



NF5466M5 Technical White Paper

Revision 1.0

Published on Dec. 27th, **2018**

Dear users,

Thank you for choosing Inspur storage optimized server.

This manual describes the product information of the storage optimized server and is intended to help you know and use it efficiently.

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1 Product Overview

Inspur's Yingxin server NF5466M5 is Inspur's new-generation 4U 2-socket rack-mounted storage server. With its ultimate design based on the new-generation Intel Xeon scalable processor, it provides exceptional computing performance as well as flexible super-large local storage. It is an ideal solution to the hot, warm and cold data storage in various industries such as communication, public security, transportation, government, education, enterprise, Internet, etc. It is especially suitable for the infrastructure in the distributed storage system and can be used in video storage, cloud storage resource pool, archive, big data and many more applications.



2 Features

For diversified application scenarios, Inspur NF5466M5 demonstrates consistent high quality and reliability, which exerts the ultimate design ideas in the performance, expandability, availability and manageability:

Performance:

- Adopts Intel® new-generation Xeon® scalable processors, with up to 28 cores and 56 threads per CPU running at 3.6 GHz maximum, up to TDP 165W CPU, 39 MB L3 cache, resulting in high processing capability of the server

Supports Turbo Boost: the frequency of the processor cores can be accelerated dynamically to enhance the processor performance based on of the applications' actual demands. Supporting Hyper Threading: it allows simultaneous processing of multiple threads in the chip so as to improve the chip performance.

- Supports 24* 2933 MHz DDR4 ECC memories (RDIMM / LRDIMM), to create excellent speed and high availability as well as memory capacity up to 3T
- Supports Intel Advanced Vector Extensions (AVX-512) with improvements in terms of data register width and quantity and FMA unit width, and obvious increase of floating point performance in computational intensive applications.
- Supports up to 44 Large Form Factor "LFF" Hard drives in a single server with capacity up to 616TB. The ultimate design ensures the maximum bandwidth and IOPS and gives full play to the performance of large drives.

Expandability:

- Various types of storage modules, I/O modules, network modules and GPU modules allows different combinations in different application scenarios thus users can choose configurations flexibly as required by the services.
- Supporting up to 44* 3.5" SAS/SATA hard drives + 2* 2.5" SAS/SATA/SSD and two internal M.2 drives.
- Supporting up to 8 standard PCIe 3.0 expansions for further I/O performance improvement.
- Supporting free switchover between OCP and PHY network cards and multiple OCP network interfaces of 1G, 10G, 25G, 40G and 50G, to achieve more flexible network configuration for applications.
- Supporting up to 2 dual-width GPUs or 6 single-width GPUs

Availability:

- The adoption of humanized design concept and modular design allow fast assembling/disassembling and reduces O&M time greatly.
- The intelligent control technique in conjunction with the advanced ventilation system of Inspur creates optimal working environment and ensure stable system operation.
- Hot-pluggable hard drives support RAID 0/1/1E/10/5/50/6/60, provides RAID Cache and support ultracapacitor power loss data protection.
- Through the cutting-edge BMC technologies, the Web management interface, and the fault diagnosis LED indicators help technicians pinpoint rapidly the component that fails or is going to fail, thus simplifying the maintenance work, expediting the problem solving and increasing the system availability.
- The BMC monitors system parameters and gives alarm information early, so that the technicians can take measures to ensure stable equipment operation and minimize the odds of downtime.

Manageability:

- With the embedded server intelligent management chip, it can support IPMI2.0 and Redfish. It realizes management functions including complete remote system monitoring, remote KVM and virtual media.
- The Inspur power consumption management technology can help users perform accurate real-time monitoring and control of the system power consumption, realize power telemetry exclusively, cooperate with the Node manager 3.0 technology to effectively conduct a comprehensive energy consumption management and control, and further improve the overall energy efficiency performance of the IT infrastructure.
- Rapid optic line diagnosis for the server is available. The LED indicators save space on the motherboard and help the administrator find the equipment to be maintained rapidly with the minimum work pressure.
- The integrated industry-standard unique expandable firmware interface (UEFI) increases the setting, configuration and update efficiency and simplifies error handling workflow.
- Remote power-on/off can be realized on individual hard drive.

Energy efficiency

- Its 1300W/1600W 80 PLUS platinum power module has a conversion efficiency up to 94% when the power supply is at 50% load.
- It supports 1+1 redundancy and AC/DC inputs, resulting in increased power conversion efficiency.
- The high efficient single-board VRD power supply minimizes the DC-DC conversion loss.
- It supports intelligent speed regulation for the system thermal dissipation fans and CPU frequency regulation to save energy.
- Supports optimized system thermal dissipation design with high-energy-efficient fans reduces the energy consumption on thermal dissipation.
- Different thermal dissipation policies are designed elaborately for different configurations.

Security

- With the support of Intel Trusted Execution Technology, the hardware-based protection against malware creates trusted environment upon startup, and further provides multiple methods for the system software to realize a safer system and better protection for data integrity.
- Firmware encryption/digital signature is implemented to prevent illegal write from unknown firmware.
- Structurally, the lock design on the upper cover of the chassis gives alarm automatically and prevent illegal operation.

3 Logical architecture

The NF5466M5 supports two Intel® Xeon® scalable processors and 24 DDR4 DIMMs. The processors are fully interconnected via two UPI buses with up to 10.4GT/s transmission rate. The processors are connected with three 3 PCIe Risers via PCIe bus, to support different PCIe slots. CPU0 is connected with the onboard OCP A connector PCIe bus, and the OCP C connector via the PCH.

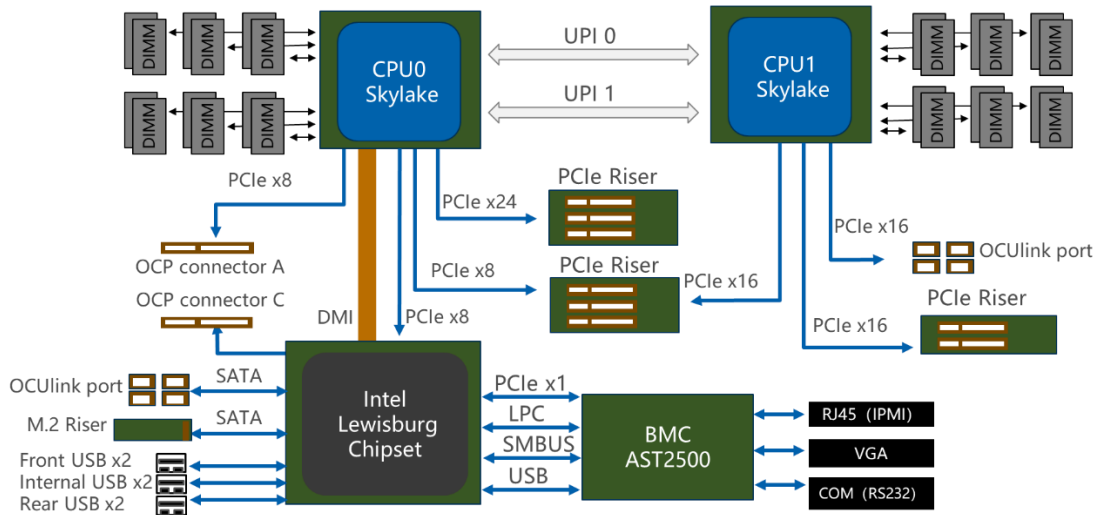


Fig. 0-1 NF5466M5 logical block diagram

4 Product Introduction

4.1 Front panel

4.1.1 Front view

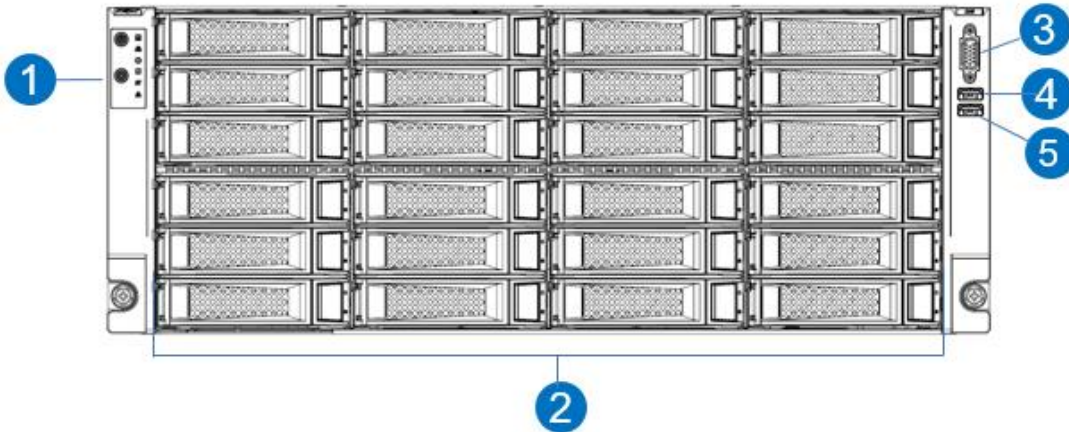


Fig. 0-1 Front view

Table 4-1 Front Panel component identification

No.	Module name
1	Front panel buttons and indicators
2	Front hard drive bay
3	Front VGA interface
4	Front USB3.0 interface
5	Front USB2.0+LCD interface

The hard drive sequence for the front drive bay is shown in figure 4-2.

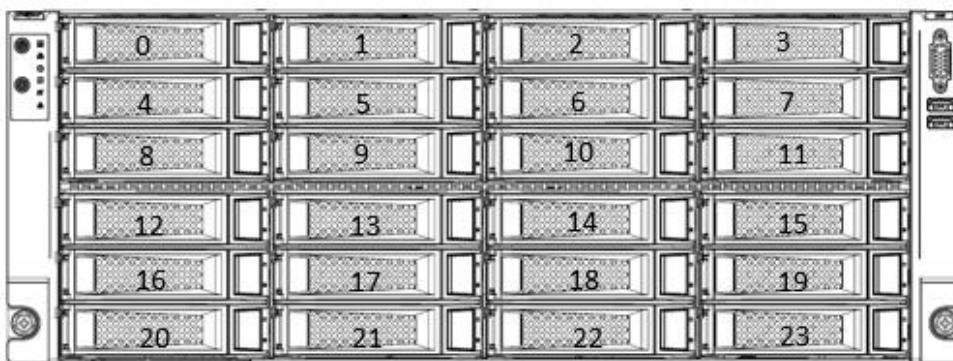


Fig. 0-2 Hard drive sequence

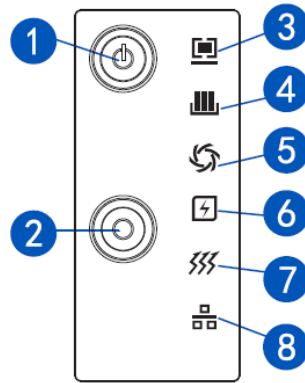


Fig. 0-3 Control panel LED indicators and buttons

Table 4-2 Control Panel LED indicators and buttons detail

No.	Module name	No.	Module name
1	Power button	5	Fans fault indicator
2	UID RST button	6	Power supply fault indicator
3	System fault indicator	7	System overheating indicator
4	Memory fault indicator	8	Network status indicator

4.1.2 Hard drive tray indicator

The hard drives are in trays which have 2 indicators to show the drive’s status.

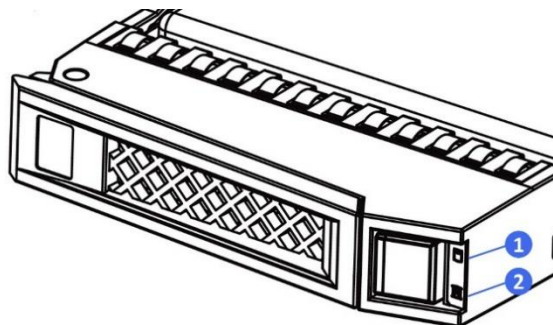


Fig. 0-4 Hard drive tray indicator

Table 4-3 Hard drive tray indicator detail

No.	Module name	Description
1	Hard drive fault indicator	Red light on: drive fault Blue light on: drive location Pink light flashing: RAID Rebuilding
2	Hard drive activity status indicator	Green light on: Normal Green light flashing: Hard drive in reading/writing

4.2 Rear panel

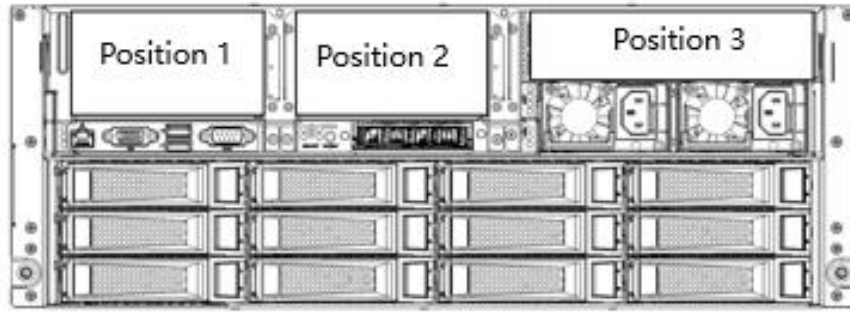


Fig. 05 Rear view

Positions 1, 2 and 3 contained in the upper 2U space can be configured as follows:

- Positions 1: PCIe Riser module or the 2*3.5inch hard drive
- Positions 2: PCIe Riser module or the 2*3.5inch hard drive
- Positions 3: PCIe Riser module or the 4*2.5inch hard drive

The lower 2U space is 12 3.5inch hard disk modules.

4.3 Top view

Fig. 06 Server inside illustration

The internal components of Inspur NF5466M5 is shown in figure 4-5.

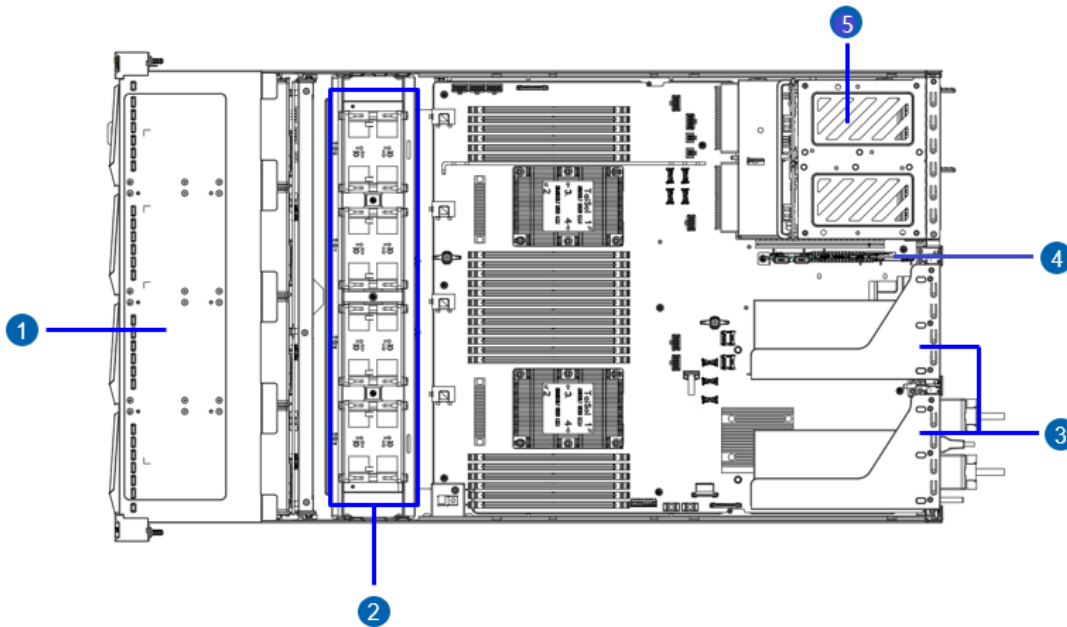


Fig. 4-5 Internal view

Table 4-6 Server internal components identification

No.	Module name	No.	Module name
1	24 LFF hard drives	2	System fans (4* 8056 fans)
3	PCIe module	4	2 M.2 SSD
5	1+1 redundant power supply unit		

4.4 PCIe adapter and OCP/PHY card

The server supports one OCP and one PHY cards that are illustrated in figure 4-6 and figure 4.7.

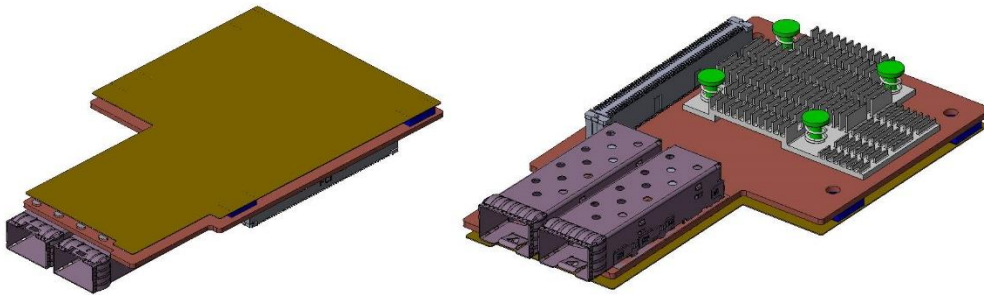


Fig. 0-6 PCIe adapter and OCP card

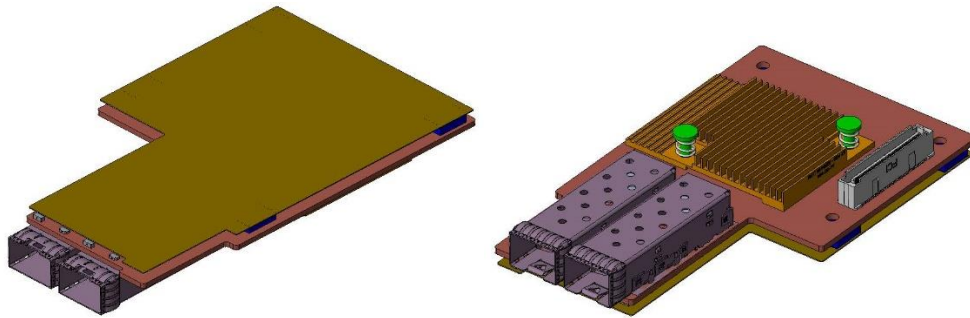


Fig. 4-7 PHY card

4.5 Motherboard layout

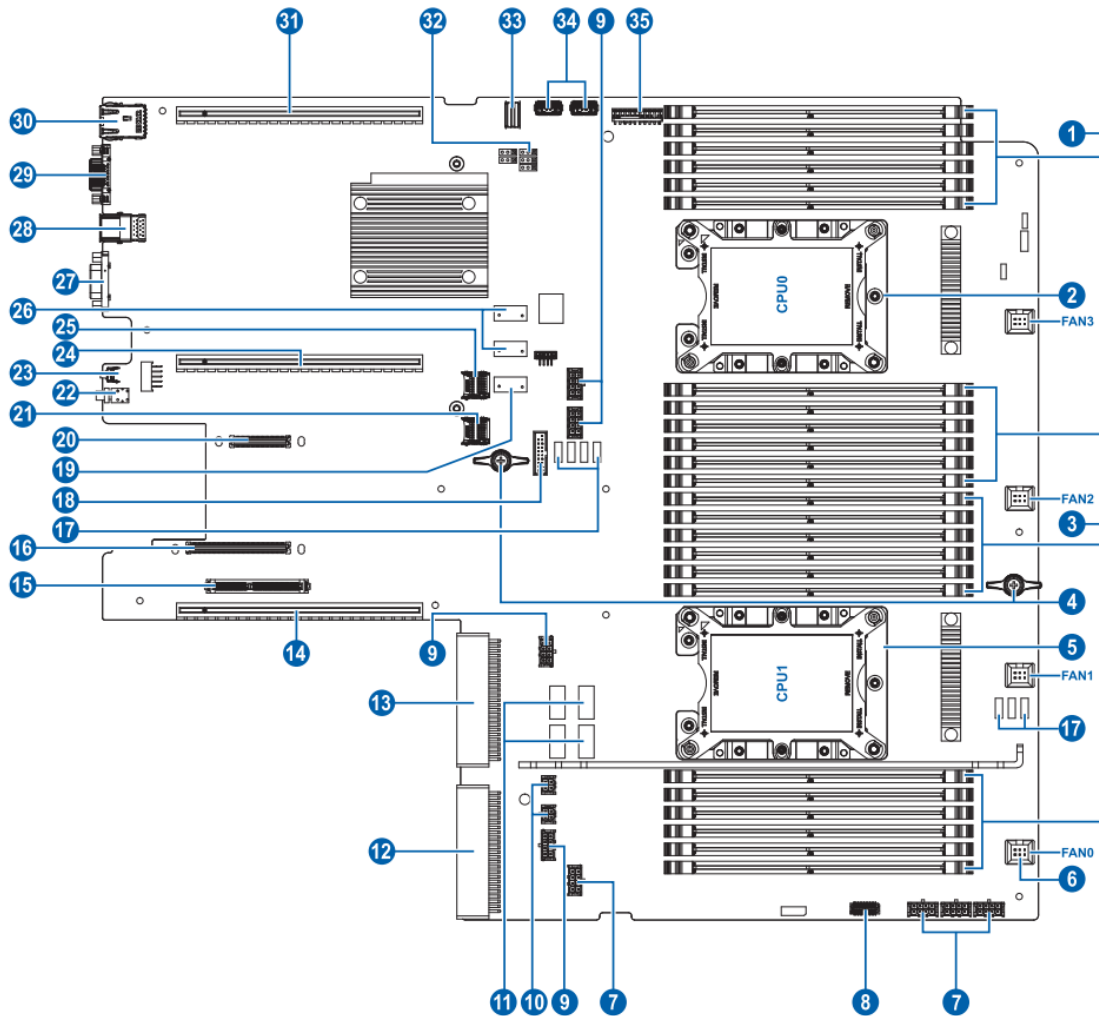


Fig. 08 Motherboard layout

Table 4-7 Server motherboard detail

No.	Module name	No.	Module name
1	Memory slot (corresponding to CPU0)	2	CPU0
3	Memory slot (corresponding to CPU1)	4	Motherboard handle (x2)
5	CPU1	6	System fan interface (x4)
7	Front hard drive backplane power supply interface	8	Front control board interface
9	GPU power interface	10	Rear hard drive backplane power supply interface (x2)
11	NVMe interface (x4)	12	PSU1 interface
13	PSU0 interface	14	PCIe2_CPU1 slot
15	M.2_CONN interface	16	OCP-A interface
17	I ² C interface (x7)	18	NC-SI interface
19	sSATA interface	20	OCP-C interface
21	SYS_TF_SLOT slot	22	UID RST button
23	BMC Reset button	24	PCIe1_CPU0/1 slot
25	BMC_TF_SLOT slot	26	SATA interface (x2)
27	Serial port	28	USB3.0 interface (x2)
29	VGA interface	30	MLAN interface
31	PCIe0_CPU0 slot	32	CLR_CMOS
33	Front controller board VGA+USB interface	34	USB3.0 interface (x2)
35	TPM interface		

5 System specifications

Table 0-1 System specifications

Components	Description
Specifications	4U rack-mounted server
Processor	Supporting 1-2 Intel ® Xeon® Scalable processors (3100/3200, 4100/4200, 5100/5200, 6100/6200, 8100/8200 series) with: up to 28 cores (2.5GHz), maximum frequency 3.8GHz Two UPI interconnecting links, of 10.4GT/s maximum ; Maximum L3 level cache 39MB; Maximum thermal design power 165W
Chipset	Intel C622
Video memory	Integrated onboard, supporting up to 1280*1024 resolution
Memory	Supporting up to 24* 2933MT/s RDIMM/LRDIMM/DIMMs (each processor supporting 6 memory channels and each channel supporting 2 memory slots). Supports ECC, memory mirroring and memory leveled protection.
Max memory capacity	RDIMM: Two processors support at most 24x64GB memories with capacity up to 1.5TB LRDIMM: Two processors support at most 24x128GB memories with capacity up to 3TB
Storage	Front panel: <ul style="list-style-type: none"> • 24* 3.5" SATA/SAS hot-pluggable • 12* 3.5" SATA/SAS+12* 2.5" SATA/SAS/SSD hot-pluggable Rear panel: <ul style="list-style-type: none"> • 16* 3.5" SATA/SAS hot-pluggable • 12* 3.5" SATA/SAS+4* 2.5" SATA/SAS/SSD/NVMe SSD hot-pluggable Built-in: 4* 3.5" SATA/SAS
M.2 & SD	Supporting up to two PCIe M.2 or two SATA M.2 Supporting up to two TF cards Note: The OS TF card is used to support Inspur standalone O&M software ISQP (downloadable from the official website). The BMC TF card is used to back up the BMC log and BIOS mirror.
Network interface	Supporting OCP network card or PHY card Supporting external PCIe network card Providing 1G, 10G, 25G, 40G, 50G, 100G network cards
I/O expansion slots	On the rear panel, supports up to 8 standard PCIe slots, and one OCP network card (connector A) slot or one PHY card (connector C) slot Riser module 1: expandable to 3 PCIe3.0x8 interfaces or 1 PCIe3.0x16 interface and 1 PCIe3.0x8 interface or expanded

	<p>3 PCIe3.0x16 (x8 signal)</p> <p>Riser module 2: expandable to 3 PCIe3.0x8 interfaces or 1 PCIe3.0x16 interface and 1 PCIe3.0x8 interface or 3 PCIe3.0x16 (x8 signal)</p> <p>Riser module 3: expandable to 2 PCIe3.0x8 interfaces</p> <p>Single-width GPU configuration:</p> <p>Riser module 1: expandable to 3 PCIe3.0x16 interfaces (x8 signal)</p> <p>Riser module 2: expandable to 3 PCIe3.0x16 interfaces (x8 signal)</p>
Interfaces	<p>Front (chassis handle):</p> <p>1 VGA + 1 USB3.0 + 1 USB2.0 (supporting LCD)</p> <p>Rear:</p> <p>1 RJ45 + 1 VGA + 2 USB.3.0 + 1 COM</p>
Fan	Supports 4* 8056 N +1 redundant fans
Power supply	Supports 1+1 redundancy power supply of 800W/1300W/1600W and higher power
System management	One independent onboard 1000Mbps network interface for remote management
Operating system	<p>Microsoft Windows Server 2012/2016;</p> <p>SUSE Linux Enterprise Server 12;</p> <p>Red Hat Enterprise 7;</p> <p>CenterOS 7;</p> <p>Kylin 7.4</p> <p>See the Compatibility List for details.</p>
Dimensions	<p>Without chassis handle: 446 W × 174.4 H × 786.3 D (mm)</p> <p>With chassis handle: 482.4 W × 174.4 H × 818.7 D (mm)</p>
Weight	<p>Gross weight at full configuration: 67kg (including mainframe + packing box + guiding rail + accessory box)</p> <p>Net weight: 60kg</p>

6 Compatibility list

6.1 Processor

The NF5466M5 supports at most two Intel® Xeon® Scalable Processors. The list below shows the specifications of some of the processors supported by the NF5466M5.

Table 0-1 Processor compatibility list

Model	Number of cores	Threads	Base frequency	Cache (MB L3)	Maximum memory supported	UPI amount	Power consumption
8176	28	56	2.10 GHz	38.50	768 GB	3	165 W
8170	26	52	2.10 GHz	35.75	768 GB	3	165 W
8160	24	48	2.10 GHz	33.00	768 GB	3	150 W
6152	22	44	2.10 GHz	30.25	768 GB	3	140 W
6150	18	36	2.70 GHz	24.75	768 GB	3	105 W
6146	12	24	3.2 GHz	25	768 GB	3	165W
6142	16	32	2.60 GHz	22.00	768 GB	3	150 W
6140	18	36	2.30 GHz	24.75	768 GB	3	140 W
6138	20	40	2.00 GHz	27.50	768 GB	3	125 W
6134	8	16	3.20 GHz	24.75	768 GB	3	130 W
6132	14	28	2.60 GHz	19.25	768 GB	3	140W
6130	16	32	2.10 GHz	22.00	768 GB	3	125 W
6129	16	32	3.2 GHz	25	768 GB	2	120W
6128	6	12	3.4 GHz	19	768 GB	3	115W
6126	12	24	2.60 GHz	19.25	768 GB	3	125 W
5120	14	28	2.20 GHz	19.25	768 GB	2	105 W
5118	12	24	2.30 GHz	16.50	768 GB	2	105 W
4116	12	24	2.10 GHz	16.50	768 GB	2	85W
4114	10	20	2.20 GHz	13.75	768 GB	2	85W
4110	8	16	2.10 GHz	11.00	768 GB	2	85W
8260L	24	48	2.4GHz	36	4.5TB	3	165W
8260	24	48	2.4GHz	36	1TB	3	165W
8276M	28	56	2.2 GHz	38.5	2TB	3	165W
8276	28	56	2.2 GHz	38.5	1TB	3	165W
6244	8	16	3.7GHz	24.75	1TB	3	150W
6230	20	40	2.1 GHz	27.5	1TB	3	125W
6240	18	36	2.6GHz	24.75	1TB	3	150W
6242	16	32	2.8GHz	22	1TB	3	150W
6248	20	40	2.4GHz	27.5	1TB	3	150W
6252	24	48	2.1 GHz	35.75	1TB	3	150W
5222	4	8	3.6 GHz	16.5	1TB	2	105W
5218	16	32	2.3GHz	22	1TB	2	125W
5220	18	36	2.2GHz	24.75	1TB	2	125W
4214	12	24	2.2GHz	16.5	1TB	2	85W
4210	10	20	2.2GHz	13.75	1TB	2	85W

Note: The Compatibility List will be updated from time to time.

6.2 Memory

When two processors are installed, the NF5466M5 supports up to 24 DIMMs. Each processor has six memory channels; each channel has two DIMMs. RDIMM, LDIMM and NVDIMM memories are supported.

Table 0-2 Memory compatibility list

Type	Capacity	Rate	Data width
RDIMM	16GB	2666	x72
RDIMM	16GB	2933	x72
RDIMM	32GB	2666	x72
RDIMM	32GB	2933	x72
RDIMM	32GB	2666	x72
RDIMM	64GB	2933	x72
LRDIMM	64GB	2933	x72
LRDIMM	64GB	2666	x72

Note:

- The memory cannot be installed until the processor is installed completely.
- If only one processor is installed, only half of the DIMM slots can be used.
- When two processors are installed, the DIMMs shall be balanced between the two processors.
- Mix of different DIMM types (UDIMM, RDIMM and LRDIMM) is not supported.

6.3 Storage

6.3.1 SATA/SAS hard drive model

Table 0-3 Hard drive compatibility list

Type	Hard drive speed	Capacity
2.5 SAS	10K	300G/600G/900G/1.2T/1.8T/2.4T
2.5 SAS	15K	300G/600G/900G
3.5 SAS	7.2K	4T/6T/8T/10T
3.5 SATA	7.2K	2T/4T/6T/8T/10T/12T/14T/16T
SATA SSD	/	240G/480G/960G/1.92T/3.84T
NVMe SSD	/	1T/1.6T/2T/3.2T/3.6T/4T/6.4T
PCIe SSD	/	1.6T/2T/4T
SATA M.2	/	240G/480G

Note: For the part model not mentioned in this list, please contact Inspur technician for support.

6.4 RAID/SAS card

Table 0-4 RAID/SAS card compatibility list

Type	Model & description	SAS speed	Buffer	Super-capacitor
SAS card	SAS card_INSPUR_SAS3008+IR+PCIE3.0	12Gbps	N/A	N/A
	SAS card_INSPUR_SAS3008+IT+PCI-E3.0	12Gbps	N/A	N/A
RAID card	RAID card_L_8R0_9460-8i_2GB_HDM12G_PCI-E3	12Gbps	2GB	Optional
	RAID card_PM8060_2GB_SAS12G_PCI-E3.0	12Gbps	2GB	Optional
	RAID card_INSPUR_SAS3108_2GB_SAS12G_PCI-E3	12Gbps	2GB	Optional
	RAID card_INSPUR_SAS3108_4GB_SAS12G_PCI-E3	12Gbps	4GB	Optional
	RAID card_L_8R0_9361-8i_1GB_	12Gbps	1GB	Optional

	HDM12G_PCI-E3.0			
	RAID card_L_8R0_9361-8i_2GB_HDM12G_PCI-E3.0	12Gbps	2GB	Optional

Table 0-5 RAID/SAS level

RAID card model	RAID level supported
3008 IT	No Raid
3008 IR	RAID 0,1,1E,10
9361-8i/3108	RAID 0, 1, 5, 6, 10, 50, 60
PM8060	RAID 0, 1, 5, 6, 10, 50, 60
9460-8i	RAID 0, 1, 5, 6, 10, 50, 60

Table 0-6 RAID level and related characteristics

RAID level	Reliability	Read performance	Write performance	Hard drive utilization
RAID 0	Low	High	High	100%
RAID 1	High	High	Low	50%
RAID 10	High	High	Middle	50%
RAID 1E	High	Middle	Middle	50%
RAID 5	Relatively high	High	Middle	(N-1)/N
RAID 50	High	High	Relatively high	(N-M)/N
RAID 6	High	Middle	Middle	(N-2)/N
RAID 60	Relatively high	High	Middle	(N-Mx2)/N

Note: N is the number of hard drives; M is the number of subgroups of the RAID group.

6.5 Network card

Table 0-8 Network card compatibility list

Type	Model & description	Rate	Number of interfaces
PHY card	Network card_Inspur__10G_2 (note: RJ45)	10G	2
	Network card_Inspur__CS4227_10G_LC_2	10G	2
	Network card_Inspur__1G_RJ_4_PHY	1G	4
OCP	Network card_Inspur_OCP_25G_CX4LX_25G_LC_PCI-Ex8_2	25G	2
	Network card_M_25G_MCX4421ACQN_LC_PCI-Ex8_2_XR_OCP	25G	2
PCI-E	Network card_Intel_W_I350-T2V2_RJ_PCI-E4X_1KM_dual	1Gb	2
	network card_I_10G_X710DA2_LC_PCIEx8_2_XR	1Gb	2
	Network card_SND_W_I350-AM2_RJ_PCI-E4X_1KM_dual	1Gb	2
	Network card_Intel_W_X540-T2_RJ45_PCI-E8X_10G_dual	10Gb	2
	Network card_Intel_W_82599ES_LC_PCI-E8X_10G_single	10Gb	1
	Network card_Intel_W_82599ES_LC_PCI-E8X_10G_dual	10Gb	2
	Network card_I_10G_X710DA4FH_LC_PCIEx8_4_XR	10Gb	4
	Network card_M_25G_MCX4121A-ACAT_LC_PCIEx8_D_XR	25Gb	2
Network card_BROADCM_25G_57414_LC_PCIEx8_2_XR_42C	25Gb	2	

	Network card_I_40G_XL710_LC_PCIEx8_MM	40Gb	1
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6.6 FC HBA card

Table 0-9 FC HBA card compatibility list

Type	Model & description	Rate	Number of interfaces
HBA card	HBA card_E_0R1_LPE1250_LC8G_PCIE	8Gb/s	1
	HBA card_E_0R2_LPE12002_LC8G_PCIE	8Gb/s	2
	HBA card_E_0R1_LPE16000B_LC16G_PCIE	16Gb/s	1
	HBA card_Q_0R1_QLE2670_LC16G_PCIE	16Gb/s	1
	HBA card_QL_4R1_QLE2690-ISR-BK_FC16G_PCIE	16Gb/s	1
	HBA card_Q_0R2_QLE2672_LC16G_PCIE	16Gb/s	2
	HBA card_E_0R2_LPE16002B_LC16G_PCIE	16Gb/s	2
	HBA card_QL_4R2_QLE2692-ISR-BK_FC16G_PCIE	16Gb/s	2

For more details on the HBA specifications, see the following URL:

<http://www.qlogic.com/Products/adapters/Pages/FibreChannelAdapters.aspx>

<https://www.broadcom.com/products/storage/fibre-channel-host-bus-adapters/#tab-168G2>

6.7 HCA card

Table 0-10 HCA card compatibility list

Type	Model & description	Rate	Number of interfaces
HCA card	HCA card_M_1-IB22.4X_MCX353A-FCBT_PCIE3.0	56Gbps	1
	HCA card_M_MCX353A-FCCT_FDR	56Gbps	1
	HCA card_M_MCX455A-ECAT_EDR	100Gbps	1

For more details, see the following URL:

<https://www.asus.com/Commercial-Servers-Workstations/PEMFDR/overview/>

http://www.mellanox.com/page/infiniband_cards_overview

<http://ark.intel.com/products/family/92003/Intel-Omni-Path-Host-Fabric-Interface-Products>

6.8 Expander card

Table 0-11 Expander card compatibility list

Type	Model & description	Number uplink channels	Number of SAS	Number downlink channels	Number of SAS
Expander card	Expander card_Inspur_5466M5_35x48_x8_x40_SAS	8		40	

6.9 Graphic card

Table 0-12 Graphic card compatibility list

Type	Model & description	Maximum quantity
GPU	Graphic card_NV_24G_TESLA-P40_384b_P_CAC	2
	GPU_NV_8G_P4_256b_P_CAC	6

Note:

- NVIDIA PCIe x16 adapter (x16-wired) needs the PCIe x16 riser card.
- The GPU configuration is subject to technical review.

6.10 Power supply

Table 0-13 Power supply compatibility list

Power	Brand	Input parameters	Rated inputs	Minimum	Maximum
800W 1300W 1600W	GreatWall	AC	100-240V	90	264
		Frequency		47	63
		DC	240Vdc	180	310
800W 1300W 1600W	LITEON	AC	115-230V	90	264
		Frequency	50-60Hz	47	63
		DC	270Vdc	164	300

6.11 Operating system

Table 0-14 Operating system compatibility list

OS vendor	OS version
Red Hat	Red Hat Enterprise 7.3~7.4
CentOS	CentOS 7.0~7.5
Windows	Windows Server 2012R2
Windows	Windows Server 2016
Kylin	Kylin 7.4
SUSE	SLES 12.2~12.3
Debian	Debian 8
Solaris	Solaris11.3
Ubuntu	Ubuntu 16.04

Note 1: The OS compatibility list will be updated from time to time.

Note 2: To make sure of correct sequence of hard drives, the related parameters need to be adjusted in the OS. For more details, see the OS Installation Guide on the official website.

7

Notes on configuration

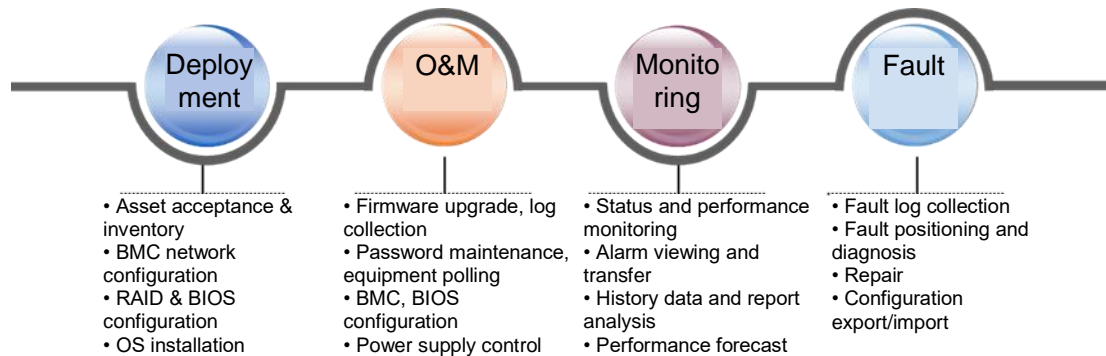
- For specific configurations, contact Inspur pre-sales engineers.

8 System management

8.1 System management introduction

The NF5466M5 has a full lifecycle O&M plan that helps IT administrators deploy, upgrade, monitor and manage the IT equipment efficiently. Overall O&M plans are available for local or remote environment, and in-band or out-band operations. Inspur servers can be easily introduced into your existing management architecture so as to minimize TCO maintenance cost.

Fig. 11 Server full lifecycle O&M



Inspur supplies a series of server management software that includes related tools for helping the data center O&M people from the equipment installation to disposal, which:

1. Reduces the complication and saves time
 - Reduces maintenance complication
 - Shortens execution time
2. Increases O&M efficiency and lowers cost
 - Optimizes asset management
 - Increases resource utilization
3. Prevents downtime and improve productivity
 - Minimizes downtime and human error
 - Matches customer's O&M environment

Inspur server management software product effectively helps administrators control and manage the servers.

8.2 Inspur Server Baseboard Management Controller

The Inspur Server Baseboard Management Controller (shortened as ISBMC) is an independent processor that runs an embedded OS. Independent of the server and its OS, it provides a secure and reliable way to execute common management tasks and ensures stable operation of the server. The ISBMC is embedded in the server so there is no necessity of additional software. It starts up and runs just by plugging the power cable and network cable. Through the out-band method, the ISBMC monitors the server sensors statuses, executes power-on/off remotely, accesses the BIOS configuration or OS console information, virtual KVM, etc., and sends the received server fault to the Trap, Email, Syslog alarm and so on. Instead of physical presence at the server site, the administrator performs remote management through Web or command line using IPMI, SNMP, Redfish and Smash CLI.

The IT administrator can use ISBMC for OS deployment, firmware upgrade, status monitoring, and configuration management on the server. This kind of out-band management method allows not only one-to-one operation of the administrator but also more servers to be included in the centralized monitoring platform (such as the ISPIM management software). No matter how is the user's scale, Inspur's productivity solution will increase the efficiency of IT administrators and lower the cost.

With the newest generation ISBMC, more utilities have been introduced, such as BMC dual mirror, RAID configuration, BIOS configuration, server fault diagnosis and HTML5 KVM, so that the out-band management becomes easier. The administrators does not need to be present in the noisy equipment room and can perform remote operation at ease.

Table 8-1 ISBMC function list

ISBMC function list			
Interface/standard	Redfish	Remote control	Power supply control
	IPMI 2.0		Startup control
	SNMP v1/v2c/v3		Virtual media
	Syslog		Virtual folder
	Web GUI		Remote folder sharing
	Telnet		Virtual console
	SSH		Access to virtual console via HTML5
	DCMI 1.5	Power and heat dissipation	Real-time voltage
	SOL		Power threshold and alarm
	KVM/HTML5		Real-time power
NTP	History power curve		
SMTP	Power upper limit capping		
Connectivity	Sharing NIC	Diagnosis/log records	Peak shifting power-on
	Special NIC		Temperature monitoring
	VLAN tag		History temperature curve
	IPv4		Fan speed control
	IPv6		Embedded diagnosis tool/fault analysis
	DHCP	Part replacement record	
	DNS	System event log (SEL)	
Security	ISMD (OS connectivity)	Upgrade/configuration	Audit log
	Role based right		Blackbox log
	Local user		Crash screenshot
	SSL encryption		Crash video
	IP access limit		BMC restart button
	Directory service (AD/LDAP)		BMC upgrade
	Login timeout		BIOS upgrade
Chassis invasion detection	BMC/BIOS dual mirror		
Running monitoring status	Agentless monitoring	BMC configuration	
	SNMP Trap	BIOS configuration	
	Email alarm	RAID configuration	
	Syslog alarm	ISA batch O&M tool	

	Configurable threshold	/	/
	Fan monitoring	/	/
	Power supply monitoring	/	/
	Temperature monitoring	/	/
	CPU monitoring	/	/
	Memory monitoring	/	/
	Hard drive monitoring	/	/
	RAID monitoring	/	/
	NIC monitoring	/	/
	BMC self-monitoring	/	/

8.3 Inspur Physical Infrastructure Manager

Inspur Physical Infrastructure Manager (ISPIM) is a high-availability, high-performance, high-expandability and high-maintainability infrastructure management platform independently developed by Inspur based on market demands. In the B/S architecture, it runs on the out-band network to monitor server, collect key indicators of the monitored devices, provide alarms, and send alarms to third-party monitoring platform with friendly and visual configuration UIs.

ISPIM is an overall operation & maintenance platform oriented to the data centers in the telecom, finance, Internet, government, enterprises and other industries. It features resource management, active/passive monitoring, real-time performance monitoring, alarm receiving/push, topology presentation, log collection and so on. It implements unified management over the servers, storage, switch, firewall and other devices, effectively helping enterprises improve O&M productivity, lower O&M cost and guarantee a safe and reliable operation of the data centers.

Table 8-2 Specifications

Functions	Function description
Home	Statistics by assets Health status Resource status distribution Alarm statistics distribution Asset resource distribution
Configuration management	Asset management Subnet management Position management Monitoring template
Alarm management	Real-time alarm History alarm Event Masking rule MIB management
Performance management	Resource indicator list Indicator list comparison and export History performance
Topology management	Network view Device view
Log management	Log collection

	Log retrieval Log query
System setting	User management Operation log Setting

9 Physical specifications

Table 0-1 Physical specifications

Item	Specifications
Dimensions	Without chassis handle: 446 W × 174.4 H × 786.3 D (mm) With chassis handle: 482.4 W × 174.4 H × 818.7 D (mm)
Weight	Gross weight at full configuration: 67kg (including mainframe + packing box + guide rail + accessory box) Net weight: 60kg
Power supply	1300 W: 1300 W (rated input voltage: 100 V ~ 240 V AC or 240V DC) 1600 W: 1600 W (rated input voltage: 115 V ~ 230 V AC or 240V DC)
Temperature	Working temperature: 5~35°C Storage temperature (with package): -40~+70°C Storage temperature (without package): -40~+55°C
Humidity	Working humidity: 10%~90% R.H. Storage humidity (with package): 10%~93% R.H. Storage humidity (without package): 10%~93%R.H.
Elevation	0 ~ 914m (3000ft), working temperature 5 ~ 35°C 914 ~2133m (7000ft), working temperature 10 ~ 32°C

10 Certification

Table 10-1 Certification

No.	Country	Certification	Standard
1	China	RoHS	SJ/T 11363-2006 SJ/T 11364-2006 GB/T 26572-2011
2	China	CCC	GB4943.1-2011 GB9254-2008(ClassA) GB17625.1-2012
3	Europe	CE	Safety: EN 60950-1: 2006 +A11: 2009 +A1: 2010 +A12: 2011 +A2: 2013 EMC: EN 55032:2015, EN 55024:2010, EN61000-3-2:2014, EN 61000-3-3:2013 RoHS: 2002/95/EC,2011/65/EU,EN50581: 2012 WEEE: 2002/96/EC,2012/19/EU
4	USA	FCC	CFR 47 FCC Part 15 subpart B, 2017
5	USA	Energy Star	ENERGY STAR Program Requirements for Enterprise Servers Version 2.0 and 2.1
6	Canada	IC	ICES-003: Issue 6:2016
7	Australia	RCM	AS/NZS CISPR 32:2015
8	Japan	VCCI	VCCI-CISPR 32:2016

Remarks: The certification is subject to the pre-sales confirmation of Inspur.

11 Support and service

Global service hotline:

- 1-844-860-0011 (toll-free)
- 1-646-517-4966 (direct)

Service email:

- serversupport@inspur.com

The customer shall provide the following information:

- Name
- Telephone number
- Email
- Product model
- Product service SN
- Problem description

12 New technology description

- Higher per-core performance: Up to 28 cores provide high performance and expandability for computing intensive workloads in the applications of computing, storage and network.
- Higher memory bandwidth and capacity: 50% more memory bandwidth and capacity. The new product supports six memory channels and is more suitable for memory intensive workloads in contrast to the four memory channels in its last generation.
- More flexible expansion and I/O Bandwidth of 48 PCIe3.0, higher throughput, applicable for I/O intensive workloads
- Supporting Intel UPI interconnection: Up to three Intel® UPI channels allowing a platform expandability of at most 8-sockets and meanwhile increase the inter-CPU bandwidth for I/O intensive workloads.
- Supporting Intel AVX-512 instructions: In contrast to the last generation AVX2, the number of triggers per clock period is doubled. Intel AVX-512 can improve the performance and throughput to meet the requirement of the most demanding computing tasks, such as modeling and simulation, data analysis and machine learning, data compression, visualization and digital content creation.
- **ECC** error correcting code: the multi-digit error detection and unit correcting are used to handle minor data corruption. Depending on the system, ECC can recognize the faulty DIMM.
- **Memory Mirroring**: It prevents uncorrectable memory error to avoid system fault. In this mode, the system maintains two copies of all data. In case of uncorrectable memory error, the system retrieves automatically good data from the mirrored (redundant) copy. The system continues its operation without the intervention of the user. The extra mirroring redundancy provided in the memory creates strong protection for the whole system, and prevent memory failure in case of ECC, SDDC, DDDC and online backup memory correction.
- **Memory Rank Sparing**: Provides protection against persistent DRAM fault. It tracks excessive correctable errors and, before the occurring error of multiple bits or consecutive single bits, duplicates the unhealthy rank contents to the usable standby rank, which may lead uncorrectable error in future. It does not identify or disable a single faulty DRAM, but disables the DIMM or rank. Due to the need of DIMM or rank to execute the backup, this technology uses memory for backup and thus reduces the total available memory capacity. The backup of each DIMM can process one fault. The DIMM that may receive deadly/uncorrectable memory error will be deleted automatically from the operation, thus reducing the system downtime.

Note: In order to use the memory mirroring, it is necessary to install DIMM in pair (at least one pair for each of the processors), and the two DIMMs must be the same in terms of type and size. In order to use the memory rank sparing, each channel shall have at least one quad rank DIMM or two single or dual rank DIMM(s) (which are not necessarily the same). In the sparing mode, one rank of the DIMM in each channel is reserved as the spare memory. The size of the rank depends on the installed DIMM.

- Individual disk power-on/off technology: In order to realize ultimate energy-saving and easy maintenance of the product, the eFuse technology is adopted to work with the new generation ISBMC system, so that the user remotely sends commands via BMC to the CPLD, and the CPLD rapidly realizes power-on/off control for individual disks.

13 Downloads

For more information, refer to the following URLs:

<http://www.inspur.com>

<http://en.inspur.com>

14 Brands

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