



White Paper for meta brain[®]

i24G7 Series Servers

Powered by AMD Processors

For i24-A7-A0-R0-00 and i24-A7-C0-R0-00

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Applicable Model

Server Model	Node Model	Maintenance	Cooling
i24-A7-A0-R0-00	NS5180-A7-A0-R0-00	Rear access	Air cooling
i24-A7-C0-R0-00	NS5180-A7-C0-R0-00	Rear access	Cold-plate liquid cooling

Technical Support

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Abstract

This document describes the i24G7 AMD-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	2024/04/17	Initial release

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1 Product Overview

The i24G7 is a 2U4N (2U 4-node) 2-socket rack server that is powered by the 4th Gen AMD EPYC processors. It is specially designed to cater to the needs of such fields as education and scientific research and finance. This server supports both air- and liquid-cooling configurations and can accommodate processors with a TDP of up to 500 W, significantly improving computing performance. The cold plates in liquid-cooled nodes dissipate the heat generated by CPUs, DIMMs, and voltage regulator (VR) modules, achieving a power usage effectiveness (PUE) as low as 1.1. This server is optimized from multiple perspectives such as cooling performance, power supply, monitoring, and management. It can fulfill the requirements of high-performance applications for hardware devices in different scenarios, bring customers the unrivaled performance experience, and help customers build a new generation of high-density green data centers.

Figure 1-1 i24-A7-A0-R0-00 (5 × 8086 Fan Configuration)



Figure 1-2 i24-A7-A0-R0-00 (8 × 2.5-Inch Drive + 4 × 8086 Fan Configuration)



Figure 1-3 i24-A7-A0-R0-00 (4 × 2.5-Inch Drive + 4 × 8086 Fan Configuration)



Figure 1-4 i24-A7-C0-R0-00 (8 × 2.5-Inch Drive + 2 × 8080 Fan Configuration)



Figure 1-5 i24-A7-C0-R0-00 (4 × 2.5-Inch Drive + 2 × 8080 Fan Configuration)



2 Features

2.1 Scalability and Performance

Table 2-1 Scalability and Performance

Technical Feature	Description
4 th Gen AMD EPYC Processors	<p>A node supports two 4th Gen AMD EPYC processors (Genoa/Genoa-X/Bergamo) that use an SP5 form factor and either the 'Zen 4' or 'Zen 4c' core design, with up to 128 cores per processor, a max. boost frequency of up to 4.3 GHz, an L3 cache of up to 1,152 MB, and 4 xGMI links at up to 32 GT/s, delivering unrivaled processing performance.</p> <ul style="list-style-type: none">• A node supports 2 processors with 128 cores and 256 threads per processor, maximizing the concurrent execution of multi-threaded applications.• With the processor cache hierarchy optimization, a larger L2 cache is provided. Each core has a private L2 cache of 1 MB and an L3 cache of at least 4 MB.• AMD Turbo Core technology automatically scales CPU speeds up to the maximum boost frequency at peak workloads, allowing processor cores to exceed the thermal design power (TDP) for a limited time.• AMD Simultaneous Multi-Threading (SMT) technology allows up to 2 threads to run on each core to improve the performance of multi-threaded applications.• AMD Virtualization (AMD-V) technology provides hardware assist to the virtualization software, allowing the operating system to better use hardware to handle virtualized workloads.• Advanced Vector Extensions 512 (AVX-512), an instruction set, can significantly accelerate the workloads that are strongly floating point compute intensive.
DIMM Form Factor	<p>Up to 96 DDR5 ECC RDIMMs (4,800 MT/s) in a server, delivering superior speed, high availability, a memory capacity of up to 12,288 GB, and a theoretical memory bandwidth of up to 900 GB/s.</p>

Technical Feature	Description
Flexible Drive Configurations	Provides elastic and expandable storage solutions to meet different capacity and upgrade requirements.
Support for All-SSD Configuration	Delivers all-SSD configurations, bringing higher I/O performance over all-HDD or HDD-SSD mixing configurations.
PCIe Expansion	<ul style="list-style-type: none"> An air-cooled node supports up to 1 standard HHHL PCIe 5.0 x16 expansion card, 1 standard HHHL PCIe 4.0 x16 expansion card, and 1 OCP 3.0 card. A liquid-cooled node supports up to 1 standard HHHL PCIe 5.0 x16 expansion card and 1 OCP 3.0 card.
OCP Expansion	A node supports 1 OCP slot that flexibly supports 1/10/25/40/100 Gb hot-plug OCP 3.0 cards.

2.2 Availability and Serviceability

Table 2-2 Availability and Serviceability

Technical Feature	Description
Hot-Swap Drives	Supports hot-swap SATA/NVMe drives.
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 the front and rear panels and the ISBMC Web GUI indicate the status of key components and quickly lead technicians to failed (or failing) components, simplifying maintenance and speeding up troubleshooting. A node supports 1 hot-swap PSU. The server supports PSUs with N+N redundancy, and provides up to 5 front hot-swap fans with N+1 redundancy, improving system availability.
Maintenance Efficiency	The BMC management network port on the rear panel enables remote ISBMC O&M, improving O&M efficiency.

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.
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.
AMD Secure Processor	AMD Secure Processor (ASP), a microcontroller within the AMD processor, provides enhanced security through hardware-based resistance to malicious software attacks.
AMD SEV	AMD Secure Encrypted Virtualization (SEV) technology protects Linux KVM virtual machines by transparently encrypting the memory of each VM with a unique key.
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	Recovers firmware upon detection of corrupted firmware.

Technical Feature	Description
BMC Secure Boot	Protects BMC from malicious tampering.
BMC Access Control Policies	Flexible BMC access control policies improve BMC management security.
System Secure Erase Function	Optional system secure erase function can wipe data on the storage devices with one click.

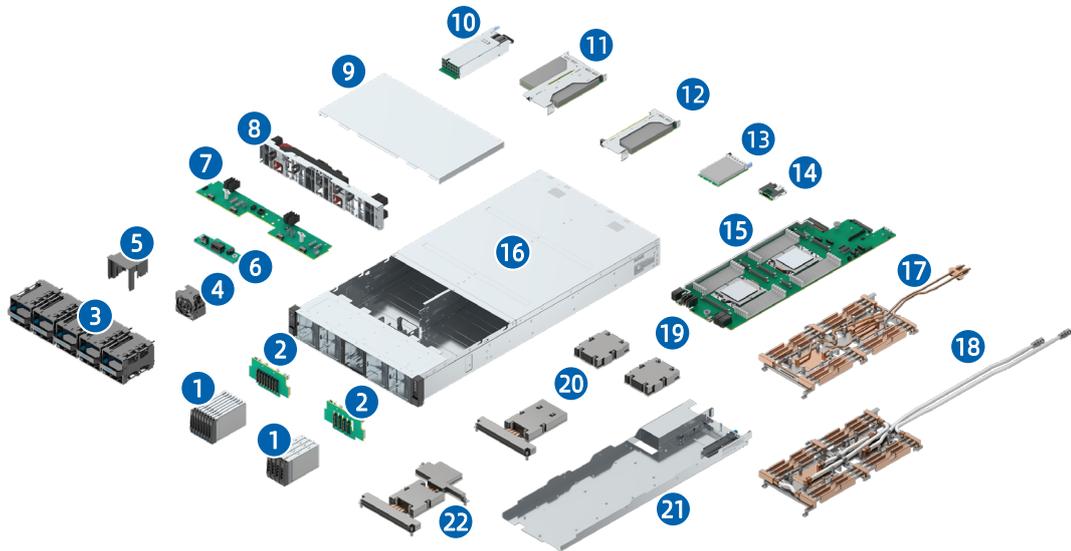
2.4 Energy Efficiency

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 94% (Platinum)/96% (Titanium) at a load of 50%.
N+N Redundant PSUs	The server offers N+N redundant PSUs for improved system reliability.
VRD Solution	Features the high-efficiency single-board voltage regulator-down (VRD) solution, reducing DC-DC conversion loss.
Intelligent Fan Speed Control and CPU Frequency Scaling	Supports Proportional-Integral-Derivative (PID) intelligent fan speed control and intelligent CPU frequency scaling, conserving energy.
System Cooling Design	Offers a fully-optimized system cooling design with energy-efficient cooling fans, lowering energy consumption from system cooling.
Power Capping and Power Control	Provides power capping and power control measures.
Staggered Spin-up of Drives	Supports staggered spin-up of drives, reducing power consumption during server startup.

3 System Parts Breakdown

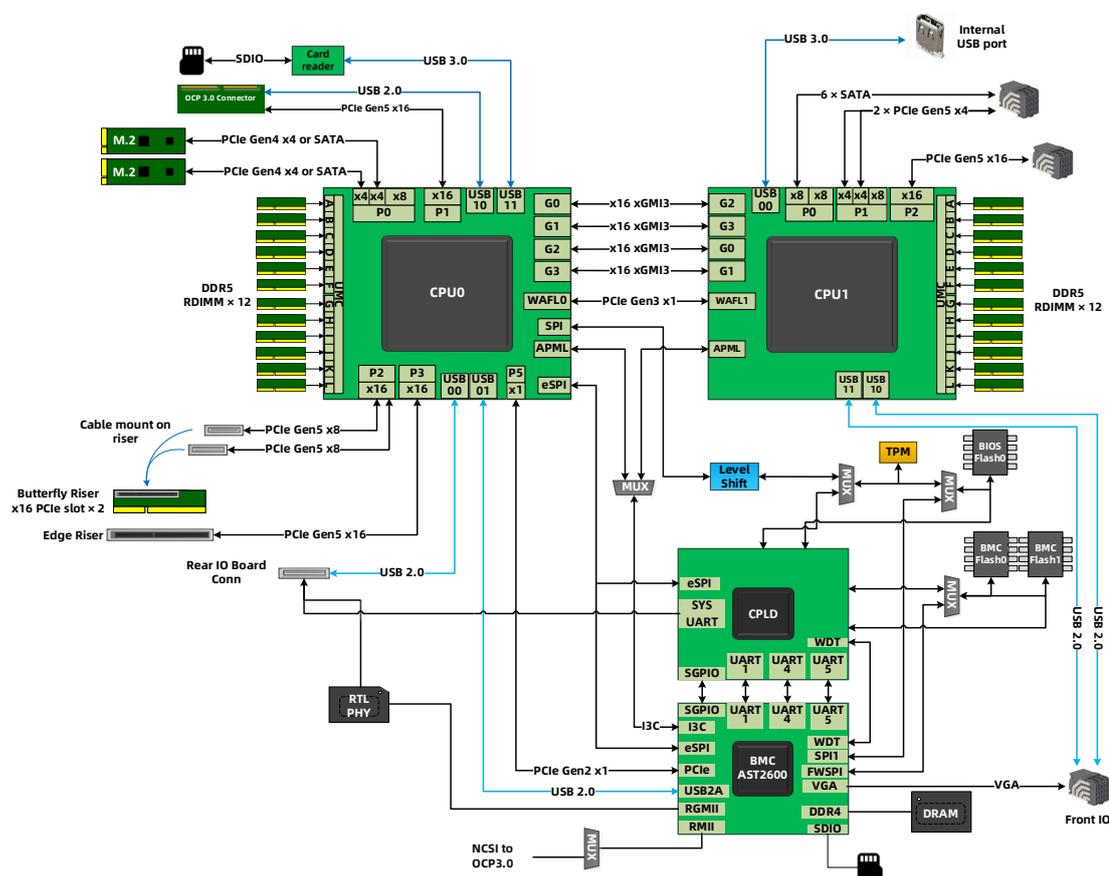
Figure 3-1 Exploded View



Item	Feature	Item	Feature
1	2.5-Inch Drive Module	12	LP PCIe Riser Module
2	2.5-Inch Drive Backplane	13	OCP 3.0 Card
3	Front Fan Module	14	I/O Module
4	Internal Fan Module	15	Motherboard
5	Internal Fan Air Duct	16	Server Chassis
6	Internal Fan Backplane	17	Liquid-Cooling Heatsink (Copper Tube Solution)
7	Midplane	18	Liquid-Cooling Heatsink (Hose Solution)
8	Cable Management Bracket	19	Air-Cooling Heatsink
9	Top Cover	20	EVAC Heatsink 1
10	PSU	21	Node Chassis
11	Butterfly PCIe Riser Module	22	EVAC Heatsink 2

4 System Logical Diagram

Figure 4-1 System Logical Diagram



- CPU design: A node supports two 4th Gen AMD EPYC processors (Genoa/Genoa-X/Bergamo) that use an SP5 form factor and either the 'Zen 4' or 'Zen 4c' core design, with a TDP of up to 500 W.
- xGMI design: 4 xGMI3 links per CPU at up to 32 GT/s.
- Memory design: A node supports 24 DDR5 DIMMs, and each CPU has 12 channels with 1 DIMM per channel.
- PCIe design: In addition to 4 xGMI3 x16 lanes, each CPU supports 4 x16 lanes and 2 x4 lanes, namely, each CPU supports 72 PCIe lanes, and 2 CPUs support 144 PCIe lanes. CPU0 is connected to an OCP 3.0 connector that can support one OCP 3.0 card, and a PCIe riser card can support up to 2 standard PCIe x16 expansion cards depending on the configuration. CPU1 is connected to 2 Impel

HD connectors, each carrying 2 PCIe x4 signals and 4 PCIe x4 signals, respectively.

- SAS/SATA design: The 2 CPUs support 8 SATA connectors. CPU0 is connected to 2 M.2 connectors that can transmit 2 SATA signals while CPU1 is connected to one Impel HD connector that can transmit 6 SATA signals.
- LAN design: The onboard network chip is RTL8211FD, and it supports 1 GbE BMC management network port.
- USB design: The node motherboard provides 1 internal USB 3.0 port, and the rear I/O board provides 1 Micro USB port. The server front panel provides 2 USB 2.0 ports.
- JTAG design: The JTAG supports features such as remote debugging, CPLD programming, and boundary scan.
- UI design: The UI design unit includes interfaces such as buttons and LEDs on the front and rear panels.
- Fan design: 8-pin fan connectors are used, supporting four 8086 fans + one internal 6038 fan, or five 8086 fans, or two 8080 fans + one internal 6038 fan.

5 Hardware Description

5.1 Front Panel

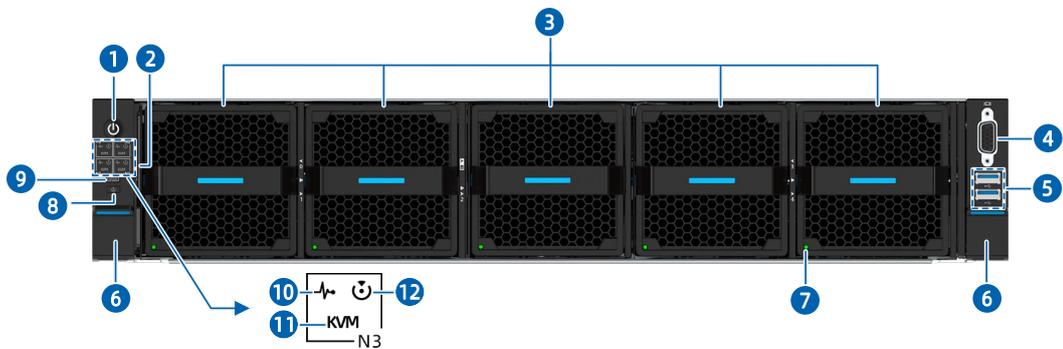
5.1.1 5 × 8086 Fan Configuration



NOTE

Applicable model: i24-A7-A0-R0-00.

Figure 5-1 Front View



Item	Feature	Item	Feature
1	Power Button and LED	7	Fan LED
2	Node LEDs	8	UID/BMC RST Button and LED
3	8086 Fan	9	Node Switch Button
4	VGA Port	10	Node Health LED
5	USB 2.0 Port	11	Node Selected LED
6	Ear Latch	12	Node UID LED

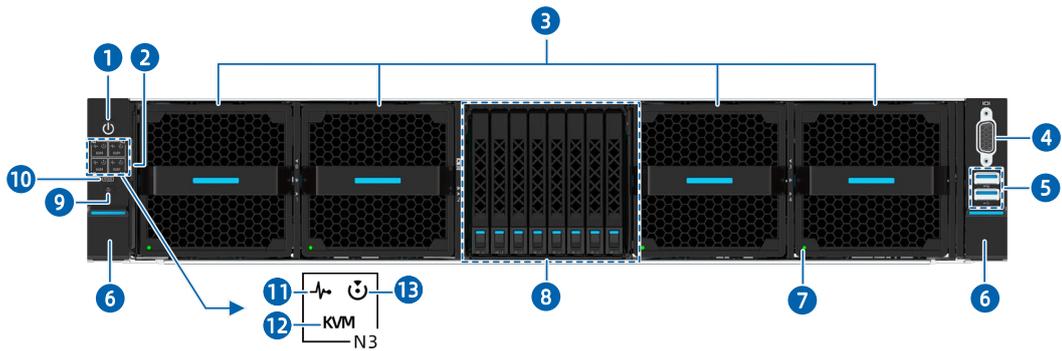
5.1.2 8 × 2.5-Inch Drive + 4 × 8086 Fan Configuration



NOTE

Applicable model: i24-A7-A0-R0-00.

Figure 5-2 Front View



Item	Feature	Item	Feature
1	Power Button and LED	8	2.5-Inch Drive Bay
2	Node LEDs	9	UID/BMC RST Button and LED
3	8086 Fan	10	Node Switch Button
4	VGA Port	11	Node Health LED
5	USB 2.0 Port	12	Node Selected LED
6	Ear Latch	13	Node UID LED
7	Fan LED	-	-

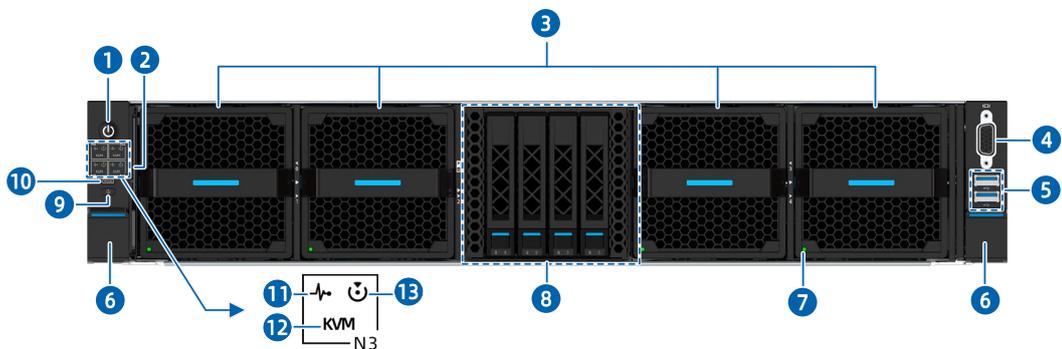
5.1.3 4 × 2.5-Inch Drive + 4 × 8086 Fan Configuration



NOTE

Applicable model: i24-A7-A0-R0-00.

Figure 5-3 Front View



Item	Feature	Item	Feature
------	---------	------	---------

1	Power Button and LED	8	2.5-Inch Drive Bay
2	Node LEDs	9	UID/BMC RST Button and LED
3	8086 Fan	10	Node Switch Button
4	VGA Port	11	Node Health LED
5	USB 2.0 Port	12	Node Selected LED
6	Ear Latch	13	Node UID LED
7	Fan LED	-	-

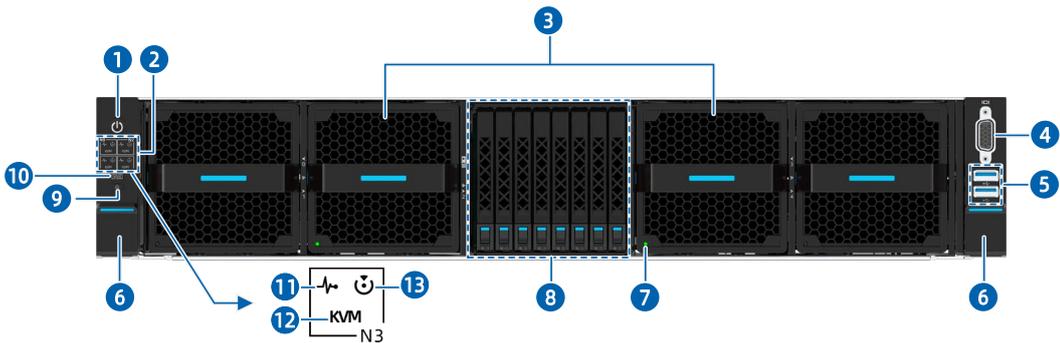
5.1.4 8 × 2.5-Inch Drive + 2 × 8080 Fan Configuration



NOTE

Applicable model: i24-A7-C0-R0-00.

Figure 5-4 Front View



Item	Feature	Item	Feature
1	Power Button and LED	8	2.5-Inch Drive Bay
2	Node LEDs	9	UID/BMC RST Button and LED
3	8080 Fan	10	Node Switch Button
4	VGA Port	11	Node Health LED
5	USB 2.0 Port	12	Node Selected LED
6	Ear Latch	13	Node UID LED
7	Fan LED	-	-

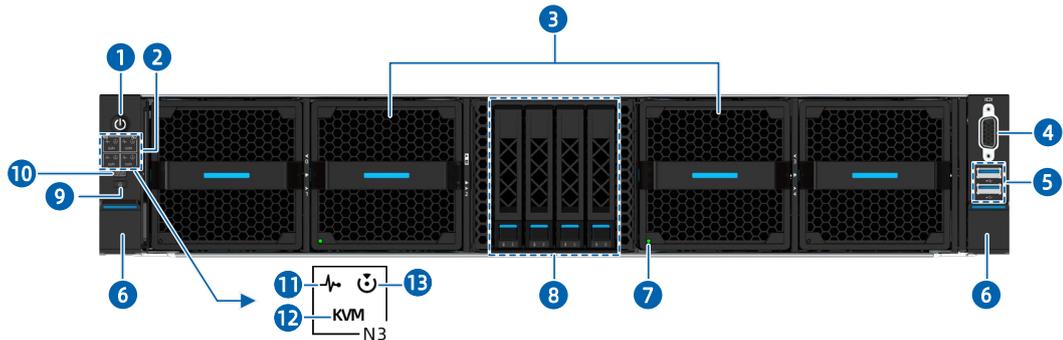
5.1.5 4 × 2.5-Inch Drive + 2 × 8080 Fan Configuration



NOTE

Applicable model: i24-A7-C0-R0-00.

Figure 5-5 Front View

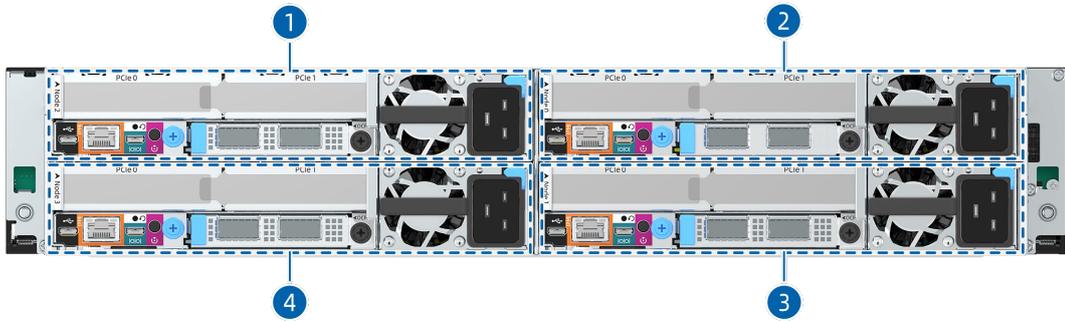


Item	Feature	Item	Feature
1	Power Button and LED	8	2.5-Inch Drive Bay
2	Node LEDs	9	UID/BMC RST Button and LED
3	8080 Fan	10	Node Switch Button
4	VGA Port	11	Node Health LED
5	USB 2.0 Port	12	Node Selected LED
6	Ear Latch	13	Node UID LED
7	Fan LED	-	-

5.2 Rear Panel

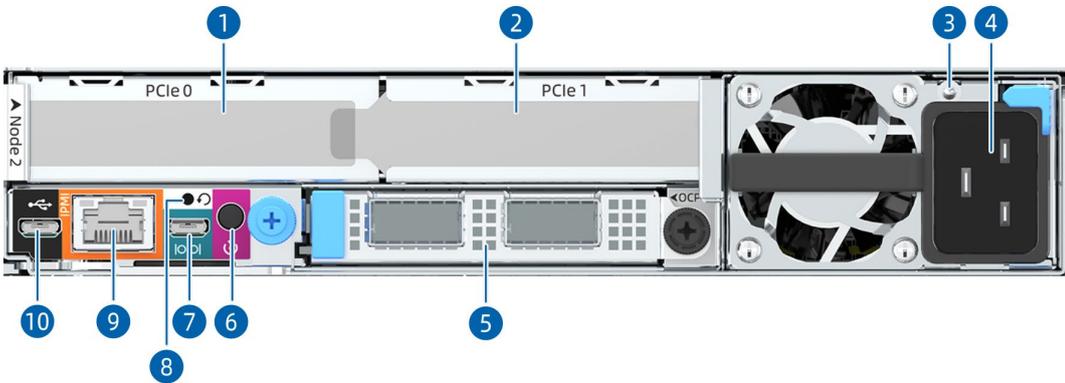
5.2.1 i24-A7-A0-R0-00

Figure 5-6 Server Rear View



Item	Feature	Item	Feature
1	Node 2	3	Node 1
2	Node 0	4	Node 3

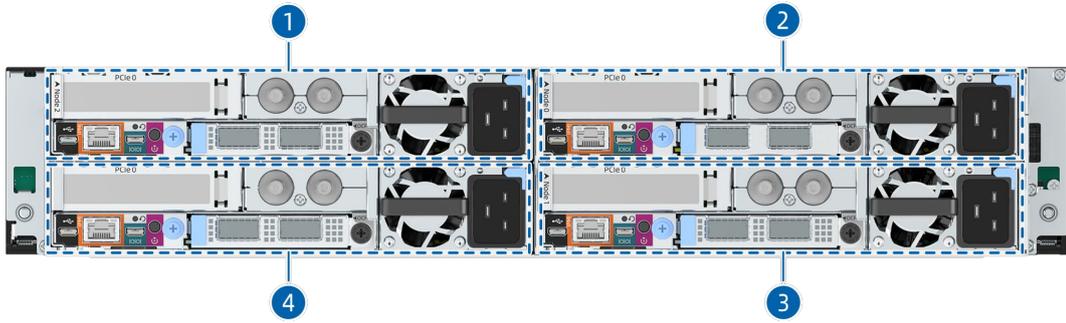
Figure 5-7 Node Rear View (KM1280-E2-A0-R0-00)



Item	Feature	Item	Feature
1	PCIe Slot 0	6	UID/BMC RST Button and LED
2	PCIe Slot 1	7	System/BMC Serial Port
3	PSU LED	8	Node SYS RST Button
4	PSU Socket	9	BMC Management Network Port
5	OCP 3.0 Card	10	Micro USB Port

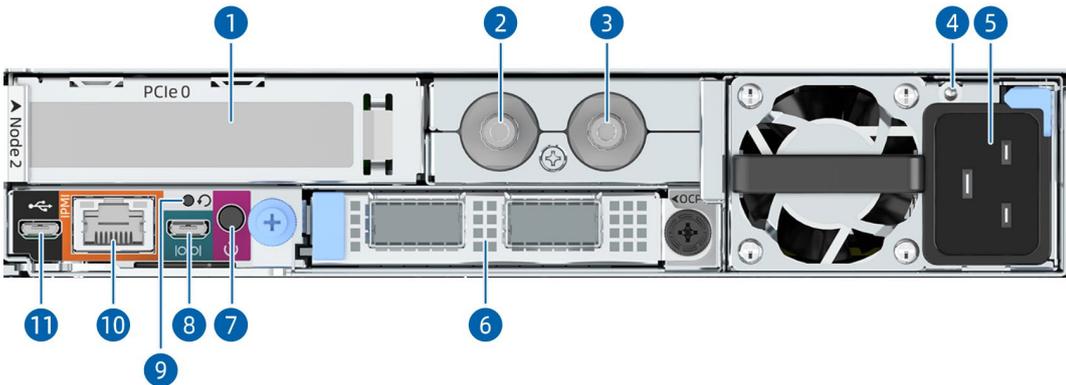
5.2.2 i24-A7-C0-R0-00

Figure 5-8 Server Rear View



Item	Feature	Item	Feature
1	Node 2	3	Node 1
2	Node 0	4	Node 3

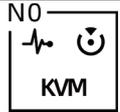
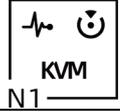
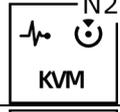
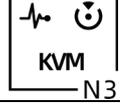
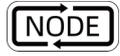
Figure 5-9 Node Rear View (KM1280-E2-C0-R0-00)

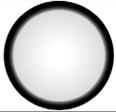
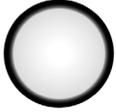


Item	Feature	Item	Feature
1	PCIe Slot 0	7	UID/BMC RST Button and LED
2	Liquid Outlet	8	System/BMC Serial Port
3	Liquid Inlet	9	Node SYS RST Button
4	PSU LED	10	BMC Management Network Port
5	PSU Socket	11	Micro USB Port
6	OCP 3.0 Card	-	-

5.3 LEDs and Buttons

Table 5-1 LED and Button Description

Icon	Feature	Description
	Power Button and LED	<ul style="list-style-type: none"> Power LED: <ul style="list-style-type: none"> Solid green = Power-on state Solid yellow = Standby state Power button: <ul style="list-style-type: none"> Press and hold the button for 4 seconds to force a shutdown. Press and release the button to power off the system from the power-on state. Press and release the button to power on the system from the standby state.
	Node 0 LEDs	Include Node 0 health LED, UID LED, and selected LED.
	Node 1 LEDs	Include Node 1 health LED, UID LED, and selected LED.
	Node 2 LEDs	Include Node 2 health LED, UID LED, and selected LED.
	Node 3 LEDs	Include Node 3 health LED, UID LED, and selected LED.
	Node Switch Button	Enables you to switch the selected node. Upon switching to a specific node, the front USB and VGA ports will serve as the output ports for that node.
	UID/BMC RST Button and LED	<ul style="list-style-type: none"> Solid blue = The UID LED is activated by the UID button or via the BMC Press and hold the button for 6 seconds to force a BMC reset.
	Node Health LED	<ul style="list-style-type: none"> Off = Normal Flashing red (1 Hz) = A warning error occurs

Icon	Feature	Description
		<ul style="list-style-type: none"> • Solid red = A critical error occurs
	Node Selected LED	<ul style="list-style-type: none"> • Off = The current node is not selected • Solid white = The current node is selected
	Node UID LED	Solid blue = The UID LED is activated by the UID/BMC RST button or via the BMC
-	Fan LED	<ul style="list-style-type: none"> • Off = Normal • Flashing red (1 Hz) = A warning error occurs • Solid red = A critical error occurs
	Node SYS RST Button	Press the button to reset the node system.
	PSU LED	<ul style="list-style-type: none"> • Off = No AC/DC input to the PSU • Flashing green (1 Hz) = PSU operating in standby mode with normal input • Flashing green (2 Hz) = PSU firmware updating • Flashing green (on for 2 seconds and off for 1 second) = PSU in cold redundant state • Solid green = Normal • Flashing amber (1 Hz) = PSU warning event where the PSU continues to operate (possible causes: PSU overtemperature/ overcurrent warning, excessively low fan speed warning) • Solid amber = PSU critical event causing a shutdown (possible causes: PSU overtemperature/ overcurrent/overvoltage protection, short circuit protection)

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, such as a monitor or KVM.
2	USB 2.0 Port	Enables you to connect a USB 2.0 device to the system. Note: Make sure that the USB device is in good condition or it may cause the server to work abnormally.
3	Micro USB Port	Enables you to transmit data.
4	BMC Management Network Port	ISBMC management network port, used to manage the server. Note: It is a Gigabit Ethernet port that supports 100 Mbps and 1,000 Mbps auto-negotiation.
5	System/BMC Serial Port	<ul style="list-style-type: none">Enables you to print system logs.Enables you to capture BMC logs and debug the BMC. Note: It is a micro USB serial port with a default baud rate of 115,200 bit/s.
6	PSU Socket	Connected through a power cord. You can select the PSUs as needed. Notes: <ul style="list-style-type: none">When 2 PSUs are configured, make sure that the rated power of each PSU is greater than that of the server.When 4 PSUs are configured, make sure that the total rated power of 2 PSUs is greater than that of the server.

5.5 Processors

- A node supports 2 processors.
- 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 5-10 Processor Locations (Air-Cooled Node KM1280-E2-A0-R0-00)

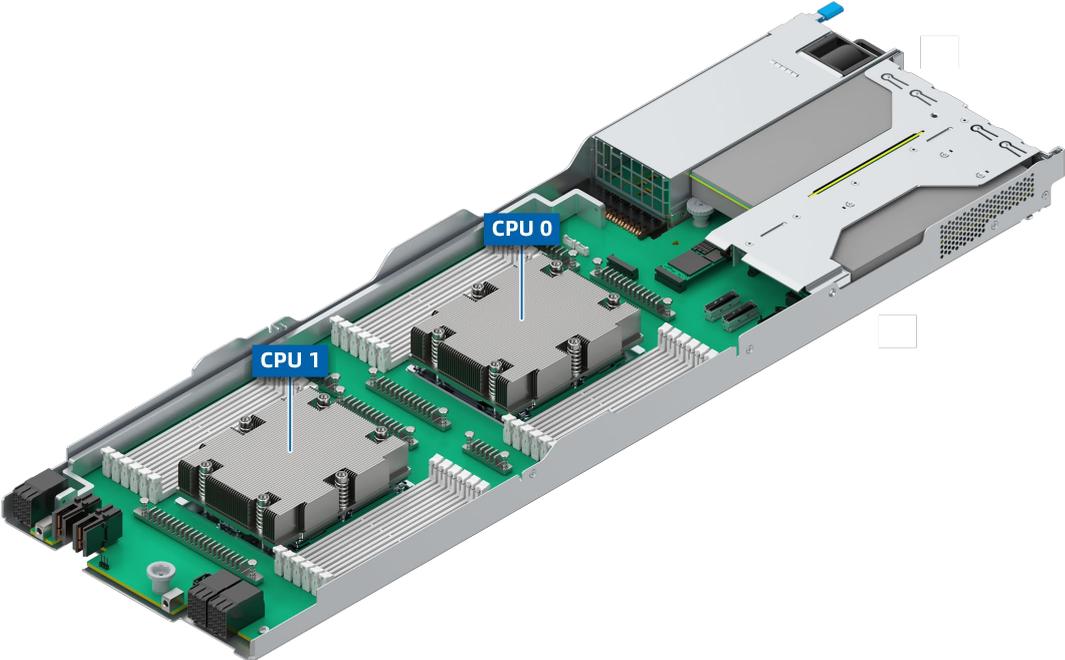
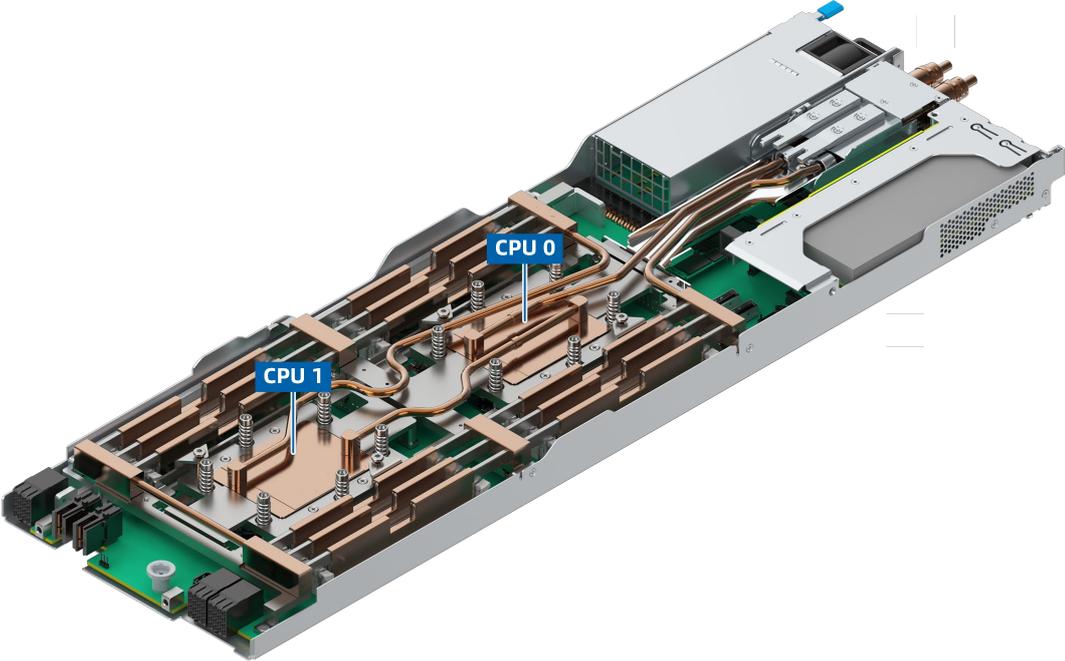


Figure 5-11 Processor Locations (Liquid-Cooled Node KM1280-E2-C0-R0-00)



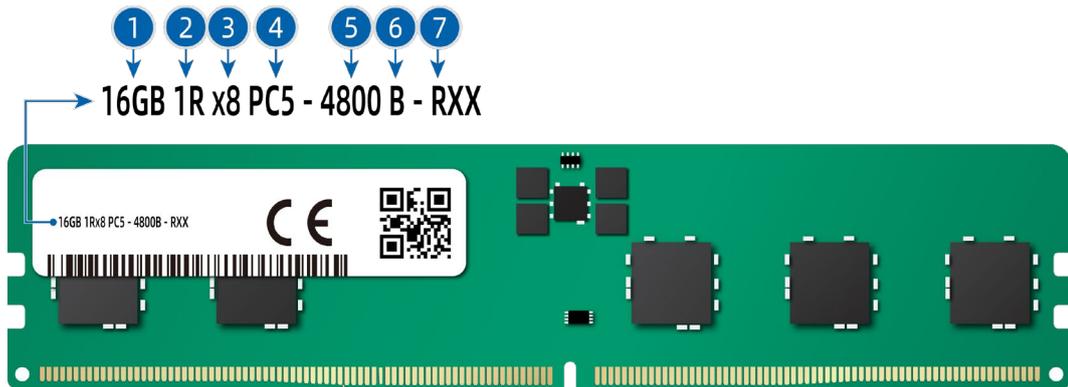
5.6 Memory

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 5-12 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

Item	Description	Example
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

A node supports 24 DIMM slots and 12 memory channels per CPU.

Table 5-3 DIMM Slot List

CPU	Channel ID	Silk Screen
CPU0	Channel A	CPU0_CAD0
	Channel B	CPU0_CBD0
	Channel C	CPU0_CCD0
	Channel D	CPU0_CDD0
	Channel E	CPU0_CED0
	Channel F	CPU0_CFD0
	Channel G	CPU0_CGD0
	Channel H	CPU0_CHD0
	Channel I	CPU0_CID0
	Channel J	CPU0_CJD0
	Channel K	CPU0_CKD0
	Channel L	CPU0_CLD0
CPU1	Channel A	CPU1_CAD0
	Channel B	CPU1_CBD0
	Channel C	CPU1_CCD0
	Channel D	CPU1_CDD0
	Channel E	CPU1_CED0
	Channel F	CPU1_CFD0
	Channel G	CPU1_CGD0
	Channel H	CPU1_CHD0
	Channel I	CPU1_CID0
	Channel J	CPU1_CJD0
	Channel K	CPU1_CKD0
	Channel L	CPU1_CLD0

3. Compatibility

Refer to the following rules to configure the DDR5 DIMMs.



IMPORTANT

- A server must use DDR5 DIMMs with the same part number (P/N code). All DDR5 DIMMs operate at the same speed, which is the lowest of:
 - Memory speed supported by a specific CPU.
 - Maximum operating speed of a specific memory configuration.
 - Mixing DDR5 DIMMs of different specifications (capacity, bit width, rank, height, etc.) is not supported.
 - For specific memory options, consult your local sales representative or refer to [7.2 Hardware Compatibility](#).
-
- DDR5 DIMMs can be used with the 4th Gen AMD EPYC (Genoa/Genoa-X/Bergamo) processors. The maximum memory capacity supported is identical for different CPU models.
 - The total memory capacity supported is the sum of the capacities of all DDR5 DIMMs.



NOTE

Maximum number of DIMMs supported per channel \leq 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)	32	48	64	96	128
Type	RDIMM	RDIMM	RDIMM	RDIMM	RDIMM
Rated speed (MT/s)	4,800	4,800	4,800	4,800	4,800
Operating voltage (V)	1.1	1.1	1.1	1.1	1.1
Maximum number of DDR5 DIMMs	96	96	96	96	96

Item		Value				
supported in a server ^a						
Maximum capacity of DDR5 DIMMs supported in a server (GB) ^b		3,072	4,608	6,144	9,216	12,288
Actual speed (MT/s)	1DPC ^c	4,800	4,800	4,800	4,800	4,800
<p>Notes:</p> <p>a: The maximum number of DDR5 DIMMs supported is based on the quad-node configuration where each node is configured with 2 CPUs.</p> <p>b: It indicates the maximum memory capacity supported when all the DIMM slots are populated with DDR5 DIMMs.</p> <p>c: 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 patrol scrubbing
 - Follow the general population rules.

5. DIMM Slot Layout

Up to 24 DDR5 DIMMs can be installed in a node, and a balanced DIMM configuration is recommended for optimal memory performance. DIMM configuration must be compliant with the DIMM population rules.

Figure 5-13 DIMM Slot Layout

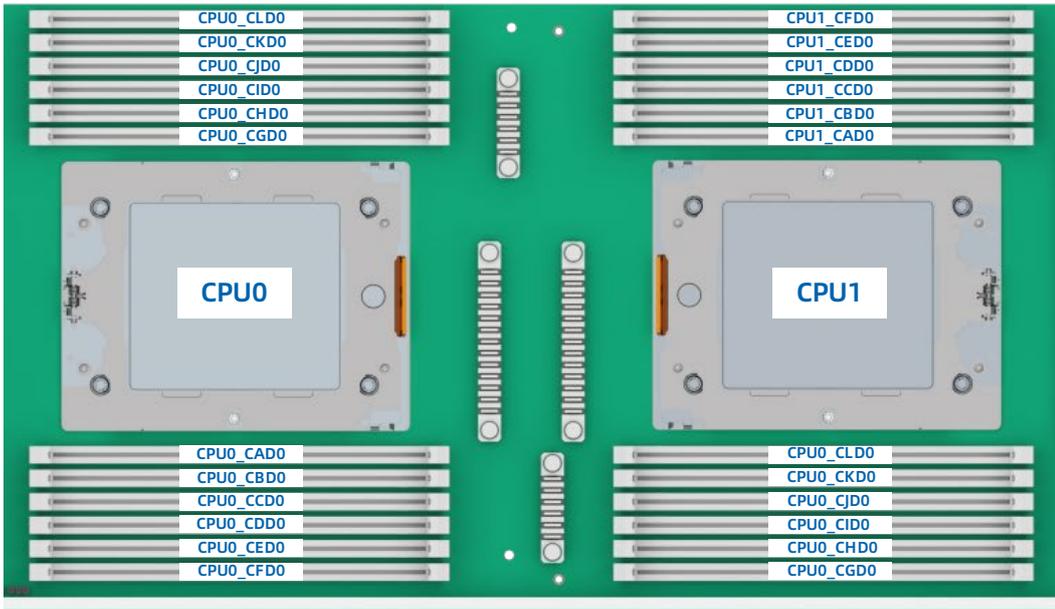


Table 5-5 DDR5 DIMM Population Rules (Dual-CPU Configuration of a Node)

DDR QTY	CPU0												CPU1											
	CLD0	CKD0	CJD0	CID0	CHD0	CGD0	CAD0	CBD0	CCD0	CDD0	CED0	CFD0	CFD0	CED0	CDD0	CCD0	CBD0	CAD0	CGD0	CHD0	CID0	CJD0	CKD0	CLD0
2							•											•						
4						•	•											•	•					
8				•		•	•		•							•		•	•		•			
12				•	•	•	•	•	•							•	•	•	•	•	•			
16		•		•	•	•	•	•	•		•			•		•	•	•	•	•	•		•	
20		•	•	•	•	•	•	•	•	•				•	•	•	•	•	•	•	•	•	•	•
24	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•

5.7 Storage

5.7.1 Drive Configurations



NOTE

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

1. i24-A7-A0-R0-00

Table 5-6 Drive Configurations

Config.	Front Drives	Internal Drives	Drive Management Mode
8 × 2.5-Inch Drive Config.	8 × 2.5-inch 7 mm drive: Drive bays with physical drive No. 0 to 7 support SATA/NVMe SSDs only	2 × M.2 SSD (PCIe 4.0/SATA 3.0)	<ul style="list-style-type: none">• SATA SSD: CPU• NVMe SSD: CPU
4 × 2.5-Inch Drive Config.	4 × 2.5-inch 15 mm drive: Drive bays with physical drive No. 0 to 3 support SATA/NVMe SSDs only	2 × M.2 SSD (PCIe 4.0/SATA 3.0)	<ul style="list-style-type: none">• SATA SSD: CPU• NVMe SSD: CPU

2. i24-A7-C0-R0-00

Table 5-7 Drive Configurations

Config.	Front Drives	Internal Drives	Drive Management Mode
8 × 2.5-Inch Drive Config.	8 × 2.5-inch 7 mm drive: Drive bays with physical drive No. 0 to 7 support SATA/NVMe SSDs only	2 × M.2 SSD (PCIe 4.0/SATA 3.0)	<ul style="list-style-type: none">• SATA SSD: CPU• NVMe SSD: CPU
4 × 2.5-Inch Drive Config.	4 × 2.5-inch 15 mm drive: Drive bays with physical drive No. 0 to 3 support SATA/NVMe SSDs only	2 × M.2 SSD (PCIe 4.0/SATA 3.0)	<ul style="list-style-type: none">• SATA SSD: CPU• NVMe SSD: CPU

5.7.2 Drive Numbering

1. 8 × 2.5-Inch Drive Configuration



NOTE

Applicable models: i24-A7-A0-R0-00 and i24-A7-C0-R0-00.

There are slight differences in the appearance of the two models.

Figure 5-14 Drive Numbering



- 8 × SATA drive:

Table 5-8 SATA Drive Numbering

Physical Drive No.	Silkscreen on the Chassis	Drive No. Identified by the ISBMC/ISBIOS
0	N0_0	SATA0
1	N0_1	SATA1
2	N1_0	SATA0
3	N1_1	SATA1
4	N2_0	SATA0
5	N2_1	SATA1
6	N3_0	SATA0
7	N3_1	SATA1

- 8 × NVMe drive:

Table 5-9 NVMe Drive Numbering

Physical Drive No.	Silkscreen on the Chassis	Drive No. Identified by the ISBMC/ISBIOS
0	N0_0	NVMe0
1	N0_1	NVMe1
2	N1_0	NVMe0
3	N1_1	NVMe1
4	N2_0	NVMe0
5	N2_1	NVMe1

Physical Drive No.	Silkscreen on the Chassis	Drive No. Identified by the ISBMC/ISBIOS
6	N3_0	NVMe0
7	N3_1	NVMe1

2. 4 × 2.5-Inch Drive Configuration



NOTE

Applicable models: i24-A7-A0-R0-00 and i24-A7-C0-R0-00.

There are slight differences in the appearance of the two models.

Figure 5-15 Drive Numbering



- 4 × SATA drive:

Table 5-10 SATA Drive Numbering

Physical Drive No.	Silkscreen on the Chassis	Drive No. Identified by the ISBMC/ISBIOS
0	N0_0	SATA0
1	N1_0	SATA0
2	N2_0	SATA0
3	N3_0	SATA0

- 4 × NVMe drive:

Table 5-11 NVMe Drive Numbering

Physical Drive No.	Silkscreen on the Chassis	Drive No. Identified by the ISBMC/ISBIOS
0	N0_0	NVMe0

Physical Drive No.	Silkscreen on the Chassis	Drive No. Identified by the ISBMC/ISBIOS
1	N1_0	NVMe0
2	N2_0	NVMe0
3	N3_0	NVMe0

5.7.3 Drive LEDs

1. SATA Drive LEDs

Figure 5-16 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		Drive present but not in use
Flashing (4 Hz)	Off	Off		Drive present and in use
Flashing (4 Hz)	Solid pink			Copyback/Rebuild in progress
Solid on	Solid on	Off		Drive selected but not in use
Flashing (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 5-17 NVMe Drive LEDs



The NVMe drive LEDs can be illuminated.

Table 5-12 NVMe Drive LED Description

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

5.8 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

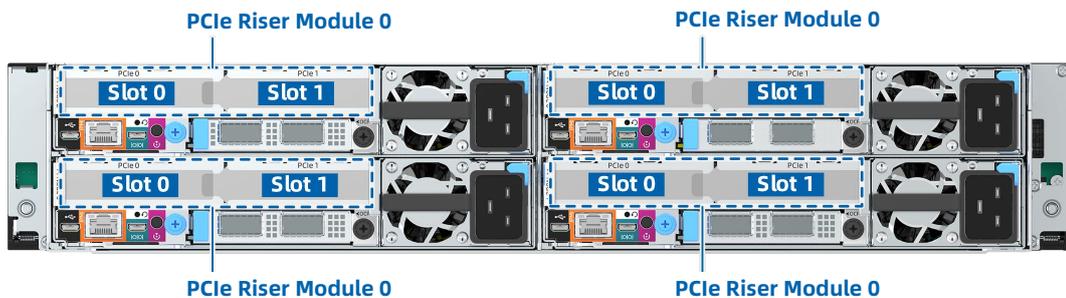
5.9.1 PCIe Expansion Cards

PCIe expansion cards provide system expansion capabilities.

- An air-cooled node supports 1 PCIe 5.0 expansion slot, 1 PCIe 4.0 expansion slot, and 1 dedicated slot for the OCP 3.0 card.
- A liquid-cooled node supports 1 PCIe 5.0 expansion slot and 1 dedicated slot for the OCP 3.0 card.
- 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 5-18 PCIe Slots

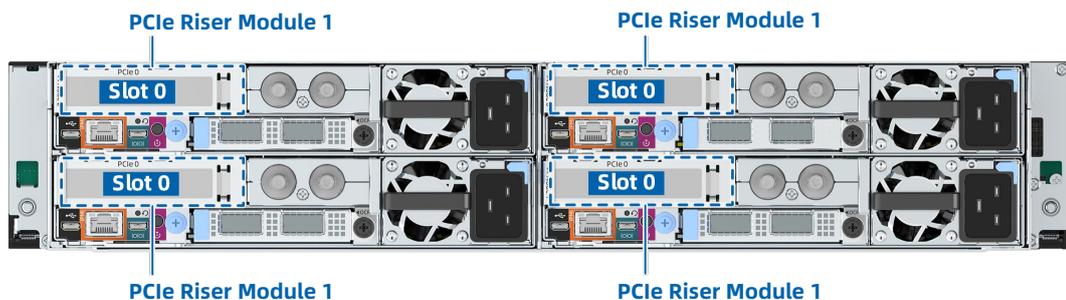


NOTE

Applicable model: i24-A7-A0-R0-00.

Slot 0 and slot 1 reside in PCIe riser module 0.

Figure 5-19 PCIe Slots





NOTE

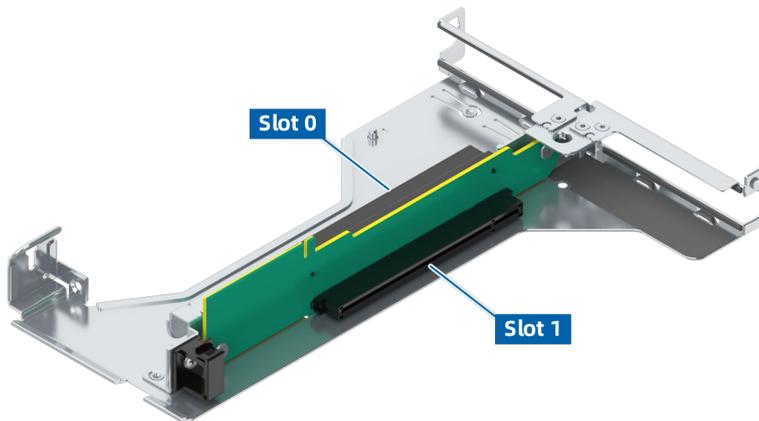
Applicable model: i24-A7-C0-R0-00.

Slot 0 resides in PCIe riser module 1.

5.9.3 PCIe Riser Modules

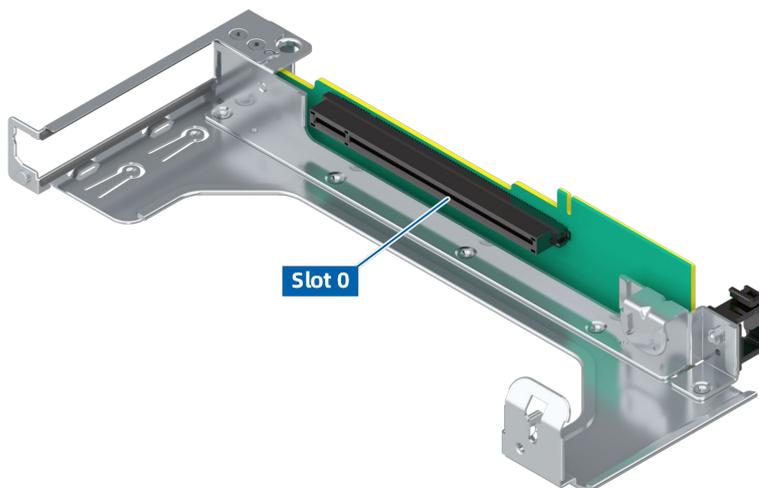
PCIe Riser Module 0 (2 × PCIe x16 Slot)

Figure 5-20 PCIe Riser Module 0



PCIe Riser Module 1 (1 × PCIe x16 Slot)

Figure 5-21 PCIe Riser Module 1



5.9.4 PCIe Slot Description

Table 5-13 PCIe Slot Description (2 × PCIe x16 Slot)

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port No.	Root Port (B/D/F)	Form Factor
Slot 0	CPU0	PCIe 5.0	x16	x16	PCIe 0	00/01/01	HHHL
Slot 1	CPU0	PCIe 4.0	x16	x16	PCIe 1	20/01/01	HHHL
OCP 3.0 Slot	CPU0	PCIe 5.0	x16	x16	OCP 3.0	40/01/01	SFF OCP 3.0

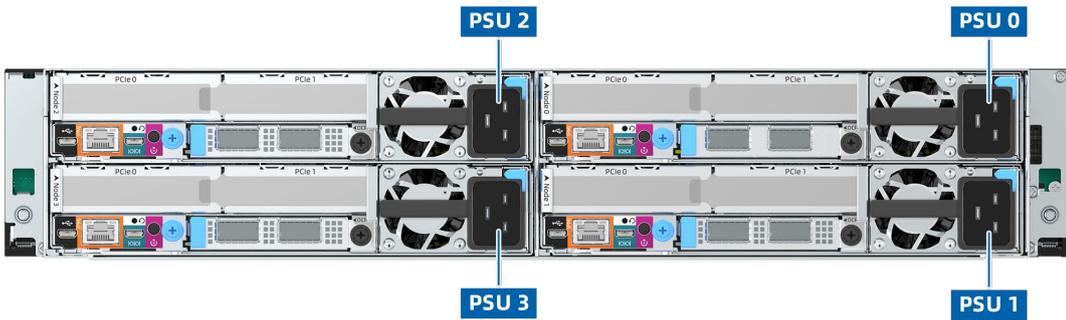
Table 5-14 PCIe Slot Description (1 × PCIe x16 Slot)

PCIe Slot	Owner	PCIe Standard	Connector Width	Bus Width	Port No.	Root Port (B/D/F)	Form Factor
Slot 0	CPU0	PCIe 5.0	x16	x16	PCIe 0	00/01/01	HHHL
OCP 3.0 Slot	CPU0	PCIe 5.0	x16	x16	OCP 3.0	40/01/01	SFF OCP 3.0

5.10 PSUs

- The server supports 2 or 4 PSUs.
- The server supports AC or DC power input.
- The PSUs are hot-swappable.
- The server supports 2 PSUs 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 5-22 PSU Locations



5.11 Fans

Air-cooled node i24-A7-A0-R0-00:

- The server supports 4 or 5 hot-swap 8086 fans with N+1 redundancy.
- The server supports intelligent fan speed control.
- The server must use fans with the same part number (P/N code).

Liquid-cooled node i24-A7-C0-R0-00:

- The server supports 2 hot-swap 8080 fans with N+1 redundancy.
- The server supports intelligent fan speed control.
- The server must use fans with the same part number (P/N code).

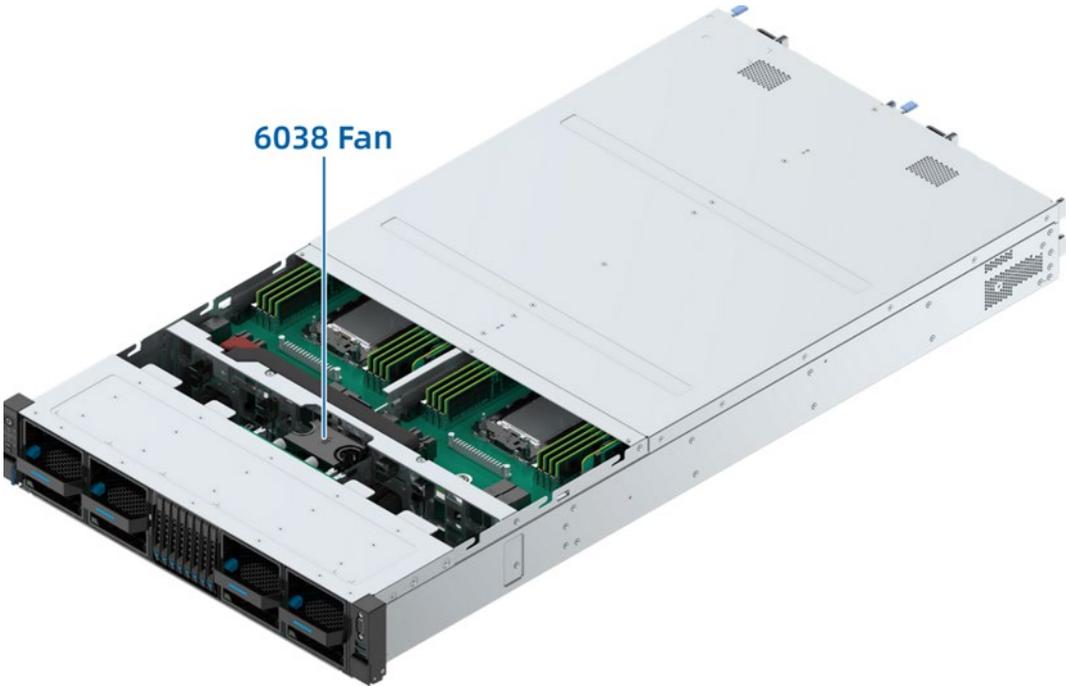
Internal fan:

- The server supports up to 1 internal 6038 fan.
- This fan is not hot-swappable.
- This fan is not redundant.

Figure 5-23 Front Fan Locations



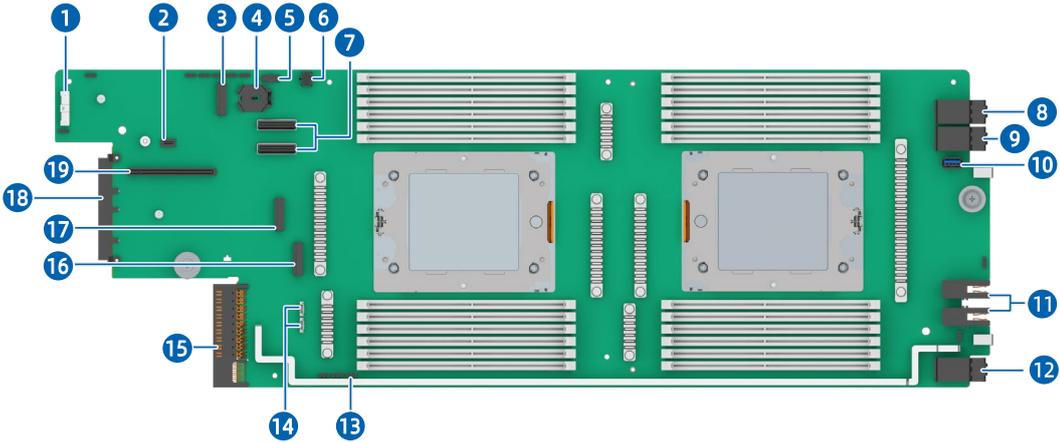
Figure 5-24 Internal Fan Location



5.12 Boards

5.12.1 Motherboard

Figure 5-25 Motherboard Layout



Item	Feature	Item	Feature
1	I/O Board Connector	11	Power Connector
2	TPM/TCM Connector	12	24-Drive Backplane High-Density Connector (Reserved)

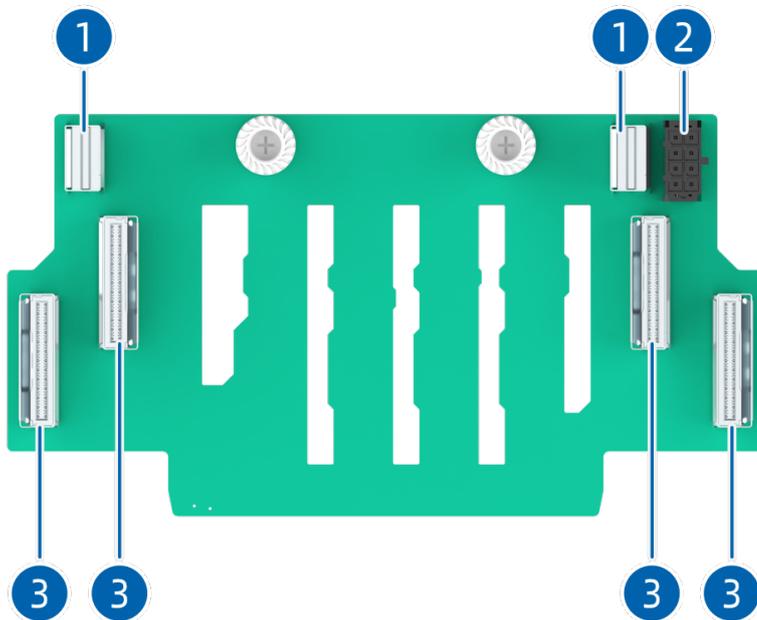
Item	Feature	Item	Feature
3	M.2_0 SSD Connector	13	CMOS Jumper
4	Button Cell Battery Socket	14	Leak Detection Connector
5	HDT Connector	15	PSU Connector
6	PCIe Riser Power Connector	16	TF Card Adapter Connector
7	MCIO x8 Connector	17	M.2_1 SSD Connector
8	Midplane High-Density Connector	18	OCP 3.0 Card Connector
9	Drive Backplane High-Density Connector	19	MCIO x16 Connector
10	USB 3.0 Port	-	-

5.12.2 Drive Backplanes

1. Front Drive Backplanes

- 4 × 2.5-Inch SATA/NVMe Drive Backplane

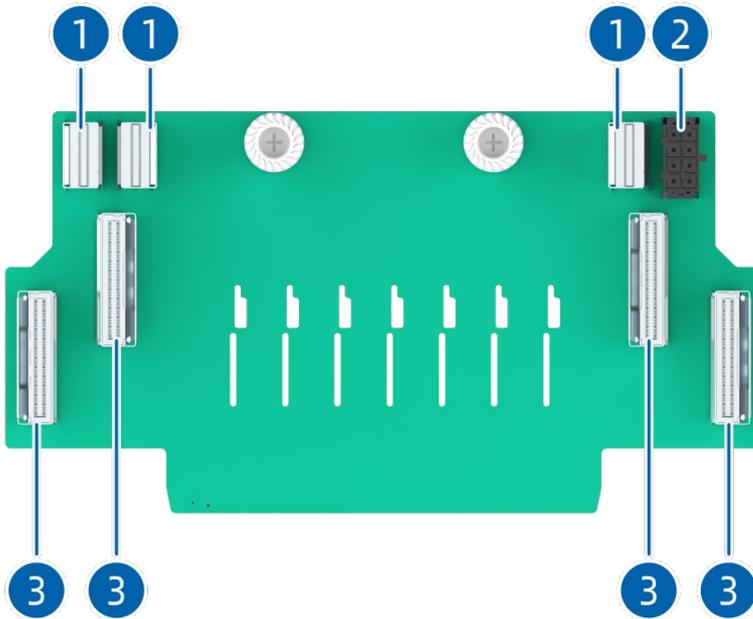
Figure 5-26 4 × 2.5-Inch SATA/NVMe Drive Backplane



Item	Feature	Item	Feature
1	Slimline x4 Connector	3	MCIO x8 Connector
2	Power Connector	-	-

- 8 × 2.5-Inch SATA/NVMe Drive Backplane

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



Item	Feature	Item	Feature
1	Slimline x4 Connector	3	MCI0 x8 Connector
2	Power Connector	-	-

6 Product Specifications

6.1 i24-A7-A0-R0-00

6.1.1 Technical Specifications

Table 6-1 Technical Specifications

Item	Description
Form Factor	2U4N rack server
Processor	<p>A node supports two 4th Gen AMD EPYC processors (Genoa/Genoa-X/Bergamo) that use an SP5 form factor and either the 'Zen 4' or 'Zen 4c' core design:</p> <ul style="list-style-type: none">• Up to 128 cores per CPU• Max. boost frequency of 4.4 GHz (16 cores)• 4 xGMI links per CPU at up to 32 GT/s• L3 cache up to 1,152 MB per CPU• TDP up to 400 W
Memory	<p>The server supports up to 96 DIMMs:</p> <ul style="list-style-type: none">• A node supports up to 24 DIMMs.• Each processor supports 12 memory channels.• Each channel supports up to 1 DIMM.• Up to 4,800 MT/s• RDIMMs supported• Memory protection technology: ECC and memory encryption
Storage	<ul style="list-style-type: none">• Front drives of the server:<ul style="list-style-type: none">- 8 × 2.5-inch SATA/NVMe drive (hot-swap) or- 4 × 2.5-inch SATA/NVMe drive (hot-swap)• Internal drives and TF cards of a node:<ul style="list-style-type: none">- 2 × optional SATA x1/PCIe x4 M.2 SSD- 2 × TF card
Network	<p>A node supports multiple network expansion capabilities.</p> <ul style="list-style-type: none">• 1 optional OCP 3.0 card (1/10/25/40/100 Gb)

Item	Description
	<ul style="list-style-type: none"> • 2 onboard GbE ports • Standard 1/10/25/40/100/200 Gb PCIe NICs
I/O Expansion	A node supports up to 1 standard HHHL PCIe 5.0 x16 expansion card, 1 standard HHHL PCIe 4.0 x16 expansion card, and 1 OCP 3.0 card.
Port	<ul style="list-style-type: none"> • The server supports 2 front USB 2.0 ports. • The server supports 1 front VGA port. • A node supports 1 rear system/BMC serial port. • A node supports 1 rear BMC management network port. • A node supports 1 rear micro USB port.
Fan	<ul style="list-style-type: none"> • The no-drive configuration supports 5 hot-swap 8086 fans with N+1 redundancy. • The 8- or 4-drive configuration supports 4 hot-swap 8086 fans with N+1 redundancy and 1 internal 6038 fan.
Power Supply	<ul style="list-style-type: none"> • A node supports 1 CR68 PSU. • The server supports PSUs with N+N redundancy. • PSUs with the output power of 2,200 W/2,700 W are supported. <ul style="list-style-type: none"> - 115 Vac: 90 Vac to 132 Vac - 230 Vac: 180 Vac to 264 Vac - 240 Vdc: 180 Vdc to 320 Vdc
System Management	Integrated with 1 independent 1,000 Mbps BMC management network port, dedicated to IPMI remote management
Operating System	<ul style="list-style-type: none"> • SUSE Linux Enterprise Server 15 • Red Hat Enterprise 8.6/9.0 • CentOS 8 • Ubuntu 22.04.01

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)

Item	Description
	<ul style="list-style-type: none"> • 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: 7.8 B - LpAm: 59.4 dBA • Operating: <ul style="list-style-type: none"> - LWAd: 8.1 B - LpAm: 62.5 dBA

Notes:

1. Not all configurations support the operating temperature range of 5°C to 40°C (41°F to 104°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 over 900 m (2,953 ft), derate the maximum allowable temperature by 1°C per 300 m (1°F per 547 ft). The maximum operating altitude is 3,050 m (10,007 ft) and the maximum temperature gradient is 20°C/h (36°F/h), both varying with server configuration.
 - Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.
3. Expanded operating temperature:

- For certain approved configurations, the supported system inlet ambient temperature can be expanded to 5°C to 10°C (41°F to 50°F) and 35°C to 40°C (95°F to 104°F) at sea level. At an altitude of 900 to 3,050 m (2,953 to 10,007 ft), derate the maximum allowable operating temperature by 1°C per 175 m (1°F per 319 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 configuration, workload, ambient temperature and other factors. These values are for reference only and subject to change without notice.

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

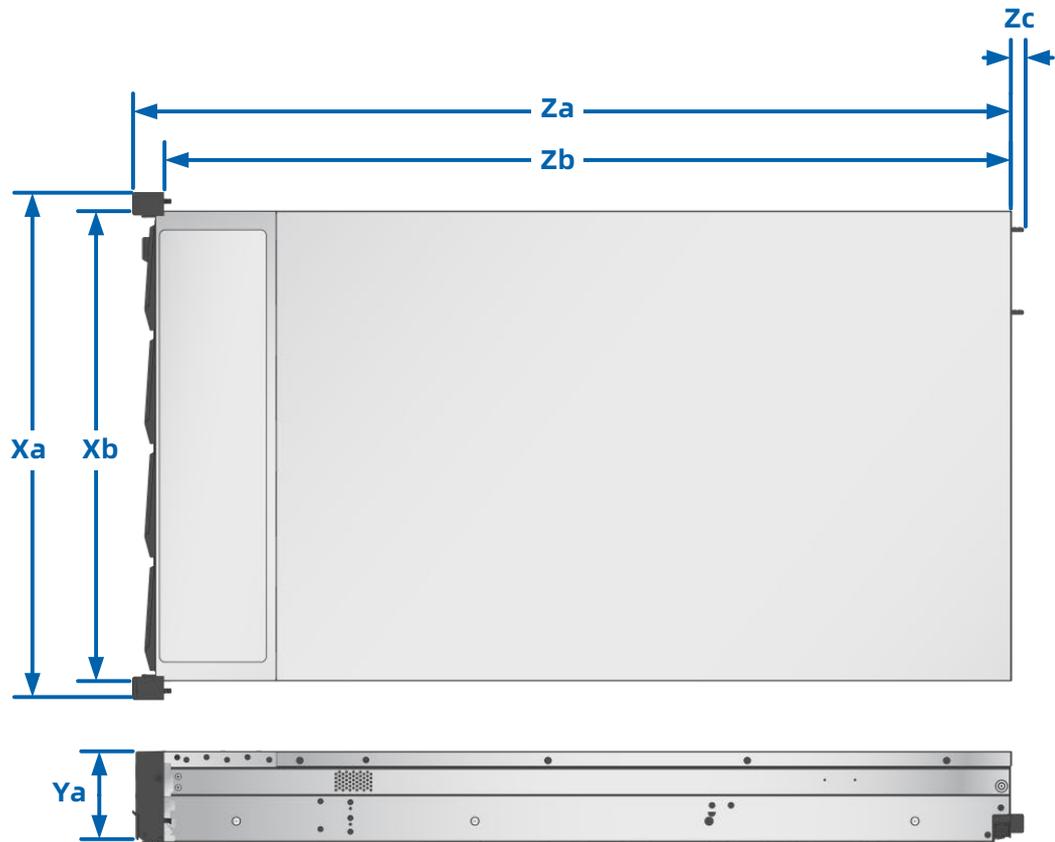
6.1.3 Physical Specifications

Table 6-3 Physical Specifications

Item	Description
Carton Dimensions (L x W x H)	1,190 x 600 x 295 mm (46.85 x 23.62 x 11.61 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"> - L-bracket rails: The distance between the front and rear mounting flanges ranges from 650 to 910 mm (25.59 to 35.83 in.). Square-hole [9.5 mm (0.37 in.)] and round-hole [7.1 mm (0.28 in.)] cabinets are supported.
Weight	<ul style="list-style-type: none"> • 8 x 2.5-inch drive configuration (with all drives installed) <ul style="list-style-type: none"> - Net weight: 50.6 kg (111.55 lbs) - Gross weight: 56 kg (123.46 lbs) (including server, packaging box, rails and accessory box) <p>Note: The server weight is for reference only and varies by configuration.</p>

Item	Description
Energy Consumption	The energy consumption varies by configuration (including ErP standard-compliant configuration). For details, contact our customer service.

Figure 6-1 Chassis Dimensions



Model	Za	Zb	Zc	Xa	Xb	Ya
i24-A7-A0-R0-00	921 mm (36.26 in.)	896 mm (35.28 in.)	15.3 mm (0.60 in.)	482 mm (18.98 in.)	447 mm (17.60 in.)	87 mm (3.43 in.)

6.2 i24-A7-C0-R0-00

6.2.1 Technical Specifications

Table 6-4 Technical Specifications

Item	Description
Form Factor	2U4N rack server
Processor	<p>A node supports two 4th Gen AMD EPYC processors (Genoa/Genoa-X/Bergamo) that use an SP5 form factor and either the 'Zen 4' or 'Zen 4c' core design:</p> <ul style="list-style-type: none"> • Up to 128 cores per CPU • Max. boost frequency of 4.4 GHz (16 cores) • 4 xGMI links per CPU at up to 32 GT/s • L3 cache up to 1,152 MB per CPU • TDP up to 500 W
Memory	<p>The server supports up to 96 DIMMs:</p> <ul style="list-style-type: none"> • A node supports up to 24 DIMMs. • Each processor supports 12 memory channels. • Each channel supports up to 1 DIMM. • Up to 4,800 MT/s • RDIMMs supported • Memory protection technology: ECC and memory encryption
Storage	<ul style="list-style-type: none"> • Front drives of the server: <ul style="list-style-type: none"> - 8 × 2.5-inch SATA/NVMe drive (hot-swap) or - 4 × 2.5-inch SATA/NVMe drive (hot-swap) • Internal drives and TF cards of a node: <ul style="list-style-type: none"> - 2 × optional SATA x1/PCIe x4 M.2 SSD - 2 × TF card
Network	<p>A node supports multiple network expansion capabilities.</p> <ul style="list-style-type: none"> • 1 optional OCP 3.0 card (1/10/25/40/100 Gb) • 2 onboard GbE ports • Standard 1/10/25/40/100/200 Gb PCIe NICs
I/O Expansion	A node supports up to 1 standard HHHL PCIe 5.0 x16 expansion card and 1 OCP 3.0 card.

Item	Description
Port	<ul style="list-style-type: none"> The server supports 2 front USB 2.0 ports. The server supports 1 front VGA port. A node supports 1 rear system/BMC serial port. A node supports 1 rear BMC management network port. A node supports 1 rear micro USB port.
Fan	The server supports 2 hot-swap 8080 fans with N+1 redundancy and 1 internal 6038 fan.
Power Supply	<ul style="list-style-type: none"> A node supports 1 CR68 PSU. The server supports PSUs with N+N redundancy. PSUs with the output power of 2,200 W/2,700 W are supported. <ul style="list-style-type: none"> 115 Vac: 90 Vac to 132 Vac 230 Vac: 180 Vac to 264 Vac 240 Vdc: 180 Vdc to 320 Vdc
System Management	Integrated with 1 independent 1,000 Mbps BMC management network port, dedicated to IPMI remote management
Operating System	<ul style="list-style-type: none"> SUSE Linux Enterprise Server 15 Red Hat Enterprise 8.6/9.0 CentOS 8 Ubuntu 22.04.01

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 45°C (41°F to 113°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)

Item	Description
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: 7.8 B - LpAm: 59.4 dBA • Operating: <ul style="list-style-type: none"> - LWAd: 8.1 B - LpAm: 62.5 dBA

Notes:

1. Not all configurations support the operating temperature range of 5°C to 45°C (41°F to 113°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 over 900 m (2,953 ft), derate the maximum allowable temperature by 1°C per 300 m (1°F per 547 ft). The maximum operating altitude is 3,050 m (10,007 ft) and the maximum temperature gradient is 20°C/h (36°F/h), both varying with server configuration.
 - Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.
3. Expanded operating temperature:
 - For certain approved configurations, the supported system inlet ambient temperature can be expanded to 5°C to 10°C (41°F to 50°F) and 35°C to 45°C (95°F to 113°F) at sea level. At an altitude of 900 to 3,050 m (2,953 to 10,007 ft), derate the maximum allowable operating temperature by 1°C per 175 m (1°F per 319 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 configuration, workload, ambient temperature and other factors. These values are for reference only and subject to change without notice.

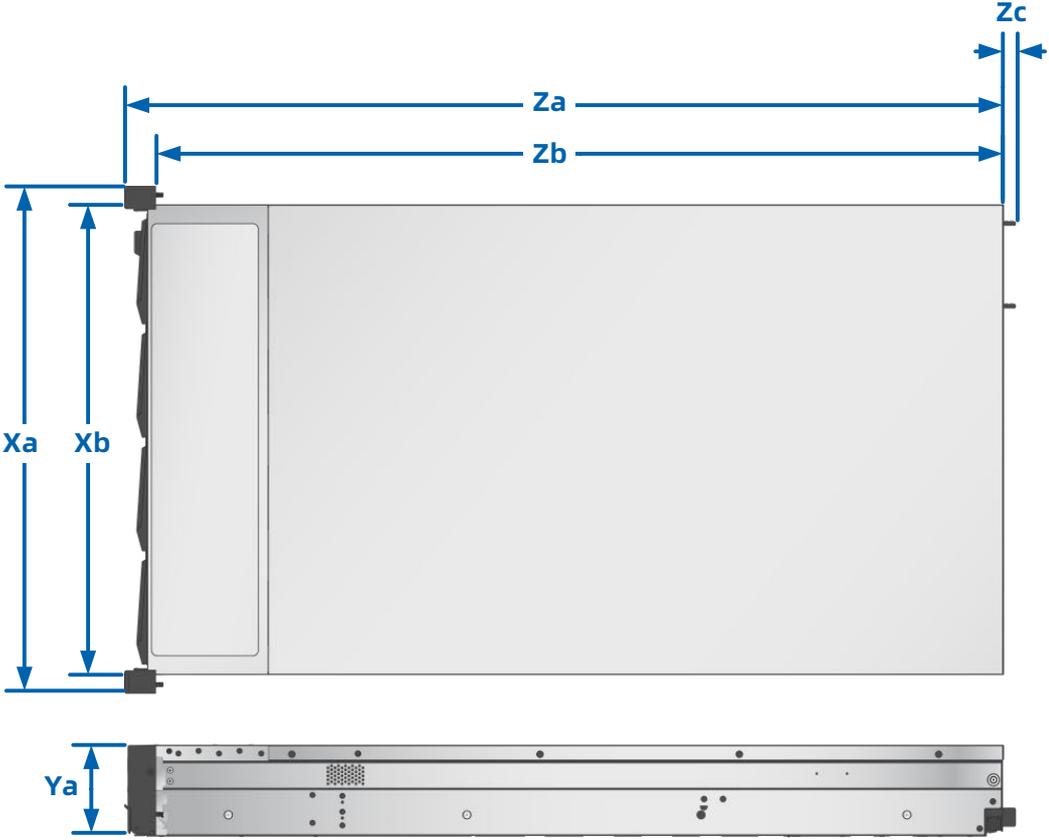
6. Product conformance to cited normative standards is based on sample testing, evaluation, or assessment. This product or family of products is eligible to bear the appropriate compliance logos and statements.

6.2.3 Physical Specifications

Table 6-6 Physical Specifications

Item	Description
Carton Dimensions (L x W x H)	1,190 x 600 x 295 mm (46.85 x 23.62 x 11.61 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"> - L-bracket rails: The distance between the front and rear mounting flanges ranges from 650 to 910 mm (25.59 to 35.83 in.). Square-hole [9.5 mm (0.37 in.)] and round-hole [7.1 mm (0.28 in.)] cabinets are supported.
Weight	<ul style="list-style-type: none"> • 8 x 2.5-inch drive configuration (with all drives installed) <ul style="list-style-type: none"> - Net weight: 53 kg (116.84 lbs) - Gross weight: 79 kg (174.17 lbs) (including server, packaging box, rails and accessory box) <p>Note: The server weight is for reference only and varies by configuration.</p>
Energy Consumption	The energy consumption varies by configuration (including ErP standard-compliant configuration). For details, contact our customer service.

Figure 6-2 Chassis Dimensions



Model	Za	Zb	Zc	Xa	Xb	Ya
i24-A7-C0-R0-00	921 mm (36.26 in.)	896 mm (35.28 in.)	15.3 mm (0.60 in.)	482 mm (18.98 in.)	447 mm (17.60 in.)	87 mm (3.43 in.)

7 Operating System and Hardware Compatibility

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



IMPORTANT

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

7.1 Supported Operating System

Table 7-1 Supported Operating System

OS Version
Red Hat Enterprise Linux 8.6

7.2 Hardware Compatibility

7.2.1 CPU Specifications

A node (either liquid-cooled or air-cooled) supports two 4th Gen AMD EPYC

processors (Genoa/Genoa-X/Bergamo) that use an SP5 form factor and either the 'Zen 4' or 'Zen 4c' core design.

Table 7-2 CPU Specifications

Model	Cores	Threads	Base Frequency (GHz)	Max. Boost Frequency (GHz)	Cache (MB)	TDP (W)
9654	96	192	2.4	3.7	384	360
9454	48	96	2.75	3.8	256	290

7.2.2 DIMM Specifications

A node supports up to 24 DDR5 DIMMs that should support the maximum speed as recorded in the AMD memory PoR (Plan of Record).

Table 7-3 DIMM Specifications

Type	Capacity (GB)	Speed (MT/s)	Data Width	Organization
RDIMM	32	4,800	x72	2R x8

7.2.3 Drive Specifications

- Each node supports 2 M.2 SSDs (22 × 80 mm, PCIe 4.0/SATA 3.0 connector).
- Each node supports up to two 7 mm 2.5-inch SATA 3.0/NVMe SSDs.
- The server supports up to eight 7 mm 2.5-inch SSDs.

Table 7-4 SATA SSD Specifications

Type	Capacity (GB)	Max. Qty.
SATA SSD	240	2
SATA SSD	480	2
SATA SSD	960	2

Table 7-5 U.2 NVMe SSD Specifications

Type	Capacity	Max. Qty.
U.2 NVMe SSD	960 GB	2

Type	Capacity	Max. Qty.
U.2 NVMe SSD	1.92 TB	2
U.2 NVMe SSD	3.84 TB	2

Table 7-6 M.2 SSD Specifications

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

7.2.4 NIC Specifications

Table 7-7 OCP Card Specifications

Type	Description	Speed (Gbps)	Port Qty.
OCP 3.0 Card	NIC_IAG_M_I350_1G_RJ_PCIEx4-G2_4_OCP	1	4

Table 7-8 PCIe NIC Specifications

Type	Description	Speed (Gbps)	Port Qty.
PCIe NIC	NIC_M_25G_MCX631102AN_LC_PCIEx8_2_XR	25	2

7.2.5 HCA Card Specifications

Table 7-9 HCA Card Specifications

Type	Description	Speed (Gbps)	Port Qty.
HCA Card	MCX653105A-HDAT PCIE GEN4 x16	200	1
	MCX653106A-HDAT PCIE GEN4 x16	200	2
	MCX75310AAS-HEAT PCIE GEN5 x16	200	1

7.2.6 PSU Specifications

The server supports up to 4 CR68 PSUs in N+N redundancy. 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 CR68 PSUs are 80 Plus Platinum or Titanium rated with various output powers, allowing customers to choose as needed.

- The following rated 115 Vac, 230 Vac and 240 Vdc PSUs in N+N redundancy are supported:
 - 2,200 W Platinum PSU: 1,000 W (115 Vac), 2,200 W (230 Vac), 2,200 W (240 Vdc for China)
 - 2,200 W Titanium PSU: 1,000 W (115 Vac), 2,200 W (230 Vac), 2,200 W (240 Vdc for China)
 - 2,700 W Titanium PSU: 1,000 W (115 Vac), 2,700 W (230 Vac), 2,700 W (240 Vdc for China)



CAUTION

At a rated input voltage of 115 Vac, the output power of a 2,200/2,700 W PSU will be derated to 1,000 W.

Operating voltage range:

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

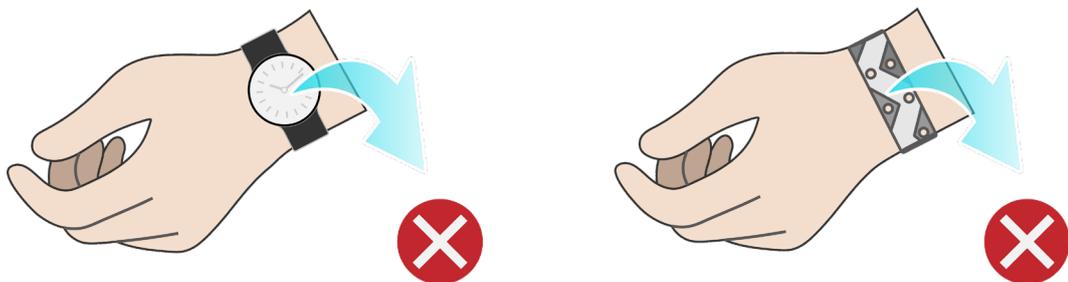
- Only personnel certified or authorized by us are allowed to perform the installation procedures.
- Stop any operation that could cause personal injury or equipment damage. Report to the project manager and take effective protective measures.
- Working during thunderstorms, including but not limited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

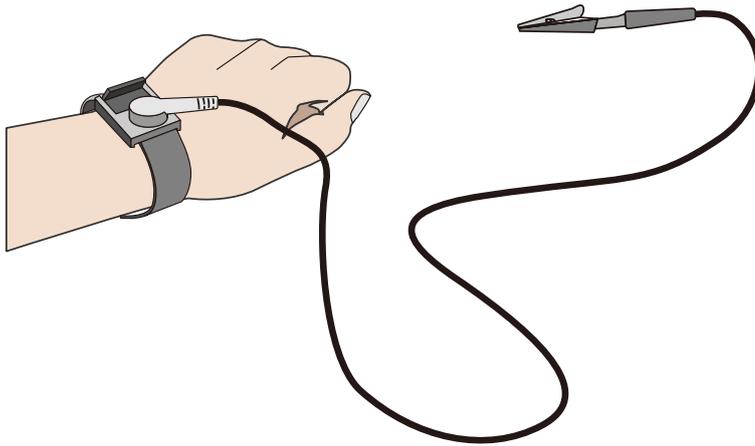
Figure 8-2 Removing Conductive Objects



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

Organization	Weight Limit (kg/lbs)
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"> <li data-bbox="1034 342 1284 376">• Male: 15/33.08 <li data-bbox="1034 394 1316 427">• 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.



NOTE

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

9.1.5 24 × 7 × 4 Onsite Service

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



NOTE

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

9.2 Our Service SLA

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

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

9.3 Warranty Exclusions

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

The Limited Warranty does not apply to

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

In no event will we be liable for any direct loss of use, interruption of business, lost profits, lost data, or indirect, special, incidental or consequential damages of any kind regardless of the form of action, whether in contract, tort (including negligence), strict liability or otherwise, even if we have been advised of the

possibility of such damage, and whether or not any remedy provided should fail of its essential purpose.

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

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

10 System Management

10.1 Intelligent Management System ISBMC

ISBMC, a remote server management system, supports mainstream management specifications in the industry such as IPMI 2.0 and Redfish 1.13. 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

Feature	Description
Accurate and Intelligent Fault Location	IDL, a fault diagnosis system, offers accurate and comprehensive hardware fault location capabilities, and outputs detailed fault causes and handling suggestions.
Alert Management	Supports rich automatic remote alert capabilities, including proactive alerting mechanisms such as SNMP Trap (v1/v2c/v3), email alerts and syslog remote alerts to ensure 24 × 7 reliability.
Remote Console KVM	Supports HTML5- and Java-based remote console to remotely control and operate the monitor/mouse/keyboard of the server, providing highly available remote management capabilities without on-site operation.
Virtual Network Console (VNC)	Supports mainstream third-party VNC clients without relying on Java, improving management flexibility.
Remote Virtual Media	Supports virtualizing images, USB devices, folders and local media devices as media devices of remote servers, simplifying OS installation, file sharing, and other O&M tasks.
Web GUI	Supports the visual management interface developed by us, displaying abundant information of the server and components, and offers easy-to-use Web GUIs.
Crash Screenshot and 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.

Feature	Description
	<ul style="list-style-type: none"> Provides a thermal protection mechanism, which is automatically triggered when the BMC is abnormal to ensure that the fan operates at safe speeds to avoid system overheating. Supports self-diagnosis of processors, memory modules, and storage devices of ISBMC, and automatically cleans the workload to restore to normal when the device usage rate is too high.
Power Control	Supports virtual power buttons for power on/off, power cycle and reset.
UID LED	Supports remote lighting of the UID LED for locating the server in the server room.
Secure Firmware Update	<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 InManage

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

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

- lightweight deployment in multiple scenarios and full lifecycle management of devices
- high reliability and on-demand scalability enabled by 1 to N data collectors
- intelligent asset management and real-time tracking of asset changes

- comprehensive monitoring for overall business control
- intelligent fault diagnosis for reduced maintenance time
- second-level performance monitoring for real-time status of devices
- batch configuration, deployment and update, shortening the time needed to bring the production environment online
- improved firmware version management efficiency
- standardized northbound interfaces for easy integration and interfacing

Table 10-2 InManage Features

Feature	Description
Home	Display of basic information (data centers, server rooms, cabinets, assets and alerts), quick addition of devices and custom home page
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 the 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 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 Customized InManage parameters
Security	Security control of InManage via a set of security policies such as user management, role management, authentication

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

10.3 InManage Tools

Table 10-3 Features of InManage Tools

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

11 Certifications

11.1 i24-A7-A0-R0-00

Table 11-1 Certifications

Country/Region	Certification	Mandatory/Voluntary
China	CQC	Voluntary
	China Environmental Labelling	Voluntary
International	CB	Voluntary

11.2 i24-A7-C0-R0-00

Table 11-2 Certifications

Country/Region	Certification	Mandatory/Voluntary
China	China Environmental Labelling	Voluntary
International	CB	Voluntary

12 Appendix A

12.1 Operating Temperature Specification Limits

12.1.1 i24-A7-A0-R0-00

Table 12-1 Operating Temperature Specification Limits

Config.	Max. Operating Temp.: 35°C (95°F)	Max. Operating Temp.: 40°C (104°F)
8 × 2.5-Inch Drive Configuration	<ul style="list-style-type: none">• CPUs ≤300 W• DIMMs ≤128 GB• The rear PCIe slot (Slot 1) supports NICs ≤200 Gb.	<ul style="list-style-type: none">• CPUs ≤240 W• DIMMs ≤32 GB• The rear PCIe slot (Slot 1) supports NICs ≤100 Gb.
4 × 2.5-Inch Drive Configuration	<ul style="list-style-type: none">• CPUs ≤300 W• DIMMs ≤128 GB• The rear PCIe slot (Slot 1) supports NICs ≤200 Gb.	<ul style="list-style-type: none">• CPUs ≤240 W• DIMMs ≤32 GB• The rear PCIe slot (Slot 1) supports NICs ≤100 Gb.
No Front Drive Configuration	<ul style="list-style-type: none">• CPUs ≤300 W• DIMMs ≤128 GB• The rear PCIe slot (Slot 1) supports NICs ≤200 Gb.	<ul style="list-style-type: none">• CPUs ≤240 W• DIMMs ≤32 GB• The rear PCIe slot (Slot 1) supports NICs ≤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.

12.1.2 i24-A7-C0-R0-00

Table 12-2 Operating Temperature Specification Limits

Config.	Max. Operating Temp.: 45°C (113°F)
8 × 2.5-Inch Drive Configuration	<ul style="list-style-type: none">• CPUs ≤400 W• The rear PCIe slot supports NICs ≤200 Gb.
4 × 2.5-Inch Drive Configuration	<ul style="list-style-type: none">• CPUs ≤400 W• The rear PCIe slot supports NICs ≤200 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.

12.2 Models

Table 12-3 Models

Certified Model	Description
i24-A7-A0-R0-00	Global
i24-A7-C0-R0-00	Global

12.3 RAS Features

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

12.4 Sensor List

Table 12-4 Sensor List

Sensor	Description	Sensor Location
Inlet_Temp	Air inlet temperature	Right mounting ear

Sensor	Description	Sensor Location
MB_Inlet_Temp	Motherboard air inlet temperature	Motherboard air inlet
Outlet_Temp	Air outlet temperature	Motherboard air outlet
CPUx_Temp	CPUx core temperature	CPUx x indicates the CPU number with a value of 0 - 1
CPUx_VR_Temp	CPUx VR chip temperature	CPUx x indicates the CPU number with a value of 0 - 1
CPUx_DIMM_T	The maximum temperature among DDR5 DIMMs of CPUx	DIMMs of CPUx x indicates the CPU number with a value of 0 - 1
PSUx_Inlet_Temp	PSUx temperature	PSUx x indicates the PSU number with a value of 0 - 3
HDD_BP_Temp	The maximum temperature among all drives	Drives
OCP_NIC_Temp	OCP card temperature	OCP card
PCIe_NIC_Temp	The maximum temperature among all PCIe NICs	PCIe NICs
NVME_Temp	The maximum temperature among all NVMe drives	NVMe drives
SYS_12V	12 V voltage supplied by the motherboard to CPUs	Motherboard
STBY_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
PSUx_VIN	PSUx input voltage	PSUx x indicates the PSU number with a value of 0 - 3
PSUx_VOUT	PSUx output voltage	PSUx x indicates the PSU number with a value of 0 - 3

Sensor	Description	Sensor Location
RTC_Battery	Motherboard RTC battery voltage	Motherboard RTC battery
FANx_Speed	FANx speed	FANx x indicates the fan number with a value of 0 - 4
FANx_F_Speed		
FANx_R_Speed		
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
PSUx_IIN	PSUx input current	PSUx x indicates the PSU number with a value of 0 - 3
PSUx_IOUT	PSUx output current	PSUx x indicates the PSU number with a value of 0 - 3
FAN_Power	Total fan power	Fans
CPU_Power	Total CPU power	Motherboard
Memory_Power	Total memory power	Motherboard
Node_Power	Power of a node	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)	CPUs
CPUx_MEM_Hot	CPUx memory temperature alarm	CPUx x indicates the CPU number with a value of 0 - 1
FANx_Status	FANx status	FANx x indicates the fan module number with a value of 0 - 4
FAN_Redundant	Fan redundancy lost	Fans
PCle_Status	PCle status error	PCle expansion card
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	Power drop status	Motherboard
PWR_On_TMOU	Power-on timeout	Motherboard
PWR_CAP_Fail	Power capping status	Motherboard
BPO_Present	BPO is present	Drive backplane
PSU_Redundant	PSU redundancy failure	PSU
PSU_Mismatch	PSU model mismatch	PSU
PSUx_Status	PSUx status	PSUx x indicates the PSU number with a value of 0 - 3
LeakageSensor	Leakage sensor	-
SysShutdown	System shutdown cause	-
ACPI_PWR	ACPI power status	
SysRestart	System restart cause	
BIOS_Boot_Up	BIOS bootup complete	
System_Error	Emergency system error	
POST_Status	POST status	
BMC_Boot_Up	Record BMC bootup event	-
SEL_Status	Record SEL full/cleared event	
BMC_Status	BMC status	-

13 Appendix B Acronyms and Abbreviations

A

AC	Alternating Current
ACPI	Advanced Configuration and Power Interface
AI	Artificial Intelligence
ANSI	American National Standards Institute
AQSIQ	General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China
ARMA	Advanced Return Material Authorization
ASP	AMD Secure Processor
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
CE	Conformite Europeenne
CEN	European Committee for Standardization

CLI	Command-Line Interface
CMOS	Complementary Metal-Oxide-Semiconductor
CPLD	Complex Programmable Logic Device
CPU	Central Processing Unit

D

DC	Direct Current
DDR5	Double Data Rate 5
DIMM	Dual In-line Memory Module
DOA	Dead on Arrival
DPC	DIMM Per Channel
DRAM	Dynamic Random Access Memory

E

ECC	Error-Correcting Code
ECMA	European Computer Manufacturers Association
EN	European Standard
ErP	Energy related Products
EVAC	Extended Volume Air Cooling
ESD	Electrostatic Discharge

F

FCC	Federal Communications Commission
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G

GUI	Graphical User Interface
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H

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

I

I/O	Input/Output
IC	Industry Canada
IEC	International Electrotechnical Commission
IP	Internet Protocol
IPMI	Intelligent Platform Management Interface
ISA	International Society of Automation
ISO	International Organization for Standardization

J

JTAG	Joint Test Action Group
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K

KVM	Keyboard, Video, Mouse
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L

LAN	Local Area Network
LDAP	Lightweight Directory Access Protocol
LED	Light Emitting Diode
LP	Low Profile

M

MCIO	Mini Cool Edge Input/Output
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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
OS	Operating System

P

PCIe	Peripheral Component Interconnect Express
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PDU	Power Distribution Unit
PID	Proportional-Integral-Derivative
POST	Power On Self Test
PoR	Plan of Record
PSU	Power Supply Unit

R

RAID	Redundant Arrays of Independent Disks
RDIMM	Registered Dual In-line Memory Module
RH	Relative Humidity
RMA	Return Material Authorization
RST	Reset
RTC	Real Time Clock

S

SAS	Serial Attached SCSI
SATA	Serial Advanced Technology Attachment
SCSI	Small Computer System Interface
SDP	Single Die Package
SEL	System Event Log
SEV	Secure Encrypted Virtualization
SFF	Small Form Factor
SLA	Service Level Agreements
SNMP	Simple Network Management Protocol
SSD	Solid State Drive

SSH	Secure Shell
SYS	System

T

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

U

UEFI	Unified Extensible Firmware Interface
UI	User Interface
UID	Unit Identification
UL	Underwriters Laboratories
UMC	Unified Memory Controllers
USB	Universal Serial Bus

V

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

X

xGMI	External Global Memory Interface
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