



White Paper for KAYTUS KR4276V2 Series Servers

Powered by Intel Processors

For KR4276-X2-A0-F0-00 and KR4276-X2-A0-R0-00

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Applicable Model

Model	Maintenance	Cooling
KR4276-X2-A0-F0-00	Front access	Air cooling
KR4276-X2-A0-R0-00	Rear access	Air cooling

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Abstract

This document describes the KR4276V2 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	2024/05/10	Initial release

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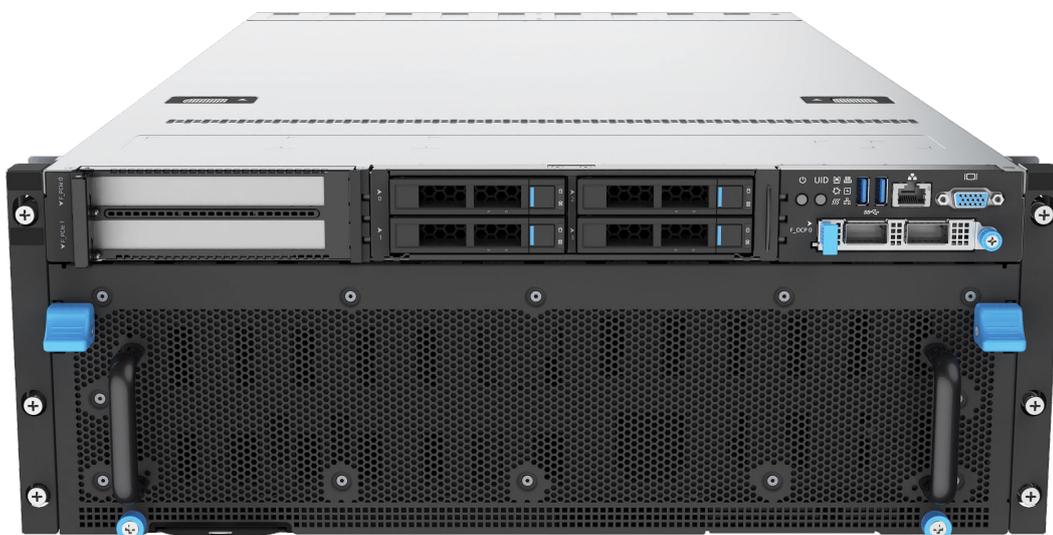
1 Product Overview

The KR4276V2 Intel-based system is a high-density 4U 2-socket storage rack server powered by the 4th/5th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids). With its cutting-edge design of compact size, high storage capacity, flexible I/O configurations, and energy-saving features, it can meet users' current and future business expansion needs. In addition, with support for sixty 3.5-inch drives in a 4U chassis, it can meet the demanding requirements for the space and storage cost, making it suitable for cloud storage, video storage, big data, archiving, and other application scenarios.

Figure 1-1 10 × 2.5-Inch Drive Configuration



Figure 1-2 4 × 2.5-Inch Drive Configuration



2 Features

2.1 Scalability and Performance

Table 2-1 Scalability and Performance

Technical Feature	Description
4 th /5 th Gen Intel Xeon Scalable Processors	<ul style="list-style-type: none">• One processor supports up to 64 cores, a max. Turbo frequency of 4.2 GHz, an L3 cache of 320 MB, and 4 UPI links per CPU at up to 20 GT/s.<ul style="list-style-type: none">- Supports up to 2 processors with 128 cores and 256 threads, maximizing the concurrent execution of multi-threaded applications.- 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 the L2 cache, improving the memory access performance and reducing the demand on L3 cache capacity. A single processor can share up to 320 MB of L3 cache.- 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 Hyper-Threading Technology, allowing each processor core to run multiple threads (up to 2 threads per core) concurrently 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 virtualized workloads.- Supports Intel Advanced Vector Extensions 512 (Intel AVX-512), significantly accelerating the workloads that are strongly floating point compute intensive.- Supports Intel Deep Learning Boost (Intel DL Boost) that uses Vector Neural Network Instructions (VNNI),

Technical Feature	Description
	improving the performance for deep learning applications.
DIMM Form Factor	Up to 32 DDR5 ECC DIMMs (5,600 MT/s, RDIMMs), delivering superior speed, high availability, and a memory capacity of up to 4 TB.
Flexible Drive Configurations	Provides elastic and expandable storage solutions to meet different capacity and upgrade requirements.
Support for All-SSD Configuration	Delivers all-SSD configuration, bringing higher I/O performance over all-HDD or HDD-SSD mixing configuration.
12 Gbps Serial Attached SCSI (SAS)	Doubles the internal storage data transfer rate of the 6 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	Up to 7 PCIe expansion slots, supporting 1 FHHL PCIe x8 card, 2 FHHL PCIe x16 cards, 2 HHHL PCIe x16 cards, and 2 OCP 3.0 cards.
OCP Expansion	Supports 2 OCP 3.0 slots that can flexibly support 1 Gb/10 Gb/25 Gb/100 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 0/1/10/5/50/6/60 and RAID cache provided by RAID cards, and data protection enabled by the super-capacitor in case of power failures.
Reliability	<ul style="list-style-type: none"> SSDs are much more reliable than traditional HDDs, increasing system uptime. The ISBMC monitors system parameters in real time and sends alerts in advance, enabling technicians to take appropriate measures in time to ensure stable operation and minimize system downtime.
Availability	<ul style="list-style-type: none"> The LEDs on front and rear panels, the LCD module, and the ISBMC Web GUI indicate the status of key components and quickly lead technicians to failed (or

Technical Feature	Description
	<p>failing) components, simplifying maintenance and speeding up troubleshooting.</p> <ul style="list-style-type: none"> Provides up to 4 hot-swap PSUs with 1+1/2+2 redundancy and up to 5+8 (KR4276-X2-A0-R0-00)/5+9 (KR4276-X2-A0-F0-00) hot-swap fan modules with N+1 redundancy.
Maintenance Efficiency	<ul style="list-style-type: none"> The BMC management network port on the front/rear panel enables remote ISBMC O&M, improving O&M efficiency. Provides online memory diagnosis function, which helps service personnel quickly locate the DIMM to be serviced via BMC monitoring.

2.3 Manageability and Security

Table 2-3 Manageability and Security

Technical Feature	Description
Remote Management	The ISBMC monitors the system operating status and enables remote management.
Network Controller Sideband Interface (NC-SI) Feature	<p>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 ISBMC.</p> <p>Notes:</p> <p>The service port with NC-SI enabled supports:</p> <ul style="list-style-type: none"> 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.
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.

Technical Feature	Description
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 malicious tampering.
BMC Access Control Policies	Flexible BMC access control policies improve BMC management security.
Chassis Intrusion Detection	Enhances physical 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.

2.4 Energy Efficiency

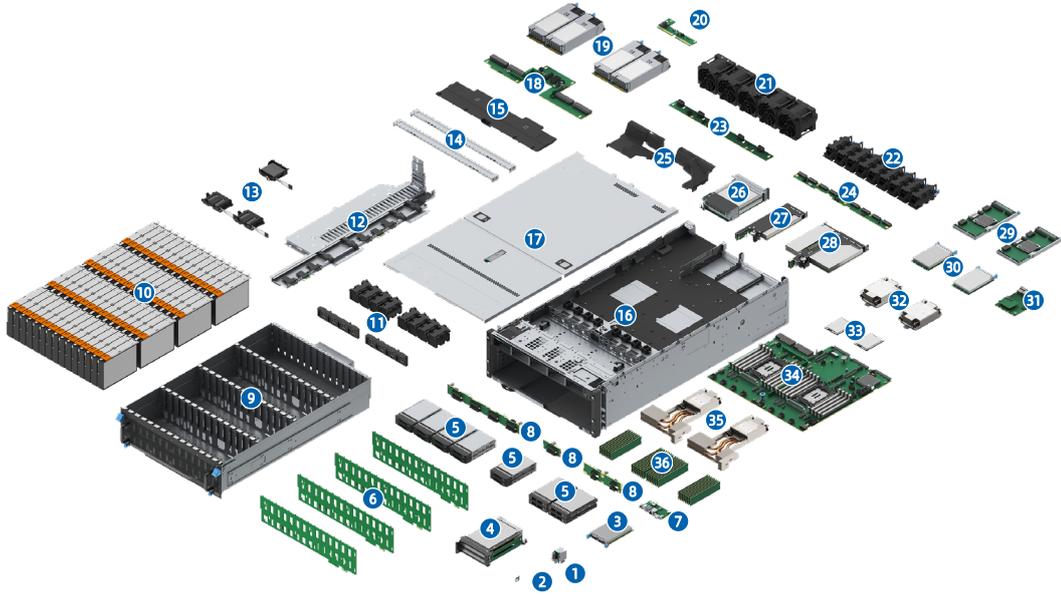
Table 2-4 Energy Efficiency

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%.
N+N Redundant PSUs	Supports 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.

Technical Feature	Description
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 4 th /5 th Gen Intel Xeon Scalable processors, consuming less energy and meeting the demands of data centers and telecommunications environments constrained by power and thermal limits.

3 System Parts Breakdown

Figure 3-1 Exploded View

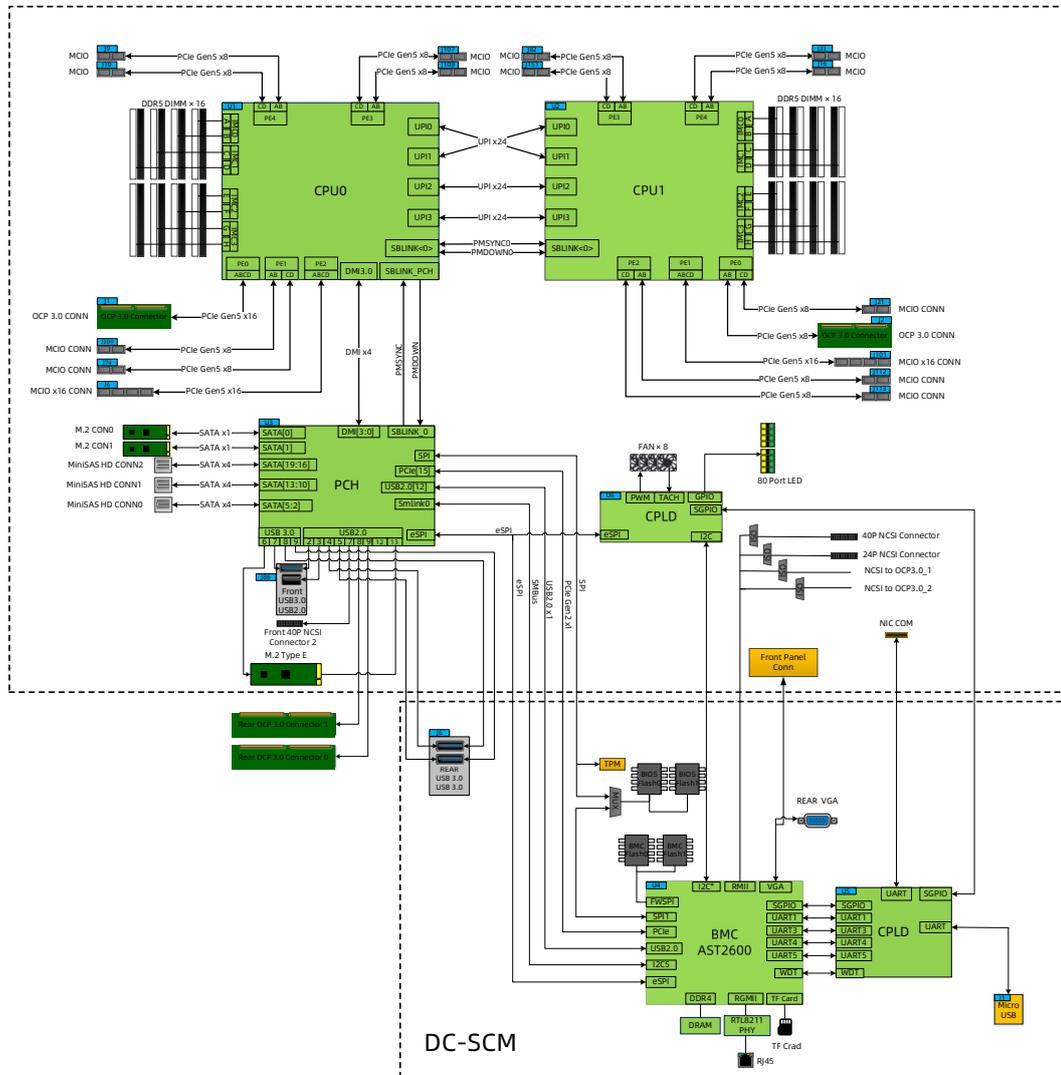


Item	Feature	Item	Feature
1	Front I/O Module (rear access chassis)	19	PSU
2	USB Type-C Board	20	RADSOK Board
3	OCP 3.0 Card	21	8056 Fan Module
4	Front PCIe Riser Module	22	4056 Fan Module
5	2.5-Inch Drive Module	23	8056 Fan Board
6	3.5-Inch Drive Backplane	24	4056 Fan Board
7	Front I/O Module (front access chassis)	25	PSU Air Duct
8	2.5-Inch Drive Backplane	26	Rear PCIe Riser Module
9	Drive Drawer	27	LP PCIe Riser Module
10	3.5-Inch Drive Module	28	Butterfly PCIe Riser Module
11	Internal Fan Module	29	Expander Card
12	Cable Carrier	30	OCP 3.0 Card
13	Super-Capacitor	31	DC-SCM Board
14	Reinforcement Crossbar	32	Standard Heatsink

Item	Feature	Item	Feature
15	Air Duct	33	CPU
16	Chassis	34	Motherboard
17	Top Cover	35	EVAC Heatsink
18	PDB	36	DIMM

4 System Logical Diagram

Figure 4-1 System Logical Diagram



- One or two 4th/5th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids) with a maximum TDP of 385 W per CPU.
- Up to 32 DIMMs.
- 4 UPI links per CPU at up to 20 GT/s.
- Up to 7 PCIe expansion slots, including 2 rear OCP 3.0 slots and 1 front OCP 3.0 slot.

- The motherboard integrates Emmitsburg (EBG) Platform Controller Hub (PCH) to support 3 USB 3.0 ports, 12 SATA 3.0 drive connectors, 2 M.2 connectors, and 1 TF card adapter connector.
- The DC-SCM board integrates an AST2600 management chip and supports 1 VGA port, 1 BMC management network port, 1 system/BMC serial port, 1 TF card slot, and other connectors.

5 Hardware Description

5.1 Front Panel

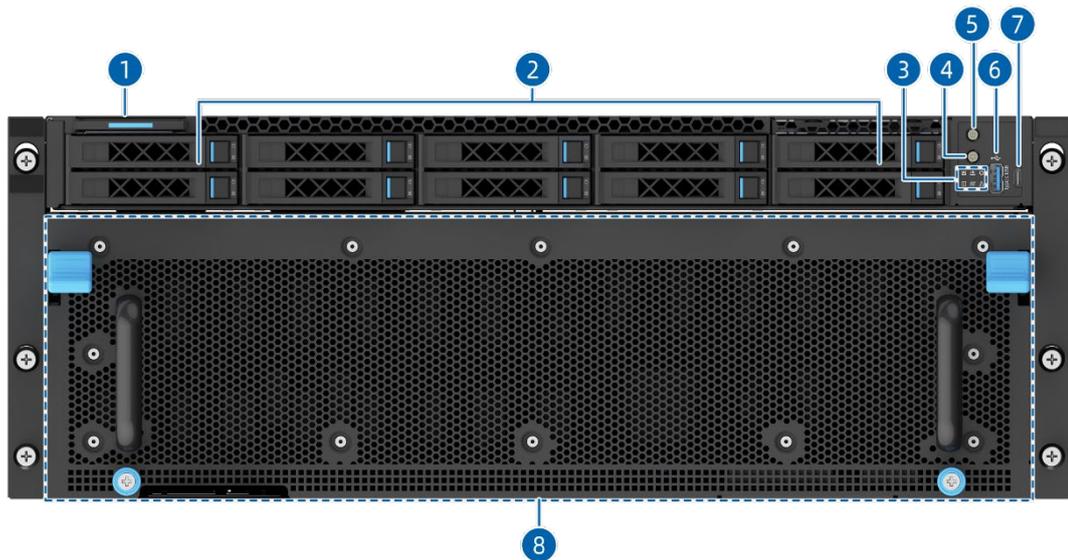
5.1.1 10 × 2.5-Inch Drive Configuration



NOTE

Applicable model: KR4276-X2-A0-R0-00.

Figure 5-1 Front View



Item	Feature	Item	Feature
1	Serial Label Pull Tag	5	Power Button and LED
2	2.5-Inch Drive Bay	6	USB 2.0/LCD Port
3	LEDs	7	USB Type-C Port
4	UID/BMC RST Button and LED	8	Drive Drawer

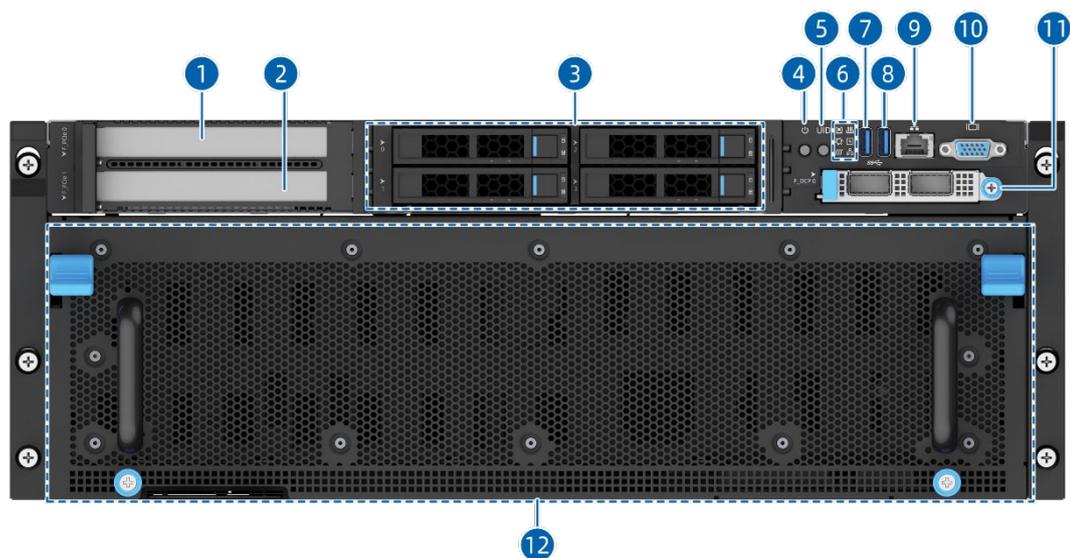
5.1.2 4 × 2.5-Inch Drive Configuration



NOTE

Applicable model: KR4276-X2-A0-F0-00.

Figure 5-2 Front View



Item	Feature	Item	Feature
1	PCIe Slot 0	7	USB 3.0 Port
2	PCIe Slot 1	8	USB 2.0/LCD Port
3	2.5-Inch Drive Bay	9	BMC Management Network Port
4	Power Button and LED	10	VGA Port
5	UID/BMC RST Button and LED	11	OCP 3.0 Card
6	LEDs	12	Drive Drawer

5.2 Rear Panel

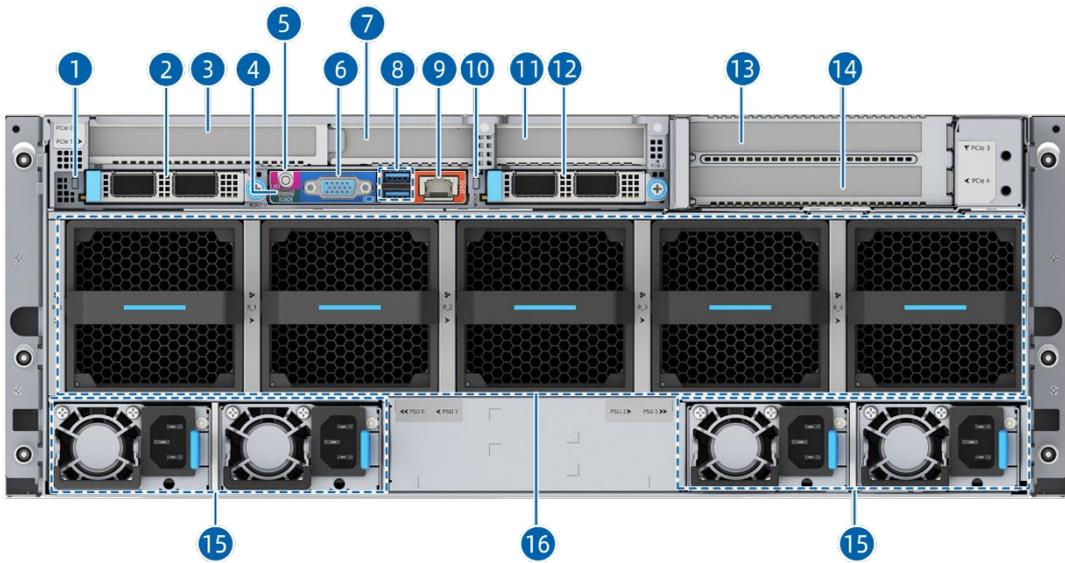
5.2.1 5 × PCIe Slot



NOTE

Applicable model: KR4276-X2-A0-R0-00.

Figure 5-3 Rear View



Item	Feature	Item	Feature
1	OCP 3.0 Card 0 Hot-Plug Button and LED	9	BMC Management Network Port
2	OCP 3.0 Card 0	10	OCP 3.0 Card 1 Hot-Plug Button and LED
3	PCIe Slot 0	11	PCIe Slot 2
4	System/BMC Serial Port	12	OCP 3.0 Card 1
5	UID/BMC RST Button and LED	13	PCIe Slot 3
6	VGA Port	14	PCIe Slot 4
7	PCIe Slot 1	15	PSU
8	USB 3.0 Port	16	8056 Fan Module

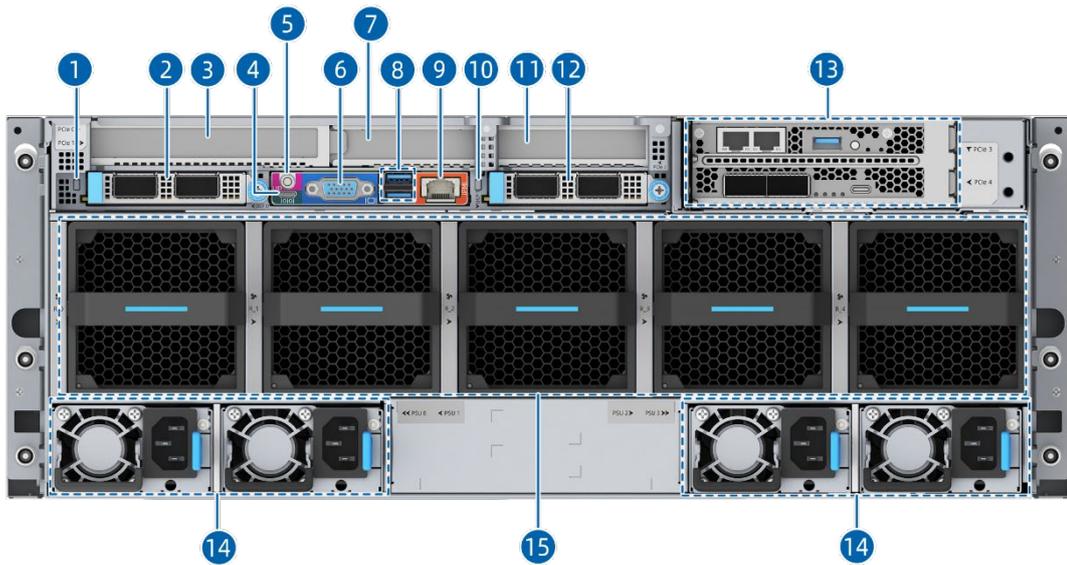
5.2.2 3 × PCIe Slot + Smart NIC



NOTE

Applicable model: KR4276-X2-A0-R0-00.

Figure 5-4 Rear View



Item	Feature	Item	Feature
1	OCP 3.0 Card 0 Hot-Plug Button and LED	9	BMC Management Network Port
2	OCP 3.0 Card 0	10	OCP 3.0 Card 1 Hot-Plug Button and LED
3	PCIe Slot 0	11	PCIe Slot 2
4	System/BMC Serial Port	12	OCP 3.0 Card 1
5	UID/BMC RST Button and LED	13	Smart NIC
6	VGA Port	14	PSU
7	PCIe Slot 1	15	8056 Fan Module
8	USB 3.0 Port	-	-

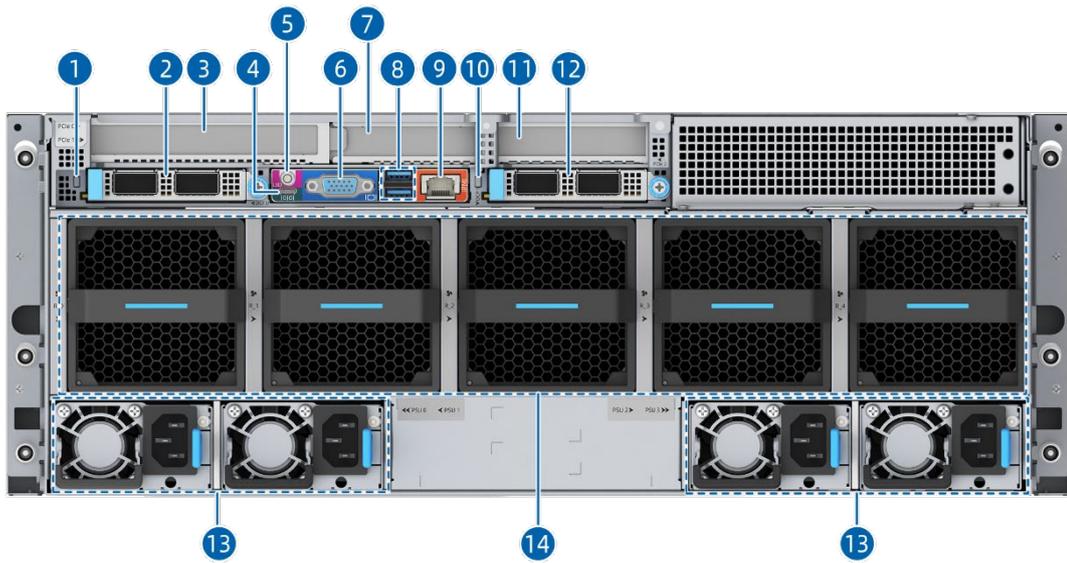
5.2.3 3 × PCIe Slot



NOTE

Applicable model: KR4276-X2-A0-R0-00.

Figure 5-5 Rear View



Item	Feature	Item	Feature
1	OCP 3.0 Card 0 Hot-Plug Button and LED	8	USB 3.0 Port
2	OCP 3.0 Card 0	9	BMC Management Network Port
3	PCIe Slot 0	10	OCP 3.0 Card 1 Hot-Plug Button and LED
4	System/BMC Serial Port	11	PCIe Slot 2
5	UID/BMC RST Button and LED	12	OCP 3.0 Card 1
6	VGA Port	13	PSU
7	PCIe Slot 1	14	8056 Fan Module

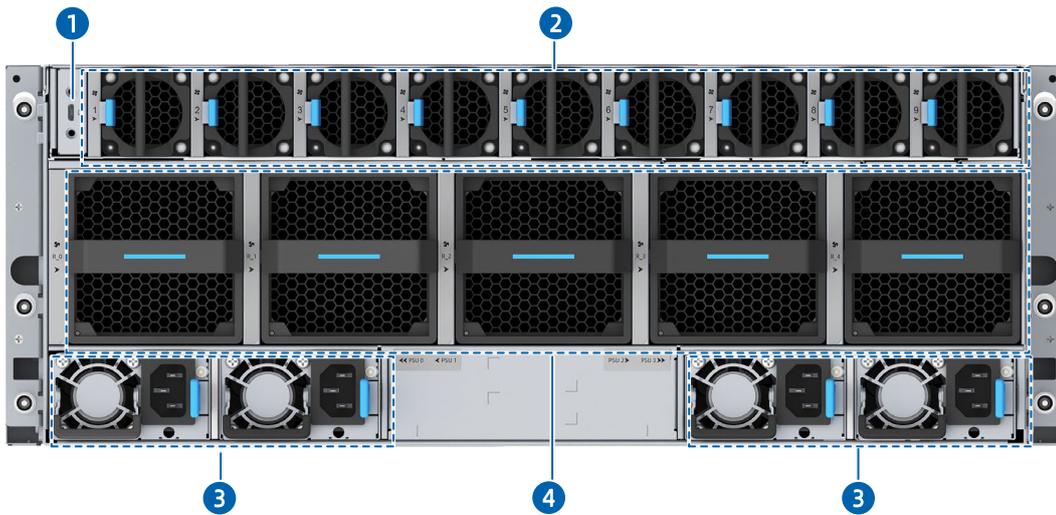
5.2.4 9 × 4056 Fan + 5 × 8056 Fan



NOTE

Applicable model: KR4276-X2-A0-F0-00.

Figure 5-6 Rear View



Item	Feature	Item	Feature
1	System/BMC Serial Port	3	PSU Module
2	4056 Fan Module	4	8056 Fan Module

5.3 LEDs and Buttons

Table 5-1 LED and Button Description

Item	Icon	Feature	Description
1		Power Button and LED	<ul style="list-style-type: none"> Power LED: <ul style="list-style-type: none"> Off = No power Solid green = Power-on state Solid orange = Standby state Power button: <ul style="list-style-type: none"> Press and release the button to power on the system from the standby state. Press and hold the button for 6 seconds to force a shutdown from the power-on state.
2		System Status LED	<ul style="list-style-type: none"> Off = Normal Blinking red (1 Hz) = A warning error is detected on CPU,

Item	Icon	Feature	Description
			<p>memory, power supply, drive, fan, etc.</p> <ul style="list-style-type: none"> • Solid red = A critical error is detected on CPU, memory, power supply, drive, fan, etc.
3		Memory Status LED	<ul style="list-style-type: none"> • Off = Normal • Blinking red (1 Hz) = A warning error occurs • Solid red = A critical error occurs
4		Fan Status LED	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Off = Normal • Blinking red (1 Hz) = A warning error occurs • Solid red = A critical error occurs
6		System Overheat LED	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Off = No network connection • Blinking green = Network connected with data being transmitted • Solid green = Network connected without data being transmitted <p>Note: It only indicates the status of the self-developed OCP card.</p>
8		UID/BMC RST Button and LED	<ul style="list-style-type: none"> • UID/BMC RST LED:

Item	Icon	Feature	Description
			<ul style="list-style-type: none"> - Solid blue = The UID LED is activated by the UID button or via the BMC • UID/BMC RST button: <ul style="list-style-type: none"> - Press and release the button to activate the UID LED. - Press and hold the button for 6 seconds to force a BMC reset.
9	-	OCP 3.0 Card Hot-Plug Button and LED	<ul style="list-style-type: none"> • This button is used for hot-plugging the OCP 3.0 card: <ul style="list-style-type: none"> - Before removing the OCP 3.0 card, press the button, and wait until the LED turns off. - After installing the OCP 3.0 card, press the button, and wait until the LED turns from blinking green to solid green. • LED: <ul style="list-style-type: none"> - Solid green = OCP card is powered on - Blinking green = OCP card is getting ready for hot-plugging or OCP card is identified after being inserted - Off = OCP card is powered off



NOTE

- Warning error: Errors that result in redundancy degradation or loss, and other errors that have a minor impact on the system running and that require attention.
- Critical error: Errors that result in system crash/restart or part failure, and other errors that have a major impact on the system running and that require immediate action.

5.4 Port Description

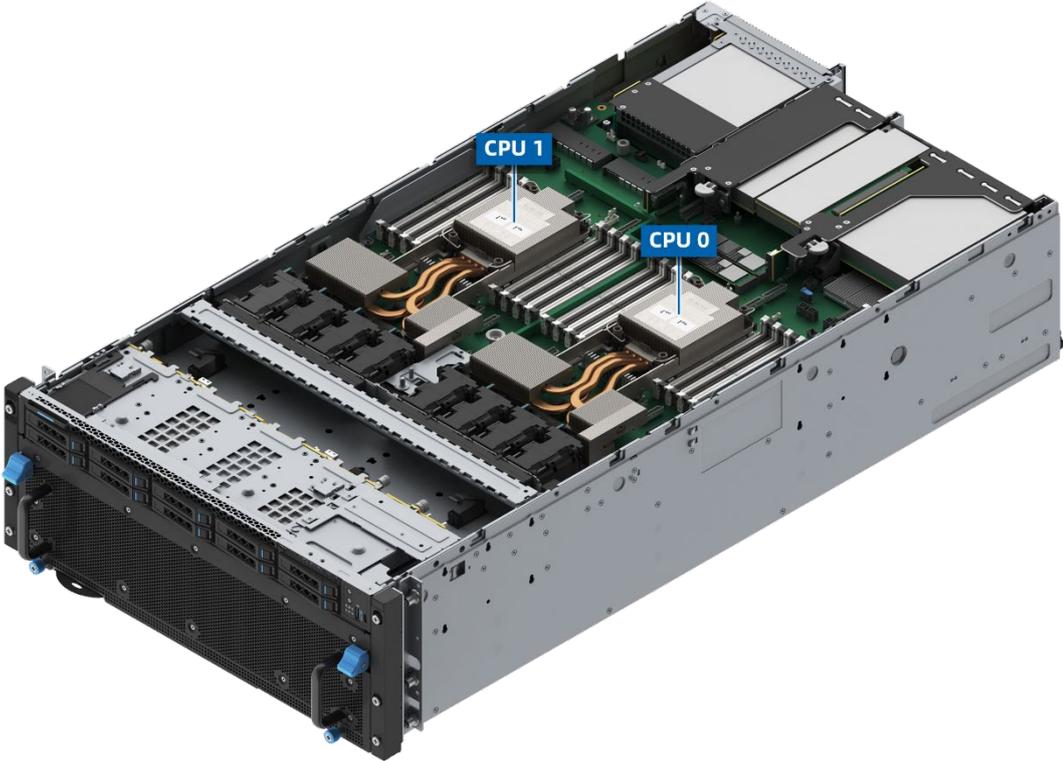
Table 5-2 Port Description

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 2.0/3.0 device to the system.
3	USB 2.0/LCD Port	Enables you to connect a USB 2.0 device or an LCD module to the system.
4	System/BMC Serial Port	<ul style="list-style-type: none">• Enables you to debug and monitor the system.• Enables you to debug and monitor the BMC.
5	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.
6	OCP 3.0 Network Port	Enables you to connect the system to the network.
7	PCIe NIC Port	Enables you to connect the system to the network.
8	USB Type-C Port	Enables you to store the BMC logs and remotely control the server.

5.5 Processors

- Supports one or two 4th/5th Gen Intel Xeon Scalable processors.
- If only 1 processor is configured, install it in the CPU0 socket.
- The processors used in a server must bear the same part number (P/N code).
- For specific processor options, consult your local sales representative or refer to [7.2 Hardware Compatibility](#).

Figure 5-7 Processor Locations



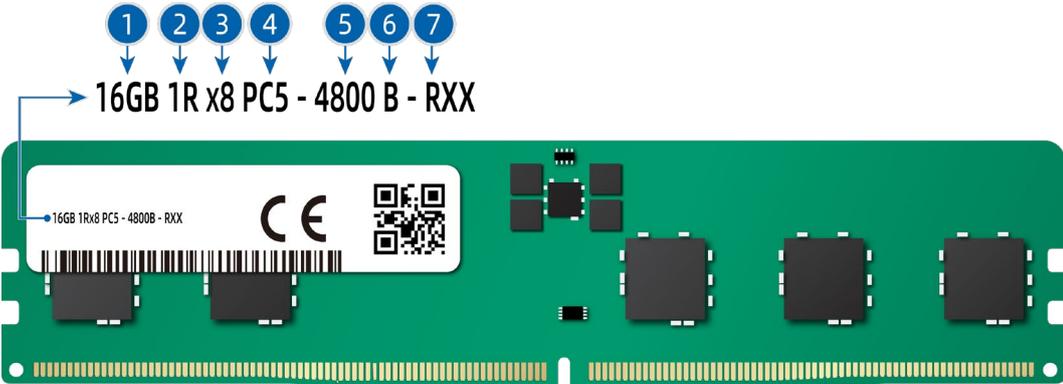
5.6 Memory

5.6.1 DDR5 DIMMs

1. Identification

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

Figure 5-8 DIMM Identification



Item	Description	Example
1	Capacity	<ul style="list-style-type: none"> • 16 GB • 32 GB • 64 GB • 128 GB • 256 GB
2	Rank(s)	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • x4 = 4 bits • x8 = 8 bits
4	DIMM slot type	PC5 = DDR5
5	Maximum memory speed	<ul style="list-style-type: none"> • 4,800 MT/s • 5,600 MT/s
6	CAS latency	<ul style="list-style-type: none"> • 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

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

CPU	Channel ID	Silk Screen	
	Channel 3	CPU0_C2D1	
		CPU0_C3D0	
	Channel 4	CPU0_C3D1	
		CPU0_C4D0	
	Channel 5	CPU0_C4D1	
		CPU0_C5D0	
	Channel 6	CPU0_C5D1	
		CPU0_C6D0	
	Channel 7	CPU0_C6D1	
		CPU0_C7D0	
	CPU1	Channel 0	CPU0_C7D1
			CPU1_C0D0
		Channel 1	CPU1_C0D1
			CPU1_C1D0
Channel 2		CPU1_C1D1	
		CPU1_C2D0	
Channel 3		CPU1_C2D1	
		CPU1_C3D0	
Channel 4		CPU1_C3D1	
		CPU1_C4D0	
Channel 5		CPU1_C4D1	
		CPU1_C5D0	
Channel 6		CPU1_C5D1	
		CPU1_C6D0	
Channel 7	CPU1_C6D1		
	CPU1_C7D0		
		CPU1_C7D1	

3. Compatibility

Refer to the following rules to select 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 (Sapphire Rapids/Emerald Rapids). The maximum memory capacity supported is identical for different CPU models.
- The maximum number of DIMMs supported varies with the CPU type, DIMM type and rank quantity.

**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
Type			RDIMM	RDIMM	RDIMM	RDIMM
Rated speed (MT/s)	SPR CPU		4,800	4,800	4,800	4,800
	EMR CPU		5,600	5,600	5,600	5,600
Operating voltage (V)			1.1	1.1	1.1	1.1
Maximum number of DDR5 DIMMs supported in a server ^a			32	32	32	32
Maximum capacity of DDR5 DIMMs supported in a server (GB)			512	1,024	2,048	4,096
Actual speed (MT/s)	1 DPC ^b	SPR CPU	4,800	4,800	4,800	4,800
		EMR CPU	5,600	5,600	5,600	5,600
	2 DPC		4,400	4,400	4,400	4,400
a. The maximum number of DDR5 DIMMs supported is based on the dual-CPU						

Item	Value
<p>configuration. The number is halved for the single-CPU configuration.</p> <p>b. DIMM Per Channel (DPC) is the number of DIMMs per memory channel.</p> <p>The information above is for reference only. Consult your local sales representative for details.</p>	

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.

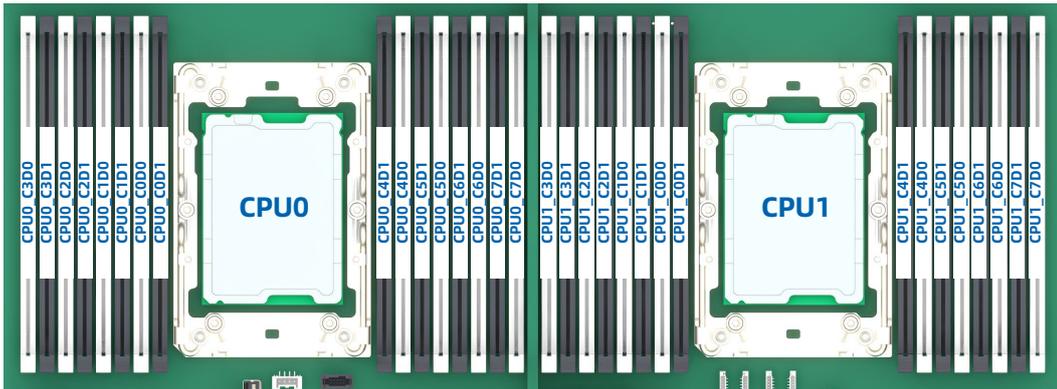
Population rules for DDR5 DIMMs in specific modes:

- Memory sparing
 - 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
 - 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. 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 5-9 DIMM Slot Layout



Detailed DIMM population rules are as follows:

- DDR5 DIMM Population Rules (Single-CPU Configuration)

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

DDR	CPU0																
	QTY	C0D0	C0D1	C1D0	C1D1	C2D0	C2D1	C3D0	C3D1	C4D0	C4D1	C5D0	C5D1	C6D0	C6D1	C7D0	C7D1
1	•																
2	•													•			
4	•					•				•				•			
6	•					•		•		•		•		•			
8	•		•			•		•		•		•		•		•	
12	•	•	•			•	•	•		•	•	•		•	•	•	
16	•	•	•	•		•	•	•	•	•	•	•	•	•	•	•	•

- DDR5 DIMM Population Rules (Dual-CPU Configuration)

Table 5-6 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



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

5.7.1 Drive Configurations



NOTE

For the physical drive No. of each configuration, refer to [5.7.2 Drive Numbering](#)

1. KR4276-X2-A0-R0-00

Table 5-7 Drive Configurations

Configuration	Front Drives	Internal Drives	Drive Management Mode
10 × 2.5-Inch Drive Configuration	10 × 2.5-inch drive (Drive bays with physical drive No. 0 to 7 support SAS/SATA/NVMe drives, and drive bays with physical drive No. 8 to 9 support SAS/SATA drives only)	<ul style="list-style-type: none"> 2 × SATA/NVMe M.2 SSD 60 × 3.5-inch SAS/SATA drive 	<ul style="list-style-type: none"> SAS/SATA drive: CPU/PCIe RAID card NVMe drive: CPU/Tri-Mode RAID card

2. KR4276-X2-A0-F0-00

Table 5-8 Drive Configurations

Configuration	Front Drives	Internal Drives	Drive Management Mode
4 × 2.5-Inch Drive Configuration	4 × 2.5-inch drive (Drive bays with physical drive No. 0 to 3 support SAS/SATA/NVMe drives)	<ul style="list-style-type: none"> 2 × SATA/NVMe M.2 SSD 60 × 3.5-inch SAS/SATA drive 	<ul style="list-style-type: none"> SAS/SATA drive: CPU/PCIe RAID card NVMe drive: CPU/Tri-Mode RAID card

5.7.2 Drive Numbering

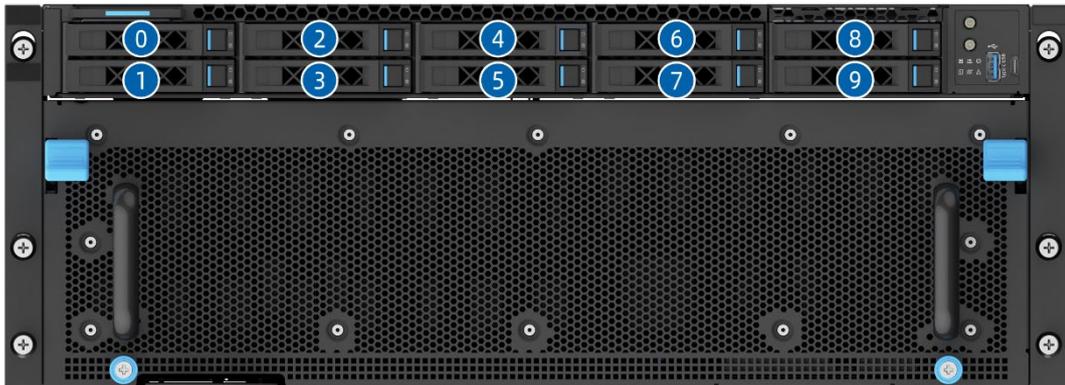
1. 10 × 2.5-Inch Drive Configuration



NOTE

Applicable model: KR4276-X2-A0-R0-00.

Figure 5-10 Drive Numbering



Configuration	Physical Drive No.	Drive No. Identified by the ISBMC	Front/Rear	Drive Number Identified by a 16i RAID Card
10 × SAS/SATA	0 - 9	0 - 9	Front	0 - 9
8 × NVMe + 2 × SAS/SATA	0 - 3	0 - 3	Front	0 - 3
	4 - 7	4 - 7	Front	-
	8 - 9	8 - 9	Front	0 - 1

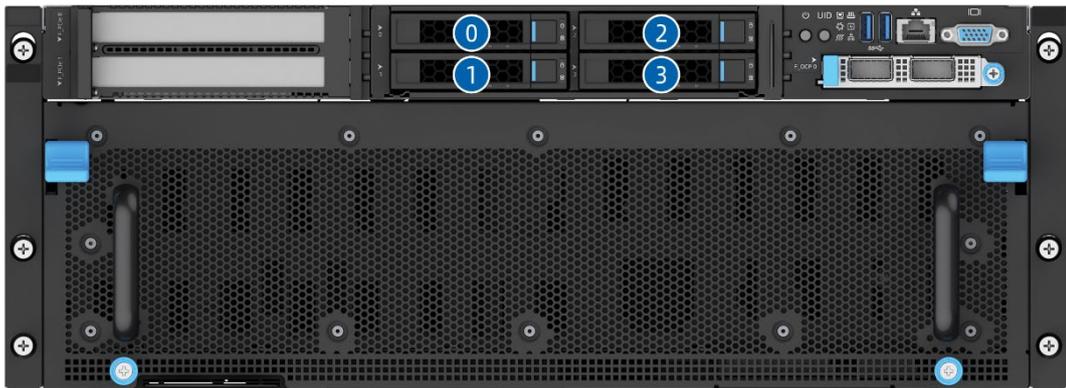
2. 4 × 2.5-Inch Drive Configuration



NOTE

Applicable model: KR4276-X2-A0-F0-00.

Figure 5-11 Drive Numbering



Configuration	Physical Drive No.	Drive No. Identified by the ISBMC	Front/Rear	Drive Number Identified by an 8i RAID Card
4 × SAS/SATA	0 - 3	0 - 3	Front	0 - 3
4 × NVMe	0 - 3	0 - 3	Front	0 - 3

5.7.3 Drive LEDs

1. SAS/SATA Drive LEDs

Figure 5-12 SAS/SATA Drive LEDs



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

Activity LED (①)	Locator/Error LED (②)		Description
	Blue	Red	
Green			
Blinking (4 Hz)	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 5-13 NVMe Drive LEDs



When the VROC and VMD functions are enabled and the latest VMD driver is installed, the NVMe drives support surprise hot swap, and the LEDs can be illuminated.

Table 5-9 NVMe Drive LED Description

Activity LED (①)	Error LED (②)		Description
	Blue	Red	
Green			
Off	Off	Off	Drive absent
Solid on	Off	Off	Drive present but not in use
Blinking (4 Hz)	Off	Off	Drive present and in use
Blinking (4 Hz)	Solid pink		Copyback/Rebuild/Initializing/ Verifying in progress
Solid on	Solid on	Off	Drive selected but not in use
Blinking (4 Hz)	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 cards provide 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 cards as needed.
- For specific NIC options, consult your local sales representative or refer to [7.2 Hardware Compatibility](#).

5.9 I/O Expansion

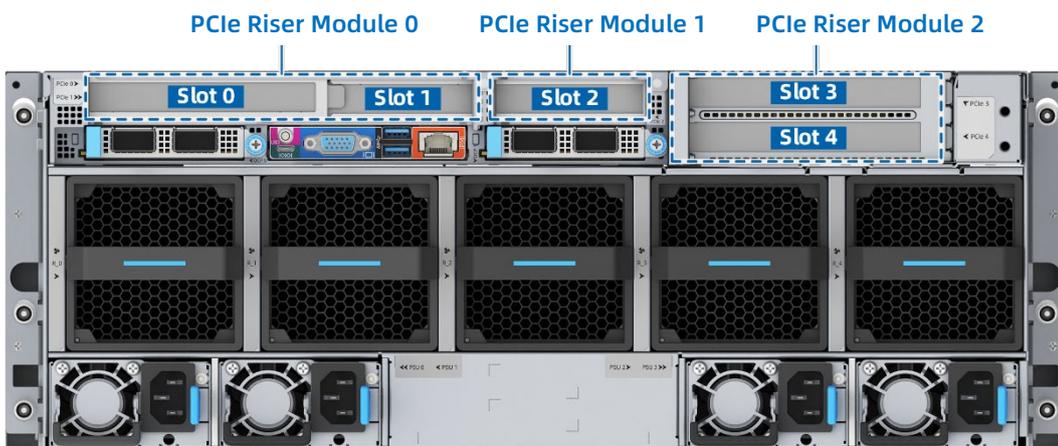
5.9.1 PCIe Expansion Cards

PCIe expansion cards provide system expansion capabilities.

- Up to 7 PCIe 4.0/5.0 expansion slots, including 2 dedicated slots for OCP 3.0 cards.
- For specific PCIe expansion card options, consult your local sales representative or refer to [7.2 Hardware Compatibility](#).

5.9.2 PCIe Slot Locations

Figure 5-14 PCIe Slots - Rear Panel



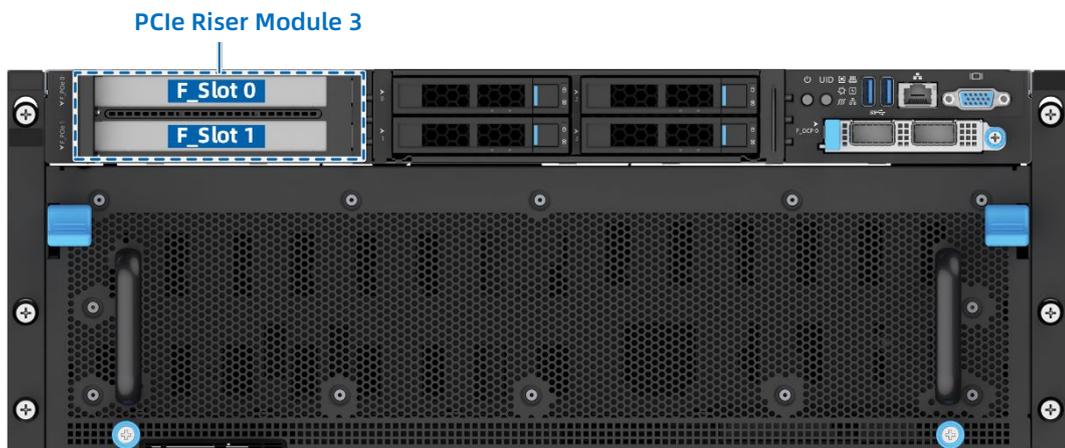


NOTE

Applicable model: KR4276-X2-A0-R0-00.

- Slot 0 and slot 1 reside in PCIe riser module 0.
- Slot 2 resides in PCIe riser module 1.
- Slot 3 and slot 4 reside in PCIe riser module 2.

Figure 5-15 PCIe Slots - Front Panel



NOTE

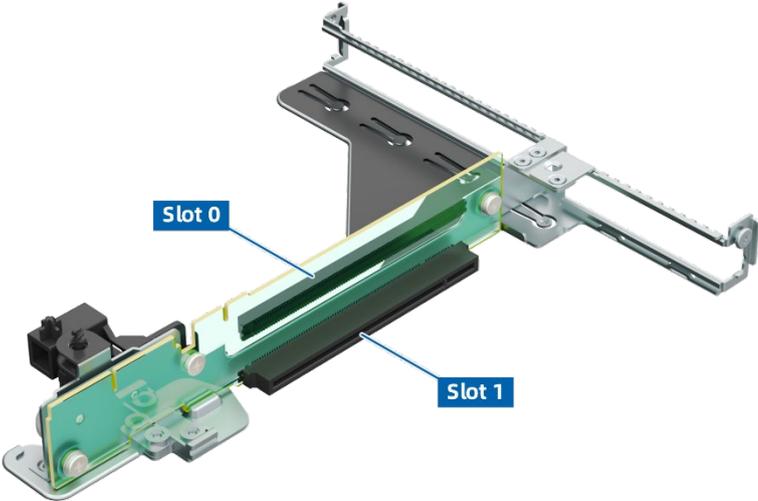
Applicable model: KR4276-X2-A0-F0-00.

F_Slot 0 and F_Slot 1 reside in PCIe riser module 3.

5.9.3 PCIe Riser Modules

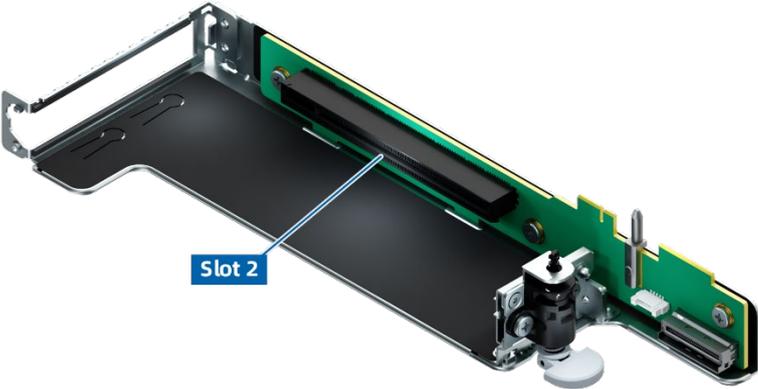
- PCIe Riser Module 0 (2 × PCIe x16 Slot)

Figure 5-16 PCIe Riser Module 0



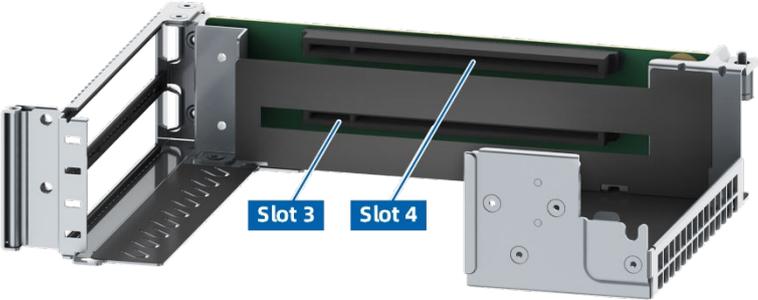
- PCIe Riser Module 1 (1 × PCIe x16 Slot)

Figure 5-17 PCIe Riser Module 1



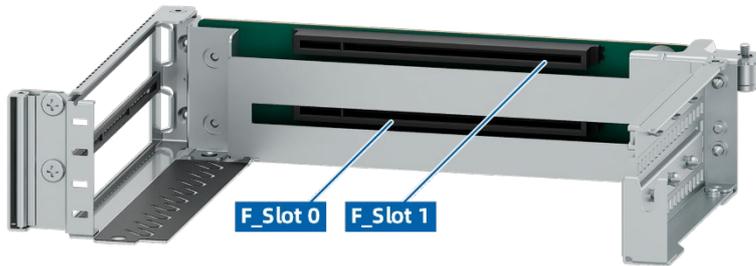
- PCIe Riser Module 2 [1 × PCIe x16 Slot (Slot 3) and 1 × PCIe x8 Slot (Slot 4)]

Figure 5-18 PCIe Riser Module 2



- PCIe Riser Module 3 (2 × PCIe x16 Slot)

Figure 5-19 PCIe Riser Module 3



5.9.4 PCIe Slot Description



NOTE

When a CPU is absent, its corresponding PCIe slots are not available.

Table 5-10 PCIe Slot Description

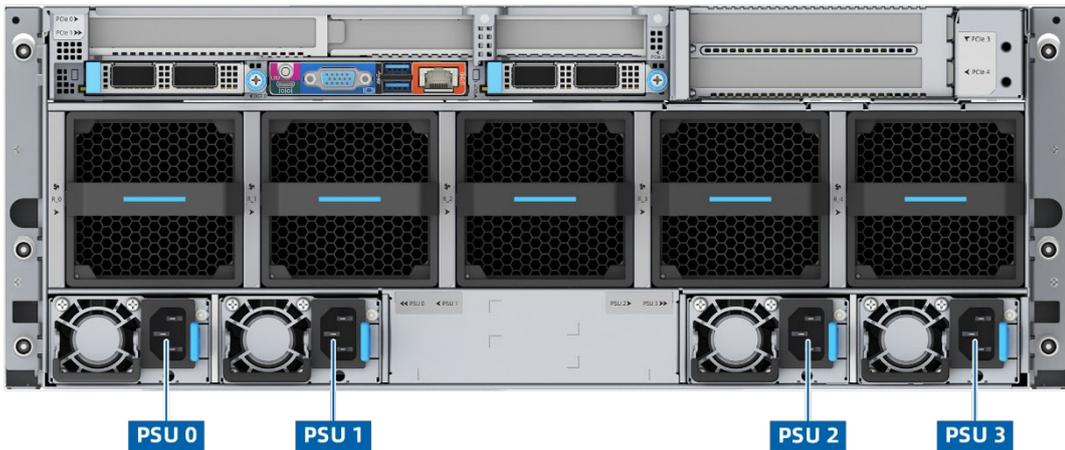
PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port No.	Form Factor
Slot 0	CPU0	PCIe 5.0	x16	x16	PE1	FHHL
Slot 1	CPU0	PCIe 4.0	x16	x16	PE2	HHHL
Slot 2	CPU1	PCIe 4.0	x16	x16	PE2	HHHL
Slot 3	CPU0	PCIe 5.0	x16	x16	PE3	FHHL
Slot 4	CPU1	PCIe 5.0	x8	x8	PE3	FHHL
OCP 3.0 Slot 0	CPU0	PCIe 5.0	x16	x16	PE0	SFF
OCP 3.0 Slot 1	CPU1	PCIe 5.0	x16	x16	PE0	SFF
F_Slot 0	CPU0	PCIe 5.0	x16	x16	PE4	FHHL
F_Slot 1	CPU1	PCIe 5.0	x16	x16	PE4	FHHL
F_OCP 3.0 Slot	CPU0	PCIe 5.0	x16	x16	PE1	SFF

5.10 PSUs

- The server supports 1 to 4 PSUs.

- The server supports AC or DC power input.
- The PSUs are hot-swappable.
- The server supports 2 PSUs (PSU0 and PSU1) in 1+1 redundancy or 4 PSUs in 2+2 redundancy.
- The server must use PSUs with the same part number (P/N code).
- The PSUs provide short circuit protection.

Figure 5-20 PSU Locations



5.10.1 PSU LED

Table 5-11 PSU LED Description

Item	PSU LED Status	Description
1	Solid green	Normal
2	Off	No AC/DC input to the PSU
3	Solid amber	PSU critical event causing a shutdown (possible causes: PSU overtemperature protection, PSU overcurrent protection, PSU overvoltage protection, short circuit protection)
4	Blinking amber (1 Hz)	PSU warning event where the PSU continues to operate (possible causes: PSU overtemperature warning, PSU overcurrent warning, excessively low fan speed warning)
5	Blinking green (1 Hz)	PSU operating in standby mode with normal input

Item	PSU LED Status	Description
6	Blinking green (on for 2 seconds and off for 1 second)	PSU in cold redundant state
7	Blinking green (2 Hz)	PSU firmware updating

5.11 Fan Modules

KR4276-X2-A0-R0-00:

- The server supports 13 fan modules, including 8 internal 4056 fan modules in the upper 1U and 5 rear 8056 fan modules in the lower 3U. For the internal fan modules, two specifications (32,000 rpm and 23,000 rpm) can be selected based on different server configurations.
- The fan modules are hot-swappable.
- The fan modules support 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 4056 fan modules with the same part number (P/N code).
- The server must use 8056 fan modules with the same part number (P/N code).

KR4276-X2-A0-F0-00:

- The server supports 14 fan modules, including 9 rear 4056 fan modules (32,000 rpm) in the upper 1U and 5 rear 8056 fan modules in the lower 3U.
- The fan modules are hot-swappable.
- The fan modules support 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 4056 fan modules with the same part number (P/N code).
- The server must use 8056 fan modules with the same part number (P/N code).

Figure 5-21 Internal Fan Module Locations (KR4276-X2-A0-R0-00)

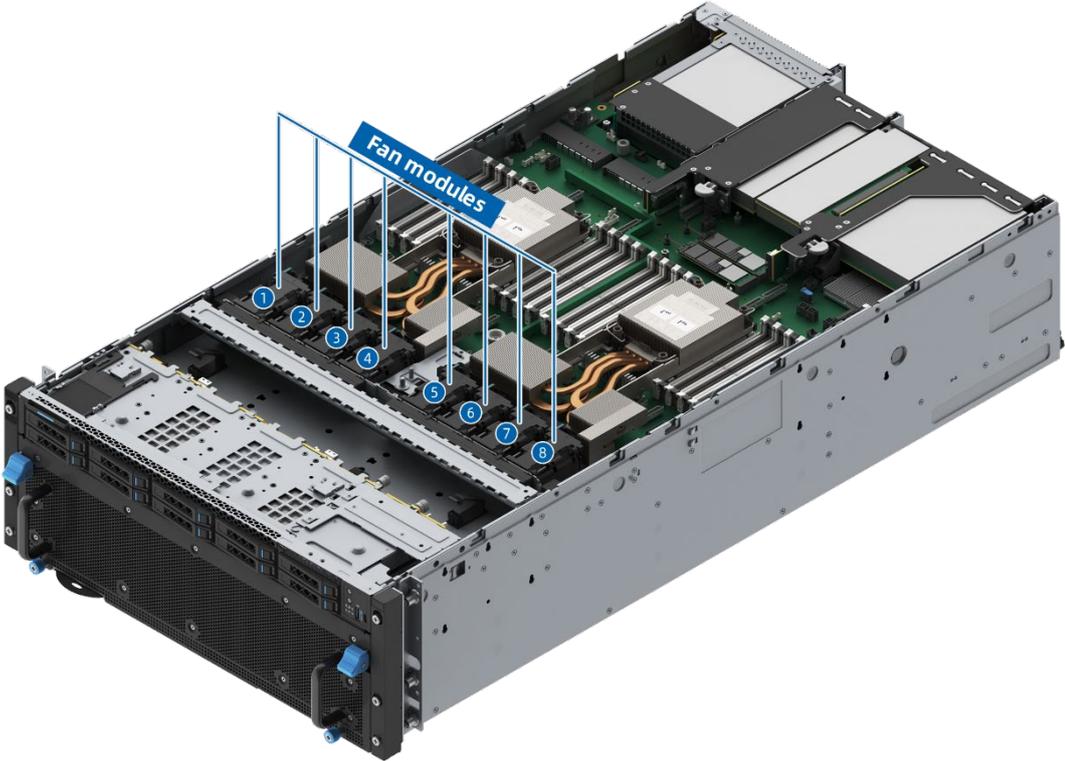


Figure 5-22 Rear Fan Module Locations (KR4276-X2-A0-R0-00)

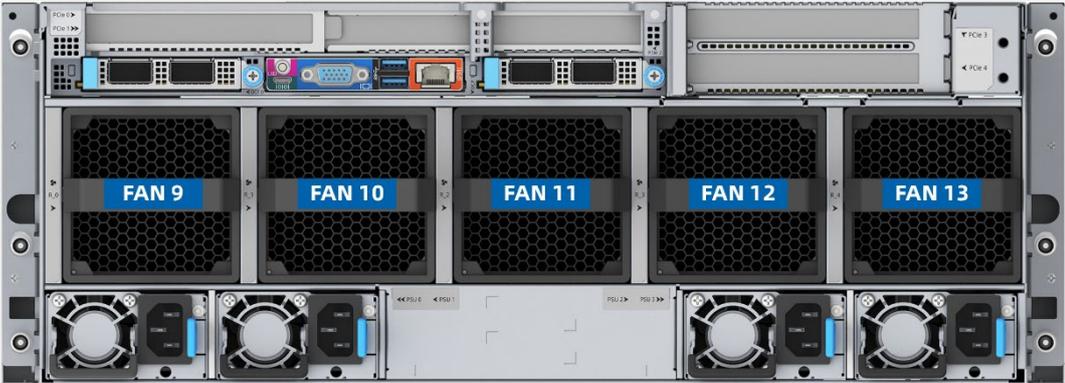
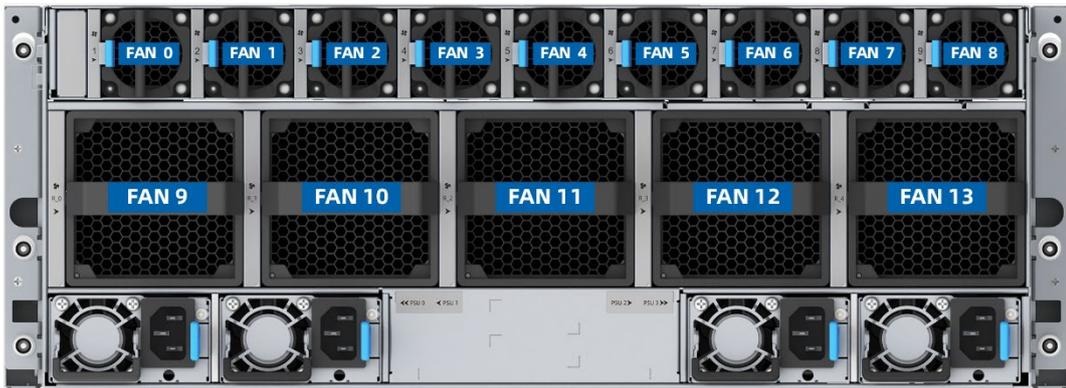


Figure 5-23 Rear Fan Module Locations (KR4276-X2-A0-F0-00)



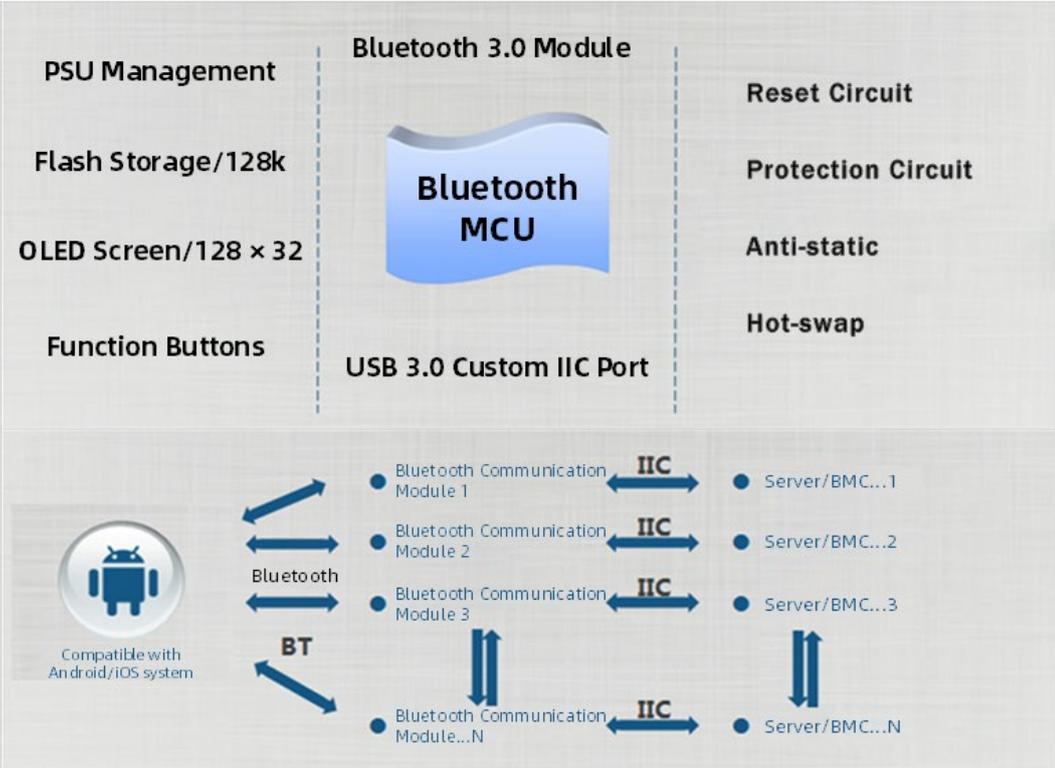
5.12 LCD Module

5.12.1 Function

The LCD module reads server-related information from the BMC, such as the operating status of processors and memories, network status, logs, and alerts, and transmits the information to client mobile terminals via Bluetooth.

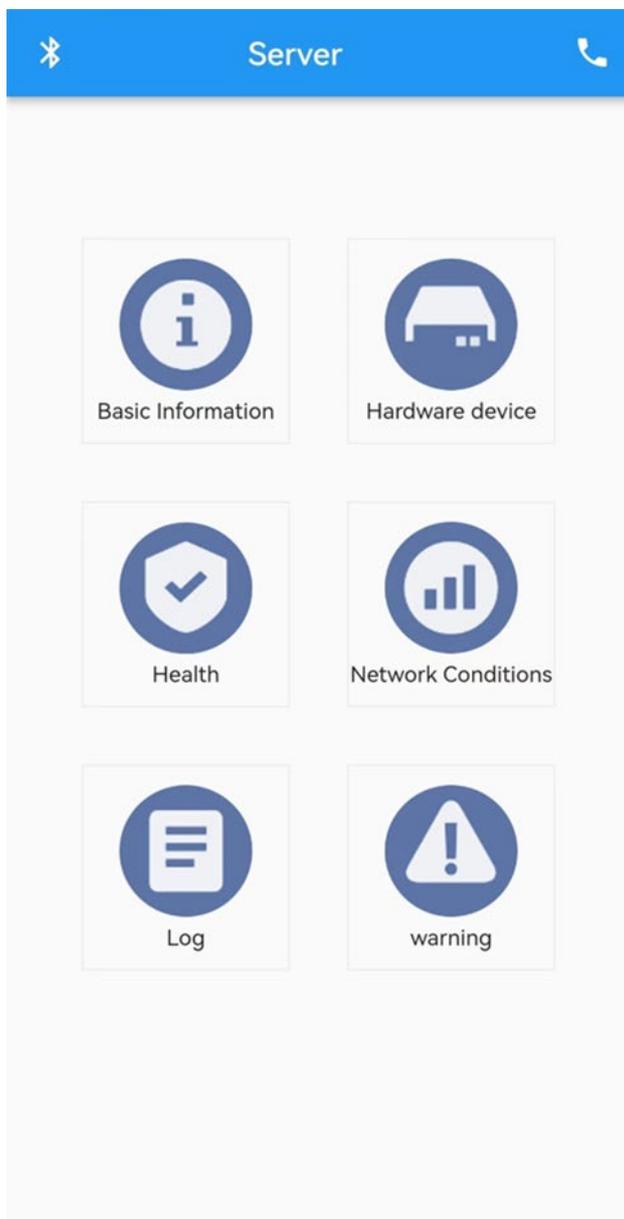
The LCD module synchronizes information with the ISBMC through I²C and can display information on an LCD screen or in the app. The server's basic information, system status and alert diagnosis can be displayed in the app via Bluetooth, facilitating the operation and maintenance.

Figure 5-24 How LCD Subsystem Works



5.12.2 Interface

Figure 5-25 App Home Screen



5.13 Boards

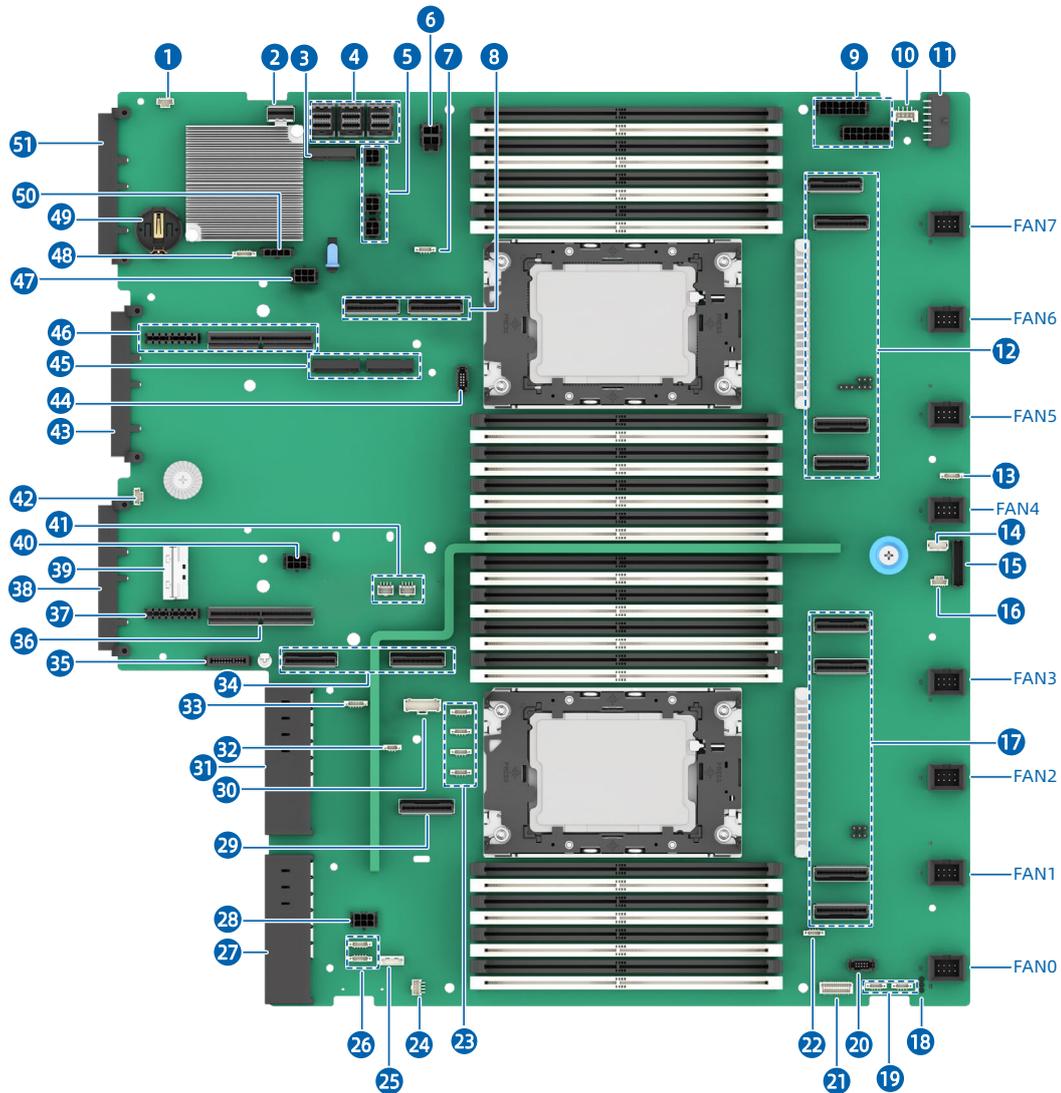


NOTE

The figures below may differ from the actual configuration.

5.13.1 Motherboard

Figure 5-26 Motherboard



Item	Feature	Item	Feature
1	OCP 3.0 Card 0 Hot-Plug Button and LED Connector	27	PSU1 Connector
2	Front Control Panel Connector	28	GPU Riser Power Connector
3	System TF Card Adapter Connector	29	MCIO x8 Connector
4	Mini-SAS HD Connector	30	NC-SI Connector
5	Rear Drive Backplane Power Connector	31	PSU0 Connector
6	OCP 3.0 Card 2 Power Connector	32	UART Connector
7	Drive Backplane I ² C Connector	33	Riser I ² C Connector

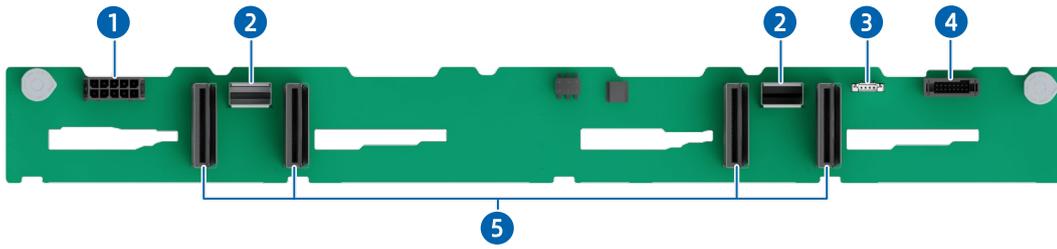
Item	Feature	Item	Feature
8	MCI0 x8 Connector	34	MCI0 x8 Connector
9	Front Drive Backplane Power Connector	35	Riser Power Connector
10	Inlet Temperature Sensor Connector	36	MCI0 x16 Connector
11	Front Drive Backplane Power Connector	37	Riser 1 Power Connector
12	MCI0 x8 Connector	38	OCP 3.0 Card 1 Connector
13	Fan Board I ² C Connector	39	OCP 3.0 Card 1 MCI0 Connector
14	Intrusion Detection Connector	40	GPU Riser 2 Power Connector
15	OCP 3.0 Card 2 Sideband Connector	41	Leak Detection Connector
16	OCP 3.0 Card 2 Hot-Plug Button and LED Connector	42	OCP 3.0 Card 1 Hot-Plug Button and LED Connector
17	MCI0 x8 Connector	43	DC-SCM Connector
18	CMOS Jumper	44	VPP Connector
19	Fan Board I ² C Connector	45	M.2 SSD Connector
20	VPP Connector	46	Riser 0 Connector
21	Front Control Panel Connector	47	GPU Riser 0 Power Connector
22	PDB I ² C Connector	48	Riser I ² C Connector
23	Drive Backplane I ² C Connector	49	Button Cell Battery Socket
24	IPMB Connector	50	Smart NIC Power Connector
25	RAID Key Connector	51	OCP 3.0 Card 0 Connector
26	Riser I ² C Connector	-	-

5.13.2 Drive Backplanes

1. Front Drive Backplanes

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

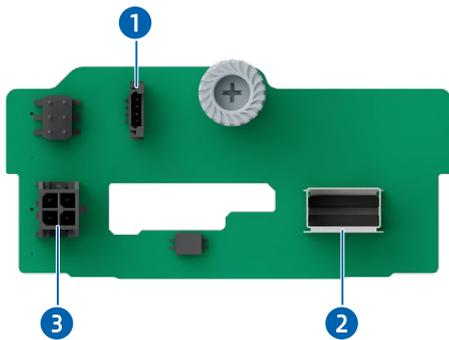
Figure 5-27 8 × 2.5-Inch SAS/SATA/NVMe Drive Backplane



Item	Feature	Item	Feature
1	Power Connector	4	VPP Connector
2	MCI0 x4 Connector	5	Slimline x8 Connector
3	BMC_I2C Connector	-	-

- 2 × 2.5-Inch SAS/SATA Drive Backplane

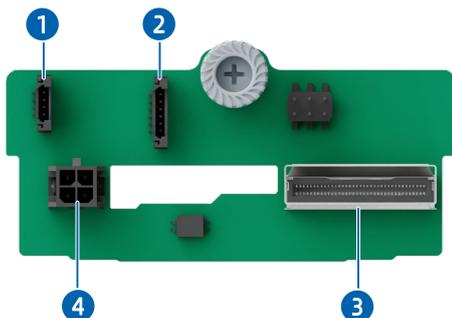
Figure 5-28 2 × 2.5-Inch SAS/SATA Drive Backplane



Item	Feature	Item	Feature
1	BMC_I2C Connector	3	Power Connector
2	Slimline x4 Connector	-	-

- 2 × 2.5-Inch NVMe Drive Backplane

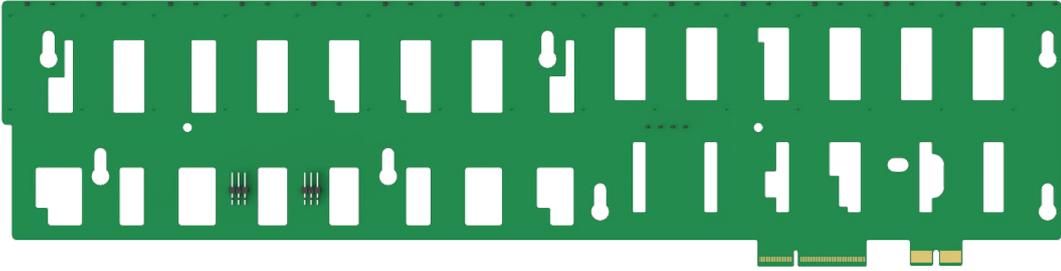
Figure 5-29 2 × 2.5-Inch NVMe Drive Backplane



Item	Feature	Item	Feature
1	BMC_I ² C Connector	3	MCIO x8 Connector
2	SGPIO Connector	4	Power Connector

2. Internal Drive Backplane

Figure 5-30 15 × 3.5-Inch SAS/SATA Drive Backplane



6 Product Specifications

6.1 KR4276-X2-A0-R0-00

6.1.1 Technical Specifications

Table 6-1 Technical Specifications

Item	Description
Form Factor	4U rack server
Chipset	Intel Emmitsburg
Processor	<p>Supports 1 or 2 processors.</p> <ul style="list-style-type: none">• 4th/5th Gen Intel Xeon Scalable processors• Integrated memory controllers and 8 memory channels per processor• Integrated PCIe controllers and 80 PCIe 5.0 lanes per processor• Up to 64 cores per CPU• 4 UPI links per CPU at up to 20 GT/s per link• Max. Turbo frequency of 4.2 GHz• L3 cache up to 320 MB per CPU• TDP up to 385 W <p>Note: The information above is for reference only. See 7.2 Hardware Compatibility for details.</p>
Memory	<p>Supports up to 32 DDR5 DIMMs.</p> <ul style="list-style-type: none">• RDIMMs supported• Up to 5,600 MT/s (1 DPC)• Up to 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). <p>Note: The information above is for reference only. See 7.2 Hardware Compatibility for details.</p>

Item	Description
Storage	<p>Supports multiple drive configurations. See 5.7.1 Drive Configurations for details.</p> <ul style="list-style-type: none"> • Front: Up to 10 × 2.5-inch drive (8 × SAS/SATA/NVMe + 2 × SAS/SATA), hot-swappable • Internal: <ul style="list-style-type: none"> - Up to 2 × TF card, one each for BIOS and BMC - Up to 60 × 3.5-inch SATA/SAS drive
Network	<ul style="list-style-type: none"> • Up to two 1 Gb/10 Gb/25 Gb/100 Gb hot-plug OCP 3.0 cards • 1 Gb/10 Gb/25 Gb/40 Gb/100 Gb PCIe NICs • 1 BMC management network port of 100 Mbps/1,000 Mbps auto-negotiation
I/O Expansion	<ul style="list-style-type: none"> • Supports up to 5 standard PCIe expansion cards <ul style="list-style-type: none"> - 2 × rear FHHL PCIe 5.0 x16 expansion card - 2 × rear HHHL PCIe 4.0 x16 expansion card - 1 × rear FHHL PCIe 5.0 x8 expansion card • Supports up to two 1 Gb/10 Gb/25 Gb/100 Gb OCP 3.0 cards <p>Note: For details, see 5.9.2 PCIe Slot Locations and 5.9.4 PCIe Slot Description.</p>
Port	<ul style="list-style-type: none"> • Front: <ul style="list-style-type: none"> - 1 × USB 2.0/LCD port - 1 × USB Type-C port • Rear: <ul style="list-style-type: none"> - 2 × USB 3.0 port - 1 × VGA port - 1 × system/BMC serial port - 1 × BMC management network port <p>Note: OS installation on the USB storage media is not recommended.</p>
Display	<p>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</p> <p>Note: 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.</p>

Item	Description
System Management	<ul style="list-style-type: none"> • UEFI/Legacy • ISBMC • NC-SI • KSManage • KSManage Tools
Security	<ul style="list-style-type: none"> • 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

6.1.2 Environmental Specifications

Table 6-2 Environmental Specifications

Item	Description
Temperature ^{1,2,3}	<ul style="list-style-type: none"> • Operating: 5°C to 40°C (41°F to 104°F) • Storage (packed): -40°C to 70°C (-40°F to 158°F) • Storage (unpacked): -40°C to 55°C (-40°F to 131°F)
Relative Humidity (RH, non-condensing)	<ul style="list-style-type: none"> • Operating: 5% to 90% RH • Storage (packed): 5% to 93% RH • Storage (unpacked): 5% to 93% RH
Operating Altitude	≤3,050 m (10,007 ft)
Corrosive Gaseous Contaminants	<p>Maximum growth rate of corrosion film thickness:</p> <ul style="list-style-type: none"> • 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)

Item	Description
Acoustic Noise ^{4,5,6}	<p>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):</p> <ul style="list-style-type: none"> • Idle: <ul style="list-style-type: none"> - LWAd: 6.7 B - LpAm: 47.1 dBA • Operating: <ul style="list-style-type: none"> - LWAd: 7.3 B - LpAm: 54.5 dBA

Notes:

1. Not all configurations support the operating temperature range of 5°C to 40°C (41°F to 104°F). Configurations with 200 Gb or above NICs and smart NICs support an operating temperature range of 5°C to 35°C (41°F to 95°F).

2. Standard operating temperature:

- 10°C to 35°C (50°F to 95°F) is the standard operating temperature range at sea level. At an altitude of 0 to 3,050 m (0 to 10,007 ft), derate the maximum allowable temperature by 1°C per 305 m (1°F per 556 ft). No direct sustained sunlight is permitted. The maximum temperature gradient is 20°C/h (36°F/h). Both the altitude and the maximum temperature gradient vary with server configuration.
- Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.

3. Expanded operating temperature:

- For some configurations, the supported system inlet ambient temperature can be expanded to 5°C to 10°C (41°F to 50°F) and 35°C to 40°C (95°F to 104°F) at sea level. At an altitude of 0 to 950 m (0 to 3,117 ft), derate the maximum allowable operating temperature by 1°C per 305 m (1°F per 556 ft). At an altitude of 950 to 3,050 m (3,117 to 10,007 ft), derate the maximum allowable operating temperature by 1°C per 175 m (1°F per 319 ft).
- For some configurations, the supported system inlet ambient temperature can be expanded to 35°C to 40°C (95°F to 104°F) at sea level. At an altitude of 0 to 950 m (0 to 3,117 ft), derate the maximum allowable operating temperature by 1°C per 305 m (1°F per 556 ft). At an altitude of 950 to 3,050 m (3,117 to 10,007 ft), derate the maximum allowable operating temperature by 1°C per 125 m (1°F per 228 ft).
- Any fan failure or operations under the expanded operating temperature may lead to system performance degradation.

4. 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.

5. The sound levels shown here were measured based on the specific configurations of a server. Sound levels vary with server configurations, workloads, ambient temperatures, and other factors. These values are for reference only and subject to change without further notice.

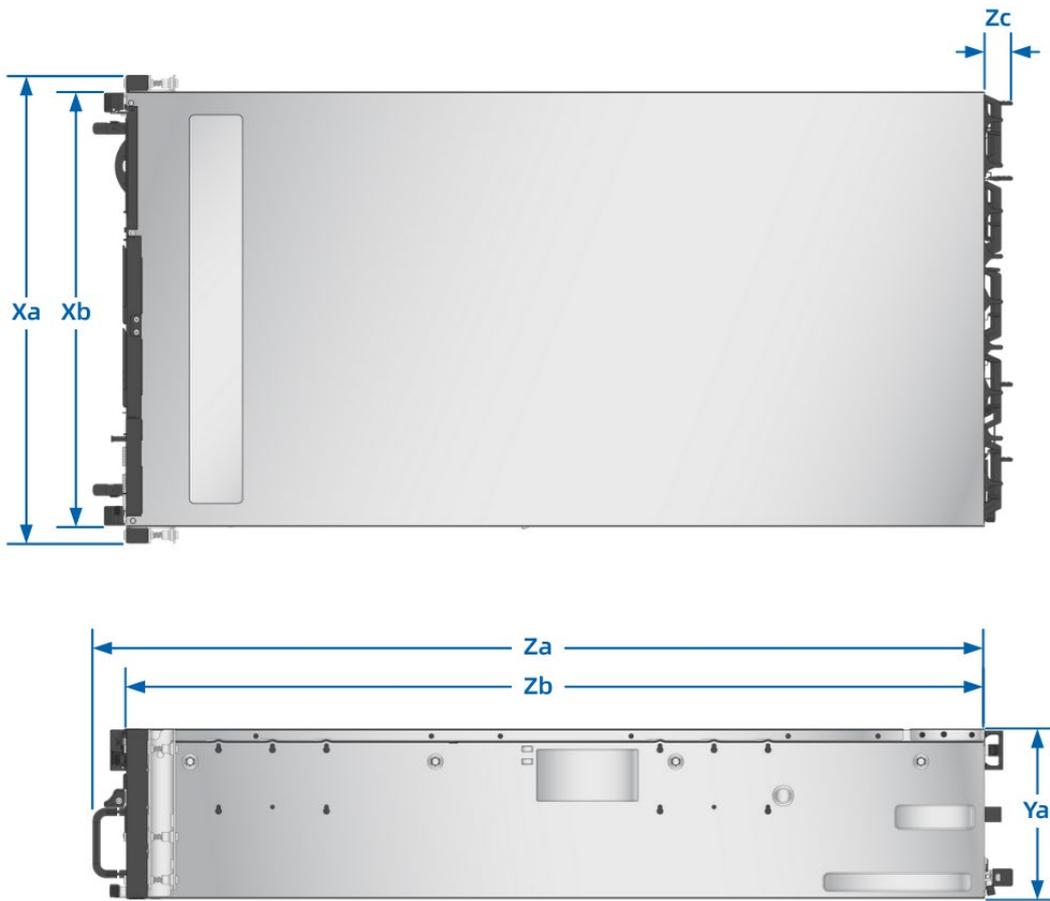
6. Product conformance to cited normative standards is based on sample testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

6.1.3 Physical Specifications

Table 6-3 Physical Specifications

Item	Description
Outer Packaging Dimensions (L × W × H)	1,190 × 760 × 353 mm (46.85 × 29.92 × 13.90 in.)
Installation Dimension Requirements	<ul style="list-style-type: none"> • Installation requirements for the cabinet are as follows: <ul style="list-style-type: none"> - 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: <ul style="list-style-type: none"> - Static rail kit: The distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.).
Weight	<ul style="list-style-type: none"> • Net weight: 91.8 kg (202.38 lbs) • Gross weight: 117 kg (257.94 lbs) (including server, packaging box, rails and accessory box) <p>Note: The server weight varies by configuration.</p>

Figure 6-1 Chassis Dimensions



Model	Xa	Xb	Ya	Za	Zb	Zc
KR4276-X2-A0-R0-00	482 mm (18.98 in.)	448 mm (17.64 in.)	175 mm (6.89 in.)	875 mm (34.45 in.)	850 mm (33.46 in.)	26.9 mm (1.06 in.)

6.2 KR4276-X2-A0-F0-00

6.2.1 Technical Specifications

Table 6-4 Technical Specifications

Item	Description
Form Factor	4U rack server
Chipset	Intel Emmitsburg
Processor	Supports 1 or 2 processors. <ul style="list-style-type: none"> 4th/5th Gen Intel Xeon Scalable processors Integrated memory controllers and 8 memory channels per processor

Item	Description
	<ul style="list-style-type: none"> • Integrated PCIe controllers and 80 PCIe 5.0 lanes per processor • Up to 64 cores per CPU • 4 UPI links per CPU at up to 20 GT/s per link • Max. Turbo frequency of 4.2 GHz • L3 cache up to 320 MB per CPU • TDP up to 385 W <p>Note: The information above is for reference only. See 7.2 Hardware Compatibility for details.</p>
Memory	<p>Supports up to 32 DDR5 DIMMs.</p> <ul style="list-style-type: none"> • RDIMMs supported • Up to 5,600 MT/s (1 DPC) • Up to 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). <p>Note: The information above is for reference only. See 7.2 Hardware Compatibility for details.</p>
Storage	<p>Supports multiple drive configurations. See 5.7.1 Drive Configurations for details.</p> <ul style="list-style-type: none"> • Front: Up to 4 × 2.5-inch SATA/SAS/NVMe drive, hot-swappable • Internal: <ul style="list-style-type: none"> - Up to 2 × TF card, one each for BIOS and BMC - Up to 60 × 3.5-inch SATA/SAS drive
Network	<ul style="list-style-type: none"> • Up to one 1 Gb/10 Gb/25 Gb/100 Gb hot-plug OCP 3.0 card • 1 Gb/10 Gb/25 Gb/40 Gb/100 Gb PCIe NICs • 1 BMC management network port of 100 Mbps/1,000 Mbps auto-negotiation
I/O Expansion	<ul style="list-style-type: none"> • Supports up to 5 standard PCIe expansion cards <ul style="list-style-type: none"> - 2 × front FHHL PCIe 5.0 x16 expansion card - 2 × internal FHHL PCIe 4.0 x16 expansion card - 1 × internal HHHL PCIe 5.0 x16 expansion card

Item	Description
	<ul style="list-style-type: none"> • Supports up to one 1 Gb/10 Gb/25 Gb/100 Gb OCP 3.0 card <p>Note: For details, see 5.9.2 PCIe Slot Locations and 5.9.4 PCIe Slot Description.</p>
Port	<ul style="list-style-type: none"> • Front: <ul style="list-style-type: none"> - 1 × USB 3.0 port - 1 × USB 2.0/LCD port - 1 × VGA port - 1 × BMC management network port • Rear: 1 × system/BMC serial port <p>Note: OS installation on the USB storage media is not recommended.</p>
Display	<p>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</p> <p>Note: 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.</p>
System Management	<ul style="list-style-type: none"> • UEFI/Legacy • ISBMC • NC-SI • KSManage • KSManage Tools
Security	<ul style="list-style-type: none"> • 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

6.2.2 Environmental Specifications

Table 6-5 Environmental Specifications

Item	Description
Temperature ^{1,2,3}	<ul style="list-style-type: none"> Operating: 5°C to 40°C (41°F to 104°F) Storage (packed): -40°C to 70°C (-40°F to 158°F) Storage (unpacked): -40°C to 55°C (-40°F to 131°F)
Relative Humidity (RH, non-condensing)	<ul style="list-style-type: none"> Operating: 5% to 90% RH Storage (packed): 5% to 93% RH Storage (unpacked): 5% to 93% RH
Operating Altitude	≤3,050 m (10,007 ft)
Corrosive Gaseous Contaminants	<p>Maximum growth rate of corrosion film thickness:</p> <ul style="list-style-type: none"> Copper coupon: 300 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013) Silver coupon: 200 Å/month (compliant with the gaseous corrosivity level of G1 defined in ANSI/ISA-71.04-2013)
Acoustic Noise ^{4,5,6}	<p>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):</p> <ul style="list-style-type: none"> Idle: <ul style="list-style-type: none"> - LWAd: 6.9 B - LpAm: 58.4 dBA Operating: <ul style="list-style-type: none"> - LWAd: 7.9 B - LpAm: 61 dBA

Notes:

1. Not all configurations support the operating temperature range of 5°C to 40°C (41°F to 104°F). Configurations with 200 Gb or above NICs and smart NICs support an operating temperature range of 5°C to 35°C (41°F to 95°F).

2. Standard operating temperature:

- 10°C to 35°C (50°F to 95°F) is the standard operating temperature range at sea level. At an altitude of 0 to 3,050 m (0 to 10,007 ft), derate the maximum allowable temperature by 1°C per 305 m (1°F per 556 ft). No direct sustained sunlight is permitted. The maximum temperature gradient is 20°C/h (36°F/h). Both the altitude and the maximum temperature gradient vary with server configuration.
- Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.

3. Expanded operating temperature:

- For some configurations, the supported system inlet ambient temperature can be expanded to 5°C to 10°C (41°F to 50°F) and 35°C to 40°C (95°F to 104°F) at sea level. At an altitude of 0 to 950 m (0 to 3,117 ft), derate the maximum allowable operating temperature by 1°C per 305 m (1°F per 556 ft). At an altitude of 950 to 3,050 m (3,117 to 10,007 ft), derate the maximum allowable operating temperature by 1°C per 175 m (1°F per 319 ft).
- For some configurations, the supported system inlet ambient temperature can be expanded to 35°C to 40°C (95°F to 104°F) at sea level. At an altitude of 0 to 950 m (0 to 3,117 ft), derate the maximum allowable operating temperature by 1°C per 305 m (1°F per 556 ft). At an altitude of 950 to 3,050 m (3,117 to 10,007 ft), derate the maximum allowable operating temperature by 1°C per 125 m (1°F per 228 ft).
- Any fan failure or operations under the expanded operating temperature may lead to system performance degradation.

4. 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.

5. The sound levels shown here were measured based on the specific configurations of a server. Sound levels vary with server configurations, workloads, ambient temperatures, and other factors. These values are for reference only and subject to change without further notice.

6. Product conformance to cited normative standards is based on sample testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

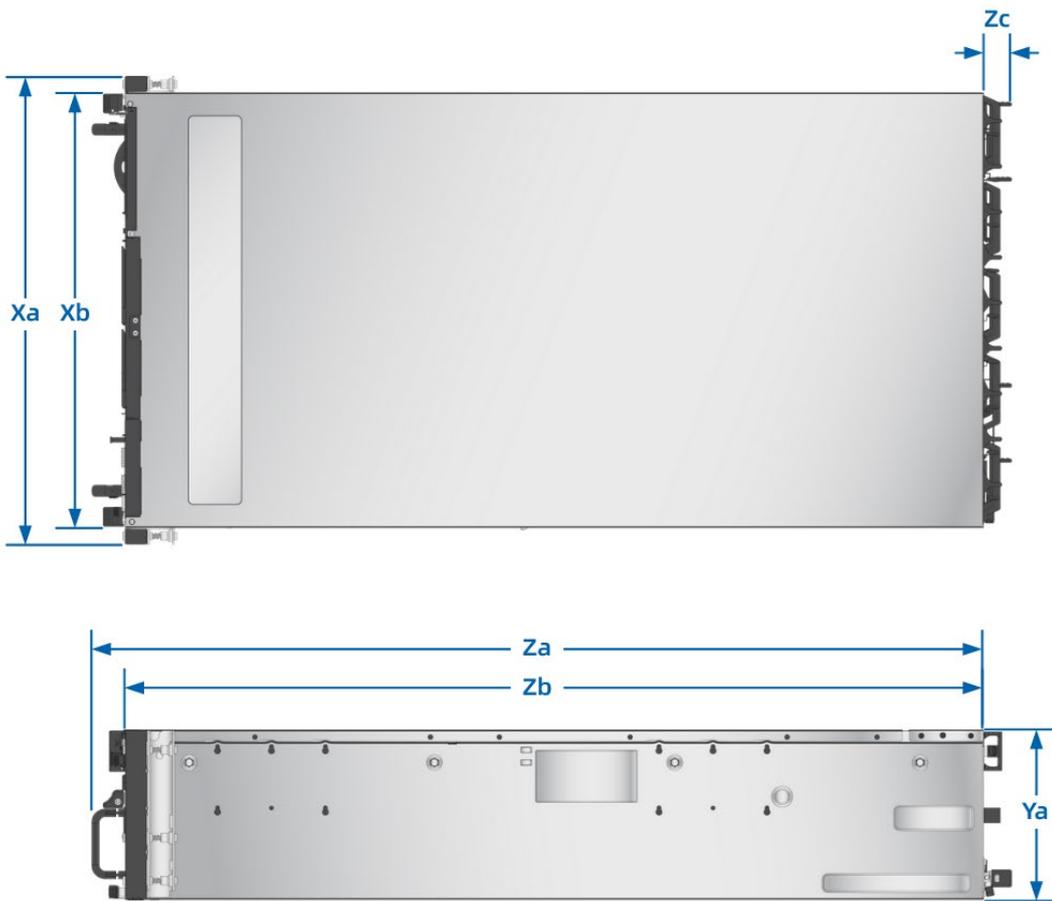
6.2.3 Physical Specifications

Table 6-6 Physical Specifications

Item	Description
Outer Packaging Dimensions (L x W x H)	1,190 x 760 x 353 mm (46.85 x 29.92 x 13.90 in.)
Installation Dimension Requirements	<ul style="list-style-type: none"> • Installation requirements for the cabinet are as follows: <ul style="list-style-type: none"> - 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: <ul style="list-style-type: none"> - Static rail kit: The distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.).

Item	Description
Weight	<ul style="list-style-type: none"> Net weight: 90.4 kg (199.30 lbs) Gross weight: 115.5 kg (254.63 lbs) (including server, packaging box, rails and accessory box) <p>Note: The server weight varies by configuration.</p>

Figure 6-2 Chassis Dimensions



Model	Xa	Xb	Ya	Za	Zb	Zc
KR4276-X2-A0-F0-00	482 mm (18.98 in.)	448 mm (17.64 in.)	175 mm (6.89 in.)	875 mm (34.45 in.)	850 mm (33.46 in.)	26.9 mm (1.06 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.
- 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 representative 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
Windows Server 2022
Windows Server 2019
Red Hat Enterprise Linux 8.6
Red Hat Enterprise Linux 9.0
Ubuntu 20.04
Ubuntu 22.04
SUSE Linux Enterprise Server 15 SP4
KOS v5.8
KOS v5.8 SP1

7.2 Hardware Compatibility

7.2.1 CPU Specifications

The server supports one or two 4th/5th Gen Intel Xeon Scalable processors (Sapphire Rapids/Emerald Rapids).

Table 7-2 CPU Specifications

Model	Cores	Threads	Base Frequency (GHz)	Max. Turbo Frequency (GHz)	Cache (MB)	TDP (W)
3408U	8	8	1.80	1.90	22.5	125
4410T	10	20	2.70	4.00	26.25	150
4410Y	12	24	2.00	3.90	30	150
4416+	20	40	2.00	3.90	37.5	165
5416S	16	32	2.00	4.00	30	150
5418N	24	48	1.80	3.80	45	165
5418Y	24	48	2.00	3.80	45	185
5420+	28	56	2.00	4.10	52.5	205
6414U	32	64	2.00	3.40	60	250
6426Y	16	32	2.50	4.10	37.5	185
6430	32	64	2.10	3.40	60	270
6438M	32	64	2.20	3.90	60	205
6438N	32	64	2.00	3.60	60	205
6438Y+	32	64	2.00	4.00	60	205
6442Y	24	48	2.60	4.00	60	225
6444Y	16	32	3.60	4.00	45	270
6448Y	32	64	2.10	4.10	60	225
6454S	32	64	2.20	3.40	60	270
8452Y	36	72	2.00	3.20	67.5	300
8458P	44	88	2.70	3.80	82.5	350
8462Y+	32	64	2.80	4.10	60	300
8468	48	96	2.10	3.80	105	350
8468V	48	96	2.40	3.80	97.5	330
8470	52	104	2.00	3.80	105	350
8480+	56	112	2.00	3.80	105	350

7.2.2 DIMM Specifications

The server supports up to 16 DDR5 RDIMMs per CPU, 32 DDR5 RDIMMs in total.

Table 7-3 DIMM Specifications

Type	Capacity (GB)	Frequency (MT/s)	Data Width	Organization
RDIMM	16	4,800	-	1R x8
RDIMM	32	4,800	-	2R x8
RDIMM	64	4,800	-	2R x4

7.2.3 Drive Specifications

Table 7-4 Front HDD Specifications

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

Table 7-5 Internal HDD Specifications

Type	Speed in rpm	Capacity (TB)	Max. Qty.
3.5-Inch SAS HDD	7.2k	8	60
		10	60
		12	60
		14	60
		16	60
		18	60
		20	60
3.5-Inch SATA HDD	7.2k	2	60
		4	60
		6	60
		8	60
		10	60

		12	60
		16	60
		18	60
		20	60
		22	60

Table 7-6 SSD Specifications

Type	Capacity	Max. Qty.
SATA SSD	240 GB	10
	480 GB	10
	960 GB	10
	1.92 TB	10
	3.84 TB	10

Table 7-7 U.2 NVMe SSD Specifications

Type	Capacity	Max. Qty.
U.2 NVMe SSD	960 GB	8
	1.92 TB	8
	3.84 TB	8
	7.68 TB	8
	1.6 TB	8
	3.2 TB	8
	6.4 TB	8

Table 7-8 M.2 SSD Specifications

Type	Capacity (GB)	Max. Qty.
M.2 SATA SSD	240	2
	480	2

7.2.4 SAS/RAID Card Specifications

Table 7-9 SAS/RAID Card Specifications

Type	Description
SAS Card	SAS_BRCM_8R0_9500-8i_SMSAS3_PCIE4
	SAS_BRCM_16R0_9500-16i_SMSAS3_PCIE4
	SAS_PM8222_SmarthBA_8_SAS3_PCIE3_MCTP
	SAS_PM8222_HBA_8_SAS3_PCIE3_MCTP
RAID Card	RAID_BRCM_8R0_9540-8i_0_SMSAS3_PCIE4
	RAID_L_16R0_9560-16i_8GB_SMSAS3_PCIE4

7.2.5 NIC Specifications

Table 7-10 OCP Card Specifications

Type	Description	Speed (Gbps)	Port Qty.
OCP Card	NIC_M_I350_1G_RJ_PCIE4-G2_4_OCP	1	4
	NIC_ME_Andes-M6_X710_10G_LC_O3x8_2_M7	10	2
	NIC_I_10G_X710DA2_LC_OCP3x8_2_XR_M7	10	2
	NIC_M_25G_MCX562A_LC_OCP3x16_2_XR_BD	25	2
	NIC_M_25G_MCX562A-ACAB_LC_OCP3x16_2_XR	25	2
	NIC_M_25G_MCX631432AN_LC_OCP3x8_2_XR	25	2
	NIC_Andes-M6_E810_25G_LC_O3x8_2_M7	25	2
	NIC_M_100G_MCX623436AN_LC_OCP3x16_2_XR	100	2
	NIC_M_100G_CX623436AN_LC_OCP3x16_2_XR_BD	100	2

Table 7-11 PCIe NIC Specifications

Type	Description	Speed (Gbps)	Port Qty.
PCIe NIC	NIC_Vostok_I350_1G_RJ_PCIE4-G3_2	1	2
	NIC_Vostok_I350_1G_RJ_PCIE4_4	1	4

Type	Description	Speed (Gbps)	Port Qty.
	NIC_I_10G_EX710DA2_LC_PCIEx8_2_XR_M7	10	2
	NIC_I_10G_X710DA2_LC_PCIEx8_2_XR_M7	10	2
	NIC_Vostok_82599_10G_LC_PCIEx8_2	10	2
	NIC_Vostok_X710_10G_LC_PCIEx8_2_M7	10	2
	NIC_I_10G_EX710DA4FH_LC_PCIEx8_4_XR_M7	10	4
	NIC_I_10G_X710T2L_RJ_PCIEx8_2_XR_M7	10	2
	NIC_M_25G_MCX512A-ACAT_LC_PCIEx8_2_XR_BD	25	2
	NIC_BRCM_25G_57414_LC_PCIEx8_2_XR_42C	25	2
	NIC_M_25G_MCX631102AN_LC_PCIEx8_2_XR	25	2
	NIC_Andes-M6_E810_25G_LC_P8-G4_2_M7	25	2
	NIC_M_100G_MCX623106_LC_PCIEx16_2_XR	100	2
	NIC_M_100G_CX623106AN_LC_PCIEx16_2_XR_BD	100	2

7.2.6 HBA/HCA Card Specifications

Table 7-12 HBA Card Specifications

Type	Description	Speed (Gbps)	Port Qty.
HBA Card	HBA_Marvell_0R1_QLE2770_FC32G_PCIE_4.0	32	1
	HBA_Marvell_0R2_QLE2772_FC32G_PCIE_4.0	32	2

Table 7-13 HCA Card Specifications

Type	Description	Speed (Gbps)	Port Qty.
HCA Card	HCA_M_2-HDR100_MCX653106A-ECAT_PCIE	100	2

7.2.7 PSU Specifications

The server supports up to 4 PSUs in 1+1 or 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, 230 Vac and 240 Vdc PSUs in 1+1 or 2+2 redundancy are supported:
 - 1,300 W Platinum PSU: 1,000 W (110 Vac), 1,300 W (230 Vac), 1,300 W (240 Vdc for China)
 - 1,600 W Platinum PSU: 1,000 W (110 Vac), 1,600 W (230 Vac), 1,600 W (240 Vdc for China)
 - 2,000 W Platinum PSU: 1,000 W (110 Vac), 2,000 W (230 Vac), 2,000 W (240 Vdc for China)
 - 1,300 W Titanium PSU: 1,000 W (110 Vac), 1,300 W (230 Vac), 1,300 W (240 Vdc for China)
 - 1,600 W Titanium PSU: 1,000 W (110 Vac), 1,600 W (230 Vac), 1,600 W (240 Vdc for China)
 - 2,000 W Titanium PSU: 1,000 W (110 Vac), 2,000 W (230 Vac), 2,000 W (240 Vdc for China)



CAUTION

At a rated input voltage of 110 Vac, the output power of a 1,300/1,600/2,000 W PSU will be derated to 1,000 W.

Operating voltage range:

- 110 Vac: 90 Vac to 132 Vac
- 230 Vac: 180 Vac to 264 Vac
- 240 Vdc: 180 Vdc to 320 Vdc

- The following rated 336 Vdc PSUs in 1+1 or 2+2 redundancy are supported:
 - 1,300 W PSU: 1,300 W (336 Vdc)

Operating voltage range:

- 336 Vdc: 260 Vdc to 400 Vdc, 176 Vac to 264 Vac

- The following rated -48 Vdc PSUs in 1+1 or 2+2 redundancy are supported:
 - 1,300 W PSU: 1,300 W (-48 Vdc)

Operating voltage range:

- -48 Vdc: -40 Vdc to -72 Vdc

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

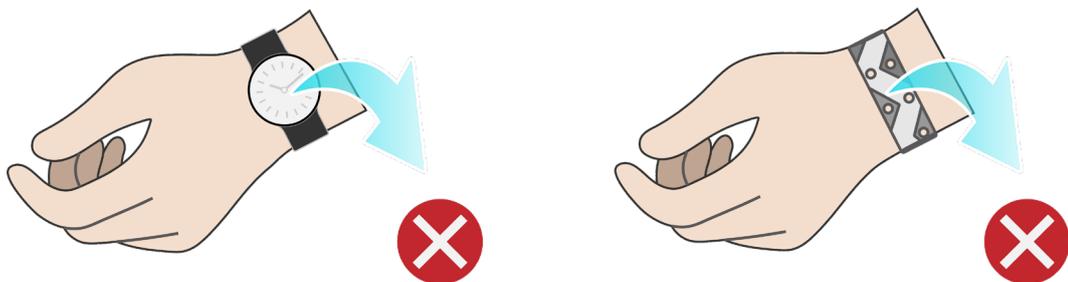
- Only personnel certified or authorized by us are allowed to perform the installation procedures.
- Stop any operation that could cause personal injury or equipment damage. Report to the project manager and take effective protective measures.
- Working during thunderstorms, including but not limited 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.

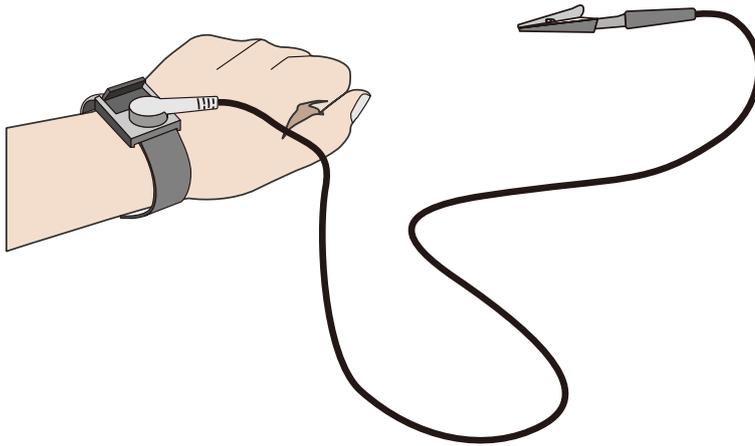
Figure 8-2 Removing Conductive Objects



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)	<ul style="list-style-type: none"> • 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 (SEs 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.



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.



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

9.2 Our Service SLA

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

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

9.3 Warranty Exclusions

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

Products.

The Limited Warranty does not apply to

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

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

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

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

10 System Management

10.1 Intelligent Management System ISBMC

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

ISBMC supports:

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

Table 10-1 ISBMC Features

Feature	Description
Management Interface	Supports extensive remote management interfaces for various server O&M scenarios. The supported interfaces include: <ul style="list-style-type: none">• IPMI• SSH CLI• 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/v2c/v3), email alerts and syslog remote alerts to ensure 24 × 7 reliability.
Remote Console KVM	Supports HTML5- and Java-based remote console to remotely control and operate the monitor/mouse/keyboard of the server, providing highly available remote management capabilities without on-site operation.
Virtual Network Console (VNC)	Supports mainstream third-party VNC clients without relying on Java, improving management flexibility.
Remote Virtual Media	Supports virtualizing images, USB devices, folders and local media devices as media devices of remote servers, simplifying OS installation, file sharing, and other O&M tasks.
Web GUI	Supports the visual management interface developed by us, displaying abundant information of the server and components, and offers easy-to-use Web GUIs.
Crash Screenshot and Crash Video Recording	<ul style="list-style-type: none"> • 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.
ISBMC Self-Diagnosis and Self-Recovery System	<ul style="list-style-type: none"> • 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
	<p>ensure that the fan operates at safe speeds to avoid system overheating.</p> <ul style="list-style-type: none"> • Supports self-diagnosis of processors, memory modules, and storage devices of ISBMC, and automatically cleans the workload to restore to normal when the device usage rate is too high.
Power Control	Supports virtual power buttons for power on/off, power cycle and reset.
UID LED	Supports remote lighting of the UID LED for locating the server in the server room.
Secure Firmware Update	<ul style="list-style-type: none"> • 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. ISBMC 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.

Feature	Description
Configuration Exporting and Importing	To import and export the existing system configurations.
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	<ul style="list-style-type: none"> • Batch asset import, automatic asset discovery, and full lifecycle management of assets • Management of the full range of our server family, including general-purpose rack servers, AI servers, multi-node servers, edge servers and all-in-one servers • Management of our general-purpose disk arrays and distributed storage devices • Management of network devices (switches, routers, etc.), security devices (firewalls, load balancers, etc.), cabinets and clouds • Management of data centers • Asset warranty information management, asset inventory reports for server acceptance, asset attribute expansion, etc.
Monitor	<ul style="list-style-type: none"> • 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
	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Overview of data center power consumption trend chart and carbon emission trend chart • Setting of server dynamic power consumption policies and minimum power consumption policies • Server temperature optimization, utilization optimization, power consumption characteristics analysis, power consumption prediction, load distribution, etc. • Carbon asset and carbon emission management
Log	<ul style="list-style-type: none"> • Fault log record management • Diagnosis record and diagnosis rule management
Topologies	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Management of warranty information reports, alert reports, asset reports, hardware reports and performance reports • Export of reports in .xlsx format
System	<ul style="list-style-type: none"> • Password management, alert forwarding and data dump

Feature	Description
	<ul style="list-style-type: none"> Customized KSMange parameters
Security	Security control of KSMange via a set of security policies such as user management, role management, authentication management (local authentication and LDAP authentication) and certificate management

10.3 KSMange Tools

Table 10-3 Features of KSMange Tools

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

11 Certifications

11.1 KR4276-X2-A0-R0-00

Table 11-1 Certifications

Country/Region	Certification	Mandatory/Voluntary
International	CB	Voluntary
US	FCC	Mandatory
	UL	Mandatory
EU	CE	Mandatory
Korea	KC	Mandatory
	E-Standby	Mandatory

11.1 KR4276-X2-A0-F0-00

Table 11-2 Certifications

Country/Region	Certification	Mandatory/Voluntary
International	CB	Voluntary
US	FCC	Mandatory
	UL	Mandatory
EU	CE	Mandatory
Korea	KC	Mandatory
	E-Standby	Mandatory

12 Appendix A

12.1 Operating Temperature Specification Limits

12.1.1 KR4276-X2-A0-R0-00

Table 12-1 Operating Temperature Specification Limits

Config.	Max. Operating Temp. 30°C (86°F)	Max. Operating Temp. 35°C (95°F)	Max. Operating Temp. 40°C (104°F)
10 × 2.5-Inch Drive Configuration	<ul style="list-style-type: none"> 4056 fans + 8056 fans RDIMMs ≤32 pcs CPU TDP ≤350 W PCIe NIC ≤100 Gb 	<ul style="list-style-type: none"> 4056 fans + 8056 fans RDIMMs ≤32 pcs CPU TDP ≤350 W PCIe NIC ≤100 Gb 	<ul style="list-style-type: none"> 4056 fans + 8056 fans RDIMMs ≤32 pcs CPU TDP ≤300 W PCIe NIC ≤100 Gb



NOTE

- The maximum operating temperature is 5°C (9°F) lower than the rated value if a single fan fails.
- Single fan failure may affect system performance.
- When using the front bezel with a smart NIC installed, the maximum operating temperature is 3°C (5.4°F) lower than the rated value.

12.1.2 KR4276-X2-A0-F0-00

Table 12-2 Operating Temperature Specification Limits

Config.	Max. Operating Temp. 30°C (86°F)	Max. Operating Temp. 35°C (95°F)	Max. Operating Temp. 40°C (104°F)
4 × 2.5-Inch Drive Configuration	<ul style="list-style-type: none"> 4056 fans + 8056 fans RDIMMs ≤32 pcs CPU TDP ≤350 W PCIe NIC ≤100 Gb 	<ul style="list-style-type: none"> 4056 fans + 8056 fans RDIMMs ≤32 pcs CPU TDP ≤350 W PCIe NIC ≤100 Gb 	<ul style="list-style-type: none"> 4056 fans + 8056 fans RDIMMs ≤32 pcs CPU TDP ≤300 W PCIe NIC ≤100 Gb

**NOTE**

- The maximum operating temperature is 5°C (9°F) lower than the rated value if a single fan fails.
- Single fan failure may affect system performance.
- When using the front bezel with a smart NIC installed, the maximum operating temperature is 3°C (5.4°F) lower than the rated value.

12.2 Model

Table 12-3 Model

Certified Model	Description
KR4276-X2-A0-R0-00	Global
KR4276-X2-A0-F0-00	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 12-4 Sensor List

Sensor	Description	Sensor Location
Inlet_Temp	Air inlet temperature	Right mounting ear
Outlet_Temp	Air outlet temperature	Motherboard
PCH_Temp	PCH temperature	Motherboard
CPUx_Temp	CPUx core temperature	CPUx x indicates the CPU number with a value of 0 - 1
CPUx_DTS	CPUx DTS temperature	CPUx x indicates the CPU number with a value of 0 - 1
CPUx_DIMM_T	CPUx DIMM temperature	DIMMs of CPUx

Sensor	Description	Sensor Location
		x indicates the CPU number with a value of 0 - 1
PSUx_Temp	PSUx temperature	PSUx x indicates the PSU number with a value of 0 - 3
HDD_MAX_Temp	The maximum temperature among all drives	Drives
OCP_NIC_Temp	The maximum temperature among all OCP cards	OCP cards
PCIe_NIC_Temp	The maximum temperature among all PCIe NICs	PCIe NICs
RAID_Temp	The maximum temperature among all RAID cards	PCIe slots
NVME_M.2_Temp	The maximum temperature among all M.2 NVMe SSDs	M.2 adapter
SYS_12V	12 V voltage supplied by the motherboard to CPUs	Motherboard
SYS_5V	5 V voltage supplied by the motherboard to the BMC	Motherboard
SYS_3V3	3.3 V voltage supplied by the motherboard to the BMC	Motherboard
CPUx_Vcore	CPUx Vcore voltage	Motherboard x indicates the CPU number with a value of 0 - 1
PSUx_VIN	PSUx input voltage	Motherboard x indicates the PSU number with a value of 0 - 3
PSUx_VOUT	PSUx output voltage	Motherboard x indicates the PSU number with a value of 0 - 3
RTC_Battery	Motherboard RTC battery voltage	Motherboard RTC battery
FANx_Speed	FANx speed	FANx
FANx_F_Speed		

Sensor	Description	Sensor Location
FANx_R_Speed		x indicates the fan module number with a value of 0 - 13
Total_Power	Total input power	PSUs
PSUx_PIN	PSUx input power	PSUx x indicates the PSU number with a value of 0 - 3
PSUx_POUT	PSUx output power	PSUx x indicates the PSU number with a value of 0 - 3
FAN_Power	Total fan power	Fan modules
CPU_Power	Total CPU power	Motherboard
Memory_Power	Total memory power	Motherboard
Disk_Power	Total drive power	Motherboard
CPUx_Status	CPUx status	CPUx x indicates the CPU number with a value of 0 - 1
CPU_Config	CPU configuration status (mixing of CPUs, or primary CPU not installed)	CPUs
CPUx_CnDm	CPUx DIMM health status	DIMMs of CPUx <ul style="list-style-type: none"> x indicates the CPU number with a value of 0 - 1 n indicates the memory channel number under CPUx with a value of 0 - 7 m indicates the DIMM slot number with a value of 0 - 1
FANx_Status	FANx health status	FANx x indicates the fan module number with a value of 0 - 13
FAN_Redundant	Fan redundancy status	Fan modules
PCIe_Status	PCIe status errors	PCIe expansion cards
Power_Button	The power button is pressed	Motherboard and power button
Watchdog2	Watchdog 2	Motherboard

Sensor	Description	Sensor Location
Sys_Health	Management subsystem health status	Management module
UID_Button	UID button status	Motherboard
PWR_Drop	Voltage drop status	Motherboard
PWR_On_TMOU	Power-on timeout	Motherboard
PWR_CAP_Fail	Power capping status	Motherboard
PSU_Redundant	PSU redundancy status	PSUs
PSU_Mismatch	PSU model mismatch	PSUs
PSUx_Status	PSUx health status	PSUx x indicates the PSU number with a value of 0 - 3
Intrusion	Chassis-opening activity	Motherboard
SysShutdown	System shutdown cause	-
ACPI_PWR	ACPI status	
ME_FW_Status	System software processes, system startup errors	
SysRestart	System restart cause	
BIOS_Boot_Up	BIOS boot-up complete	
System_Error	Emergency system errors	
POST_Status	POST status	
BMC_Boot_Up	Record BMC boot-up events	
SEL_Status	Record SEL full/cleared events	-
BMC_Status	BMC status	-
PSU_Inlet_Temp	PSU temperature (The maximum temperature will be taken)	PSUs
CPUx_VR_Temp	CPUx VR chip temperature	CPUx x indicates the CPU number with a value of 0 - 1
OCP_RAID_Temp	RAID mezz card temperature (The maximum temperature will be taken in case of	RAID mezz cards

Sensor	Description	Sensor Location
	multiple RAID mezz cards)	
NVME_Temp	The maximum temperature among all NVMe drives	NVMe drives
OCP_NIC_SFP_Temp	OCP card SFP temperature (The maximum temperature will be taken in case of multiple SFP modules)	SFP modules
PCIe_NIC_SFP_T	PCIe NIC SFP temperature (The maximum temperature will be taken in case of multiple SFP modules)	SFP modules
PVCCIN_CPUx	CPUx core voltage	CPUx x indicates the CPU number with a value of 0 - 1
PVCCFA_FIVR_CPUx	UPI I/O voltage	CPUx x indicates the CPU number with a value of 0 - 1
PVCCINFAON_CPUx	CPUx 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
PVNN_MAIN_CPUx	CPUx voltage	Motherboard x indicates the CPU number with a value of 0 - 1
P12V_CPUx_DIMM	CPUx DIMM voltage	Motherboard 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
MEM_ResourceRate	Memory utilization rate	-
CPU_ResourceRate	CPU utilization rate	-
TPM_Verify_2	TPM verification status	-

Sensor	Description	Sensor Location
FPGA_Card_Temp	PCIe FPGA card temperature	FPGA card
HBA_Temp	The maximum temperature among all HBA cards	HBA cards
Expanderx_Temp	Expander card x temperature	Expander card x x indicates the expander card number with a value of 0 - 1
PCIe_HCA_Temp	PCIe HCA card temperature (The maximum temperature will be taken in case of multiple PCIe HCA cards)	HCA cards
PCIe_HCA_SFP_T	HCA card SFP temperature (The maximum temperature will be taken in case of multiple SFP modules)	SFP modules
Air_Press	Air pressure	Left mounting ear

13 Appendix B Acronyms and Abbreviations

13.1 A - E

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
BP	Backplane

C

CAS	Column Address Strobe
CB	Certification Body
CCC	China Compulsory Certificate
CEN	European Committee for Standardization

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

D

DC	Direct Current
DC-SCM	Datacenter-ready Secure Control Module
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

E

EBG	Emmitsburg
ECC	Error-Correcting Code
ECMA	European Computer Manufacturers Association
EMR	Emerald Rapids
ESD	Electrostatic Discharge
EVAC	Extended Volume Air Cooling

13.2 F - J

F

FHHL	Full-Height Half-Length
FPGA	Field Programmable Gate Array
FRB	Fault Resilient Booting
FRU	Field-Replaceable Unit
FW	Firmware

G

GPU	Graphics Processing Unit
GUI	Graphical User Interface

H

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

I

ID	Identification
IEC	International Electrotechnical Commission
IIPC	Intel Intelligent Power Capability

iMC	Integrated Memory Controller
I/O	Input/Output
IP	Internet Protocol
IPMB	Intelligent Platform Management Bus
IPMI	Intelligent Platform Management Interface
ISA	International Society of Automation
ISO	International Organization for Standardization

13.3 K - O

K

KVM	Keyboard, Video, Mouse
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L

LCD	Liquid Crystal Display
LDAP	Lightweight Directory Access Protocol
LED	Light Emitting Diode
LP	Low Profile

M

MCIO	Mini Cool Edge Input/Output
MEM	Memory

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

13.4 P - T

P

PCH	Platform Controller Hub
PCIe	Peripheral Component Interconnect Express
PDB	Power Distribution Board
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
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S

SAS	Serial Attached SCSI
SATA	Serial Advanced Technology Attachment
SCSI	Small Computer System Interface
SDP	Single Die Package
SEL	System Event Log
SFF	Small Form Factor
SFP	Small Form-factor Pluggable
SGX	Software Guard Extensions
SLA	Service Level Agreements
SNMP	Simple Network Management Protocol
SPR	Sapphire Rapids
SSD	Solid State Drive
SSH	Secure Shell
Syslog	System Log

T

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

13.5 U - Z

U

UART	Universal Asynchronous Receiver Transmitter
UEFI	Unified Extensible Firmware Interface
UID	Unit Identification
UPI	Ultra Path Interconnect
USB	Universal Serial Bus

V

VGA	Video Graphics Array
VLAN	Virtual Local Area Network
VMD	Volume Management Device
VNC	Virtual Network Console
VNNI	Vector Neural Network Instructions
VPP	Virtual Pin Point
VR	Voltage Regulator
VRD	Voltage Regulator-Down
VROC	Virtual RAID on CPU