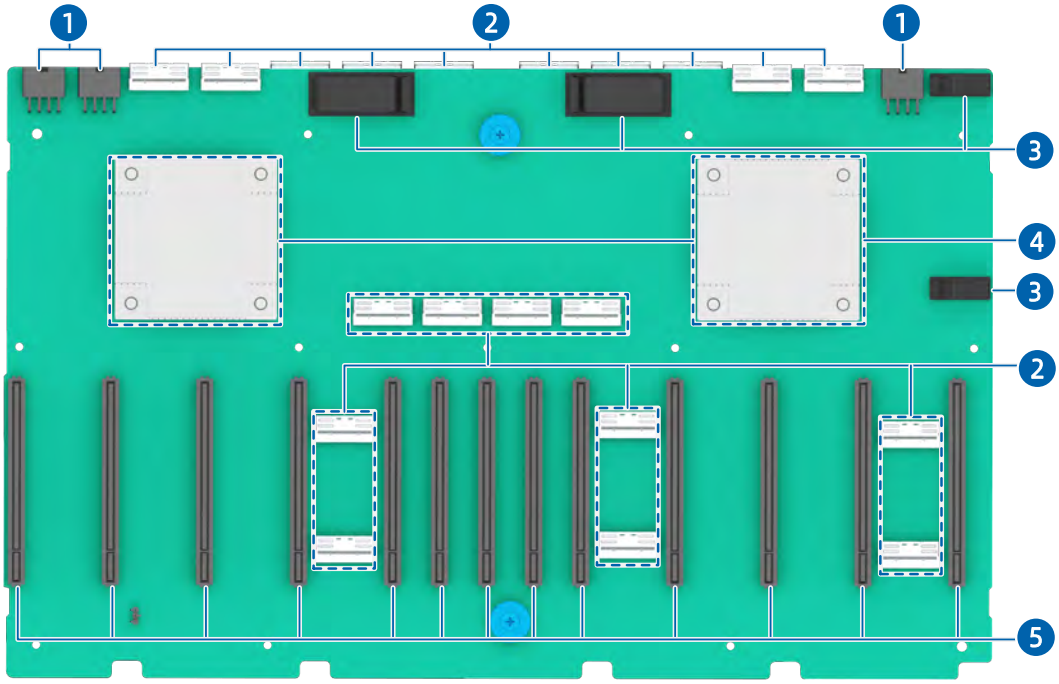
Figure 5-27 PCIe Backplane (T Configuration)



Item	Feature	Item	Feature
1	Cable Clip	3	MCIO x8 Connector
2	Power Connector	4	PCIe Slot

2. P Configuration (104 Lanes)

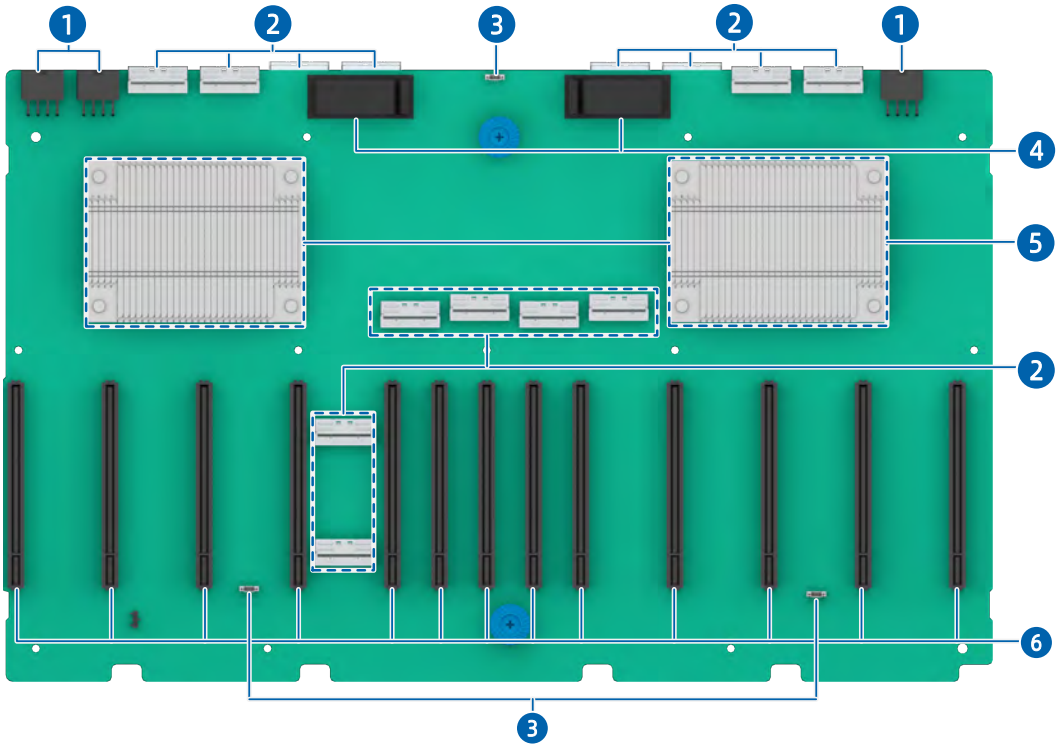
Figure 5-28 PCIe Backplane (P Configuration, 104 Lanes)



Item	Feature	Item	Feature
1	Power Connector	4	PCIe Switch Chip
2	MCIO x8 Connector	5	PCIe Slot
3	Cable Clip	-	-

3. P Configuration (144 Lanes)

Figure 5-29 PCIe Backplane (P Configuration, 144 Lanes)

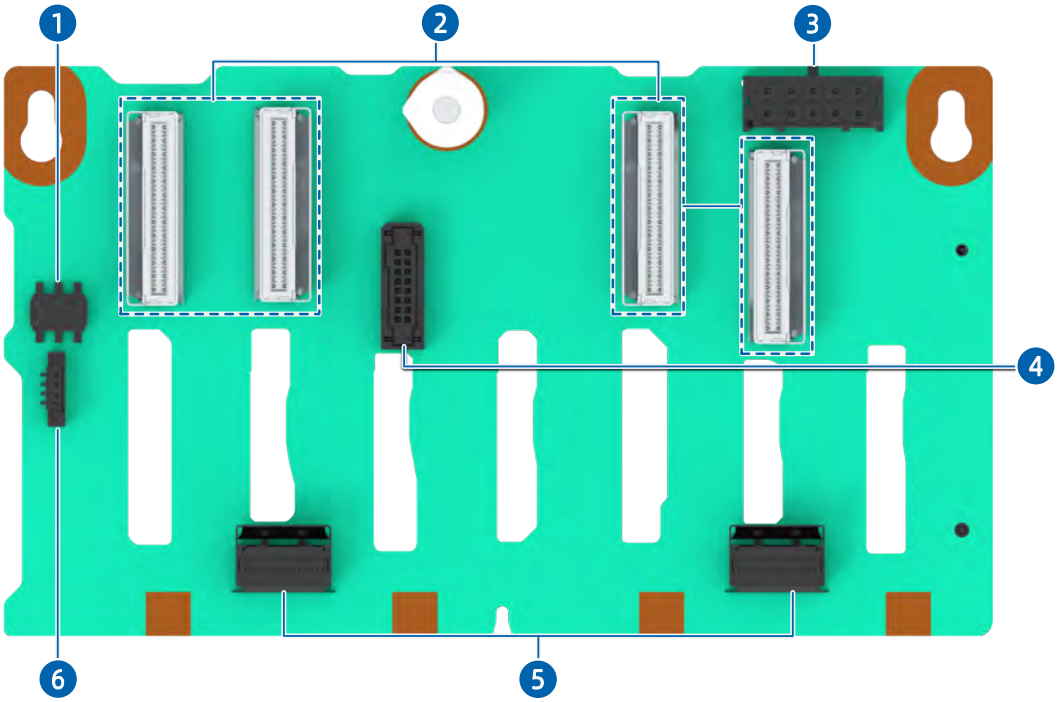


Item	Feature	Item	Feature
1	Power Connector	4	Cable Clip
2	MCIO x8 Connector	5	PCIe Switch Chip
3	UART Connector	6	PCIe Slot

5.12.4 Drive Backplanes

- 8 × 2.5-Inch SAS/SATA/NVMe Drive Backplane

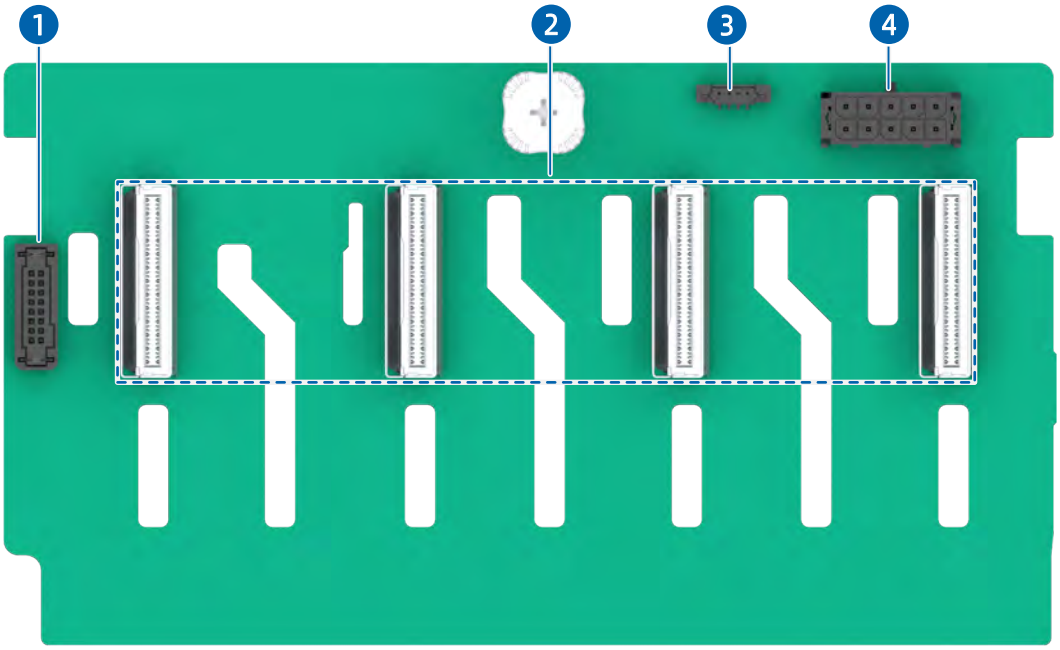
Figure 5-30 8 × 2.5-Inch SAS/SATA/NVMe Drive Backplane



Item	Feature	Item	Feature
1	CPLD JTAG Connector	4	VPP Connector
2	MCIO x8 Connector	5	Slimline x4 Connector
3	Power Connector	6	BMC I^2C Connector

- 8 × E3.S Drive Backplane

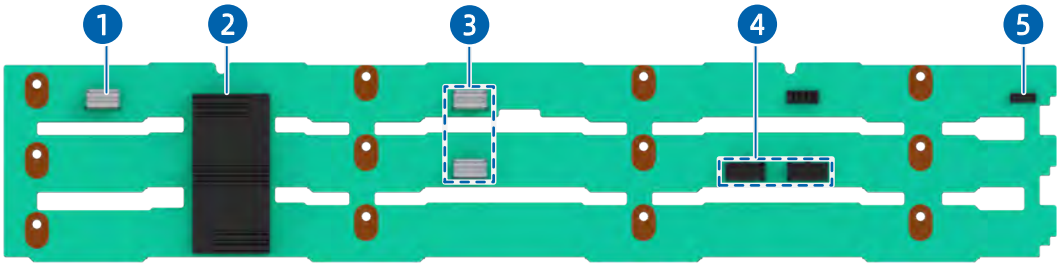
Figure 5-31 8 × E3.S Drive Backplane



Item	Feature	Item	Feature
1	VPP Connector	3	BMC I²C Connector
2	Slimline x8 Connector	4	Power Connector

- 12 × 3.5-Inch SAS/SATA Drive Backplane

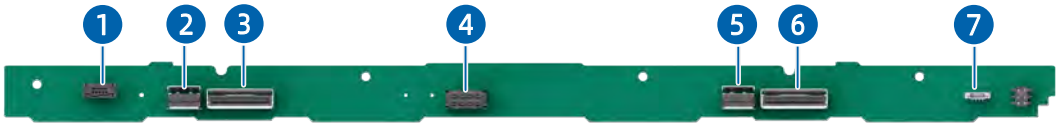
Figure 5-32 12 × 3.5-Inch SAS/SATA Drive Backplane



Item	Feature	Item	Feature
1	Slimline x4 Connector	4	Power Connector
2	Expander Chip	5	BMC I²C Connector
3	Slimline x4 Connector	-	-

- 4 × 3.5-Inch SAS/SATA/NVMe Drive Backplane

Figure 5-33 4 × 3.5-Inch SAS/SATA/NVMe Drive Backplane



Item	Feature	Item	Feature
1	VPP Connector	5	Slimline x4 Connector
2	Slimline x4 Connector	6	MCIO x8 Connector
3	MCIO x8 Connector	7	BMC I^2C Connector
4	Power Connector	-	-

6 Product Specifications

6.1 Technical Specifications

Table 6-1 Technical Specifications

Item	Description
Form Factor	4U rack server
Chipset	Intel Emmitsburg
Processor	Supports 2 processors. • 4th/5th Gen Intel Xeon Scalable processors (SPR/EMR) • 4 Integrated memory controllers and 8 memory channels per processor • Integrated PCIe 5.0 controllers and 80 PCIe lanes per processor • 4 UPI links per CPU at up to 20 GT/s per link • Up to 64 cores per CPU • TDP up to 350 W Note: The information above is for reference only. Refer to 7.2 Hardware Compatibility for details.
Memory	Supports up to 32 DDR5 DIMMs. • RDIMMs supported • Speed up to 5,600 MT/s (1 DPC) or 4,400 MT/s (2 DPC) • Mixing DDR5 DIMMs of different specifications (capacity, bit width, rank, height, etc.) is not supported. • A server must use DDR5 DIMMs with the same part number (P/N code). Note: The information above is for reference only. Refer to 7.2 Hardware Compatibility for details.
Storage	Supports multiple drive configurations. Refer to 5.7.1 Drive Configurations for details. • Front: - 24 × 2.5-inch SATA/SAS/NVMe drive (hot swap) or - 16 × E3.S SSD (hot swap) or

Item	Description
	- 12 × 3.5-inch SATA/SAS/NVMe drive (A 3.5-inch drive tray can accommodate a 2.5/3.5-inch drive.) (hot swap) or - 16 × 2.5-inch SATA/SAS/NVMe drive (hot swap) • Internal: 2 × M.2 SSD Note: The front storage of KR4268-X2-A0-F0-00 only supports 16 E3.S SSDs or sixteen 2.5-inch SATA/SAS/NVMe drives.
Network	• 1 optional OCP 3.0 card (1/10/25/40/100/200 Gb) (hot-swap) • 1 BMC management network port of 100/1,000 Mbps auto-negotiation • Standard PCIe 5.0 NICs (1/10/25/40/100/200 Gb)
I/O Expansion	• Front: Up to 3 PCIe 5.0 slots • Internal: Up to 2 PCIe 5.0 slots (dedicated for RAID cards) • Rear (T configuration): Up to 11 PCIe 5.0 slots, supporting 10 dual-width and 1 single-width PCIe expansion cards • Rear (P configuration, 104/144 lanes): Up to 13 PCIe 5.0 slots, supporting 8 dual-width and 5 single-width PCIe expansion cards • 1 front/rear OCP 3.0 card Refer to 5.9 I/O Expansion for details, and consult your local sales representative for specific configurations.
Port	• Front: - 1 × USB 2.0 port - 1 × USB 3.0 port - 1 × VGA port - 1 × USB Type-C port • Rear: - 2 × USB 3.0 port - 1 × VGA port - 1 × system/BMC serial port - 1 × BMC management network port
Display	Integrated VGA on the DC-SCM board with a video memory of 64 MB and a maximum 16M color resolution of 1,920 × 1,200 at 60 Hz. Notes:

Item	Description
	• The integrated VGA can support a maximum resolution of 1,920 × 1,200 only when the video driver matching the OS version is installed; otherwise, only the default resolution of the OS is supported. • When both the front and rear VGA ports are connected to monitors, only the monitor connected to the front VGA port works.
System Management	• UEFI • BMC • NC-SI • KSManage
Security	• Intel Platform Firmware Resilience (PFR) • Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM) • Intel Trusted Execution Technology • Firmware update mechanism based on digital signatures • UEFI Secure Boot • Hierarchical BIOS password protection • BIOS Secure Flash and BIOS Lock Enable (BLE) • BMC and BIOS dual-image mechanism • Chassis intrusion detection

6.2 Environmental Specifications

Table 6-2 Environmental Specifications

Item	Description
Temperature[1,2]	• Operating: 10°C to 35°C (50°F to 95°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% RH to 90% RH • Storage (packed): 5% RH to 93% RH • Storage (unpacked): 5% RH to 93% RH
Operating Altitude	≤3,050 m (10,007 ft)
Corrosive Gaseous Contaminants	Maximum growth rate of corrosion film thickness:

Item	Description
	• 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[3,4,5]	Noise emissions are measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). Listed are the declared A-weighted sound power levels (LWAd) and the declared average bystander position A-weighted sound pressure levels (LpAm) at a server operating temperature of 23°C (73.4°F): • Idle: - LWAd: 5.8 B - LpAm: 49.0 dBA • Operating: - LWAd: 6.4 B - LpAm: 53 dBA

Notes:

1. Not all configurations support the operating temperature range of 10°C to 35°C (50°F to 95°F). The 12 × 3.5-inch drive configuration supports an operating temperature range of 10°C to 30°C (50°F to 86°F).
2. Standard operating temperature
   - 10°C to 35°C (50°F to 95°F) is the standard operating temperature range. The maximum operating altitude is 3,050 m (10,007 ft), and the maximum temperature gradient is 20°C/h (36°F/h), both varying with server configuration. No direct sustained sunlight is permitted.
   - Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.
3. This document lists the LWAd and 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). Contact your sales representative for more information.
4. The sound levels shown here were measured based on the specific configurations of a server. Sound levels vary due to configurations, loads and temperatures. These values are for reference only and subject to change without notice.
5. 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.

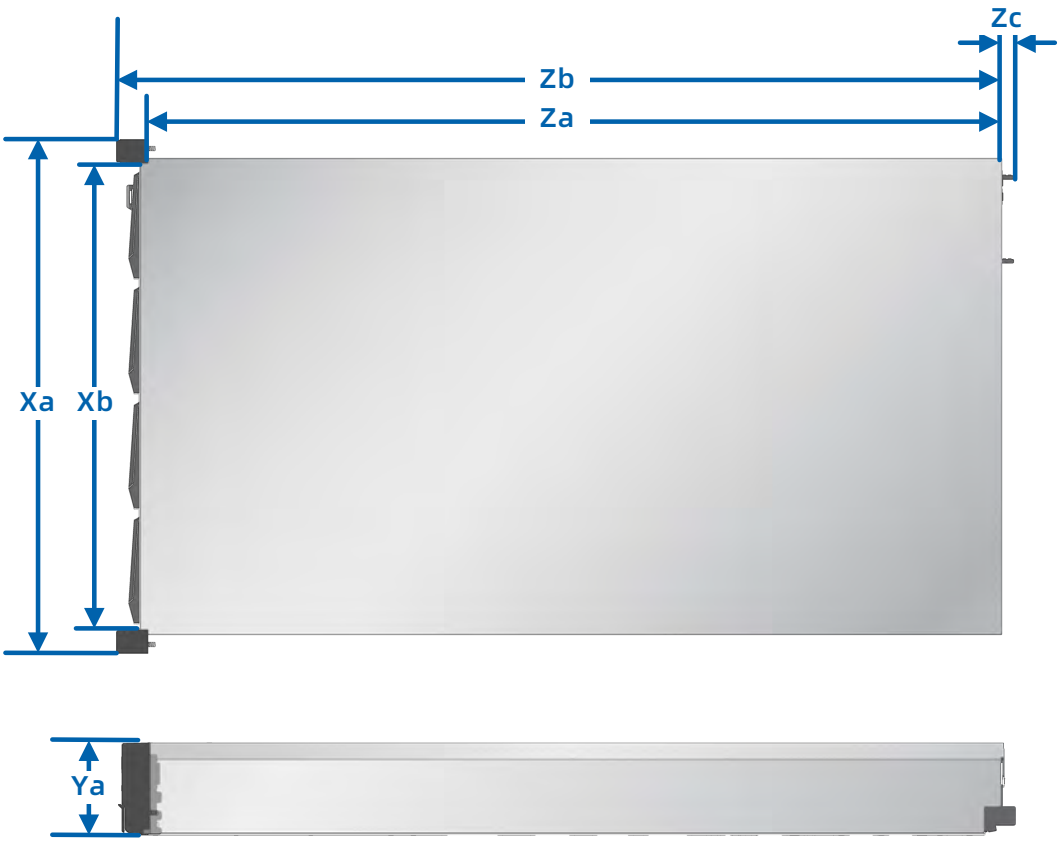
6.3 Physical Specifications

Table 6-3 Physical Specifications

Item	Description
Outer Packaging Dimensions (L × W × H)	1,200 × 800 × 471 mm (47.24 × 31.50 × 18.54 in.) (including the pallet)
Installation Dimension Requirements	• Installation requirements for the cabinet are as follows: - General cabinet compliant with the International Electrotechnical Commission 297 (IEC 297) standard - Width: 482.6 mm (19 in.) - Depth: Above 1,000 mm (39.37 in.) • Installation requirements for the server rails are as follows: - Static rail kit: The distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.) - Ball-bearing rail kit: The distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.)
Weight	• 24 × 2.5-inch drive configuration: - Net weight: 51 kg (112.44 lbs) - Gross weight: 83 kg (182.98 lbs) (including server, packaging box, rails and accessory box) • 16 × 2.5-inch drive configuration: - Net weight: 50 kg (110.23 lbs) - Gross weight: 82 kg (180.78 lbs) (including server, packaging box, rails and accessory box) • 12 × 3.5-inch drive configuration: - Net weight: 55 kg (121.25 lbs) - Gross weight: 87 kg (191.80 lbs) (including server, packaging box, rails and accessory box) • 16 × E3.S drive configuration: - Net weight: 51 kg (112.44 lbs) - Gross weight: 83 kg (182.98 lbs) (including server, packaging box, rails and accessory box) Note:

Item	Description
	The server weight varies by configuration.

Figure 6-1 Chassis Dimensions



Model	Za	Zb	Zc	Xa	Xb	Ya
KR4268-X2-A0-R0-00/ KR4268-X2-A0-F0-00	850 mm (33.46 in.)	880 mm (34.65 in.)	28 mm (1.10 in.)	482 mm (18.98 in.)	447 mm (17.60 in.)	174.5 mm (6.87 in.)

7 Operating System and Hardware Compatibility

This section describes the OS and hardware compatibility of the server. 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.
- Hardware compatibility may vary slightly from model to model. Contact your sales representatives to confirm the detailed hardware configurations during the pre-sales phase.
- 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 cards, or firmware versions) during the pre-sales phase.

7.1 Supported Operating Systems

Table 7-1 Supported Operating Systems

OS Version
Red Hat Enterprise Linux 8.6/8.8/9.0
Ubuntu 22.04
Windows Server 2022

7.2 Hardware Compatibility

7.2.1 CPU Specifications

Table 7-2 CPU Specifications

Model	Cores	Threads	Base Frequency (GHz)	Max. Turbo Frequency (GHz)	Cache (MB)	TDP (W)
8480+	56	112	2.0	3.8	105	350
8470	52	104	2.0	3.8	105	350
8468	48	96	2.1	3.8	105	350
8452Y	36	72	2.0	3.2	67.5	300
6430	32	64	2.1	3.4	60	270
8468V	48	96	2.1	3.8	97.5	330
8462Y	24	48	2.8	4.1	60	300
6438Y	32	64	2.0	4.0	60	205
6442Y	24	48	2.6	4.0	60	225
6448Y	32	64	2.1	4.1	60	225
8458P	44	88	2.7	3.8	82.5	350
6444Y	16	32	3.6	4.0	45	270
5418Y	24	48	2.0	3.8	45	185
5416S	16	32	2.0	4.0	30	150
4410Y	12	24	2.0	3.9	30	150
8558P	48	96	2.7	4.0	260	350
6530	32	64	2.1	4.0	160	270
6542Y	24	48	2.9	4.1	60	250
6526Y	16	32	2.8	3.9	37.5	195
5520+	28	56	2.2	4.0	52.5	205
4514Y	16	32	2.0	3.4	30	150

7.2.2 DIMM Specifications

The server supports up to 32 DDR5 DIMMs. Each processor supports 8 memory

channels with up to 2 DIMMs per channel. RDIMMs are supported.

Table 7-3 DIMM Specifications

Type	Capacity (GB)	Speed (MT/s)	Data Width	Organization
RDIMM	128	4,800	x72	4R x4
	64	5,600	x72	2R x4
	64	4,800	x72	4R x4
	64	4,800	x72	2R x4
	32	5,600	x72	2R x8
	32	4,800	x72	2R x8
	32	4,800	x72	1R x4

7.2.3 Drive Specifications

Table 7-4 SSD Specifications

Type	Capacity	Max. Qty.
SATA SSD	240 GB/480 GB/960 GB/1.92 TB/3.84 TB/7.68 TB	24
U.2 NVMe SSD	960 GB/1.6 TB/1.92 TB/3.2 TB/3.84 TB/6.4 TB/7.68 TB/12.8 TB	8
SATA M.2 SSD	240 GB/480 GB	2
PCIe M.2 SSD	960 GB/1.92 TB/3.84 TB	2

Table 7-5 HDD Specifications

Type	Speed in rpm	Capacity	Max. Qty.
2.5-Inch SAS HDD	10k	600 GB/1.2 TB/1.8 TB/2.4 TB	24

7.2.4 SAS/RAID Card Specifications

Table 7-6 SAS/RAID Card Specifications

Type	Description
SAS Card	SAS_PM8222_SmartHBA_8_SAS3_PCIE3

	SAS_BRCM_16R0_9500-16i_SMSAS3_PCIE4
	SAS_zhongqiu_8242_24_SAS3_PCIE3
	SAS_BRCM_16R0_9500-16i_SMSAS3_PCIE4
RAID Card	RAID_PM8204_RA_8_2GB_SAS3
	RAID_PM8204_RA_8_4GB_SAS3
	RAID_L_16R0_9560-16i_8GB_SMSAS3_PCIE4
	RAID_L_8R0_9560-8i_4G_HDM12G_PCIE4
	RAID_BRCM_16R_9540-16i_0_SMSAS3_PCIE4_S
	RAID_BRCM_8R0_9540-8i_0_SMSAS3_PCIE4
	RAID_PM8204_Y_8R0_2GB_SAS3_PCIE3_M
	RAID_PM8204_Y_8R0_4GB_SAS3_PCIE3_M

7.2.5 NIC Specifications

Table 7-7 OCP Card Specifications

Type	Description	Speed (Gb/s)	Port Qty.
OCP 3.0 Card	NIC_M_200G_MCX623435AN	200	1
	NIC_M_100G_MCX623436AN	100	2
	NIC_M_25G_MCX631432AN	25	2
	NIC_Andes-M6_X710_10G_LC_OCP3x8_2	10	2
	NIC_A-M6_E810_25G_LC_O3x8_2	25	2
	NIC_BROADCM_100G_57508	100	2
	NIC_I_100G_E810CQDA2	100	2

Table 7-8 PCIe NIC Specifications

Type	Description	Speed (Gb/s)	Port Qty.
PCIe NIC	NIC_Vostok_I350_1G_RJ_PCIEx4_4	1	4
	NIC_Vostok_X710_10G	10	2
	NIC_Pyxis_X550_10G_RJ_PCIEx8_2_XR	10	2
	NIC_SZ_SP1000A_10G_LC_PCIx8-G3_2	10	2
	NIC_M_25G_MCX512A-ACAT_LC_PCIEx8_2_XR	25	2
	NIC_Andes-M6_E810_25G_LC_PCIE2x8_2	25	2
	NIC_BROADCM_25G_57414_LC_PCIEx8_2_XR_42C	25	2
	NIC_M_25G_MCX631102AN_LC_PCIEx8_2_XR	25	2
	NIC_M_100G_MCX516A-CDAT_LC_PCIEx16_2P_XR	100	2
	NIC_M_100G_MCX623105A_LC_PCIEx16_XR	100	1
	NIC_M_100G_MCX623106AN_LC_PCIEx16_2_XR	100	2
	NIC_M_200G_MCX623105AN_LC_PCIEx16_XR	200	1
	NIC_M_400G_MCX75310AAS_LC_PCIEx16_XR_S	400	1

7.2.6 HCA Card Specifications

Table 7-9 HCA Card Specifications

Type	Description	Speed (Gb/s)	Port Qty.
HCA Card	HCA_NV_1-NDR_MCX75310AAS-NEAT_PCIE	400	1
	HCA_NV_2-NDR200_MCX755106AS-HEAT_PCIE	200	2
	HCA_NV_1-NDR200_MCX75310AAS-HEAT_PCIE	200	1
	HCA_MCX683105AN-HDAT PCIE4.0 x16	200	1
	HCA_MCX653105A-HDAT PCIE4.0 x16	200	1
	HCA_MCX653105A-ECAT PCIe 4.0 x16	100	1
	HCA_MCX653106A-ECAT_PCIE 4.0 x16	100	2

7.2.7 GPU/Graphics Card Specifications

Table 7-10 GPU/Graphics Card Specifications

Type	Description	Max. Qty.
GPU	GPU_NV_48G_NVIDIA-L40-PCIe4_384b_MP	8
	GPU_NV_24G_NVIDIA-A10_384b_NOCEC	8
	GPU_NV_24G_NVIDIA-L4-PCIe4-LP_192b_MP	8
	GPU_NV_80G_NVIDIA-A800-PCIe4_5120b_S	8
	GPU_NV_80G_NVIDIA-H800-PCIe5-ACM_5120b_S	8
	GPU_NV_48G_NVIDIA-A40-PCIe4_384b_NOCEC	8
	GPU_NV_48G_L20-PCIe4_384b_S	8
	GPU_NV_48G_NVIDIA-L40S-PCIe4_384b_MP	8
Graphics Card	Video_LT_24G_RTX4090D_384b_P_S	8
	Video_GA_24G_RTX4090D_384b_P	8

7.2.8 PSU Specifications

The server supports up to 4 PSUs in 2+2 redundancy that 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. The CRPS PSUs are 80 Plus Platinum or Titanium rated with various output powers, allowing customers to choose as needed.

- The following rated 110 Vac and 230 Vac PSUs in 2+2 redundancy are supported:
  - 1,600 W Platinum PSU: 1,000 W (110 Vac), 1,600 W (230 Vac)
  - 2,000 W Platinum PSU: 1,000 W (110 Vac), 2,000 W (230 Vac)
  - 2,200 W Platinum PSU: 1,100 W (110 Vac), 2,200 W (230 Vac)
  - 3,000 W Platinum PSU: 1,200 W (110 Vac), 3,000 W (230 Vac)
  - 1,600 W Titanium PSU: 1,000 W (110 Vac), 1,600 W (230 Vac)
  - 2,000 W Titanium PSU: 1,000 W (110 Vac), 2,000 W (230 Vac)
  - 3,000 W Titanium PSU: 1,200 W (110 Vac), 3,000 W (230 Vac)
- Operating voltage range:

- 110 Vac/230 Vac: 90 Vac to 264 Vac

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.

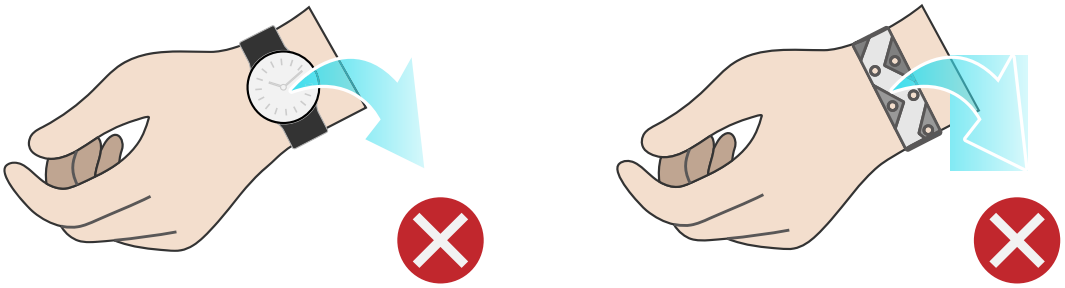
8.1.2 Personal Safety

- 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.

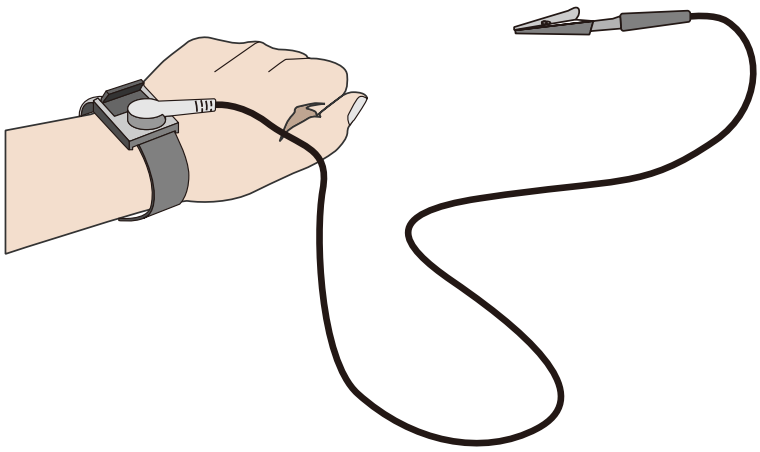
Figure 8-2 Removing Conductive Objects



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 are 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 expansion 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 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 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 (BMC)

BMC, a remote server management system, supports mainstream management specifications in the industry such as IPMI 2.0 and Redfish 1.13. BMC features high operational reliability, easy serviceability for different business scenarios, accurate and comprehensive fault diagnosis capabilities, and industry-leading security reinforcement capabilities.

BMC supports:

- IPMI 2.0
- Redfish 1.13
- SNMP v1/v2c/v3
- HTML5/Java remote consoles (keyboard, video, mouse)
- remote virtual media
- login via web browsers
- intelligent fault diagnosis

Table 10-1 BMC Features

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

Feature	Description
Alert Management	Supports rich automatic remote alert capabilities, including proactive alerting mechanisms such as SNMP Trap (v1/v2/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 local images, USB devices, and folders 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 Crash Video Recording	• Supports automatic crash screenshot and crash video recording (video needs to be enabled manually) to capture the last screen and video before crash • 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.
BMC 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. • Provides a thermal protection mechanism, which is automatically triggered when the BMC is abnormal to

Feature	Description
	ensure that the fan operates at safe speeds to avoid system overheating. • Supports self-diagnosis of processors, memory modules, and storage devices of BMC, 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, and mismatch prevention mechanism for firmware from different manufacturers and firmware for different 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, and 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 V3.0. SSH, HTTPS, SNMP and IPMI use secure and reliable algorithms. BMC offers capabilities including secure update and boot and security reinforcement mechanisms such as anti-replay, anti-injection, and anti-brute force.
Double Factor Authentication	Supports double factor authentication for local BMC users. Users need to log in to the BMC with both password and certificate, thus to prevent attacks caused by password leakage.
Configuration Exporting and Importing	To import and export the existing system configurations.

Feature	Description
System Information Display	Displays the server basic information such as the information and health status of major server components, including CPU, memory, power supply, device inventory, hard drive, network adapter, and security chip.
Fan Management	Displays the status, current speed, duty ratio, and other information of a fan module. You can select the fan control mode and preset the speed for each fan module in the Manual Fan Control mode.
Power Policy	To set how the server operating system reacts under the BMC's control when AC power is reconnected to the server.
One-Key Erasing	To perform non-recoverable erasing on all storage devices of the server, preventing data leakage when the server is to be retired.
System Lockdown	After this feature is enabled, some parameters of the server cannot be set and some operations cannot be performed on the server.

10.2 KSManage

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

Built on cutting-edge O&M concepts, KSManage 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. KSManage 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 10-2 KSManage Features

Feature	Description
Home	Display of basic information (data centers, server rooms, cabinets, assets and alerts), quick addition of devices and custom home page
Assets	• Automatic asset discovery and batch asset import • Digital asset management and integration with IoT (Internet of Things) to achieve integrated online and offline asset management • 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

Feature	Description
	• 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 above rules
Control	• Quick start of firmware update, OS installation, power management, drive data erasing and stress test • 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 • 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
System	• Password management, alert forwarding and data dump • Customized KSManage parameters
Security	Security control of KSManage via a set of security policies such as user management, role management, authentication

Feature	Description
	management (local authentication and LDAP authentication) and certificate management

10.3 KSManage Tools

Table 10-3 Features of KSManage Tools

Feature	Description
KSManage Kits	A lightweight automatic batch O&M tool for servers, mainly used for server deployment, routine maintenance, firmware update, fault handling, etc.
KSManage 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
KSManage Server CLI	Fast integration with third-party management platforms, delivering a new O&M mode of Infrastructure as Code (IaC)
KSManage 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.
KSManage Server Provisioning	Offers users with RAID configuration, intelligent OS installation, firmware update, hardware diagnosis, secure erasing and software upgrade.

11 Certifications

Table 11-1 Certifications

Country/Region	Certification	Mandatory/Voluntary
International	CB	Voluntary
EU	CE	Mandatory
US	FCC	Mandatory
	UL	Voluntary
EAEU	EAC	Mandatory
Korea	KC	Mandatory

12 Appendix A

12.1 Operating Temperature Specification Limits

Table 12-1 Operating Temperature Specification Limits

Front Drives	Max. Operating Temperature: 30°C (86°F)	Max. Operating Temperature: 35°C (95°F)
12 × 3.5-Inch NVMe/SAS/SATA Drive	• CPU TDP ≤350 W (excluding the 6434 CPU) • GPU TDP ≤350 W (with all GPUs configured)	• CPU TDP ≤350 W (excluding the 6434 CPU) • Drive Qty. ≤8 • GPU TDP ≤300 W (with all GPUs configured)
24 × 2.5-Inch SAS/SATA Drive	• CPU TDP ≤350 W (excluding the 6434 CPU) • GPU TDP ≤350 W (with all GPUs configured)	• CPU TDP ≤350 W (excluding the 6434 CPU) • GPU TDP ≤350 W (with all GPUs configured)

NOTE

Single fan failure may affect system performance.

12.2 Model

Certified Model	Description
KR4268-X2-A0-F0-00	Global
KR4268-X2-A0-R0-00	Global

12.3 RAS Features

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

12.4 Sensor List

Table 12-2 Sensor List

Sensor	Description	Sensor Location
Inlet_Temp	Air inlet temperature	Right mounting ear
Outlet_Temp	Air outlet temperature	PCIe backplane
PVCCIN_CPUX	CPU core voltage	CPUx x indicates the CPU number with a value of 0 - 1
PVCCFA_FIVR_CPUX	UPI IIO voltage	CPUx x indicates the CPU number with a value of 0 - 1
PVCCINFAON_CPUX	CPU start voltage	CPUx x indicates the CPU number with a value of 0 - 1
PVCCFA_EHV_CPUX	Controller voltage	CPUx x indicates the CPU number with a value of 0 - 1
PVCCD_HV_CPUX	Memory controller voltage	CPUx x indicates the CPU number with a value of 0 - 1
CPUX_VR_Temp	CPU VR temperature	CPUx x indicates the CPU number with a value of 0 - 1
PSUX_VIN	PSU input voltage	PSUx x indicates the PSU number with a value of 0 - 3
PSUX_VOUT	PSU output voltage	PSUx x indicates the PSU number with a value of 0 - 3

Sensor	Description	Sensor Location
SYS_12V	System 12 V voltage	Motherboard
SYS_5V	System 5 V voltage	Motherboard
SYS_3V3	System 3.3 V voltage	Motherboard
RTC_Battery	Motherboard RTC battery voltage	Motherboard
PVNN_MAIN_CPUX	CPU GPIO voltage	CPUx x indicates the CPU number with a value of 0 - 1
P12V_CPUX_DIMM	CPU DIMM voltage	CPUx x indicates the CPU number with a value of 0 - 1
PVNN_PCH_STBY	PCH core voltage	Motherboard
P1V05_PCH_STBY	PCH logic voltage	Motherboard
CPUX_Temp	CPU core temperature	CPUx x indicates the CPU number with a value of 0 - 1
CPUx_DTS	CPU_DTS temperature, CPU margin temperature before it reaches the throttling frequency	CPUx x indicates the CPU number with a value of 0 - 1
CPUx_DIMM_T	The maximum temperature among DDR5 DIMMs of the CPU	CPUx x indicates the CPU number with a value of 0 - 1
PCH_Temp	PCH temperature	Motherboard
PSU_Inlet_Temp	PSU temperature	PSU
Total_Power	Total power	-
FAN_Power	Total fan power	-
PSUX_PIN	PSU input power	PSUx x indicates the PSU number with a value of 0 - 3
PSUX_POUT	PSU output power	PSUx x indicates the PSU number with a value of 0 - 3
CPU_Power	Total CPU power	-

Sensor	Description	Sensor Location
Memory_Power	Total memory power	-
FANX_F_Speed, FANX_R_Speed	Fan speed	Fanx x indicates the fan number with a value of 0 - 11. F indicates the front rotor and R indicates the rear rotor.
RAID_Temp	The maximum temperature among PCIe RAID cards	PCIe RAID cards
HDD_MAX_Temp	The maximum temperature among all drives	Drives
NVME_Temp	The maximum temperature among all NVMe drives	NVMe drives
OCP_NIC_SFP_Temp	OCP card SFP temperature	OCP card SFP module
PCIe_NIC_SFP_T	PCIe NIC SFP temperature	PCIe NIC SFP module
OCP_NIC_Temp	OCP card temperature	OCP card
PCIE_NIC_Temp	The maximum temperature among all PCIe NICs	PCIe NICs
MEM_ResourceRate	Memory utilization rate	-
CPU_ResourceRate	CPU utilization rate	-
GPUX_Temp	GPU core temperature	GPUx x indicates the GPU number with a value of 0 - 9
GPUX_MEM_Util	GPU video memory utilization rate	GPUx x indicates the GPU number with a value of 0 - 9
CPUX_Status	CPU status	CPUx x indicates the CPU number with a value of 0 - 1
SEL_Status	SEL status	-
PSU_Mismatch	PSU models mismatch	PSU

Sensor	Description	Sensor Location
PSU_Redundant	PSU redundancy status	PSU
FANX_Status	Fan status	Fanx x indicates the fan number with a value 0 - 11
FAN_Redundant	Fan redundancy status	Fan
PCIe_Status	The status of PCIe device (including PCIe bus, slots and cards)	Motherboard
POST_Status	System firmware and POST status	Motherboard
PWR_CAP_Fail	Power capping failure	-
CPU_Config	CPU configuration status (mixing of CPUs, or primary CPU not installed)	CPU
PSUX_Status	PSU status	PSUx x indicates the PSU number with a value of 0-3
K_HDDX	Drive status	Drive K denotes front, internal and rear, with a value of F/I/R respectively; x indicates the drive number
ACPI_PWR	ACPI power status	-
Sys_Health	System health status	-
BMC_Boot_Up	BMC boot up complete	-
Intrusion	Chassis-opening activity	Top cover
LeakageSensor	Leak detection	Motherboard
ME_FW_Status	ME health status	-
TPM_Verify	TPM verification status	TPM
BMC_Status	BMC status (including chip status, hardware status, and self-test status)	-
System_Error	Emergency system failures	CPLD

13 Appendix B Acronyms and Abbreviations

A

AC	Alternating Current
ACPI	Advanced Configuration and Power Interface
AI	Artificial Intelligence
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
AVX	Advanced Vector Extensions

B

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

C

CAS	Column Address Strobe
CB	Certification Body
CCC	China Compulsory Certificate
CE	Conformite Europeenne
CECP	China Energy Conservation Program
CEN	European Committee for Standardization

CLI	Command-Line Interface
CLP	Command Line Protocol
CMOS	Complementary Metal-Oxide-Semiconductor
CPLD	Complex Programmable Logic Device
CPU	Central Processing Unit
CRPS	Common Redundant Power Supply

D

DC	Direct Current
DCMI	Data Center Manageability Interface
DC-SCM	Datacenter-ready Secure Control Module
DDR5	Double Data Rate 5
DIMM	Dual In-line Memory Module
DL	Deep Learning
DOA	Dead on Arrival
DPC	DIMM Per Channel
DRAM	Dynamic Random Access Memory
DTS	Digital Thermal Sensor
DWPD	Drive Writes Per Day

E

EAC	Eurasian Conformity
EAEU	Eurasian Economic Union
ECC	Error-Correcting Code
ECMA	European Computer Manufacturers Association
EMR	Emerald Rapids

ESD	Electrostatic Discharge

F

FCC	Federal Communications Commission
FHFL	Full-Height Full-Length
FHHL	Full-Height Half-Length
FIVR	Fully Integrated Voltage Regulator
FW	Firmware

G

GPIO	General Purpose Input/Output
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
HTTPS	HyperText Transfer Protocol Secure

I

IEC	International Electrotechnical Commission
IERR	Internal Error
IIO	Integrated Input/Output controller

iMC	Integrated Memory Controller
IP	Internet Protocol
IPMI	Intelligent Platform Management Interface
ISA	International Society of Automation
ISO	International Organization for Standardization

J

JTAG	Joint Test Action Group

K

KC	Korea Certification
KVM	Keyboard, Video, Mouse

L

LDAP	Lightweight Directory Access Protocol
LED	Light Emitting Diode

M

MCIO	Mini Cool Edge Input/Output
ME	Management Engine

N

NBD	Next Business Day
NC-SI	Network Controller Sideband Interface
NIC	Network Interface Card

NIOSH	National Institute for Occupational Safety and Health
NVMe	Non-Volatile Memory Express

O

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

P

PCH	Platform Controller Hub
PCIe	Peripheral Component Interconnect Express
PDB	Power Distribution Board
PFR	Platform Firmware Resilience
PID	Proportional-Integral-Derivative
POST	Power-On Self-Test
PSU	Power Supply Unit

R

RAID	Redundant Arrays of Independent Disks
RAS	Reliability, Availability, Serviceability
RDIMM	Registered Dual In-line Memory Module
RH	Relative Humidity
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
SEL	System Event Log
SFP	Small Form-factor Pluggable
SGPIO	Serial General Purpose Input/Output
SGX	Software Guard Extensions
SLA	Service Level Agreement
SMASH	Systems Management Architecture for Server Hardware
SNMP	Simple Network Management Protocol
SPR	Sapphire Rapids
SSD	Solid State Drive
SSH	Secure Shell

T

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

U

UART	Universal Asynchronous Receiver/Transmitter
UEFI	Unified Extensible Firmware Interface
UID	Unit Identification
UL	Underwriters Laboratories

UPI	Ultra Path Interconnect
USB	Universal Serial Bus

V

VGA	Video Graphics Array
VLAN	Virtual Local Area Network
VNC	Virtual Network Console
VNNI	Vector Neural Network Instructions
VRD	Voltage Regulator-Down