

inspur



NF5280M5 Product Technical White Paper

Revision 5.0

Release date: 2019-12-22

Dear user:

© Copyright Inspur 2017

No part of this document may be replicated or modified and transmitted through any form or method without the prior written consent of Inspur.

Note: Commercial contracts and terms apply to purchases of goods, services, or features from Inspur. All of some of the goods, services, or features mentioned in this document may not be within your scope of purchase of use. Unless agreed otherwise, Inspur will not indicate or imply any declarations or guarantees on the contents of this manual. Due to product upgrades or added details, the contents of this manual will be regularly updated. Unless agreed otherwise, this document shall only serve as a user manual. All descriptions, information, and suggestions shall not form any explicit or implicit guarantees.

Inspur and "浪潮" are registered trademarks of Inspur Electronic Information Industry Co., Ltd.

Windows is a registered trademark of Microsoft Corporation.

Intel and Xeon are registered trademarks of Intel Corporation.

Other trademarks belong to their respective registered companies.

Technical service 4008600011
number:

Address: 1036 Langchao Rd., Jinan,
Shandong, China

Inspur Electronic Information
Industry Co., Ltd.

Postal code: 250101

Contents

1	Product Overview.....	4
2	Product Features.....	5
3	Logical Architecture	7
4	Product Introduction.....	8
4.1	Front Panel.....	8
4.1.1	24×2.5" front panel.....	8
4.1.2	12×3.5" front panel.....	10
4.1.3	25×2.5" front panel.....	10
4.1.4	Hard drive LED indicators.....	11
4.2	Rear Panel	11
4.3	Internal View of Server	13
4.4	PCIe Adapter Cards.....	14
4.5	I/O Expansion & Rear Hard Drives.....	15
4.6	Hard Drive Backplanes	17
4.7	Motherboard layout.....	18
6	Components and Compatibility	24
6.1	Processors	24
6.2	Memory.....	27
6.3	Storage	30
6.3.1	SATA/SAS hard drive model	30
6.3.2	SSD Hard drive models.....	30
6.3.3	U.2 NVME SSD hard drives	30
6.4	RAID/SAS cards.....	31
6.5	Network Cards.....	32
6.6	FC HBA Card.....	33
6.7	HCA Card.....	33
6.8	GPU.....	34
6.9	Power Supply Units	34
6.10	Operating System	35
7	Configuration Options.....	37
8	System Management.....	39
9	Certifications	41
10	Support and services.....	42
11	Description of New Technologies.....	43
11.1	Intel scalable architecture	43

11.2 Intel VROC technology.....43

11.3 QAT technology.....43

11.4 Memory Mirroring.....43

11.5 Memory Rank Sparing.....43

11.6 Power Aware Techniques.....44

12 Further Information45

13 Trademark.....46

1 Product Overview

The Inspur Yingxin NF5280M5 server is dedicated toward meeting Internet, IDC (Internet Data Center), cloud computing, enterprise markets, and telecommunications application requirements. It is a dual-path 2U rackmount server based on Intel® Xeon® scalable processors. The NF5280M5 meets more user requirements for high network bandwidth, high computing performance, and high-capacity memory. Meanwhile, it is the optimum solution for customers with specific density and storage requirements. It is highly suitable for users with stringent server requirements for big data, business intelligence, financial services, and public and private cloud applications.



Figure 1-1 View of NF5280M5

2 Product Features

The NF5280M5 maintains Inspur's high-quality and high-reliability product features for a wide variety of applications, where performance, scalability, usability, and manageability are emphasized.

Performance

- The NF5280M5 supports the next-generation Intel® Xeon® scalable processor series. Each CPU supports up to 28 cores and 56 threads, up to TDP 205W CPU, 3.6 GHz, 38.5 MB L3 cache and two 10.4 GT/s UPI interconnection links, allowing the server to achieve better performance.
- Supports up to 24*2400/2666/2933 MT/s DDR4 ECC memory; supports RDIMM, LDRIMM, and AEP types; and provides enhanced speed and high usability.
- Supports a 24*hot-swappable NVME SSD all-flash configuration. The excellent storage IO also offers excellent storage capabilities.

Scalability

- The NF5280M5 accommodates up to 20* 3.5" hard drives or 31* mixed 2.5"/3.5" hard drives. The two built-in 2 M.2 SSDs enable large-scale storage.
- A flexible OCP/PHY card slot is available for 1G, 10G, and 25G network ports, providing highly flexible network configurations for different applications.
- The NF5280M5 supports Intel integration I/O technology. In so doing, it is able to integrate a PCI Express 3.0 controller into an Intel® Xeon® scalable processor, thus significantly reducing I/O delays while increasing overall system performance.

Applicability

- The NF5280M5 is specifically designed for effortless maintenance to facilitate higher availability.
- An optimal operating environment is achieved by integrating Inspur's unique intelligent control technology with an advanced cooling system, which also guarantees system operation stability and energy efficiency.
- The hot-swappable SAS/SATA hard drives support RAID 0/1/1E/10/5/50/6/60, provide RAID CAChe, and support SuperCap power loss protection.
- The entire system supports tool-free maintenance and features human-centered designs. The front 3.5" hard drive backplane has a reinforced frame for structural components that can be disassembled easily. This greatly reduces operation and maintenance time and costs.
- Post-SSD usage reliability is significantly higher compared to conventional mechanical hard drives, thereby extending the operation time of the system.
- With the latest BMC technology, our technical support personnel are able to use the management modules, a Web management interface, as well as the onboard UID/HLY LED indicators and the fault diagnosis code displays for diagnostics. This simplifies maintenance, reduces troubleshooting time, and increases system availability.

- The onboard integrated BMC management module can be used to monitor the parameters of each sensor component while alerting our technical support team to implement recovery measures to prevent server failure.

Manageability

- Inspur's power management technology can assist users to perform accurate real-time system power monitoring and control. The exclusive pairing of power telemetry with power thermal aware solution (PTAS) and Node manager 4.0 allows the effective implementation of total power control, further increasing overall IT system performance.
- By using Inspur's visualization management modules, administrators can swiftly determine the devices that need maintenance.
- The LED indicators faster server diagnostics. This not only lowers the motherboard footprint, but also allows for the effective display of power sequence progress, easing server debugging. Technical service personnel can now effortlessly locate units requiring maintenance.

Energy efficiency

- The 550~2000 W 80 PLUS platinum power supply offers up to 94% efficiency at 50% load.
- The NF5280M5 supports active and standby power supply modes, 1+1 redundancy, and integrated AC/DC power supply systems for the enhancement of energy conversion rates.
- The efficient single-board voltage regulator device (VRD) power supply unit reduces power loss during DC to DC conversion.
- The NF5280M5 also supports active power factor correction (PFC) techniques, thereby increasing power supply utilization of mains electricity.
- It also supports partitioned adjustment of cooling fan speed and proportional–integral–derivative (PID) smart speed adjustment and smart CPU frequency adjustment, thus achieving energy conservation.
- The comprehensive and optimized system cooling design includes high-efficiency and energy-saving fans that further increase heat dissipation.

Safety

- The firmware is secured with encryption and BIOS digital signatures to prevent illegal write-ins.
- The embedded TPM hardware are equipped with encryption chips, which allows users to flexibly select their algorithm according to requirements.
- In terms of hardware design, the NF5280M5 is not only equipped with a locked board, but also has a locked chassis design and supports report functions.

3 Logical Architecture

The NF5280M5 supports two Intel® Xeon® scalable processors and 24* DDR4 DIMMs. Processors are connected with two UPI interconnection links with transmission speeds of up to 10.4 GT/s. A processor is connected with 3* PCIe Riser cards through a main PCIe link. Different PCIe Risers support PCIe slots with different specifications. The OCP Connector A on the motherboard is connected with CPU0 through the main PCIe link, while the OCP C connector is connected with PCH. Figure 3-1 shows the logical architecture of the NF5280M5.

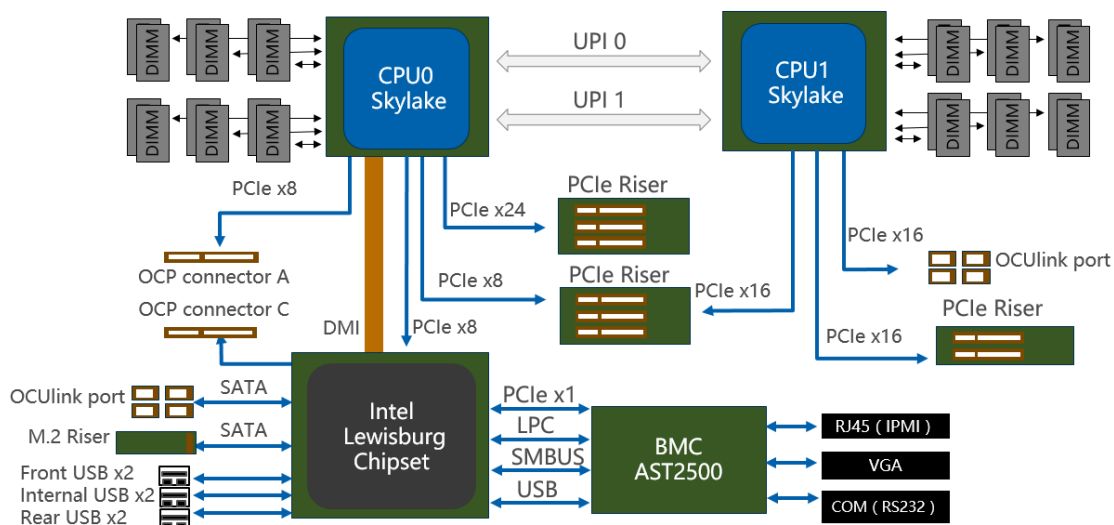


Figure 3-1 NF5280M5 motherboard logical architecture

4 Product Introduction

4.1 Front Panel

4.1.1 24×2.5" front panel

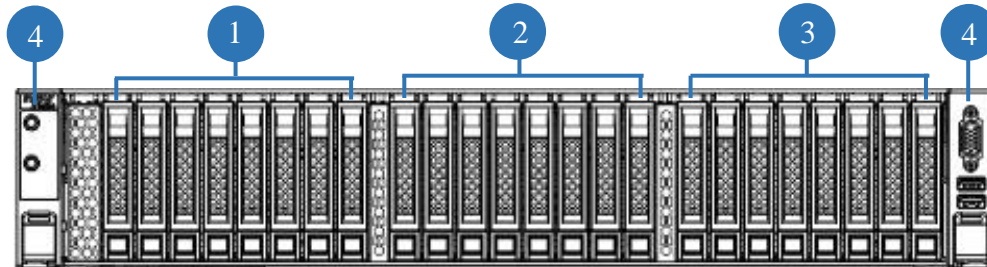


Figure 4-2 Front panel view

No.	Module	No.	Module
1	2.5" hard drives 0-7	2	2.5" hard drives 9-15
3	2.5" hard drives 16-23	4	Front board controller

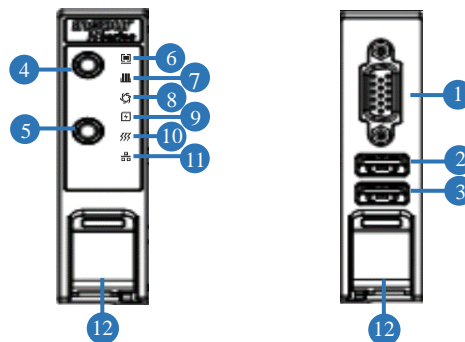


Figure 4-2 Front board controller LED indicators and buttons

No.	Module	No.	Module
1	VGA port	2	USB 3.0 connector
3	USB 2.0 LCD connector	4	Power switch
5	UID/RST button	6	System failure LED
7	Memory failure LED	8	Fan failure LED
9	Power failure LED	10	System overheat LED
11	Network status LED	12	Server and chassis latch

No.	Module	Description
1	VGA port	Can be connected to 1*VGA device
2	USB 3.0 connector	Supports 1*USB device
3	USB 2.0 LCD connector	Supports 1*USB device, can be connected with an Inspur OLED LCD module.
4	Power switch	On: Solid green Off: Orange light Force shut down: Press for 4 seconds
5	UID RST button	Turn on/off: Solid blue Force reboot: Press for 6 seconds
6	System failure LED	No failure: Off Failure: Solid red Warning: Flashing red
7	Memory failure LED	No failure: Off Failure: Solid red Warning: Flashing red
8	Fan failure LED	No failure: Off Unable to read fan speed: Solid Red Abnormal fan speed readings: Flashing red
9	Power failure LED	No failure: Off Power failure: Solid red Abnormal power status: Flashing red
10	System overheat LED	No failure: Off CPU/memory overheating: Solid red
11	Network status LED	Normal network connection: Flashing or solid green No network connection: Off *Warning: Only displays the operation status of a PHY card

Note: With connecting external USB devices, please ensure that the USB device is in good condition to avoid server malfunction.

4.1.2 12×3.5" front panel

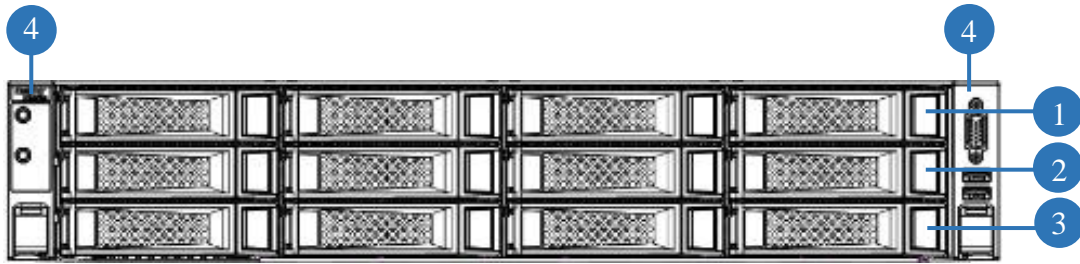


Figure 4-3 Front panel view

No.	Module	No.	Module
1	3.5" hard drives 0-3	2	3.5" hard drives 4-7
3	3.5" hard drives 8-11	4	Front board controller

4.1.3 25×2.5" front panel

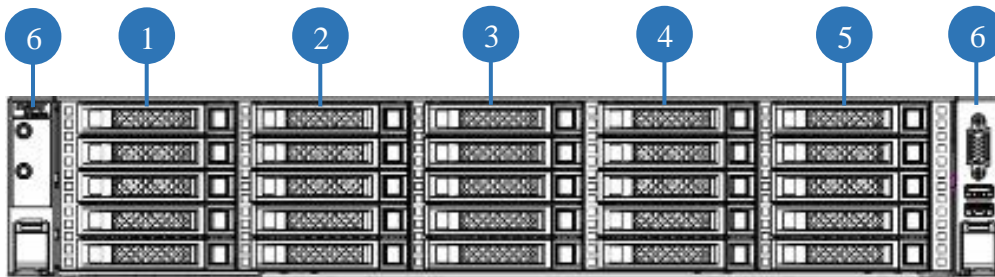


Figure 4-4 Front panel view

No.	Module	No.	Module
1	2.5" hard drives 0-4	2	2.5" hard drives 5-9
3	2.5" hard drives 10-14	4	2.5" hard drives 15-19
5	2.5" hard drives 20-24	6	Front board controller

4.1.4 Hard drive LED indicators

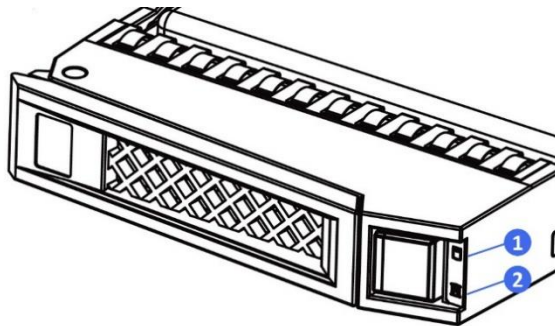


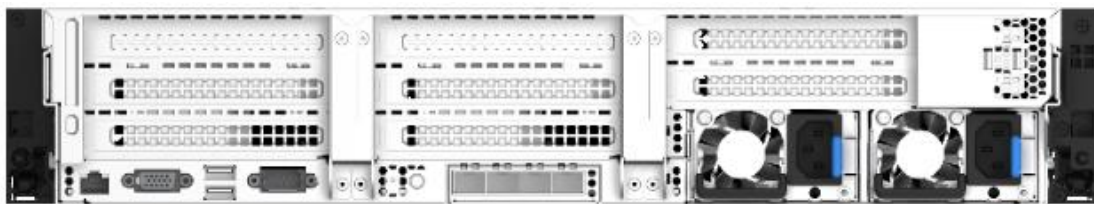
Figure 4-5 Hard drive LED indicators

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

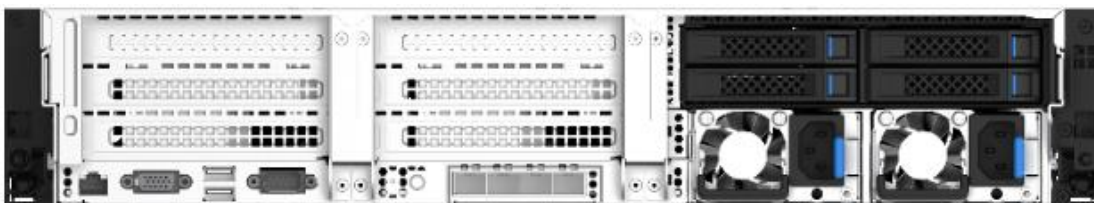
4.2 Rear Panel

The rear of the server can be configured to accommodate PCIe expansion slots or rear hard drives. Refer to 4.5 I/O Expansion & Rear Hard Drives for more information. The rear view of some configurations is shown as follows:

- Total PCIe expansion (Up to 8* PCIe X8)



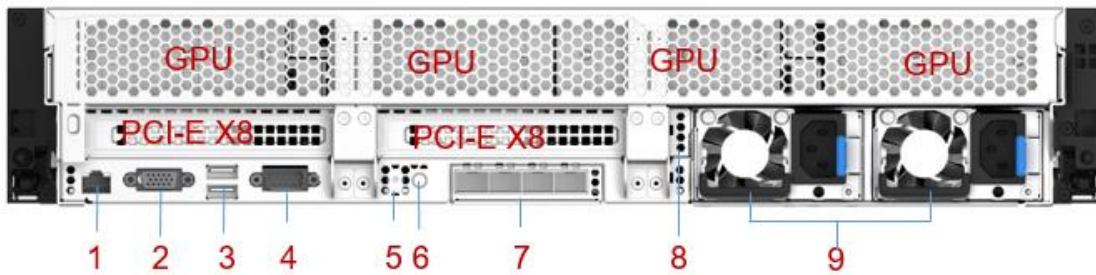
- Rear 4* 2.5" hard drive + PCIe expansion



- Rear 4*3.5" hard drive + PCIe expansion



- 4GPU configuration + 2*PCIe X8



No.	Module
1	MLAN port
2	VGA port
3	USB3.0 port (2)
4	Serial port
5	BMC_RST button
6	UID/RST button
7	OCT/PHY card connector
8	Network cable remover
9	Power supply

4.3 Internal View of Server

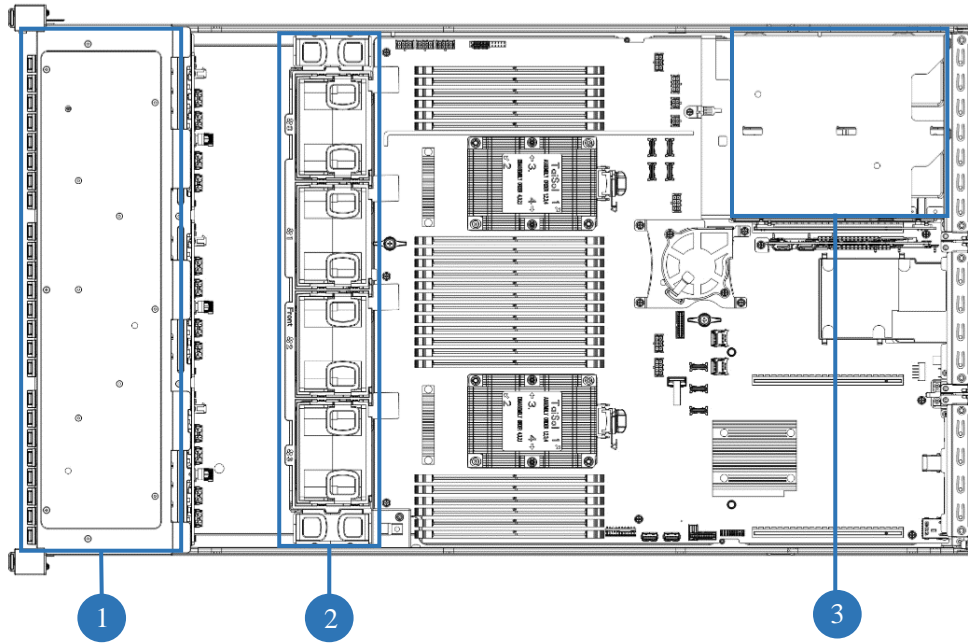


Figure 4-6 Internal view of server

No.	Module	No.	Module
1	2.5/3.5" hard drive bays	2	System fans
3	Power supply modules		

4.4 PCIe Adapter Cards

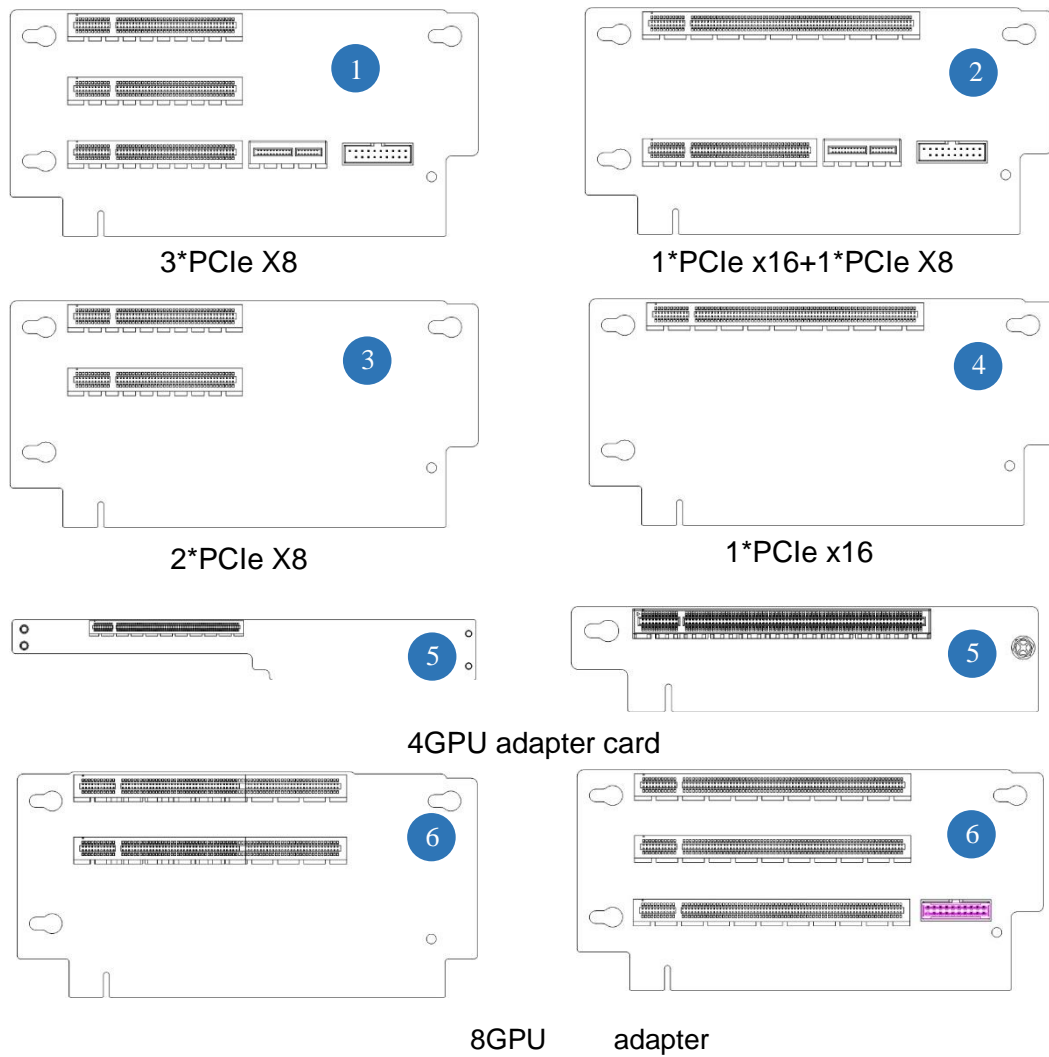


Figure 4-7 PCIe adapter cards

No.	Specifications	Motherboard PCIe slot specifications
1	PCIe X24 to X8+X8+X8 (incl. X1)	PCIe X24
2	PCIe X24 to X8+X16 (incl. X1)	
3	PCIe X16 to X8+X8	PCIe X16
4	PCIe X16 to X16	
5	PCIe X24 to X8+X16	PCIe X24
6	8GPU dedicated adapter card	

4.5 I/O Expansion & Rear Hard Drives



Figure 4-8 Rear view of server

I/O expansion slot and rear hard drives (0-4 GPU models)

Room1 | Room2 can be configured with any one of the following three configurations

- PCIe slot: X8+X8+X8
- PCIe slot: X16+X8
- 2*3.5" hard drive bays

Room3 can be configured with any one of the following three configurations

- PCIe slot: X8+X8
- PCIe slot: X16
- 4* 2.5" hard drive bays

There are five PCIe adapter cards as follows:

- PCIe Riser1: X24 to X8+X8+X8 (incl. X1)
- PCIe Riser2: X24 to X16+X8 (incl. X1)
- PCIe Riser3: X16 to X8-X8
- PCIe Riser4: X16 to X16
- PCIe Riser (NVMe): X24 to X16+X8

Note:

When installed in the X8+X1 slot, the Ethernet card (with NC-SI function) enables NC-SI function.

When installed in the X8 slot, the Ethernet card (with NC-SI function) ensures normal network card operation but does not enable no NC-SI function.

PCIe Riser (NVMe) is specifically used on a Retimer card. One Retimer card occupies one PCI-E X16 slot.

PCIe Riser1: X24 to X8+X8+X8

Slot	PCIe	Bus width	Connector width	Form factor	IO expansion location
1	3.0	X8	X8	Full length, full height	Room1 Room2
2	3.0	X8	X8	Full length, full height	
3	3.0	X8	X8	Full length, full height	

PCIe Riser2: X24 to X16+X8

Slot	PCIe	Bus width	Connector width	Form factor	IO expansion location
1	3.0	X16	X16	Full length, full height	Room1 Room2
2	3.0	X8	X8	Full length, full height	

PCIe Riser3: X16 to X8+X8

Slot	PCIe	Bus width	Connector width	Form factor	IO expansion location
1	3.0	X8	X8	Full length, full height	Room3
2	3.0	X8	X8	Full length, full height	

PCIe Riser4: X16 to X16

Slot	PCIe	Bus width	Connector width	Form factor	IO expansion location
1	3.0	X16	X16	Full length, full height	Room3

Relationship between IO expansion location, motherboard slot, and CPU signal:

IO expansion location	Motherboard slot		Motherboard number	Signal source
	Bus width	Connector width		
Room1	X24	X24	31	CPU0(X24)
Room2	X24	X24	24	CPU0(X8)+CPU1(X16)
Room3	X16	X24	14	CPU1(X16)

Note: Refer to 4.7 Motherboard Layout for the motherboard slots and numbers

In a single CPU configuration, only the PCIe expansion slot that corresponds with CPU0 may be used.

4.6 Hard Drive Backplanes

The NF5280M5 has front 3.5" backplanes, front 2.5" backplanes, rear 3.5" backplanes, and rear 2.5" backplanes, as described below:

3.5" backplane:

Backplane type	Description	Description
3.5"*4	3.5"*4_3*SAS+1*NVMe	Supports 3*SAS/SATA+1*NVMe or 4*SAS/SATA
	3.5"*4_4*NVMe	Supports 4*NVMe or 4*SAS/SATA
3.5"*12	3.5"*12_SAS	Supports 12*SAS/SATA Provides the option to cascade with 1* 2.5"*2 backplane
3.5"*2 (rear)	3.5"*2_2*SAS	Supports 2*SAS/SATA

2.5" backplane:

Backplane type	Description	Description
2.5"*8	2.5"*8_6*SAS+2*NVMe	Supports 6*SAS/SATA+2*NVMe or 8*SAS/SATA
2.5"*25	2.5"*25_21*SAS+4*NVMe	Supports 21*SAS/SATA+4*NVMe or 25*SAS/SATA
2.5"*24 (NVMe)	2.5"*24_NVMe	Supports 24*NVMe
2.5"*2 (rear)	2.5"*2_SAS	Supports 2*SAS/SATA

Note: For backplanes equipped with expander chips (such as the 3.5" *12 and 2.5" *25), a RAID/SAS card is required when configuring a SATA hard drive, and an onboard SATA controller cannot be connected.

NVMe hard drive configuration rule (Non-24NVMe drives support up to 12*NVMe):

- $1 \leq \text{NVMe} \leq 4$: Connect 4* OCuLink to motherboard
- $5 \leq \text{NVMe} \leq 8$: Add 1* Retimer card
- $9 \leq \text{NVMe} \leq 12$: Add 2* Retimer card
- 1* Retimer card supports 4*NVMe

NVMe hard drive configuration rule (for 24NVMe drives):

- $1 \leq \text{NVMe} \leq 12$: Configure with 1* PCIe Switch card
- $13 \leq \text{NVMe} \leq 24$: Configure with 2* PCIe Switch cards
- Each PCIe Switch card supports 12*NVMe

Note: A Retimer card and a PCIe Switch occupies a PCIe X16 slot

4.7 Motherboard layout

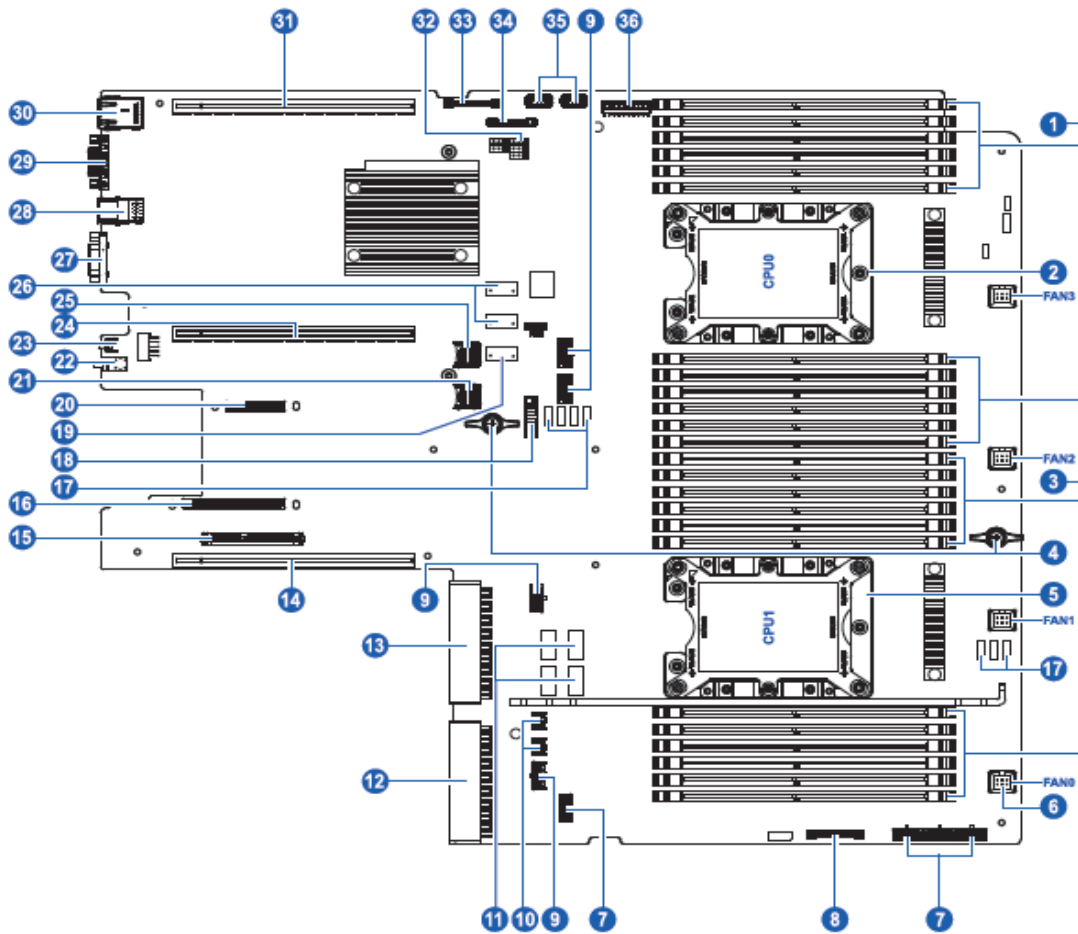


Figure 4-9 Motherboard layout

No.	Module	No.	Module
1	DIMM slots (CPU0)	2	CPU0
3	DIMM slots (CPU1)	4	Motherboard handles (2*)
5	CPU1	6	System fan connectors (4*)
7	Front hard drive backplane power connector	8	Front board controller
9	GPU PSU port	10	Rear hard drive back panel power connector (2*)
11	OCuLink port (4*)	12	PSU1 connector
13	PSU0 connector	14	PCI-E2_CPU1 card slot
15	M.2_CONN connector	16	OCP-A port
17	I2C port (7*)	18	NCSI connector
19	SSATA port	20	OCP-C port
21	SYS_TF_SLOT card slot	22	UID/RST button
23	BMC Reset button	24	PCIe1_CPU0/1 card slot
25	BMC_TF_SLOT card slot	26	SATA port (2*)
27	Serial port	28	USB3.0 port (2*)
29	VGA port	30	MLAN port
31	PCI-E0_CPU0 card slot	32	CLR_CMOS
33	Front board controller USB port	34	Front board controller VGA port
35	USB3.0 port (2*)	36	TPM connector

Note:

- PCIe slots:
- 31 = PCIe X24 slot, signals emitted from CPU0, connected to PCIe Riser;
- 24 = PCIe X24 slot, X8 signal emitted from CPU0, X16 signal emitted from CPU1, connected to PCIe Riser;
- 14 = PCIe X16 slot, signals emitted from CPU1, connected to PCIe Riser;
- PHY&OCP:

No.	Connector	Type	Signal source	Configuration
16	OCP connector A	OCP	CPU0	1* OCP or 1* PHY card can be placed in this region
20	OCP connector C	PHY	PCH	

- OcuLink port:

11 = 4* OcuLink ports for connecting NVME hard drives, and signals are emitted from CPU1

19 and 26 = 3* SATA ports for connecting SATA hard drives. Each port supports 4* SATA hard drives, for a total of 12* SATA hard drives.

5 System specifications

Table 5-1 Product parameters

Component	Description
Specifications	2U rackmount
Processor	Supports 1* or 2* Intel® Xeon® series scalable processors Supports up to 28 cores with a frequency of 2.7 GHz Maximum frequency of 3.6 GHz (8 cores) 2 UPI interconnected chains, maximum speed of 10.4 GT/s per chain Maximum TDP of 205W
Chipset	Intel C621/C622/C624
Memory	Supports up to 24* DDR4 2400/2666/2933 MT/s DIMMs Each CPU supports 12* DIMMs, two CPUs support 24* DIMMs. Supports RDIMM / LRDIMM / AEP. A single RDIMM/LRDIMM supports up to 128 GB (Skylake) / 256 GB (Cascade)
Storage	Front: Supports up to 12* 3.5" or 25* 2.5" hard drives Built-in: Supports up to 4* 3.5" hard drives or 2* M.2 SSDs Rear: Supports up to 4* 3.5" or 4* 2.5" hard drives (The maximum quantity of supported hard drives is configuration-specific)
M.2 SSD	Supports up to 2* M.2 SSD (Raid 0/1)
Storage controller	SAS card controller: Inspur 3008IT/IR, LSI 9400-8i RAID card controller: Inspur SAS3108 / SAS3008IMR / PM8060, LSI 9361-8i/16i, LSI 9460-8i/16i Intel onboard SATA controller, supports RAID 0/1/5/10 Intel onboard NVME controller, configurable with Intel NVME Raid Key Intel NVME Raid Key: Supports RAID 0/1/5/10 Not configurable with Raid Key: Can only be configured with Raid 0
Network port	The server supports 1* OCP card or 1* PHY card PHY: Supports 1 10 GE OCP: Supports 10 25 GE Standard PCIe Ethernet card: Supports 1 10 25 40 100 GE
Video card integration	Supports up to 1280x1024x32 bpp @ 60 Hz for video compression 64MB video memory
Optical drive	Supports external USB optical drive of the Slim DVDRW type
BMC	ASPEED AST2500 (ARM1176JZF-S 32Bit RISC CPU) 64 MB NOR Flash 4 Gbit DDR4 with ECC protection
I/O expansion slot	Expands up to 8* standard PCIe X8 slots, achieves various X8 and X16 slot configurations through different PCIe and riser cards. PCIe expansion adopts a modular tool-free disassembly design while retaining fixed screws.

Component	Description
	<p>The motherboard integrates 1* OCP connector A and 1* OCP connector C, used for supporting OCP/PHY cards</p> <p>The motherboard integrates 4* PCIe OCuLink ports (CPU1). Certain deployments can be expanded as PCIe slots, which can be used to support 4* NVME hard drives, the fourth GPU device, or other PCIe expansion applications.</p> <p>Supports up to 4* double-width GPU and 8* single-width CPU</p>
Ports	<p>Front: 1* USB2.0 (Supports LCD modules), 1* USB3.0, 1* VGA, 1* UID</p> <p>Built-in: 2* USB3.0</p> <p>Rear: 2* USB3.0, 1* VGA, 1* serial port, 1* network port, 1* UID</p>
Fan	4* hot-swappable N+1 redundancy 8056 fans (dual-rotor)
Power supply	Supports 2* 550W/800W/1300W/1600W/2000W PSUs (platinum/titanium), 1+1 redundancy, please see 6.9 Power Supply Units
System management	The onboard BMC management module supports IPMI, SOL, KVM Over IP, and virtual media. It provides 1* 1 Gbps RJ45 network port (supports NCSI function), and supports SSD lifespan tests and other functions.
Operating system	<p>Windows/ Red Hat/ SUSE/ Centos/ Debian/ XenServer/ Oracle Linux/ ESXi/ Ubuntu</p> <p>Please see 6.10 Operating System</p>

Table 5-2 Physical specifications

Item	Specifications
Size	<p>With handles: 478.8 mm (w) x 87 mm (h) x 811.5 mm (d)</p> <p>Without handles: 435 mm (w) x 87 mm (h) x 779.8 mm (d)</p> <p>Packaged: 1031 mm (l) x 651 mm (w) x 295 mm (h)</p>
Weight	<p>3.5"*12 configuration (includes rear 2.5" hard drives, does not include middle and rear 3.5" hard drives)</p> <p>Motherboard (unpacked): 31 kg</p> <p>Gross weight (packed): 40.5 kg (includes package + rail kit + components box)</p> <p>3.5"*12 configuration (includes middle and rear 3.5" hard drives)</p> <p>Motherboard (unpacked): 36.5 kg</p> <p>Gross weight (packed): 46kg (includes package + rail kit + components box)</p> <p>2.5"*25 configuration (includes rear 2.5" hard drives, does not include middle and rear 3.5" hard drives)</p> <p>Motherboard (unpacked): 26.5kg</p> <p>Gross weight (packed): 36kg (includes package + rail kit + components box)</p>
Temperature	<p>Operating temperature: 5°C~45°C^{1,2,3};</p> <p>Storage temperature (packed): -40°C~+70°C</p> <p>Storage temperature (unpacked): -40°C~+55°C</p>
Humidity	<p>Operating humidity: 10~90% R.H.</p> <p>Storage humidity (packed): 10~93% R.H.</p> <p>Storage humidity (unpacked): 10~93% R.H.</p>
Noise (Bels) (Sound power)	Idle

Item	Specifications
4,5,6,7	LWAd: 6.45 B for normal configurations; 6.90 B for high-end configurations LpAm: 49.0 B for normal configurations; 55.8 B for high-end configurations Operating LWAd: 6.52 B for normal configurations; 6.95 B for high-end configurations LpAm: 49.8 B for normal configurations; 56.4 B for high-end configurations
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);

Note:

1. Not all configurations support an operating temperature range of 5°C~45°C. In particular, the supported operating temperature for GPU configurations is 10°C~30°C.
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 (2953~10000 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.
 1. 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.
 2. The sound levels shown here were measured according to specific test configurations. The sound level will vary depending on system configuration. The values are subjected to change without notice and are for reference only.
 3. The sample (model) test assessments meet product specifications. This product or product series are eligible to have appropriate compliance labels and declarations.
 4. All sound levels listed are for standard shipping configurations while other system configurations may increase the volume.

Table 5-3 Safety & EMC

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 GB4943.1-2011 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	GB/T9254-2008 (idt CISPR 22: 2006) GB17625.1-2012 (idt IEC 61000-3-2: 2009) 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

Table 5-4 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 Processors

The NF5280M5 supports two Intel Xeon scalable processors.

Table 6-1 CPU list

Intel Platinum 8100&8200 series

Model	No. of cores	Threads	Frequency (GHz)	Turbo frequency (GHz)	L3 Cache (MB)	Max. memory	UPI	TDP(W)
8280L	28	56	2.70	4.0	38.5	4.5 TB	3	205
8276L	28	56	2.20	4.0	38.5	4.5 TB	3	165
8260L	24	48	2.40	3.90	35.75	4.5 TB	3	165
8280	28	56	2.70	4.0	38.5	1 TB	3	205
8270	26	52	2.70	4.0	35.75	1 TB	3	205
8268	24	48	2.90	3.90	35.75	1 TB	3	205
8276	28	56	2.20	4.0	38.5	1 TB	3	165
8260	24	48	2.40	3.90	35.75	1 TB	3	165
8256	4	8	3.80	3.90	16.5	1 TB	3	105
8253	16	32	2.20	3.00	22	1 TB	3	125
8180	28	56	2.50	3.80	38.5	768GB	3	205
8176	28	56	2.10	3.80	38.5	768GB	3	165
8170	26	52	2.10	3.70	35.75	768GB	3	165
8168	24	48	2.70	3.70	33	768GB	3	205
8164	26	52	2.00	3.70	35.75	768GB	3	150
8160	24	48	2.10	3.70	33	768GB	3	150
8156	4	8	3.60	3.70	16.5	768GB	3	105

Intel Gold 6100&6200 series

Model	No. of cores	Threads	Frequency (GHz)	Turbo frequency (GHz)	L3 Cache (MB)	Max. memory	UPI	TDP(W)
6254	18	36	3.10	4.0	24.75	1 TB	3	200
6252	24	48	2.10	3.70	35.75	1 TB	3	150
6248	20	40	2.50	3.90	27.5	1 TB	3	150
6244	8	16	3.60	4.40	24.75	1 TB	3	150
6242	16	32	2.80	3.90	22	1 TB	3	150
6240	18	36	2.60	3.90	24.75	1 TB	3	150
6238	22	44	2.10	3.70	30.25	1 TB	3	140
6234	8	16	3.30	4.00	24.75	1 TB	3	130
6230	20	40	2.10	3.90	27.5	1 TB	3	125
6226	12	24	2.70	3.70	19.25	1 TB	3	125
6154	18	36	3.00	3.70	24.75	768GB	3	200
6152	22	44	2.10	3.70	30.25	768GB	3	140
6150	18	36	2.70	3.70	24.75	768GB	3	165
6148	20	40	2.40	3.70	27.5	768GB	3	150
6146	12	24	3.20	4.20	24.75	768GB	3	165
6144	8	16	3.50	4.20	24.75	768GB	3	150
6142	16	32	2.60	3.70	22	768GB	3	150
6140	18	36	2.30	3.70	24.75	768GB	3	140
6138T	20	40	2.00	3.70	27.5	768GB	3	125
6138	20	40	2.00	3.70	27.5	768GB	3	125
6136	12	24	3.00	3.70	24.75	768GB	3	150
6134	8	16	3.20	3.70	24.75	768GB	3	130
6132	14	28	2.60	3.70	19.25	768GB	3	140
6130T	16	32	2.10	3.70	22	768GB	3	125
6130	16	32	2.10	3.70	22	768GB	3	125
6128	6	12	3.40	3.70	19.25	768GB	3	115
6126T	12	24	2.60	3.70	19.25	768GB	3	125
6126	12	24	2.60	3.70	19.25	768 GB	3	125

Intel Gold 5100&5200 series

Model	No. of cores	Threads	Frequency (GHz)	Turbo frequency (GHz)	L3 Cache (MB)	Max. memory	UPI	TDP(W)
5215L	10	20	2.50	3.40	13.75	4.5 TB	2	85
5222	4	8	3.80	3.90	16.5	1 TB	2	105
5220	18	36	2.20	3.90	24.75	1 TB	2	125
5218	16	32	2.30	3.90	22	1 TB	2	125
5217	8	16	3.00	3.70	11	1 TB	2	115
5215	10	20	2.50	3.40	13.75	1 TB	2	85
5122	4	8	3.60	3.70	16.5	768GB	2	105
5120	14	28	2.20	3.20	19.25	768GB	2	105
5118	12	24	2.30	3.20	16.5	768GB	2	105
5115	10	20	2.40	3.20	13.75	768GB	2	85

Intel Silver 4100&4200 series

Model	No. of cores	Threads	Frequency (GHz)	Turbo frequency (GHz)	L3 Cache (MB)	Max. memory	UPI	TDP(W)
4216	16	32	2.10	3.20	22	1 TB	2	100
4215	8	16	2.50	3.50	11	1 TB	2	85
4214	12	24	2.20	3.20	16.5	1 TB	2	85
4210	10	20	2.20	3.20	13.75	1 TB	2	85
4208	8	16	2.10	3.20	11	1 TB	2	85
4116	12	24	2.10	3.00	16.5	768GB	2	85
4114	10	20	2.20	3.00	13.75	768GB	2	85
4112	4	8	2.60	3.00	8.25	768GB	2	85
4110	8	16	2.10	3.00	11	768GB	2	85
4108	8	16	1.80	3.00	11	768GB	2	85

Intel Bronze 3200 series

Model	No. of cores	Threads	Frequency (GHz)	Turbo frequency (GHz)	L3 Cache (MB)	Max. memory	UPI	TDP(W)
3204	6	6	1.90	1.90	8.25	1 TB	2	85

6.2 Memory

The NF5280M5 supports up to 24* DDR4 DIMMs. Each processor supports 6* memory channels, and each channel supports 2* memory slots. Supports RDIMM / LRDIMM / AEP. Supports 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)

Table 6-2 DIMM list

Type of DIMM	Maximum memory capacity	Description
RDIMM	384 GB	24×16GB RDIMM@2400
	384 GB	24×16GB RDIMM@2666
	384 GB	24×16GB RDIMM@2933
	768 GB	24×32GB RDIMM@2400
	768 GB	24×32GB RDIMM@2666
	768 GB	24×32GB RDIMM@2933
	1.5 TB	24×64GB RDIMM@2666
	1.5 TB	24×64GB RDIMM@2933
LRDIMM	1.5 TB	24×64GB LRDIMM@2400
	1.5 TB	24×64GB LRDIMM@2666
	1.5 TB	24×64GB LRDIMM@2933
AEP	768 GB	6×128GB AEP@2666
	1.5 TB	6×256GB AEP@2666
	3072 GB	6×512GB AEP@2666

Note:

1. The same node does not support mixed memories from different memory types (RDIMM, LDRIMM) and different specifications (capacity, bit width, rank, depth).
2. Memory capacity can be maximized by installing two processors. When a single processor is used, the maximum memory capacity is halved.
3. The use of 5, 7, 9, 10, or 11 DIMMs for a single CPU (10, 14, 18, 20, 22 DIMMs for dual CPUs) is not recommended.
4. A technical review is required when using a NVDIMM.

Table 6-3 General memory slotting sequence

Memory slot		Memory quantity																								
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
CPU0	C0D0	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	C0D1													•	•	•	•	•	•	•	•	•	•	•	•	
	C1D0			•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	C1D1																•	•	•	•	•	•	•	•	•	
	C2D0					•	•	•		•	•	•	•	•	•	•		•	•	•	•	•	•	•	•	
	C2D1																		•	•		•	•	•	•	
	C3D0								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	C3D1																•	•	•		•	•	•	•	•	
	C4D0								•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
	C4D1																•	•			•	•	•	•	•	
	C5D0												•	•	•	•	•			•	•	•	•	•	•	
	C5D1																								•	
	CPU1	C0D0		•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•
		C0D1														•	•	•	•	•	•	•	•	•	•	•
C1D0					•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
C1D1																	•	•	•	•	•	•	•	•	•	
C2D0								•	•		•	•	•	•	•	•			•	•	•	•	•	•	•	
C2D1																			•	•			•	•	•	
C3D0									•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
C3D1																	•	•			•	•	•	•	•	
C4D0									•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	•	
C4D1																	•	•			•	•	•	•	•	
C5D0														•	•	•	•			•	•	•	•	•	•	
C5D1																									•	

Table 6-4 AEP memory slotting sequence

Memory slot	Memory quantity																								
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	
CPU 0	C0D0					DD R		DD R		DD R	DD R		DD R			DD R				DD R	DD R		DD R	DD R	
	C0D1							AEP		AEP	DD R					AEP				AEP	DD R		AEP	AEP	
	C1D0					DD R		DD R		DD R	DD R		DD R			DD R				DD R	DD R		DD R	DD R	
	C1D1									AEP	DD R									AEP	DD R		AEP	AEP	
	C2D0					DD R		DD R		DD R	AEP		DD R			DD R				DD R	AEP		DD R	DD R	
	C2D1																								AEP
	C3D0					DD R		DD R		DD R	DD R		DD R			DD R				DD R	DD R		DD R	DD R	
	C3D1							AEP		AEP	DD R					AEP				AEP	DD R		AEP	AEP	
	C4D0					DD R		DD R		DD R	DD R		DD R			DD R				DD R	DD R		DD R	DD R	
	C4D1									AEP	DD R									AEP	DD R		AEP	AEP	
	C5D0					DD R		DD R		DD R	AEP		DD R			DD R				DD R	AEP		DD R	DD R	
	C5D1																								AEP
CPU 1	C0D0											DD R				DD R				DD R	DD R		DD R	DD R	
	C0D1															AEP				AEP	DD R		AEP	AEP	
	C1D0											DD R				DD R				DD R	DD R		DD R	DD R	
	C1D1																			AEP	DD R		AEP	AEP	
	C2D0											DD R				DD R				DD R	AEP		DD R	DD R	
	C2D1																							AEP	
	C3D0											DD R				DD R				DD R	DD R		DD R	DD R	
	C3D1															AEP				AEP	DD R		AEP	AEP	
	C4D0											DD R				DD R				DD R	DD R		DD R	DD R	
	C4D1																			AEP	DD R		AEP	AEP	
	C5D0											DD R				DD R				DD R	AEP		DD R	DD R	
	C5D1																							AEP	

6.3 Storage

6.3.1 SATA/SAS hard drive model

Table 6-5 Hard drive configuration capacity

	Capacity	Configuration
Hot Plug LFF SAS HDD	209.6TB	10TB * 12(Front) + 10TB * 4(Middle) + 10TB * 4(Rear) [Plus 4 * 2.4TB SFF SSD rear]
Hot Plug LFF SATAHDD	249.6TB	12TB * 12(Front) + 12TB * 4(Middle) + 12TB * 4(Rear) [Plus 4 * 2.4TB SFF SSD rear]
Hot Plug SFF SAS HDD	69.6TB	2.4TB * 25(Front) + 2.4TB *4 (Rear)
Hot Plug SFF SATAHDD	58TB	2TB * 25(Front) + 2TB *4 (Rear)

Note: Mixing of 2.5" and 3.5" hard drives is allowed, but no more than three different types of hard drives should be used.

6.3.2 SSD Hard drive models

Table 6-6 Hard drives

Model	Capacity
SATA SSD	150G
SATA SSD	200G
SATA SSD	240G
SATA SSD	400G
SATA SSD	480G
SATA SSD	800G
SATA SSD	960G
SATA SSD	1.9T
SATA SSD	3.8T

6.3.3 U.2 NVME SSD hard drives

Table 6-7 U.2 NVME SSD hard drives

Model	Capacity	Maximum number
U.2 NVME SSD	1T	24
U.2 NVME SSD	1.8T	24
U.2 NVME SSD	2T	24
U.2 NVME SSD	3.6T	24
U.2 NVME SSD	4T	24
U.2 NVME SSD	8T	24

Note: Only supports NVME SSD after two processors have been installed

6.4 RAID/SAS cards

Table 6-8 SAS cards

Brand	Description	SuperCap
Inspur	SAS card_INSPUR_SAS3008+IR+PCI-E3.0	None
Inspur	SAS card_INSPUR_SAS3008+IT+PCI-E3.0	None
LSI	SAS card_L_8R0_9400-8i_HDM12G_PCI-E3	None

Table 6-9 RAID cards

Brand	Description	SuperCap
Inspur	RAID card_INSPUR_SAS3108_2GB_SAS12G_PCI-E3	SuperCap_AG_6.4F_CVM02_8G_3108
	RAID card_INSPUR_SAS3108_4GB_SAS12G_PCI-E3	SuperCap_AG_6.4F_CVM02_8G_3108
	RAID card_INSPUR_SAS3008+IMR+PCI-E3.0	None
	RAID card_INSPUR_PM8060_1GB_SAS12G_PCI-E3.0	Management board_INSPUR_ZY-AFM700+SuperCap
	RAID card_INSPUR_PM8060_2GB_SAS12G_PCI-E3.0	Management board_INSPUR_ZY-AFM700+SuperCap
LSI	RAID card_L_8R0_9361-8i_1GB_HDM12G_PCI-E3.0	SuperCap_L_8.0F_CVM02_4G_9361
	RAID card_L_8R0_9361-8i_2GB_HDM12G_PCI-E3.0	SuperCap_AG_6.4F_CVM02_8G_3108
	RAID card_L_8R0_9460-8i_2GB_HDM12G_PCI-E3	SuperCap_L_7.6F_49571-22_9460
	RAID card_L_16R0_9361-16i_2GB_HDM12G_PCI-E3	SuperCap_L_6.4F_49571-15_N_9361-16i
	RAID card_L_16R0_9460-16i_4GB_HDM12G_PCI-E3	SuperCap_L_7.6F_49571-22_9460

6.5 Network Cards

Table 6-10 PHY cards

Type	Model and description	Speed	Number of connectors
PHY	Network card_Inspur_5280M5_10G_2	10G	2
	Network card_Inspur_5280M5_CS4223_10G_4	10G	4
	Network card_Inspur_5280M5_CS4227_10G_LC_2	10G	2
	Network card_Inspur_5280M5_1G_RJ_4_PHY	1G	4

Note: A 1G PHY card is not compatible with a 100M switch

Table 6-11 OCP cards

Type	Model and description	Speed	Number of connectors
OCP	Network card_Inspur_OCP 25G_CX4LX_25G_LC_PCI-EX8_2	25G	2
	Network card_Inspur_OCP 25G_CX4LX_25G_LC_PCI-EX8	25G	1
	Network card_M_25G_MCX4421ACQN_LC_PCI-EX8_2_XR_OCP	25G	2

Table 6-12 Standard PCIe network cards

Type	Model and description	Speed	Number of connectors
PCIe	G_NIC_Intel_I350T2V2_1Gbps_RJ45_2Port	1G	2
	G_NIC_SiNEAD_I350AM2_1Gbps_RJ45_2Port	1G	2
	G_NIC_SiNEAD_W_I350-AM4_RJ_PCI-E4X_1KM_4	1G	4
	G_NIC_Silicom_I350_1Gbps_RJ45_2Port	1G	2
	G_NIC_Intel_I350T4V2_1Gbps_RJ45_4Port	1G	4
	G_NIC_Silicom_I350_1Gbps_RJ45_4Port	1G	4
	G_NIC_Intel_82599ES_10Gbps_LC_1Port_MM_SFP+	10G	1
	G_NIC_Intel_82599ES_10Gbps_LC_2Port_MM_SFP+	10G	2
	G_NIC_Intel_X540T2_10Gbps_RJ45_2Port	10G	2
	G_NIC_Inspur_XL710_10Gbps_LC_2Port_SFP+	10G	2
	G_NIC_Silicom_82599ES_10Gbps_LC_2Port_SFP+	10G	2
	G_NIC_Intel_10G_X710DA4FH_LC_PCI-EX8_4_XR	10G	4
	G_NIC_Silicom_82599ES_10Gbps_LC_4Port_SFP+	10G	4
	G_NIC_Silicom_82599ES_10Gbps_LC_1Port_SFP+	10G	1
	G_NIC_Intel_10G_X550T2_RJ_PCI-Ex4_2_XR	10G	2
	G_NIC_I_25G_XXV710DA2_LC_PCI-EX8_2_XR_limit	25G	2

Type	Model and description	Speed	Number of connectors
	G_NIC_QL_25G_QL45212HLCU-SP_LC_PCI-EX8_2_XR	25G	2
	G_NIC_M_25G_MCX4121A-ACAT_LC_PCI-EX8_D_XR	25G	2
	G_NIC_Qlogic_25G_QL41212HLCU_LC_PCI-EX8_2_XR_T	25G	2
	G_NIC_Mellanox_25G_MCX4121ACAT_LC_PCI-EX8_2_XR_T	25G	2
	G_NIC_BROADCM_25G_95741_LC_PCI-EX8_2_XR_T	25G	2
	G_NIC_BROADCM_25G_57414_LC_PCI-EX8_2_XR_42C	25G	2
	G_NIC_Mellanox_25G_MCX4111A-ACAT_LC_PCI-EX8_XR	25G	1
	G_NIC_Intel_XXV710DA2_25Gbps_LC_PCI-EX8	25G	2
	G_NIC_Intel_XL710_40Gbps_LC_1Port_MM_QSFP+	40G	1
	G_NIC_Intel_XL710_40Gbps_LC_2Port_MM_QSFP+	40G	2
	G_NIC_Mellanox_MCX416A-BCAT_40Gbps_LC_PCI-Ex16_2_XR_T	40G	2
	G_NIC_Mellanox_MCX416A-CCAT_100Gbps_LC_2Port_QSFP28	100G	2

Note: One server supports up to 6* network cards of the same type, 6* different types of 1G and 10G network cards, and 4* 25G and above network cards. Supports mixing of two different network card types.

6.6 FC HBA Card

Table 6-13 FC HBA card

Type	Model and description	Speed	Number of connectors
	G_FCHBA_8Gb/s_Emulex-LPE1250_1Port	8Gb/s	1
	G_FCHBA_8Gb/s_Emulex-LPE12002_2Port	8Gb/s	2
	G_FCHBA_16Gb/s_Qlogic-QLE2670_1Port	16Gb/s	1
	G_FCHBA_16Gb/s_Emulex-LPE16000B_1Port	16Gb/s	1
	G_FCHBA_16Gb/s_Qlogic-QLE2690_1Port	16Gb/s	1
	G_FCHBA_16Gb/s_Emulex-LPE16002B_2Port	16Gb/s	2
	G_FCHBA_16Gb/s_Qlogic-QLE2672_2Port	16Gb/s	2
	G_FCHBA_16Gb/s_Qlogic-QLE2692_2Port	16Gb/s	2

Note: Do not mix. Up to 4 cards may be installed.

6.7 HCA Card

Table 6-14 HCA card

Type	Model and description	Speed	Number of connectors
	HCA card_M_MCX455A-ECAT_EDR	100Gbps	1

	HCA card_M_1-IB22.4X_MCX353A-FCBT_PCI-E3.0	56Gbps	1
--	--	--------	---

Note: 100G requires PCIe X16

6.8 GPU

Table 6-15 GPU

Type	Model and description	Maximum number
GPU card	Video card_NV_16G_M60_256_P	4
	GPU_NV_16GB_Tesla-T4_256b_P	4
	GPU_NV_32GB_Tesla-V100_4096_P_CAC	4
	G_GPU_16GB_Tesla-V100_NVIDIA_PCI-E	4

Note: Each GPU is a X16 bus and must be inserted into the X16 slot in a riser card. Certain GPU configurations do not support 1+1 power supply redundancy.

6.9 Power Supply Units

The power supply units (PSU) are equipped with Intel Standard CRPS. The universal electrical and structural design supports hot-swapping, 1+1 redundancy, and up to two PSUs. Each PSU supports tool-free disassembly and is automatically locked in place when inserted into the server. CRPS units meets the 80 PLUS platinum efficiency and certain titanium efficiencies. It also provides multiple power outputs where users can choose PSUs with different powers according to specific configurations.

- Supports the following rated AC 110V~230V and DC 240V power supply and 1+1 redundancy:

550 W Platinum PSU: 550 W (110VAC), 550 W (230VAC), 550 W (240VDC for China)

800 W Platinum PSU: 800 W (110VAC), 800 W (230VAC), 800 W (240VDC for China)

1300W Platinum PSU: 1000 W (110VAC), 1300 W (230VAC), 1300 W (240VDC for China)

1600 W Platinum PSU: 1000 W (110VAC), 1600 W (230VAC), 1600 W (240VDC for China)

2000W Platinum PSU: 1000 W (110VAC), 2000 W (230VAC), 2000 W (240VDC for China)

550 W Titanium PSU: 550 W (230VAC), 550 W (230VAC), 550 W (240VDC for China)

800W Titanium PSU: 800 W (230VAC), 800 W (230VAC), 550 W (240VDC for China)

1300W Titanium PSU: 1300 W (230VAC), 1300 W (230VAC), 550 W (240VDC for China)

Note: At a rated 110 VAC, 1300W/1600W/2000W will be reduced to 1000W.

Input voltage range:

110VAC~230VAC: 90V~264V

240VDC: 190V~300V

- Supports the following rated DC 240V~336V power supply and 1+1 redundancy:

550W 336VDC PSU: 550W(240VDC), 550W(336VDC)

800W 336VDC PSU: 800W(240VDC), 800W(336VDC)

1300W 336VDC PSU: 1300W(240VDC), 1300W(336VDC)

1600W 336VDC PSU: 1600W(240VDC), 1600W(336VDC)

Input voltage range:
240VDC~336VDC: 190V~400V

- Supports the following rated AC -48V power supply and 1+1 redundancy:

800W -48VDC PSU: 800W(-48VDC)
1300W -48VDC PSU: 1300W(-48VDC)

Input voltage range:
-48VDC: -40V ~ -72V

6.10 Operating System

Table 6-16 Operating system

OS company	OS version
Windows	Windows_Server_2012R2
	Windows server 2016
	Windows server 2019
Red Hat	Red Hat Enterprise 6.7
	Red Hat Enterprise 6.8
	Red Hat Enterprise 6.9
	Red Hat Enterprise 7.2
	Red Hat Enterprise 7.3
	Red Hat Enterprise 7.4
	Red Hat Enterprise 7.5
	Red Hat Enterprise 7.6
SUSE	SUSE11.4
	SUSE12.2
	SUSE12.3
Centos	Centos_6.4
	Centos_6.5
	Centos_6.7
	Centos_6.8
	Centos_6.9
	Centos_6.10
	Centos_7.2
	Centos_7.3
	Centos_7.4

OS company	OS version
	Centos_7.5
	Centos_7.6
Debian	Debian_8.5
	Debian_8.6
XenServer	XenServer 7.1
Oracle Linux	Oracle Linux_6.9
	Oracle Linux_6.10
	Oracle Linux_7.2
	Oracle Linux_7.4
	Oracle Linux_7.6
ESXi 6.X	Vmware Esxi_6.3
	Vmware Esxi_6.5
	Vmware Esxi_6.0U1
	Vmware Esxi_6.0U2
	Vmware Esxi_6.5_limit
Ubuntu16	Ubutu_Server_14.04
	Ubutu_Server_16.04
	Ubutu_Server_16.1
	Ubutu_Server_18.04
	Ubutu_Server_16.04.02
	Ubutu_Server_18.04.02

Note: Cascade lake CPU supports windows 2016 2019, redhat7.5 and above, Skylake CPU supports the aforementioned operating systems.

7 Configuration Options

- The 4×GPU and onboard NVME are mutually exclusive.
- Inspur is only responsible for the initial shipping configuration. For example, the 3GPU models are separated from the GPU, and users are required to purchase their own GPU. Inspur is not responsible for subsequent problems.
- 1 to 3 GPUs can be configured in a 3GPU chassis, while no GPUs can be configured in an ordinary chassis
- The use of 5, 7, 9, 10, or 11 DIMMs for a single CPU (10, 14, 18, 20, 22 DIMMs for dual CPUs) is not recommended.
- For backplanes equipped with expander chips, a RAID/SAS card is required when configuring a SATA hard drive, and an onboard SATA controller cannot be connected.
- When the ambient temperature is 30°C, all configurations are supported. When the ambient temperature is above 35°C, GPU configuration is not supported; it is recommended to keep the temperature of the server room below 30°C.
- The following table shows the configurations supported according to the ambient temperature:

Type	30°C	35°C	40°C	45°C
2.5" *24	Y	Y	N	N
2.5" *25	Y	Y	N	N
3.5" *12	Y	Y	N	N
4* built-in bays	Y	Y	N	N
24NVME	Y	Y	N	N
1-3GPU	Y	N	N	N
4GPU	Y	N	N	N
8GPU	Y	N	N	N
GPU Balance	Y	N	N	N

Y: Support N: No support

- The NF5280M5 offers the following configuration types:

SNF5280M5009PDE NF5280M5_3.5x12 ordinary configuration

Suitable for backplane:

GPU quantity:

Front hard drive:

NVMe support:

SNF5280M500APDE NF5280M5_3.5 3GPU configuration

SNF5280M500BPDE NF5280M5_3.5 4GPU configuration

SNF5280M500CPDE NF5280M5_3.5 8GPU configuration

SNF5280M500DPDE NF5280M5_2.5x24 ordinary configuration

SNF5280M500EPDE NF5280M5_2.5 3GPU configuration

SNF5280M500FPDE NF5280M5_2.5 4GPU configuration

SNF5280M500GPDE NF5280M5_PCIE Switch configuration

SNF5280M500HPDE NF5280M5 BOM-2.5x25 configuration

8 System Management

The NF5280M5 integrates a next-generation BMC intelligent management system. 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

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	Checks screenshots through WebGui or RESTful ports
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.

Specifications	Description
IPv6	Supports IPv6 functions to achieve IPv6 environments and provide various IP addresses.
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	UID LED can be enabled to identify the location of a single system.
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.

9 Certifications

As of October 2019, the NF5280M5 has received the following certifications:

Region	Certification	Logo	Mandatory/discretionary	Description
PRC	3C		Mandatory	
	China Environmental Labelling		Discretionary	
	Energy-efficiency standards		Discretionary	
IAF	CB		Discretionary	
EU	CE		Mandatory	
USA	FCC		Mandatory	
	UL		Discretionary	
	Energy Star		Discretionary	
Russia	CU Certification		Mandatory	
	IT Security	N/A	Mandatory	
India	BIS		Mandatory	
South Korea	E-Standby Energy Efficiency Certification		Mandatory	
	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 Memory Mirroring

Memory mirroring prevents uncorrectable memory errors and system failure. When enabled, the system protects all data by storing two copies. In the event of an uncorrectable memory error, the system will automatically retrieve good data from the mirrored (redundant) copy. The system will continue to operate without user intervention. By providing additional mirrored redundancy in the memory system, memory mirroring provides the greatest protection for the entire system. It prevents memory failures during ECC, SDDC, DDDC, and online spare memory correction.

11.5 Memory Rank Sparing

Memory rank sparing provides protection against persistent DRAM failure. It tracks

excessive numbers of correctable errors. It copies unhealthy ranks to available spare ranks prior to multi-bit or persistent single-bit errors, which may cause uncorrectable errors in the future. It does not identify or disable a single failed DRAM, but instead disables the DIMM or rank. Since a DIMM or rank is needed to perform sparing, memory rank sparing, this technique uses the memory used for sparing to reduce the total amount of available memory. Each spare DIMM can only handle one failure. DIMMs that are likely to receive fatal/uncorrectable memory errors are automatically removed from operation, thus reducing system downtime.

11.6 Power Aware Techniques

Power aware techniques enable real-time power consumption monitoring of the CPU, memory, HDD, and fans in the system, so as to provide power consumption data for maintenance needs.

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

Inspur and the Inspur logo are registered trademarks of Inspur Electronic Information Industry Co., Ltd. All other trademarks and products mentioned in this document are properties of their respective owners.