



i24 Product Technical White Paper

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1 Product Overview

Inspur Yingxin i24 is a next-generation, 2U4-node, and high-density server optimized for multiple applications. The 2U chassis supports 4* dual-path NS5162M5 nodes. Each node is connected to the chassis via a side card, and the nodes share a common power supply and cooling system. Equipped with a CMC+BMC dual management system, the i24 is able to support 2.5" and 3.5" hard drives and realize an all-flash configuration.

The i24 perfectly features high-density, high-efficiency, high-reliability, and high-intelligence within its smaller footprint. It also has a higher compute density, sufficient storage space, and offers desirable scalability and management characteristics. As a result, it realizes energy conservation by means of spatial resources, energy efficiency, and deployment costs, which makes it the optimum solution for customers to reduce their total cost of ownership (TCO) of their data center.

The i24 provides configuration solutions that cater more specifically to the requirements for computing, storage, and scaling in high-performance computing; cloud computing; super-integration; and distributed storage applications. It is suitable for infrastructure platform virtualization, high-performance computing, establishment of cloud platforms and industries based on high-performance computing (HPC) and hyper-converged infrastructure (HCI).



Figure 1-1 i24 server overview

2 Product features

The design concept of the i24 is based on increasing the server's compute density while maintaining sufficient storage space and product scalability performance. In so doing, it provides compute density optimization for high-performance computing and other applications. In addition, it also provides large capacity hard drive deployments while achieving storage optimization based on all-flash configurations for distributed storage applications. Therefore, the i24 is the optimum choice for high-performance computing, cloud computing, distributed architecture, and super-integrated architecture platforms applications.

High density deployment, high performance, and high efficiency

- The i24 deploys 4* dual-path nodes within a 2U space. This realizes a four-fold higher compute density than other 2U dual-path rackmount servers, thus enhancing the spatial usage efficiency of server rooms.
- Each node supports 2* Intel® Xeon® scalable processors and supports up to TDP 165W.
- The entire server supports up to 24*2.5" SAS/SATA/NVMe hard drives or 12*3.5" SAS/SATA hard drives, thus offering a large storage capacity. Each node contains 2*SATA M.2 hard drives for installing the operating system.
- 3*PCIe x16 slots can be configured in each node, allowing users to utilize more network card configuration solutions.

High reliability, effortless management

- As the modular nodes can be pulled out, the i24 achieves rapid deployment, increases the operation efficiency during node replacement and upgrading, and reduces room deployment time by more than 50%.
- A unified power supply and cooling system is shared between each node, thus enhancing the utilization efficiency of the power supply and fans. A configuration of 1+1 redundancy power supply and N+1 redundancy fans ensure the stable operation of the system and reduce the possible loss caused by server room or component malfunction.
- The firmware is secured with encryption and digital signatures to prevent illegal write-ins.
- The embedded hardware is equipped with encryption chips, which allows users to flexibly select their algorithm according to requirements.
- The i24 also supports the BMC+CMC dual-management model, thus allowing users to effortlessly achieve the unified management of the server's power supply and fans. Furthermore, users can check the regulatory information of each node through the remote management module.

Advanced design, ultimate performance

- The advanced fan cooling system of the i24 realizes an optimum operation environment. The comprehensive and optimized cooling system also achieves partitioned speed adjustment and proportional–integral–derivative (PID) smart speed adjustment and smart CPU frequency adjustment, so as to ensure a stable system operation.
- The i24 supports multiple AEP storage configurations, enhances storage capacities, and the non-volatility of memory and data. In so doing, it enhances the data processing speeds and meets various application requirements.
- Within an all-flash mode, the 24*NVMe hard drives can be configured in the entire server. This offers users more input/output operations per second (IOPS), as well as faster caches and lower latencies.
- The i24 also supports PHY/OCP/standard PCIe network cards, providing multiple network connector options for users and offers more flexible network structure configuration solutions for users.

3 Logical architecture

Each NS5162M5 node features dual Intel® Xeon® Scalable processors and supports up to 16* DDR4 DIMMs.

Processors are connected with two UPI interconnection links with transmission speeds of up to 10.4 GT/s.

Each NS5162M5 node provides 3* PCIe x16 slots.

CPU0 is connected with 2* PCIe riser cards through the PCIe bus and supports 2* PCIe slot expansion cards through the two PCIe riser cards.

CPU0 and PCH are interconnected and enable the installation of a standard OCP card or a PHY card.

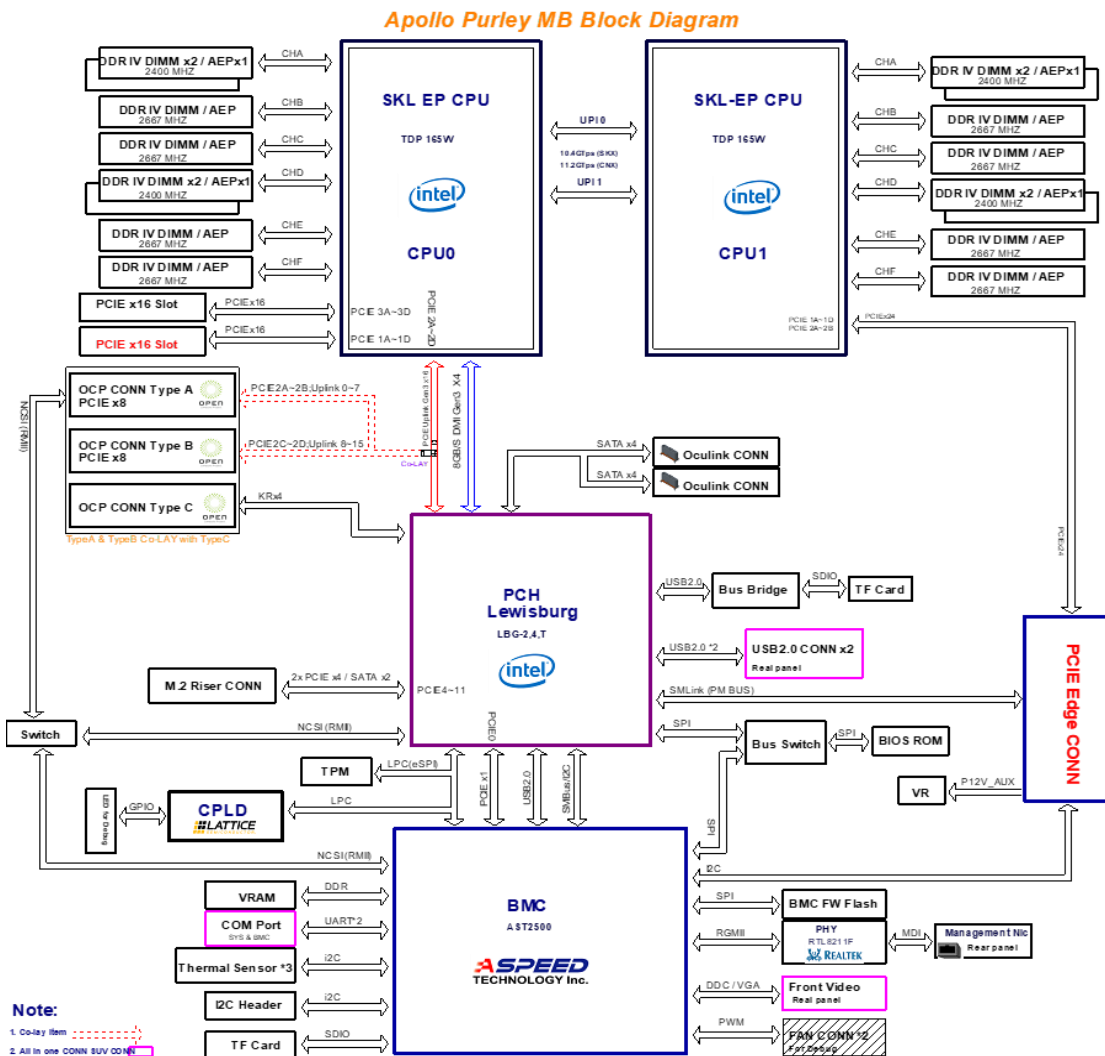


Figure 3-1 NS5162M5 node logical architecture

4 Product Introduction

4.1 Internal View of Server Chassis

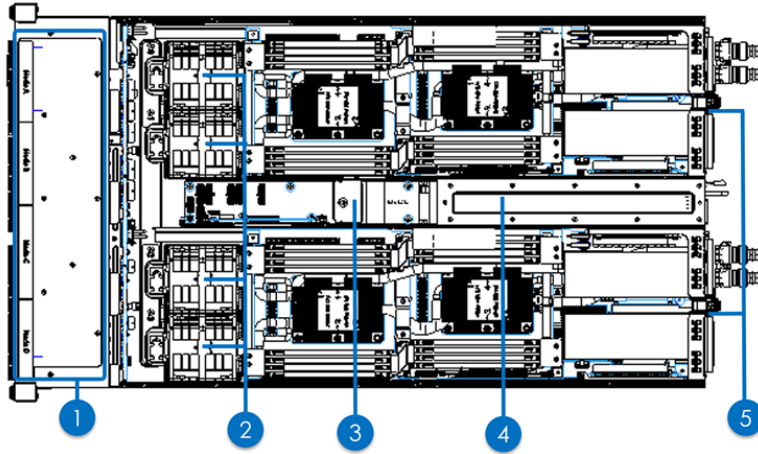


Figure 4-1 i24M5 server chassis internal structure

No.	Module	No.	Module
1	2.5/3.5' hard drive slots	2	System fans
3	Power distribution board (PDB)	4	Power supply modules
5	Nodes		

4.2 Motherboard components

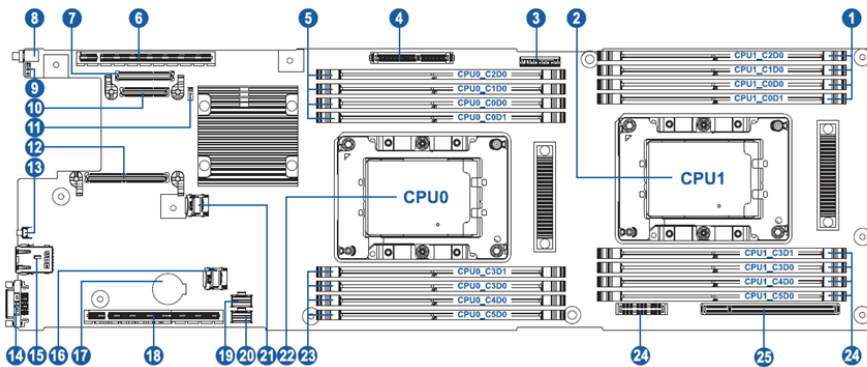


Figure 4-2 NS5162M5 motherboard components

No.	Module	No.	Module
1	DIMM slots (CPU1)	2	CPU1
3	TPM connector	4	M.2 RISER connector
5	DIMM slots (CPU0)	6	PCI-E0_CPU0 connector
7	OCPB_CPU0 connector	8	UID/RST button
9	BMC_RELOAD	10	OCPC connector
11	CLR_COMS	12	OCPA_CPU0 connector

No.	Module	No.	Module
13	BMC RST button	14	SUV connector
15	MLAN port	16	BMC_TF_SLOT card slot
17	RTC battery	18	PCI-E1_CPU0 connector
19	SATA4-7 connector	20	SATA0-3 connector
21	SYS_TF_SLOT card slot	22	CPU0
23	DIMM (CPU0)	24	EDGE_PWER connector
25	EDGE_PCI-E connector	26	DIMM (CPU1)

4.3 Front panel

4.3.1 12*3.5 Front Panel Components

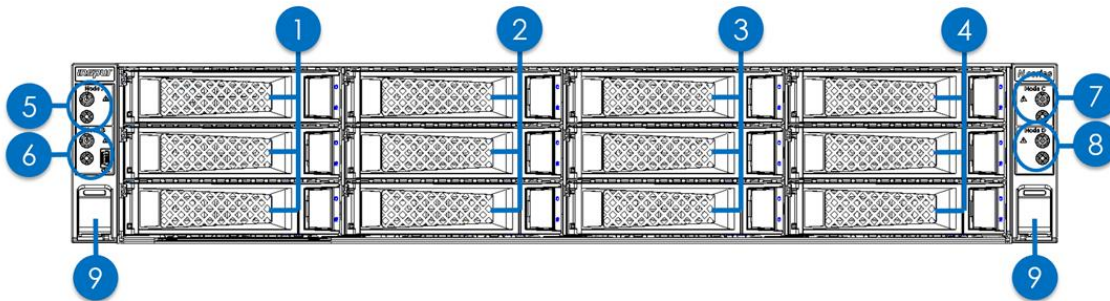


Figure 4-3 i24 server components

No.	Module	No.	Module
1	Node A hard drive	2	Node B hard drive
3	Node C hard drive	4	Node D hard drive
5	Node A control board	6	Node B control board
7	Node C control board	8	Node D control board
9	Server and chassis latch		

*Please refer to 4.2.1 Rear view for the exact locations of nodes A, B, C, and D.

4.3.2 Front Panel Controller

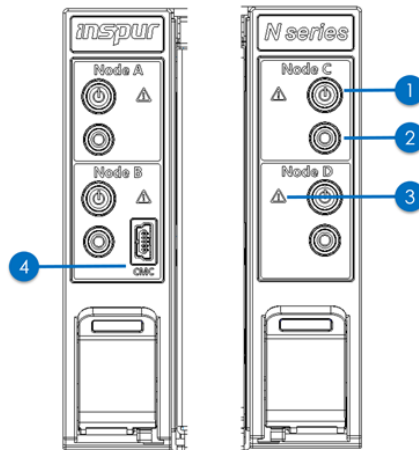


Figure 4-4 Front panel controller components

No.	Module	Description
1	Power switch	On: Solid green Off: Orange light Force shut down: Press for 4 seconds
2	UID/RST button	Turn on/off: Solid blue Force reboot: Press for 6 seconds
3	System failure LED	No failure: Off Failure: Solid red Warning: Blinking red
4	CMC management port	Mini USB to RJ45 adapter, CMC debug connector

4.3.3 24*2.5 Front Panel Components

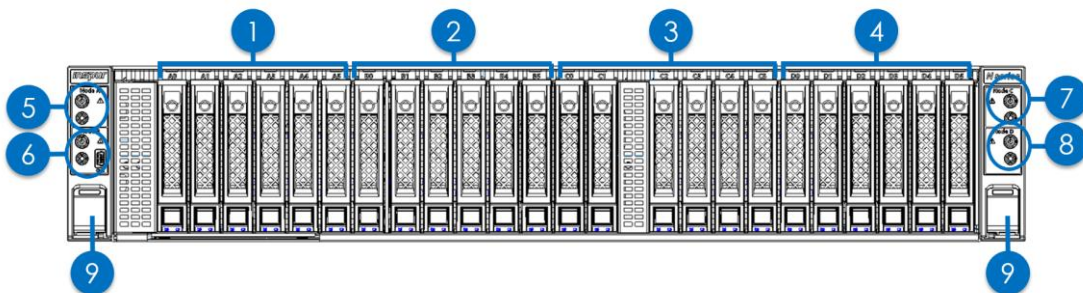


Figure 4-5 i24 server front panel components

No.	Module	No.	Module
1	Node A hard drive	2	Node B hard drive
3	Node C hard drive	4	Node D hard drive
5	Node A control board	6	Node B control board

No.	Module	No.	Module
7	Node C control board	8	Node D control board
9	Server and chassis latch		

4.3.4 Hard Drive

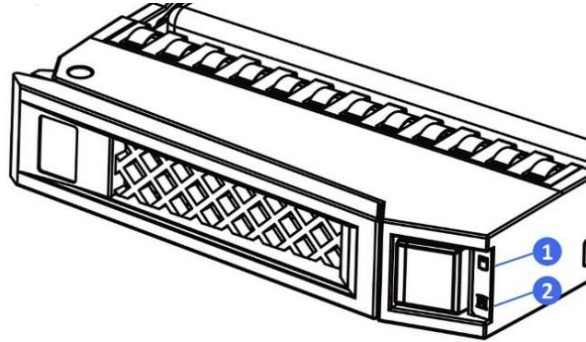


Figure 4-6 Hard drive LED description

No.	Module	Description
1	Hard drive status LED	Failure: Solid red Positioning: Solid blue RAID Rebuilding: Solid pink
2	Hard drive activity LED	Normal: Solid green Activity: Flashing green

4.4 Rear Panel

4.4.1 Chassis and power supply

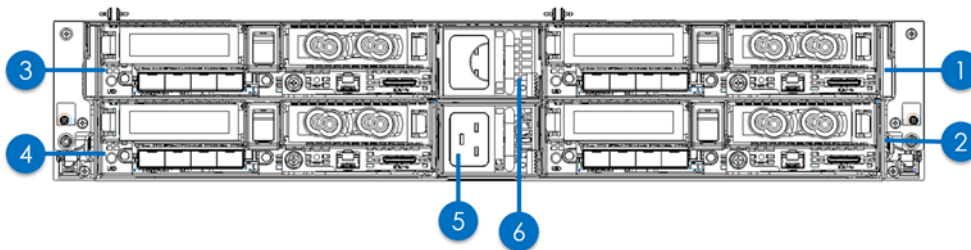


Figure 4-7 i24M5 server rear panel (1) structure

No.	Module	No.	Module
1	Node A	2	Node B
3	Node C	4	Node D
5	PSU 0	6	PSU 1

4.4.2 Chassis components

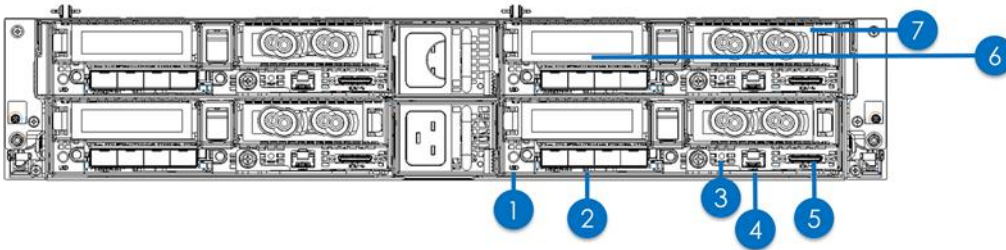


Figure 4-8 i24M5 server rear panel (2) structure

No.	Module	Description
1	UID	UID LED and RST button
2	Standard OCP card or PHY card slot	Configurable with standard OCP card or PHY card
3	BMC Reset	BMC reset button
4	IPMI2.0 management port	Node management port
5	SUV connector	High density connector: 2* integrated USB 2.0 connector 1* integrated VGA port 2* integrated serial ports (for BMC and for System)
6	PCIe GEN3 x16	Expands to PCI-E 3.0 x16 devices
7	PCIe GEN3 x16	Expands to PCI-E 3.0 x16 devices

4.5 Hard drive backplanes

Table 4-5-1 3.5*12 backplane configuration

Backplane type	Description	Description
3.5" *12	3.5"* 12_SATA/SAS	Supports 12*SAS/SATA

Note: Since 3.5"*12 is a directly connected backplane, a RAID/SAS card is required when configuring a SAS hard drive in order to connect it with the onboard SATA controller.

Table 4-5-2 2.5*24 backplane configuration

Backplane type	Description	Description
2.5" *24	2.5"* 24_8*SAS+16* NVME	Supports 8* SAS/SATA + 16* NVME or 24* SAS/SATA

Table 4-5-3 2.5*24 backplane configuration

Backplane type	Description	Description
2.5" *24	2.5" *24* NVME	Only supports 24* NVME

Note: Only supports 2.5"*24 NVME drives, does not support SATA/SAS

4.6 PCIe adapter cards

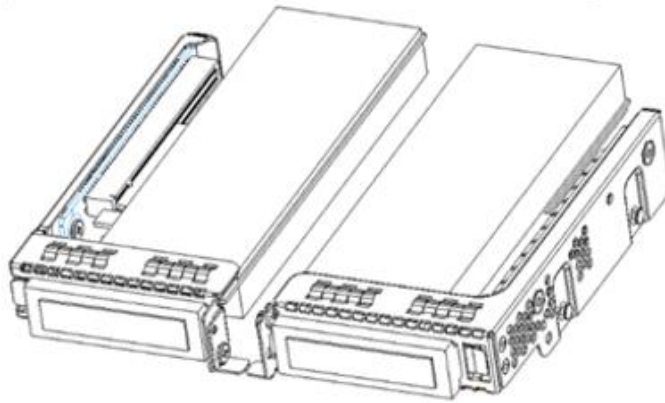


Figure 4-9 X16 PCIe riser (left and right)

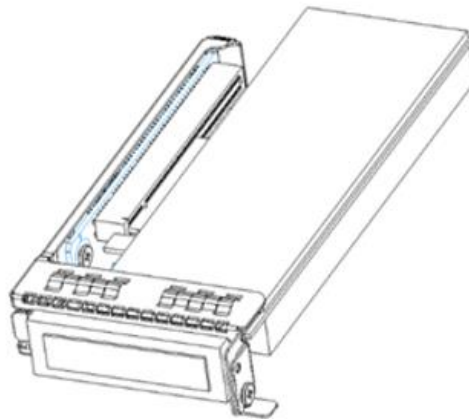


Figure 4-10 X16 PCIe riser (left)

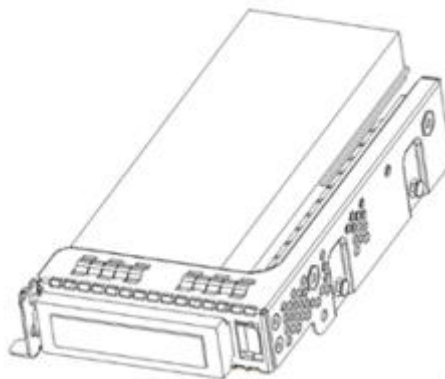


Figure 4-11 X16 PCIe riser (left)

4.7 OCT/PHY cards

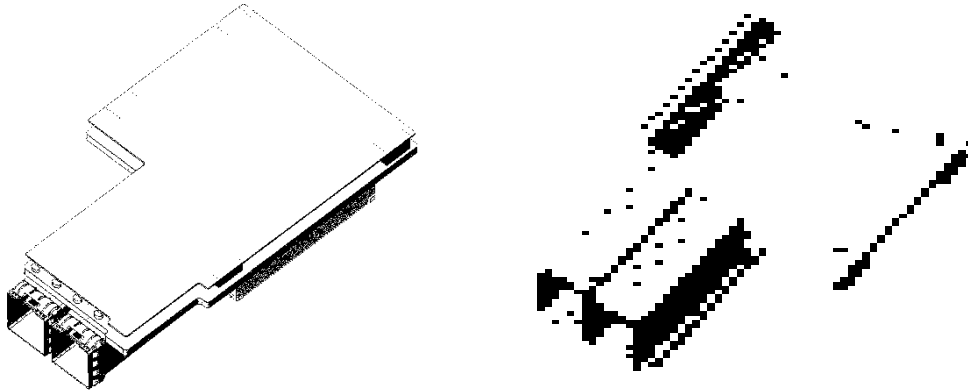


Figure 4-11 OCP card

Note: Supports OCP A+B and OCP A+C; supports 10 G and 25 G OCP network cards.

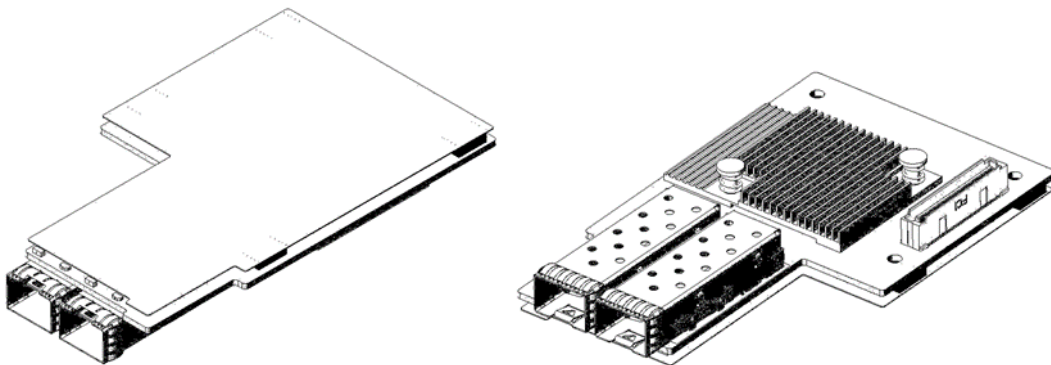


Figure 4-12 PHY card

Note: Supports 1G and 10G PHY cards.

5 System specifications

Table 5-1 System specifications

Node parameters	
Year of Manufacture	2017
Processor	Dual socket 2* Intel® Xeon® series scalable processors
Chipset	C622, C624, C627
Memory	Supports 16* DDR4 RDIMM/LRDIMM, up to 2400/2666/2933 Mhz, and supports AEP memory
I/O port	Expands via SUV to 2* USB 2.0 ports, 1* VGA port, and 2* serial ports
Display controller	Consists of Aspeed2500 chips,64M frame buffer, resolution up to 1280 x 1024
RAID controller	SATA controller on motherboard (supports RAID 0/1/5/10) Standard PCIe RAID controller RAID 0/1/10/1E/5/6/10/50
Network card controller	Supports 1* standard OCP card or PHY card
Management port	1* dedicated 1000Mbps network port for remote management. BMC -Aspeed AST2500- 1GB SDRAM BMC -Aspeed AST1250- 512MB SDRAM
PCIe expansion slot	3* PCI-E 3.0 x16 expansion slots: Supports horizontal slot cards as well as low-profile and half-length cards through riser adapter cards. A riser adapter card installed at riser slot 1 and slot 2 (CPU0) supports 1* PCIe 3.0 x16 slot. 1* standard OCP2.0 card or PHY card slot on motherboard
DIMM	2* M.2 SSDs
Server parameters	
Front hard drive slots (6* 2.5" or 3*3.5" per node)	2.5" NVMe backplane 2.5" NVMe + SAS backplane 3.5" NVMe backplane
Power supply	2*2000W 80Plus platinum power supply supports 1+1 redundancy (supports 1+1 redundancy under certain conditions, please check according to actual configurations) 100 V to 250 V AC or 192 V to 300 V DC (Please follow the power input value specified on the label on the host)
Fan	4* 80mm cooling fans in the middle of the chassis
Mainframe size	2.5" chassis: 446 mm (w) × 87.5 mm (h) × 805 mm (d) 3.5" chassis: 446 mm (w) × 87.5 mm (h) × 805 mm (d) Package size 721 mm (w) × 279 mmm (h) × 1168 mm (d)
Product weight	Full load gross weight of 2.5" chassis: 40.5 kg/53 kg (includes server + package + rail kit + components box) Full load gross weight of 3.5" chassis: 42.9 kg/58 kg (includes server + package + rail kit + components box)

Operating temperature	5°C~-35°C
Chassis airflow requirements	Unidirectional
Storage temperature	Packed: -40°C~+70°C Unpacked: -40°C~+55°C
Humidity	Operating humidity: 10%~90% R.H. Storage humidity: 10%~93% R.H.
Noise (Bels) (Sound power) 4,5,6,7	Idle LWAd: 6.7 B for normal configuration; LpAm: 54 dBA for normal configuration; Operating LWAd: 7.2 B for normal configuration; LpAm: 59.7 dBA for normal configuration;
Elevation	Operating temperature: 5°C~45°C at 0~914 m (3000 ft); Operating temperature: 10°C~32°C at 914~2133 m (7000 ft);
Safety	IEC 60950-1:2005 (Second Edition); Am1:2009 + Am2:2013 IEC 60950-1:2005 EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013 UL 60950-1 and CAN/CSA C22.2 No. 60950-1-07 standards for information Technology Equipment-Safety-Part 1: General Requirements TC 004/2011 IS 13252(PART 1):2010/ IEC 60950-1: 2005
EMC	EN 55032:2015 EN 61000-3-2:2014 EN 61000-3-3:2013 EN 55024:2010+A1:2015 EN 55035:2017 AS/NZS CISPR 32:2015 CFR 47 FCC Part 15 subpart B, 2018 ICES-003 ISSUE 6:2016 TC 020/2011 KN32 KN35

Note:

1. Not all configurations support an operating temperature range of 5°C~35°C. A technical review is required for AEP DIMM support and 205W CPU support.
2. Standard operating temperature
 - 10°C~35°C at sea level (50°F~95°F). For every altitude increment of 305 m above sea level, the temperature drops by 1.0°C (a 1.8°F drop per 1000 ft). The maximum operating altitude is 3050 m (10000 ft). Please keep away from direct sunlight. Maximum rate of change = 20°C/hr (36°F/hr). The operating altitude and maximum rate of change varies according to system configurations.
 - In the event of fan malfunction or operations above 30°C (86°F), the performance of the system may

be decreased.

3. Operating temperature at scaled environments

- With regard to certain approved configurations, the supported system entry range at sea level can be scaled to 5°C~10°C (41°F~50°F) and 35°C~45°C (95°F~104°F). At an elevation of 900~3050 m (2953~10000 ft), the temperature drops by 1.0°C for every altitude increment of 175 m (1.8°F per 574 ft).
- With regard to certain approved configurations, the supported system entry range at sea level can be scaled to 35°C~45°C (104°F~113°F). At an elevation of 900~3050 m (2953 ft~10000 ft), the temperature drops by 1.0°C for every altitude increment of 125 m (1.8°F per 410 ft).
- The system performance may decrease when the system is operating in the scaling range or in the event of fan malfunction.
 4. This text lists the weighted sound power level (LWAd) and the weighted sound pressure level (LpAm) of the product at an operating temperature of 23°C. The values were reported according to the ISO7779 (ECMA 74) noise measurement standards and ISO 9296 (ECMA 109). The listed sound levels can be used for general shipping configurations while other options may increase the volume. Please contact your sales representative for more information.
 5. The sound levels shown here were measured according to specific test configurations. The sound level will vary depending on system configuration. Values are subjected to change without notice and are for reference only.
 6. The sample (model) test assessments meet product specifications. This product or product series are eligible to have appropriate compliance labels and declarations.
 7. All sound levels listed are for standard shipping configurations while other system configurations may increase the volume.

Table 5-2 Industry Standard Compliance

ACPI 6.1 Compliant
PCI-E 3.0 Compliant
WOL Support
SMBIOS 3.1
UEFI 2.6
Redfish API
IPMI 2.0
Microsoft® Logo certifications
PXE Support
Advanced Encryption Standard (AES)
SNMP v3
TLS 1.2
Active Directory v1.0

6 Components and compatibility

Updated on August 2019. Please consult with our technical support team for the latest compatibility configurations and product components not listed in this manual.

6.1 Processor

Table 6-1 Each node supports 2* Intel Xeon scalable processors

Model	No. of cores	Threads	Frequency (GHz)	Turbo frequency (GHz)	L3 Cache (MB)	Max. memory	UPI	TDP(W)
8276L	2.8	5.6	2.20	4.0	38.5	4.5 TB	165	2.20
8260L	2.4	4.8	2.40	3.90	35.75	4.5 TB	165	2.40
8276	28	56	2.20	4.0	38.5	1 TB	165	2.20
8260	24	48	2.40	3.90	35.75	1 TB	165	2.40
8.256	4	8	3.80	3.90	16.5	1 TB	105	3.80
8.253	1.6	3.2	2.20	3.00	22	1 TB	125	2.20
8176	28	56	2.10	3.80	38.5	768 GB	165	2.10
8170	26	52	2.10	3.70	35.75	768 GB	165	2.10
8160	24	48	2.10	3.70	33	768 GB	150	2.10
8156	4	8	3.60	3.70	16.5	768 GB	105	3.60
6252	24	48	2.10	3.70	35.75	1 TB	150	2.10
6248	20	40	2.50	3.90	27.5	1 TB	150	2.50
6242	16	32	2.80	3.90	22	1 TB	150	2.80
6240	18	36	2.60	3.90	24.75	1 TB	150	2.60
6.238	2.2	4.4	2.10	3.70	30.25	1 TB	140	2.10
6.234	8	1.6	3.30	4.00	24.75	1 TB	130	3.30
6230	20	40	2.10	3.90	27.5	1 TB	125	2.10
6.226	1.2	2.4	2.70	3.70	19.25	1 TB	125	2.70
6152	22	44	2.10	3.70	30.25	768 GB	140	2.10
6150	18	36	2.70	3.70	24.75	768 GB	165	2.70
6142	16	32	2.60	3.70	22	768 GB	150	2.60
6238T	20	40	2.00	3.70	27.5	768 GB	125	2.00
6138	20	40	2.00	3.70	27.5	768 GB	125	2.00
6132	14	28	2.60	3.70	19.25	768 GB	140	2.60
6130	16	32	2.10	3.70	22	768 GB	125	2.10
6126	12	24	2.60	3.70	19.25	768 GB	125	2.60
5215L	1.0	2.0	2.50	3.40	13.75	4.5 TB	85	2.50
5222	4	8	3.80	3.90	16.5	1 TB	105	3.80

Model	No. of cores	Threads	Frequency (GHz)	Turbo frequency (GHz)	L3 Cache (MB)	Max. memory	UPI	TDP(W)
5220	18	36	2.20	3.90	24.75	1 TB	125	2.20
5218	16	32	2.30	3.90	22	1 TB	125	2.30
5.217	8	1.6	3.00	3.70	11	1 TB	115	3.00
5.215	1.0	2.0	2.50	3.40	13.75	1 TB	85	2.50
5122	4	8	3.60	3.70	16.5	768 GB	105	3.60
5118	12	24	2.30	3.20	16.5	768 GB	105	2.30
4.216	1.6	3.2	2.10	3.20	22	1 TB	100	2.10
4.215	8	1.6	2.50	3.50	11	1 TB	85	2.50
421.4	12	24	2.20	3.20	16.5	1 TB	85	2.20
4210	10	20	2.20	3.20	13.75	1 TB	85	2.20
4.208	8	1.6	2.10	3.20	11	1 TB	85	2.10
4116	12	24	2.10	3.00	16.5	768 GB	85	2.10
4114	10	20	2.20	3.00	13.75	768 GB	85	2.20
4110	8	16	2.10	3.00	11	768 GB	85	2.10

6.2 Memory

The i24 supports 8 DIMMs per CPU, and up to 16 DIMMs for dual CPUs. It also supports LRDIMM, RDIMM, and Intel® Optane™ DC continuous memory, as well as the following memory modes:

- ECC (Error Correcting Code)
- Memory mirroring
- Memory rank sparing
- SDDC (Single Device Data Correction)
- ADDDC (Adaptive Double- Device Data Correction)
- PPR (Power up-Post Package Repair)

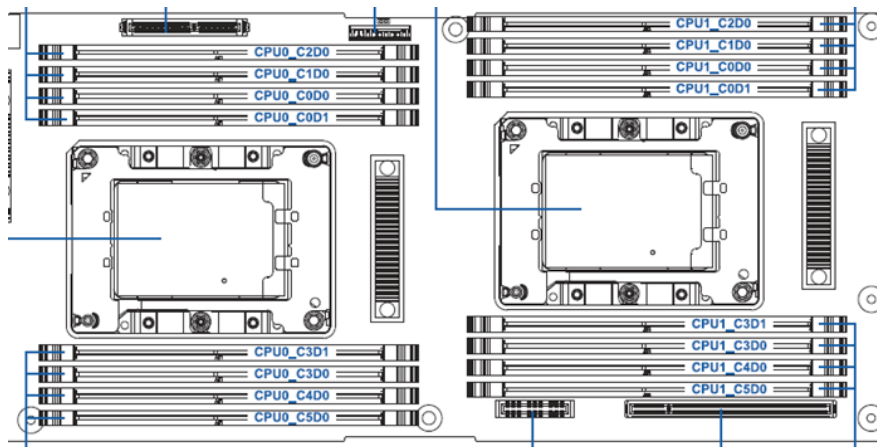
Category	Capacity	Frequency	Data width	Organization
RDIMM	16GB	2400	x72	1Rx4/ 2Rx8
RDIMM	16GB	2666	x72	1Rx4/ 2Rx8
RDIMM	32GB	2400	x72	2Rx4
RDIMM	32GB	2666	x72	2Rx4
RDIMM	64GB	2400	x72	2Rx4
RDIMM	64GB	2666	x72	2Rx4

Category	Capacity	Frequency	Data width	Organization
LRDIMM	64GB	2666	x72	4Rx4
RDIMM	32GB	2933	x72	2Rx4
LRDIMM	64GB	2933	x72	4Rx4
RDIMM	16GB	2933	x72	1Rx4
LRDIMM	64GB	2933	x72	4Rx4

The same node does not support mixed memories from different memory types (RDIMM, LDRIMM) and different specifications (capacity, bit width, rank, and depth).

Memory capacity can be maximized by installing two processors. When a single processor is used, the maximum memory capacity is halved.

The DIMM slot layout and installation procedure is shown in the following figure:



i24M5 can be configured to support up to 16* AEP memories, with 4* AEPs per node.

The AEP memory sequence is as follows:

Method 1 - CPU0 -C2D0, C5D0

CPU1 - C2D0, C5D0

Method 2 - CPU0 -C0D1, C3D1

CPU1-C0D1, C3D1

The following symmetrical sequences can be introduced into the bill of materials (BOM); a technical review is required for asymmetrical sequences and other specific sequences.

1. 2*AEPs for a single CPU.
2. 4*AEPs for dual CPUs.

Note: AEP 128 GB is currently supported

6.3 Storage (Realizing SAS/SATA mixing)

The 124M5 supports the equal distribution of four nodes across the front hard drive and realizes the mixing of SAS/SATA hard drives in the entire server and in each node.

6.3.1 SAS/SATA hard drive model

Model	Hard drive rotational speed	Capacity	Maximum number
2.5 SAS	10K	600G/900G/1.2T/1.8T	24
	15K	300G/450G/600G/900G	24
2.5 SATA	7.2K	1T/2T	24
3.5 SAS	7.2K	2T/4T/5T/6T/8T	12
3.5 SATA	7.2K	2T/3T/4T/5T/6T/8T/10T/16T	12

6.3.2 2.5" SSD hard drive

Model	Capacity	Product series
SATA SSD	240G	S4510,S4610,PM883
SATA SSD	480G	S4510,S4610,PM883
SATA SSD	960G	S4610, PM883
SATA SSD	1.92T	S4510, PM883
SATA SSD	3.84T	S4510, PM883

6.3.3 U.2 NVMe SSD hard drives

Model	Capacity	Product series
U.2 NVME SSD	1T	P4510
U.2 NVME SSD	1.6T	P4600
U.2 NVME SSD	1.8T	P4510
U.2 NVME SSD	2T	P4510,P4600
U.2 NVME SSD	3.2T	P4600
U.2 NVME SSD	3.6T	P4510
U.2 NVME SSD	4T	P4510

Note: The 3.5" hard drive model does not support NVME hard drives.

6.3.4 PCIe NVME SSD

Model	Capacity	Product series
PCI-E NVME SSD	1.6TB	PM1725
PCI-E NVME SSD	3.2TB	PM1725
PCI-E NVME SSD	6.4TB	PM1725

6.3.5 M.2 SSD

Concurrently supports software RAID and hardware RAID.

Model	Capacity	Product series
M.2 SSD	150GB	S3520
M.2 SSD	240GB	S3520
M.2 SSD	480GB	S3520
M.2 SSD	760GB	S3520
M.2 SSD	960GB	S3520
M.2 SSD	960GB	8501Q
M.2 SSD	1.92T	8501Q

Note: Software RAID achieves the RAID function through system software. Hardware RAID achieves the RAID function through RAID cards.

6.4 RAID/SAS card

Supports one RAID or SAS card

		Battery capacity
Inspur	SAS card_INSPUR_SAS3008+IT+PCI-E3.0	
	RAID card_INSPUR_SAS3108_2GB_SAS12G_PCI-E3	AG_6.4F_CVM02_8G_3108
	RAID card_INSPUR_SAS3108_4GB_SAS12G_PCI-E3	AG_6.4F_CVM02_8G_3108
	RAID card_INSPUR_SAS3008+IMR+PCI-E3.0	
LSI	RAID card_L_8R0_9361-8i_1GB_HDM12G_PCI-E3.0	LSI_CVM02_SuperCap_MR3108_1GB L_8.0F_CVM02_4G_9361
	RAID card_L_8R0_9361-8i_2GB_HDM12G_PCI-E3.0	AG_6.4F_CVM02_8G_3108

6.5 Network Card

Supports one PHY /OCP card and two PCIe network cards (no restrictions).

Type	Model and description	Speed	Number of connectors	Optical module (sm, mm)
PHY	Network card_Inspur_5280M5_10G_2	10G	2	N/A
	Network card_Inspur_5280M5_CS4223_10G_4	10G	4	Standalone configuration
	Network card_Inspur_5280M5_CS4227_10G_LC_2	10G	2	Standalone configuration
	Network card_Inspur_5280M5_1G_RJ_4_PHY	1G	4	N/A
OCP	Network card_Inspur_OCP 25G_CX4LX_25G_LC_PCI-Ex8_2	25G	2	Standalone configuration
	Network card_Inspur_OCP 25G_CX4LX_25G_LC_PCI-Ex8	25G	1	Standalone configuration
	Network card_M_25G_MCX4421ACQN_LC_PCI-Ex8_2_XR_OCP	25G	2	Standalone configuration

Speed	Model and description	Connector type	Number of connectors	Optical module
1G	Network card_Intel_W_I350-T2V2_RJ_PCI-E4X_1KM_dual	RJ45	2	N/A
	Network card_Inspur_W_I350AM4_1G_RJ45_PCI-Ex8_quad	RJ45	4	N/A
	Network card_SC_W_I350_RJ_PCI-E8X_1000M_quad	RJ45	4	N/A
	Network card_I_1G_I350F2_LC_PCI-Ex4_2_MM	SFP	2	Two external multi mode modules
10G	Network card_I_10G_82599ES_LC_PCI-Ex8_MM	SFP+	1	One external multi mode module
	Network card_Intel_W_82599ES_LC_PCI-E8X_10G_dual	SFP+	2	Two external multi mode modules
	Network card_I_10G_X540-T2_RJ_PCI-Ex8_2_XR	RJ45	2	N/A
25G	Network card_M_25G_MCX4121A-ACAT_LC_PCI-Ex8_D_XR	SFP28	2	Standalone configuration
40G	Network card_I_40G_XL710_LC_PCI-Ex8_MM	QSFP+	1	One external multi mode module

6.6 HCA Card

Supports up to two cards (no restrictions)

Type	Model and description	Speed	Number of connectors	Optical module (sm, mm)
HCA cards	HCA card_I_1-EDR4X25_100HFA016LS_PCI-E	100Gbps	1	HCA cards
	HCA card_M_2-FDR4X14_MCX354A-FCBT_PCI-E3.0	56Gbps	2	

6.7 FC HCA Card**Supports up to two cards (no restrictions)**

Type	Model and description	Speed	Number of connectors	Optical module (sm, mm)
HBA card	HBA card_QL_4R2_QLE2692-ISR-BK_FC16G_PCI-E	16G/s	2	HBA card
	HBA card_QL_4R2_QLE2690 ~ ISR-BK_FC16G_PCI-E	16G/s	1	

6.8 Power Supply

Power	Efficiency	AC/DC	Minimum	Maximum
2000W	Platinum	AC	100V	240V
		DC	192V	300V

Note: Please adhere to the actual configurations and in accordance with the power input value specified on the label found on the host.

6.9 Operating system

OS company	OS version
Windows	Windows Server 2012 R2
	Windows Server 2016
Red Hat	Red Hat Enterprise Linux 6.9
	Red Hat Enterprise Linux 7.3
	Red Hat Enterprise Linux 7.4
SUSE	SUSE Linux Enterprise Server 11.4
	SUSE Linux Enterprise Server 12.3
Citrix	Citrix XenServer 7.1
Oracle	Oracle Linux 6.9
	Oracle Linux 7.4
	VM 3.4.4
Neokylin	NeoKylin Linux Server 6.9 Advanced
VMware	Oracle VM ESXi6.5 U2-Ux&ESXi6.7 Ux
Ubuntu	Ubuntu16.04.6
	Ubuntu18.04 GA

7 Configuration Options

- The 12* 3.5" hard drive chassis does not support NVME configuration.
- The 24* NVME hard drive chassis does not support SAS/SATA configuration.
- Please note the configuration requirements for the NS5162M5 node and the i24 chassis:
The use of 5, 7, 9, 10, and 11 DIMMs for a single CPU (10, 14, 18, 20, 22 DIMMs for dual CPUs) is not recommended.

i24 chassis	NS5162M5 node	
	Supports NVMe configuration sideplane	Supports mixing of NVMe and SAS/SATA configuration sideplanes.
24* 2.5" full NVME chassis	√	X
12* 5.5" chassis	X	√
24* 2.5"mixed NVME and SAS/SATA configuration	X	√

8 System management

The i24 integrates a next-generation BMC intelligent management system (ICM). This system is wholly developed by Inspur and complies with IPM2.0 standards, providing highly reliable and intelligent hardware monitoring and management functions. The Inspur BMC intelligent management system includes the following features:

- Supports Intelligent Platform Management Interface (IPMI)
- Supports keyboard, mouse, video, and text console redirection
- Supports remote virtualization media
- Supports Redfish protocol
- Supports Simple Network Management Protocol (SNMP)
- Supports BMC login through web browsers
- The main specifications of the intelligent management system are as follows.

Table 8-1 BMC intelligent management system specifications

Specifications	Description
Management port	Supports integration with any standard management system through the following ports: IPMI CLI SNMP HTTPS Redfish
Malfunction detection	Precisely locates hardware malfunctions.
Alert management	Supports alert management and SNMPTrap(v1/v2c/v3), EmailAlert, syslog, and various alert reports. Guaranteed 7 x 24 hours of highly reliable operation.
Virtual KVM	Provides remote maintenance for off-site troubleshooting during system malfunctions.
Virtual media	Supports virtualization of media devices or images, USB devices, and folders into remote servers, which speeds up the operating system installation.
Based on web user interface	Supports image visualization interfaces. Set up and inquiries can be completed by clicking the interface.
Screenshots	No login required to view screenshots for regular inspection.
Recovery boot media	When the operating software breaks down, it can be reactivated through image backup.
Supports smart energy management	Power capping increases deployment density, dynamic energy saving decreases operating costs.
IPv6	Supports IPv6 functions to achieve IPv6 environments and provide various IP addresses.

Specifications	Description
NC-SI function	Supports the NC-SI (Network Controller Sideband Interface) function, allowing access to the BMC through our client interface.
Hardware monitoring timer	Allows the fan to enter full-speed protection mode when the BMC is unresponsive or when the safety timer is overdue.
Power control	on/off/cycle/status
UID remote control	The UID light of a single machine can be switched on manually for the ease of locating devices in a machine room. The UID light will blink when the KVM is on and firmware are being upgraded.
Firmware upgrade	Supports BMC/BIOS upgrades
Serial port redirection	System serial port I/O redirected through IPMI commands.
Checking storage information	Displays RAID logical matrix information and their corresponding physical drive information.

Table 8-2 CMC intelligent management system specifications











Function	Description	Details
Chassis information	Name, location, type	Includes FRU and version information
	Chassis layout (Front view, rear view, module status, alert display). The management interfaces of each module can directly be accessed by through a click of their respective page icons.	Modules: nodes, fan, power supply
Power supply and cooling	Power information	Status, input and output consumption, temperature, current, voltage, rated/current power, version information
Server consumption	Server consumption	Server consumption display
	SMTP alert	Covers chassis components and sets parameters
	Alert monitoring of each chassis component	Temperature, voltage, and status monitoring of chassis components
	SMTP settings	LAN used by SMTP settings e-mail address settings e-mail sender settings e-mail server IP address settings e-mail username settings e-mail password settings
Network settings	Node BMC IP address settings	Single node or multiple nodes IP address settings
	Server IP address, DNS parameter settings	Server IP address, DNS parameter settings
Log information	System log	Server temperature and voltage alert log information, important

Function	Description	Details
		node alert log information, system log removal
	User log	Operation log, user login log, system log removal
	Alert log	Alert log removal
	Log description	Chinese descriptions should be depictive and concise, such as the name and type of sensors
User management	Creating user groups, adding users, removing user, modify user permissions	Creating user groups, adding users, removing user, modify user permissions
	User login records	Records logged in users and login time
	LDAP	Activates status, protocols, and group configurations
Time management	CMC time management, time zone, NTP settings, clock source settings	Involves CMC and BMC clock sources problems
	BMC time synchronization	Realizes time synchronization between CMC and the BMC of each node

9 Certifications

※ Please contact our technical support for information on our latest certification.

As of October 2019, the i24M5 has received the following certifications:

Region	Certification	Logo	Mandatory/discretionary	Description
PRC	China Environmental Labelling		Discretionary	
IAF	CB		Discretionary	
EU	CE		Mandatory	
USA	FCC		Mandatory	
	UL		Discretionary	
	Energy Star		Discretionary	In development
Russia	CU Certification		Mandatory	
	IT Security	N/A	Mandatory	
India	BIS		Mandatory	In development
South Korea	KC Certification		Mandatory	
Australia	RCM		Mandatory	

10 Support and services

Global service hotline:

- 1-844-860-0011 (free)
- 1-646-517-4966 (DDI)
- Service e-mail: serversupport@inspur.com

Information required:

- Name
- Telephone no
- e-mail
- Product model
- Product serial number
- Problem description

11 Description of New Technologies

11.1 Intel scalable architecture

Intel's next generation Xeon processor is based on Skylake architecture. The all-new on-chip interconnect mesh architecture topology replaces traditional interconnect ring architecture to improve CPU access delays and support higher memory bandwidth requirements. In addition, it offers lower power consumption, which allows it to operate at lower clock rates and at relatively lower voltages, thereby enhancing performance and energy efficiency. The overall performance of the Intel Xeon scalable processor is up to 1.65 times better than that of previous generation products, while its OLTP base load is up to 5 times more than that of current systems.

11.2 Intel VROC technology

Intel VROC technology represents Virtual RAID on CPU, which provides enterprise RAID solutions based on NVME SSD. Its greatest advantage is that it is able to directly connect to the PCIe channels on Intel scalable processors, reducing the need for customized RAID HBA.

11.3 QAT technology

Intel® QuickAssist technology (Intel® QAT) speeds up compute-intensive applications and the operations of applications. It provides a software-based foundation for security, authentication, and compression purposes, thus significantly increasing the performances and efficiencies of standard platform solutions. These features are detailed as follows:

QAT enhances the throughput of applications in cloud computing, and adds hardware acceleration for network security, routing, storage, and big data applications, thereby maximizing CPU utilization.

In terms of network, Intel® QAT speeds up SSL/TLS, thereby allowing encrypted communications with higher performances and higher platform application efficiencies in a secure network.

In terms of big data, data blocks in the compressed file system supports faster analysis and achieves faster Hadoop operation time for big data operations. In so doing, QAT reduces processor requirements, completes tasks in a low-latency manner, and enhances the overall performance.

11.4 OCP Mezzanine Card

The Open Compute Project (OCP) is an open-source server project designed for data centers, with the aim of sharing server and data center designs with higher efficiencies. As a member of the OCP, Inspur has designed a series of OCP Mezzanine cards that complies with OCP standards.

12 Further Information

For more information, please refer to the following websites:

<http://www.inspur.com>

Our website provides troubleshooting resources and support for customers, as well as further information on our products, such as user manuals, drivers, and firmware.

13 Trademark

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