meta brain® Server NF5180A6

White Paper

Technical Support

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Preface

Abstract

This document describes the NF5180A6 server's appearance, features, performance parameters, and software and hardware compatibility, providing in-depth information of the NF5180A6.

Intended Audience

This document is intended for pre-sales engineers.

Symbol Conventions

The symbols that may be found in this document are defined as follows.

Symbol	Description
⚠ DANGER	A potential for serious injury, or even death if not properly handled
⚠ WARNING	A potential for minor or moderate injury if not properly handled
⚠ CAUTION	A potential loss of data or damage to equipment if not properly handled
ⓘ IMPORTANT	Operations or information that requires special attention to ensure successful installation or configuration
🗎 NOTE	Supplementary description of document information

Revision History

Version	Date	Description of Changes
V1.0	2024/04/17	Initial release

Table of Contents

1 Product Overview

The NF5180A6 is a 1U2S rack server with the 3rd Gen AMD EPYC processor design from the Milan platform.

The NF5180A6 maintains the high quality and reliability of our servers. With high computing performance, perfect ecological compatibility and configuration flexibility, the NF5180A6 can fulfill the configuration requirements of different industrial applications, and is particularly suitable for application scenarios such as data analysis and processing, cloud computing, and high-performance computing.

Figure 1-1 4 × 3.5-Inch + 4 × 2.5-Inch Drive Configuration
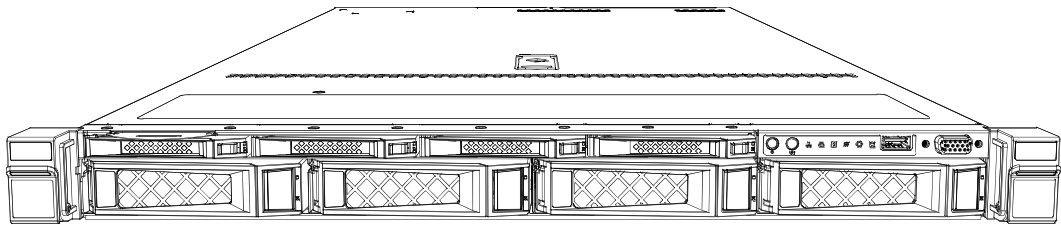
Figure 1-2 10 × 2.5-Inch Drive Configuration
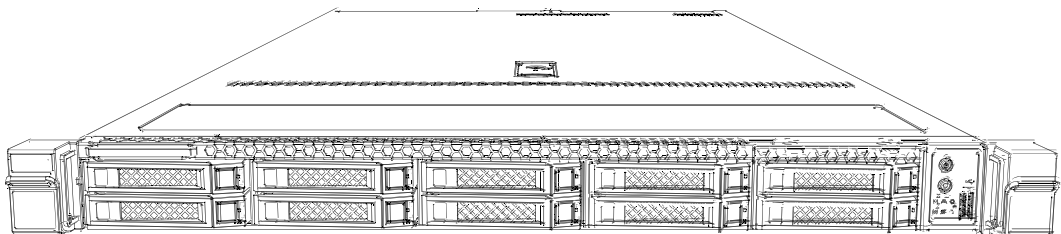
Figure 1-3 EVAC Heatsink Configuration
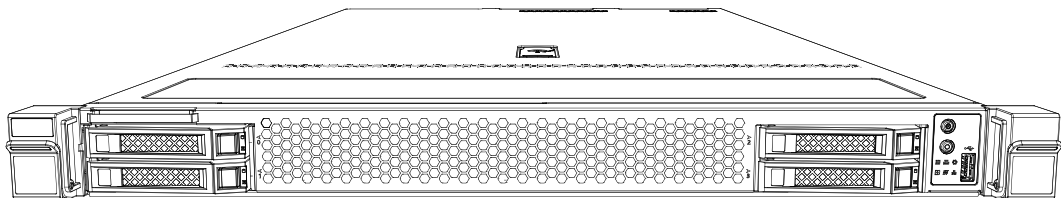
2 Features

2.1 Scalability and Performance

Scalability:

- Supports up to 10 front hot-swap SAS/SATA/NVMe drives.

- Supports up to 2 internal SATA M.2 SSDs or 1 internal PCIe M.2 SSD.

- Supports up to 3 standard rear PCIe expansion cards, including 1 FHHL and 2 HHHL expansion cards.

- Supports 1 OCP NIC 3.0 SFF expansion card.

- Supports up to 2 single-slot GPUs.

Powerful performance:

- The NF5180A6 is built on the new-generation AMD Milan processors. A single CPU supports up to 64 cores and 128 threads with a TDP of up to 280 W and a max boost frequency of 3.7 GHz. It supports PCIe 4.0 interfaces with up to 128 lanes.

- Supports 32 DDR4 ECC DIMMs (3,200 MT/s at 1 DPC and 2,933 MT/s at 2 DPC, up to 128 GB each, 4 TB max., RDIMMs and LRDIMMs), delivering high speeds and superior availability.

2.2 Availability and Serviceability

- Based on humanization design, the server allows tool-less maintenance. The modular structural parts enable quick removal/installation, greatly reducing O&M time.

- Our unique intelligent control technology combined with the cutting-edge air cooling technology creates an optimum working environment to ensure stable running of the server.

- The server supports hot-swap drives and RAID controller cards with RAID levels 0/1/10/5/6/60/1E, RAID cache and data protection enabled by the super-capacitor in case of power failures.

- With the latest BMC, the UID LED on the front panel enables technicians to identify the failed system and the BMC Web GUI and LEDs for fault diagnosis can help technicians to quickly locate components that have failed (or are about to fail), simplifying maintenance, speeding up troubleshooting, and enhancing system availability.

- The BMC can monitor system parameters and send alerts in advance, enabling technicians to take appropriate measures and ensuring stable running of the server.

2.3 Manageability and Security

- Supports firmware encryption/digital signatures to prevent unauthorized writing of unknown firmware.

- For hardware design, the NF5180A6 designs ear latches on the front panel and a hood latch on the top cover.

    - Supports Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM) that provide advanced encryption.

    - Supports the firmware update mechanism based on digital signatures to prevent unauthorized firmware updates.

    - Supports UEFI Secure Boot to protect the system from malicious bootloaders.

    - Supports hierarchical BIOS password protection, ensuring system boot and management security.

    - Supports BIOS Secure Flash and BIOS Lock Enable (BLE), reducing attacks from malicious software on the BIOS flash region.

    - Supports BMC Secure Boot to protect BMC from malicious tampering.

    - Supports flexible BMC access control policies, improving BMC management security.

- Supports chassis intrusion detection, enhancing physical security.

2.4 Energy Efficiency

- Equipped with 80 PLUS Platinum level PSUs (550 - 1,300 W) with the power efficiency up to 94% at a load of 50%.

- Offers 1+1 redundant and integrated AC/DC power supplies for optimized power conversion efficiency.

- Features the efficient single-board voltage regulator down (VRD) PSU, reducing DC-DC conversion loss.

- Supports intelligent fan speed control and intelligent CPU frequency scaling, conserving energy.

- Offers a fully-optimized system cooling design with energy-efficient cooling fans, lowering energy consumption from system cooling.

3 System Parts Breakdown

Figure 3-1 Exploded View (4 × 3.5-Inch + 4 × 2.5-Inch Drive Configuration)
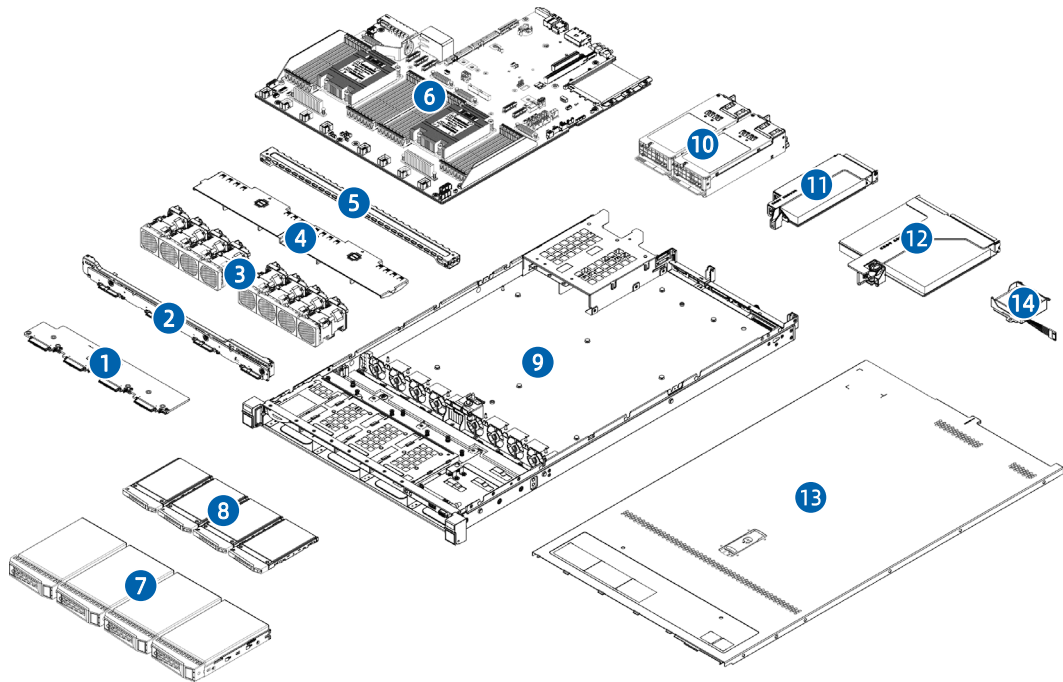
Item	Feature	Item	Feature
1	4 × 2.5-Inch Drive Backplane	2	4 × 3.5-Inch Drive Backplane
3	Fan Module × 8	4	Air Duct
5	Reinforcement Crossbar	6	Motherboard
7	3.5-Inch Drive Module × 4	8	2.5-Inch Drive Module × 4
9	Chassis	10	PSU × 2
11	PCIe Riser Module 1	12	PCIe Riser Module 0
13	Top Cover	14	Super-Capacitor Module

Figure 3-2 Exploded View (10 × 2.5-Inch Drive Configuration)
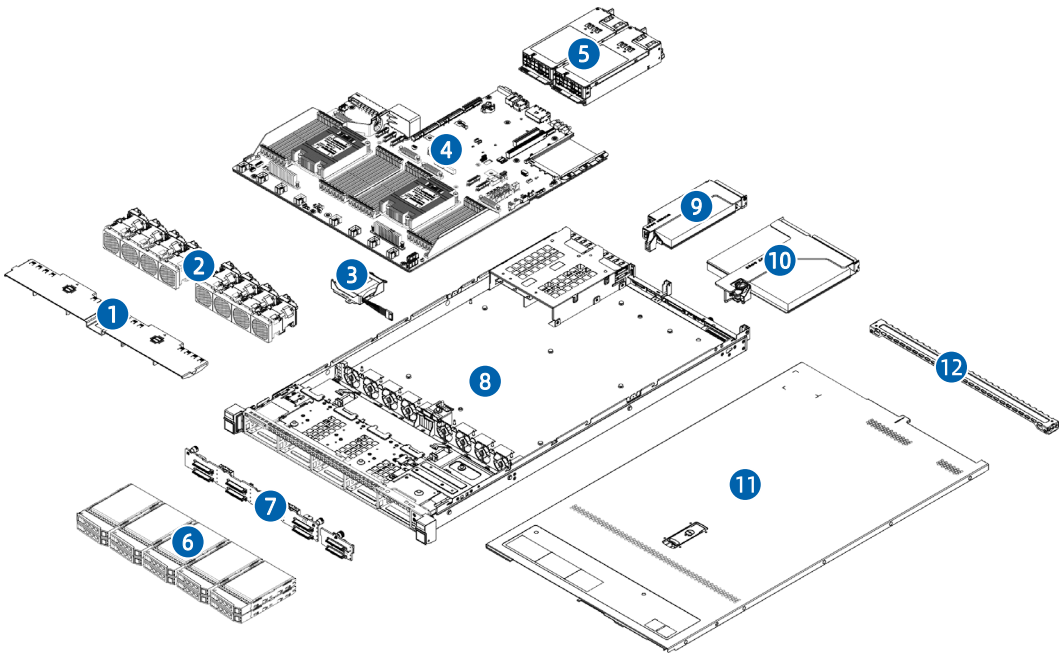
Item	Feature	Item	Feature
1	Air Duct	2	Fan Module × 8
3	Super-Capacitor Module	4	Motherboard
5	PSU × 2	6	2.5-Inch Drive Module × 10
7	10 × 2.5-Inch Drive Backplane	8	Chassis
9	PCIe Riser Module 1	10	PCIe Riser Module 0
11	Top Cover	12	Reinforcement Crossbar

Figure 3-3 Exploded View (EVAC Heatsink Configuration)
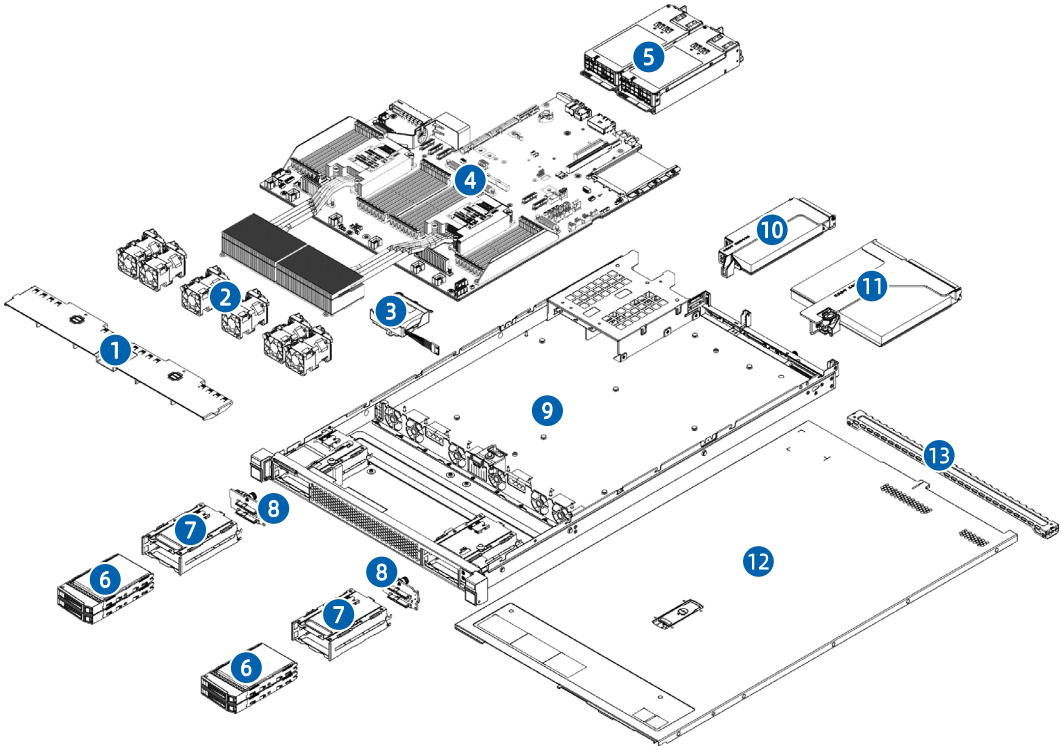
Item	Feature	Item	Feature
1	Air Duct	2	Fan Module × 8
3	Super-Capacitor Module	4	Motherboard
5	PSU × 2	6	2.5-Inch Drive Module × 4
7	2.5-Inch Drive Cage	8	2 × 2.5-Inch Drive Backplane
9	Chassis	10	PCIe Riser Module 1
11	PCIe Riser Module 0	12	Top Cover
13	Reinforcement Crossbar		

4 System Logical Diagram

Figure 4-1 System Logical Diagram
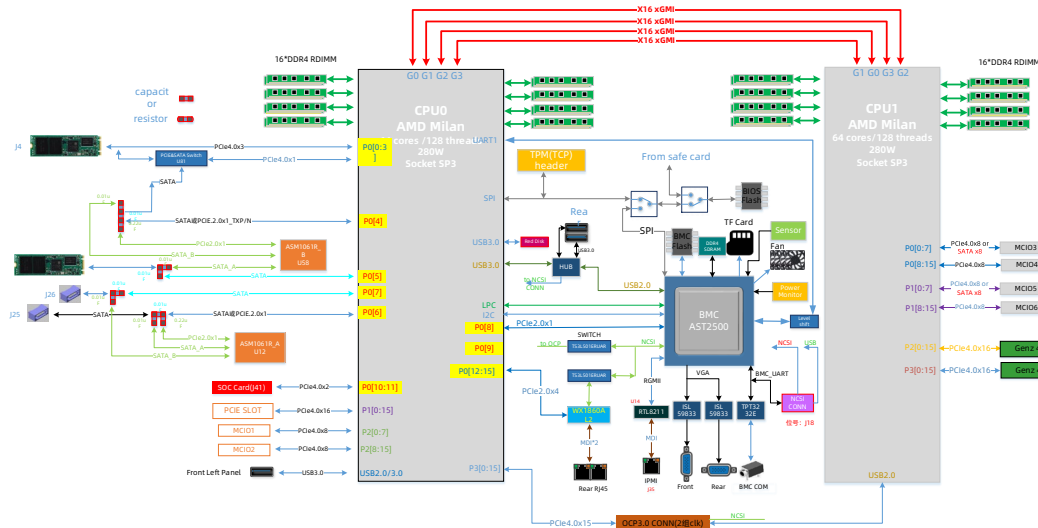
- Supports up to 2 AMD Milan processors.

- Supports 32 DDR4 DIMMs.

- Processors are interconnected through 4 x16 xGMI buses.

- Supports up to 1 standard PCIe x16 slot, 1 OCP NIC 3.0 card slot, and 2 standard GenZ slots.

- Supports 2 standard SATA connectors onboard.

- Supports 2 M.2 SSD connectors onboard, including one only for SATA M.2 SSD, and the other for both SATA and PCIe M.2 SSD.

- The PCIe RAID controller card connects the motherboard to the drive backplanes through SAS signal cables. The different drive backplanes enable various local storage configurations: 10 × 2.5-inch SATA/SAS/NVMe drive or 4 × 3.5-inch drive and 4 × 2.5-inch SATA/SAS/NVMe drive.

- The motherboard integrates an AST2500 management chip and supports a TF card and the external ports such as Video Graphics Array (VGA) port, IPMI management network port and serial port.

5 Hardware Description

5.1 Front Panel

5.1.1 Appearance

- Front View (4 × 3.5-Inch + 4 × 2.5-Inch Drive Configuration)

Figure 5-1 Front Panel LEDs and Buttons
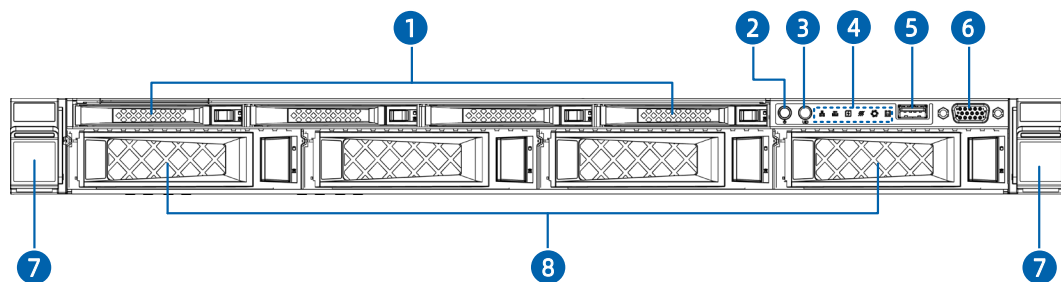
Item	Feature
1	2.5-Inch Drive Bay × 4
2	Power Button and LED
3	UID/BMC RST Button and LED
4	LEDs
5	USB 3.0 Port
6	VGA Port
7	Ear Latch × 2
8	3.5-Inch Drive Bay × 4

- Front View (10 × 2.5-Inch Drive Configuration)

Figure 5-2 Front Panel LEDs and Buttons

9
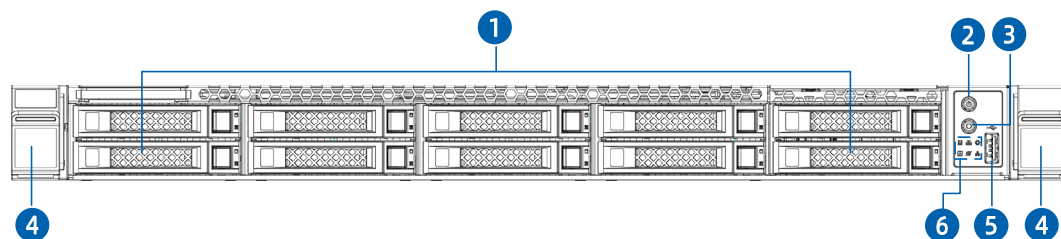
Item	Feature
1	2.5-Inch Drive Bay × 10
2	Power Button and LED
3	UID/BMC RST Button and LED
4	Ear Latch × 2
5	USB 2.0 Port
6	LEDs

● Front View (EVAC Heatsink Configuration)

Figure 5-3 Front Panel LEDs and Buttons
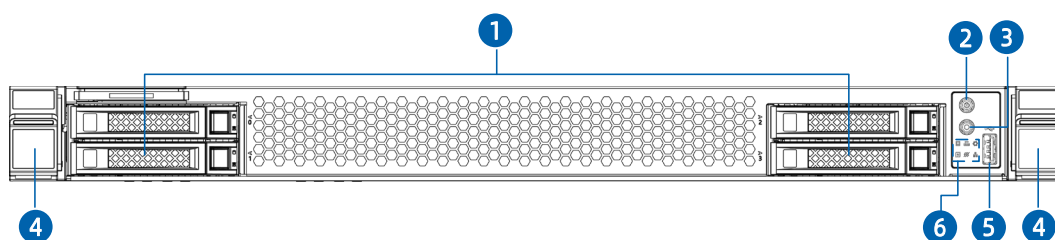
Item	Feature
1	2.5-Inch Drive Bay × 4
2	Power Button and LED
3	UID/BMC RST Button and LED
4	Ear Latch × 2
5	USB 2.0 Port
6	LEDs

5.1.2 LEDs & Buttons

Figure 5-4 Front Panel LEDs and Buttons (4 × 3.5-Inch + 4 × 2.5-Inch Drive Configuration)
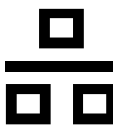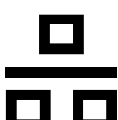
Item	Icon	Feature	Description
1		Power Button and LED	Solid green = Power-on state Solid orange = Standby state Long press 4 seconds to force a shutdown
2		UID/BMC RST Button and LED	Solid blue = The UID LED is activated by the UID button or via the BMC Long press 6 seconds to force BMC to reset
3		Network Status LED	Solid/Flashing green = Network connected Off = No network connection Note: It only indicates the working status of LOM (LAN on motherboard).
4		Memory Status LED	Off = Normal Solid red = A failure occurs Flashing red = A warning occurs
5		Power Status LED	Off = Normal Solid red = A power failure occurs Flashing red = Power state is abnormal
6		System Overheat LED	Off = Normal Solid red = CPU/Memory overheats
7		Fan Status LED	Off = Normal Solid red = Failed to read the fan speed Flashing red = Speed read by BMC is abnormal
8		System Status LED	Off = Normal Solid red = A failure occurs Flashing red = A warning occurs

Figure 5-5 10 × 2.5-Inch Drive Configuration and EVAC Heatsink Configuration Left Mounting Ear LEDs and Buttons
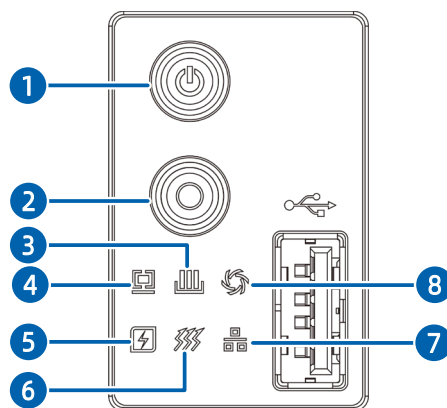
- Table 5-1 LED and Button Description

Item	Icon	Feature	Description
1		Power Button and LED	Solid green = Power-on state Solid orange = Standby state Long press 4 seconds to force a shutdown
2		UID/BMC RST Button and LED	Solid blue = The UID LED is activated by the UID button or via the BMC Long press 6 seconds to force BMC to reset
3		Memory Status LED	Off = Normal Solid red = A failure occurs Flashing red = A warning occurs
4		System Status LED	Off = Normal Solid red = A failure occurs Flashing red = A warning occurs
5		Power Status LED	Off = Normal Solid red = A power failure occurs Flashing red = Power state is abnormal
6		System Overheat LED	Off = Normal Solid red = CPU/Memory overheats
7		Network Status LED	Solid/Flashing green = Network connected Off = No network connection Note: It only indicates the working status of LOM (LAN on motherboard).

Item	Icon	Feature	Description
8		Fan Status LED	Off = Normal Solid red = Failed to read the fan speed Flashing red = Speed read by BMC is abnormal

Table 5-2 2.5- or 3.5-Inch Drive Tray LED Description
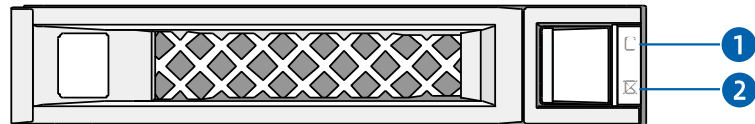
Item	Feature	Description
1	Activity LED	Solid green = Drive is present but not in use Flashing green = Drive is present and in use
2	Locator/Error LED	Solid red = Drive error or failure Solid blue = Drive is being located Solid pink = RAID rebuilding (for SAS/SATA drives only)

5.2 Rear Panel

5.2.1 Appearance

Figure 5-6 Rear View (3 × PCIe Card Configuration)
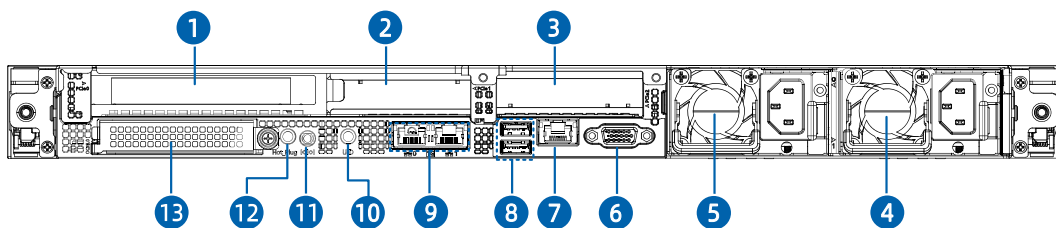
Item	Feature	Item	Feature
1	FHHL PCIe x16 Card	8	USB 3.0 Port × 2
2	HHHL PCIe x8 Card	9	1 GbE Port × 2
3	HHHL PCIe x16 Card	10	UID/BMC RST Button and LED
4	PSU1	11	System/BMC Serial Port

Item	Feature	Item	Feature
5	PSU0	12	OCP Hot-Plug Button and LED
6	VGA Port	13	OCP NIC 3.0 Card
7	BMC Management Network Port		

5.2.2 LEDs & Buttons

Figure 5-7 Rear Panel LEDs and Buttons
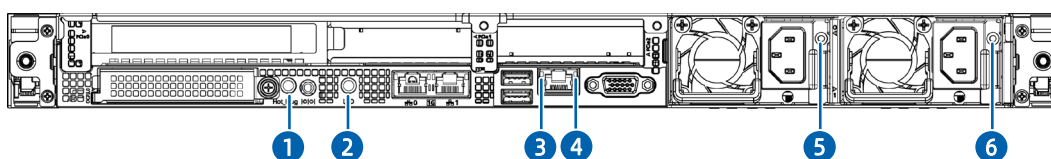
Item	Feature	Item	Feature
1	OCP Hot-Plug Button and LED	2	UID/BMC RST Button and LED
3	Management Network Port Link Speed LED	4	Management Network Port Link Activity LED
5	PSU LED0	6	PSU LED1

1. LED and Button Description

Table 5-1 Rear Panel LED and Button Description

Icon	Feature	Description
-	OCP Hot-Plug Button and LED	OCP Hot-Plug Button and LED enables you to perform hot-swap operations to the OCP NIC. Off = No power input and the device is absent as it is removed by the system Solid blue = The system unit is present with a normal power supply Flashing blue = The system unit is being powered on or off. This indicates the system unit is performing a hot-swap operation: 1) If it is being powered off, the system unit is disconnecting PCIe resources. 2) If it is being powered on, the system unit is connecting to the PCIe resources.

Icon	Feature	Description
-	UID/BMC RST Button and LED	The UID LED is used to identify the device to be operated. Off = System unit not identified Solid blue = System unit identified ▤NOTE Long press the UID button for over 6 seconds to reset the BMC.
-	Management Network Port Link Speed LED	Off = Network is not connected Solid green = Network is connected at the speed of 1,000 Mb/s Solid orange = Network is connected at the speed of 100 Mb/s or 10 Mb/s
-	Management Network Port Link Activity LED	Off = Network is not connected Solid green = Network connection status is normal Flashing green = Network data transmitting
-	PSU LED	Off = No power input to PSU Flashing green (1 Hz) = PSU operating in the standby state with normal AC input Flashing green (2 Hz) = PSU firmware updating Flashing green (off for 1 second, on for 2 seconds) = PSU in the cold redundant state Solid green = Normal input and output Flashing orange (1 Hz) = PSU warning event where the PSU continues to operate (possible causes: PSU overtemperature, PSU output overcurrent, excessively high or low fan speed) Solid orange = PSU critical event causing a shutdown (possible causes: PSU overtemperature protection, PSU output overcurrent or short circuit, output overvoltage, short circuit protection, component (not all components) failure)

5.2.3 Ports and PSUs

1. Port and PSU Location

Figure 5-8 Rear Panel Ports and PSUs
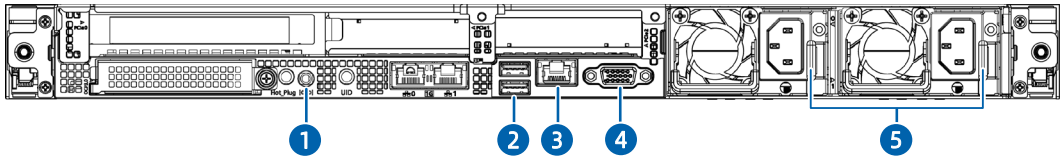
Item	Feature	Item	Feature
1	System/BMC Serial Port	2	USB 3.0 Port
3	Management Network Port	4	VGA Port
5	PSU × 2		

2. Port and PSU Description

Table 5-2 Rear Panel Port and PSU Description

Feature	Type	Quantity	Description
System/BMC Serial Port	Headphone jack	1	Enables you to capture system or BMC logs and use the BMC debugging function. ⬛NOTE The serial port uses a standard 3.5 mm jack with a default baud rate of 115,200 bit/s.
USB Port	USB 3.0	2	Enables you to connect a USB 3.0 device to the system. ⓘIMPORTANT The maximum current supported by the USB port is 0.9 A. Make sure the USB device is in good condition or it may cause the server to work abnormally.
Management Network Port	RJ45	1	Enables you to manage the server via the ISBMC management network port. ⬛NOTE It is a GbE port of 100/1,000 Mb/s (auto-negotiation).
VGA Port	DB15	1	Enables you to connect a display terminal, for example, a monitor or KVM, to the system.

Feature	Type	Quantity	Description
PSU	-	2	Connected through a power cord. Users can select the PSUs as needed. ⬛NOTE Make sure that the total rated power of the PSUs is greater than that of the server.

5.3 Processor

- Supports up to 2 processors.

- If 1 processor is configured, install it in CPU0.

- The processors used in the same server must be of the same model.

- For specific system processor options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

Figure 5-1 Processor Locations
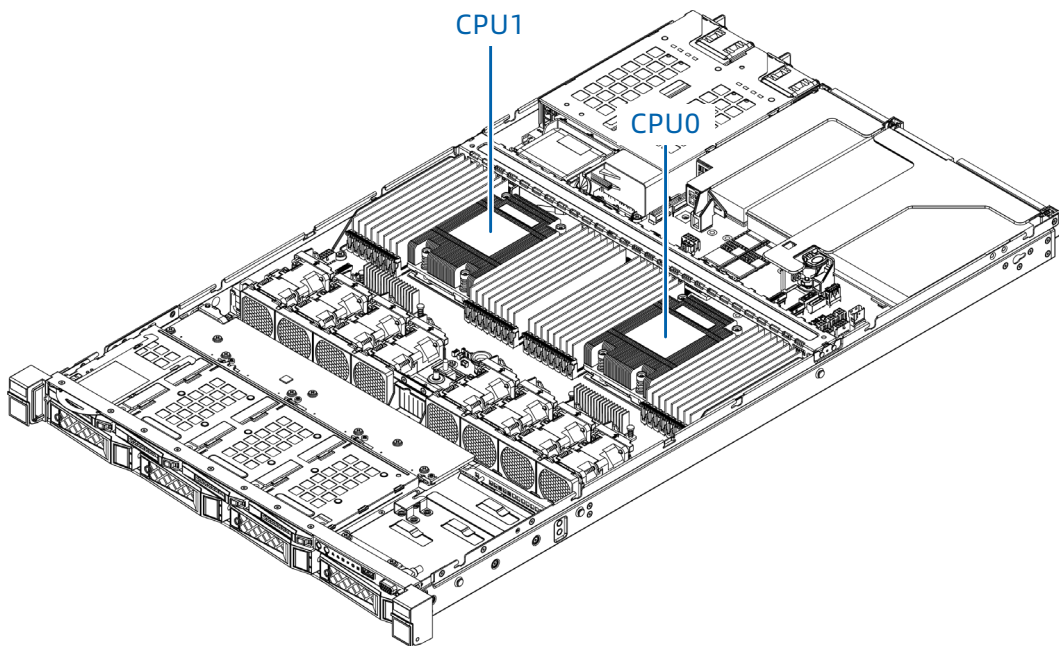
5.4 Memory

5.4.1 DDR4 DIMM

1. Identification

To determine DIMM characteristics, refer to the label attached to the DIMM and the

following figure and table.
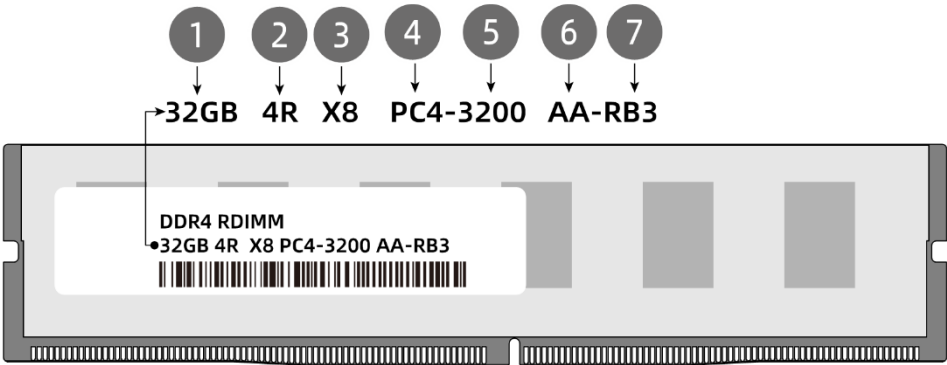
Figure 5-2 DIMM Identification

Item	Description	Example
1	Capacity	16 GB 32 GB 64 GB 128 GB
2	Rank(s)	1R = Single rank 2R = Dual rank
3	Data width of DRAM	x4 = 4 bits x8 = 8 bits
4	DIMM slot type	PC4 = DDR4
5	Maximum memory speed	2,933 MT/s 3,200 MT/s
6	CAS latency	SDP-chip-based: V = CAS-19-19-19 Y = CAS-21-21-21 AA = CAS-22-22-22 3DS-chip-based: V = CAS-22-19-19 Y = CAS-24-21-21 AA = CAS-26-22-22
7	DIMM type	R = RDIMM L = LRDIMM

2. Memory Subsystem Architecture

The NF5180A6 supports 32 DIMM slots and 8 channels per CPU with 2 DIMM slots per channel.

Within a channel, populate the DIMM slot with its silk screen ending with D1 first and second the DIMM slot with its silk screen ending with D0. For instance, within CPU0 Channel 0, populate CPU0_CAD1 first and second CPU0_CAD0. DIMMs in the standby channels cannot be used normally if no DIMMs are installed in the active channels.

Table 5-3 DIMM Slot List

CPU	Channel ID	Silk Screen
CPU0	Channel0	CPU0_CAD0
	Channel0	CPU0_CAD1
	Channel1	CPU0_CBD0
	Channel1	CPU0_CBD1
	Channel2	CPU0_CCD0
	Channel2	CPU0_CCD1
	Channel3	CPU0_CDD0
	Channel3	CPU0_CDD1
	Channel4	CPU0_CED0
	Channel4	CPU0_CED1
	Channel5	CPU0_CFD0
	Channel5	CPU0_CFD1
	Channel6	CPU0_CGD0
	Channel6	CPU0_CGD1
	Channel7	CPU0_CHD0
	Channel7	CPU0_CHD1
CPU1	Channel0	CPU1_CAD0
	Channel0	CPU1_CAD1
	Channel1	CPU1_CBD0
	Channel1	CPU1_CBD1
	Channel2	CPU1_CCD0
	Channel2	CPU1_CCD1
	Channel3	CPU1_CDD0
	Channel3	CPU1_CDD1
	Channel4	CPU1_CED0
	Channel4	CPU1_CED1
	Channel5	CPU1_CFD0
	Channel5	CPU1_CFD1
	Channel6	CPU1_CGD0
	Channel6	CPU1_CGD1

CPU	Channel ID	Silk Screen
	Channel7	CPU1_CHD0
	Channel7	CPU1_CHD1

3. Compatibility

Refer to the following rules to select the DDR4 DIMMs:

(i)IMPORTANT

- A server must use DDR4 DIMMs with the same part number (P/N code). All DDR4 DIMMs operate at the same speed, which is the lowest of:

  - Memory speed supported by a specific CPU.

  - Maximum operating speed of a memory module.

- Mixing DDR4 DIMM types (RDIMM, LRDIMM) or mixing DDR4 DIMM specifications (capacity, bit width, rank, height, etc.) is not supported.

- For specific memory options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

- Supports 3rd Gen AMD Milan processors with different CPU models supporting the same maximum memory capacity.

- The total memory capacity supported is the sum of the capacity of all DDR4 DIMMs of two CPUs.

(i)IMPORTANT

RDIMM supports up to 2 ranks and LRDIMM supports up to 8 ranks.

Table 5-4 DDR4 DIMM Specifications

Item	Value			
Capacity per DDR4 DIMM (GB)	16	32	64	128
Type	RDIMM	RDIMM	RDIMM	RDIMM
Rated speed (MT/s)	3,200	3,200	3,200	3,200
Operating voltage (V)	1.2	1.2	1.2	1.2

Maximum number of DDR4 DIMMs supported in a server[a]		32	32	32	32
Maximum capacity of DDR4 DIMMs supported in a server (GB)[b]		512	1,024	2,048	4,096
Actual speed (MT/s)	1DPC[c]	3,200	3,200	3,200	3,200
	2DPC	3,200	3,200	3,200	3,200
a: The maximum number of DDR4 DIMMs supported is based on the 2-processor configuration. If the 1-processor configuration is selected, the number should be halved. b: It indicates the maximum DDR4 memory capacity supported when all DDR4 DIMMs are populated. c: DIMM Per Channel (DPC) is the number of DIMMs per memory channel. The above information is for reference only, consult your local sales representative for details.					

4. Population Rules

📋NOTE

This section describes the DIMM population rules when all DDR4 DIMMs are populated. If mixing DDR4 DDIMs and PMems is required, refer to .

General population rules for DDR4 DIMMs:

- Install DIMMs and dummies only when the corresponding processor has been installed.

- Mixing LRDIMMs and RDIMMs is not allowed.

- Install dummies in the DIMM slots where no DIMMs are installed.

Population rules for DDR4 DIMMs in specific modes:

- Memory scrubbing

    - Follow the general population rules.

5. DIMM Slot Layout

Up to 32 DDR4 DIMMs can be installed on a server. Balance the total memory capacity between the installed processors for optimal memory performance. PMem configuration must be compliant with the PMem population rules.

Figure 5-3 DIMM Slot Layout
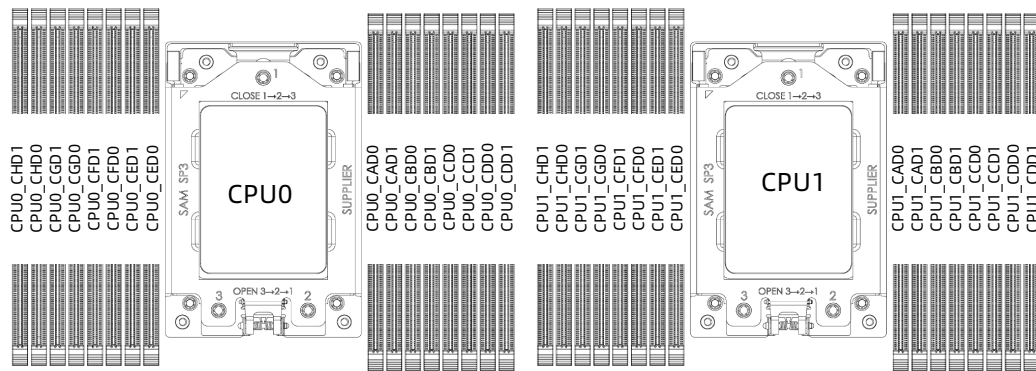
Table 5-5 DDR4 DIMM Population Rules (Single-Processor Configuration)

DDR4 QTY	CPU0															
	CH		CG		CF		CE		CA		CB		CC		CD	
	D1	D0	D1	D0	D1	D0	D1	D0	D0	D1	D0	D1	D0	D1	D0	D1
1														●		
2														●		●
4	●		●											●		●
6	●		●				●			●				●		●
8	●		●		●		●			●		●		●		●
16	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

Table 5-6 DDR4 DIMM Population Rules (Dual-Processor Configuration)

DDR4 QTY	CPU0																CPU1															
	CH		CG		CF		CE		CA		CB		CC		CD		CH		CG		CF		CE		CA		CB		CC		CD	
	D1	D0	D1	D0	D1	D0	D1	D0	D0	D1	D0	D1	D0	D1	D0	D1	D1	D0	D1	D0	D1	D0	D1	D0	D0	D1	D0	D1	D0	D1	D0	D1
2														●																●		
4														●		●														●		●
8	●		●											●		●	●		●											●		●
12	●		●				●			●				●		●	●		●				●			●				●		●
16	●		●		●		●			●		●		●		●	●		●		●		●			●		●		●		●
32	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

6. DIMM Protection Technology

DDR4 DIMMs support the following memory protection technologies:

- Error Correcting Code (ECC)

- Single Device Data Correction (SDDC)

- Adaptive Double Device Data Correction (ADDDC)
- Power up-Post Package Repair (PPR)

5.5 Storage Drive

5.5.1 Drive LEDs

1. SAS/SATA Drive LEDs

Figure 5-9 SAS/SATA Drive LEDs

Activity LED
Locator/Error LED
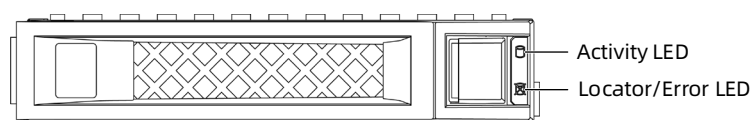
Table 5-10 SAS/SATA Drive LEDs

Activity LED (Green)	Error LED (Blue/Red)			Description
	Blue	Red		
Off	Off	RAID created	RAID not created	Drive is absent
		Solid on	Off	
Solid on	Off	Off		Drive is present but not in use
Flashing	Off	Off		Drive is present and in use
Flashing	Solid pink			Copyback/Rebuild in progress
Solid on	Solid on	Off		Drive is selected but not in use
Flashing	Solid on	Off		Drive is selected and in use
-	Off	Solid on		Drive is failed

2. NVMe Drive LEDs

Figure 5-11 4NVMe Drive LEDs

Activity LED
Locator/Error LED
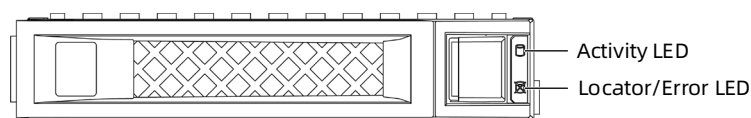
NVMe drives support surprise hot-swap. (When the NVMe drives are directly connected to the CPU, error LED and activity LED are not supported)

Table 5-12 NVMe Drive LEDs (with RAID Controller Card Installed)

Activity LED (Green)	Error LED (Blue/Red)		Description
	Blue	Red	
Off	Off	Off	Drive is absent
Solid on	Off	Off	Drive is present but not in use
Flashing	Off	Off	Drive is present and in use
Flashing	Solid pink		Copyback/Rebuild/Initializing/Verifying in progress
Solid on	Solid on	Off	Drive is selected but not in use
Flashing	Solid on	Off	Drive is selected and in use
-	Off	Solid on	Drive is failed

5.5.2 RAID Controller Cards

The RAID controller card provides functions such as RAID configuration, RAID level migration, and drive roaming.

For specific RAID controller card options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

5.6 Network

NICs provide network expansion capabilities.

- The OCP I/O slot supports the OCP NIC 3.0 card. Users can select the OCP NIC 3.0 card based on their needs.

- The PCIe expansion slots support PCIe NICs. Users can select the PCIe cards based on their needs.

- For specific NIC options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

5.7 I/O Expansion

5.7.1 PCIe Cards

The PCIe cards provide system expansion capabilities.

- The server supports up to 3 PCIe 3.0 expansion slots, including 1 dedicated slot for the OCP NIC 3.0 card.

- For specific PCIe card options, consult your local sales representative or refer to 7.2 Hardware Compatibility.

5.8 PSUs

- The server supports up to 2 PSUs.

- The server supports AC or DC power input.

- The PSUs are hot-swappable.

- 1+1 redundancy is supported when 2 PSUs are configured.

- The server must use PSUs with the same part number (P/N code).

- The server provides short-circuit protection, and provides bipolar fuses for PSUs supporting dual-live-wire input.

5.9 Fans

- The server supports 8 fan modules (4056).

- The fans are hot-swappable.

- Some configurations support N+1 redundancy, which means that the server can continue working properly when a single fan rotor fails.

- The server supports intelligent fan speed control.

- The server must use fans with the same part number (P/N code).

5.10 Boards

5.10.1 Motherboard

Figure 5-5 Motherboard Layout
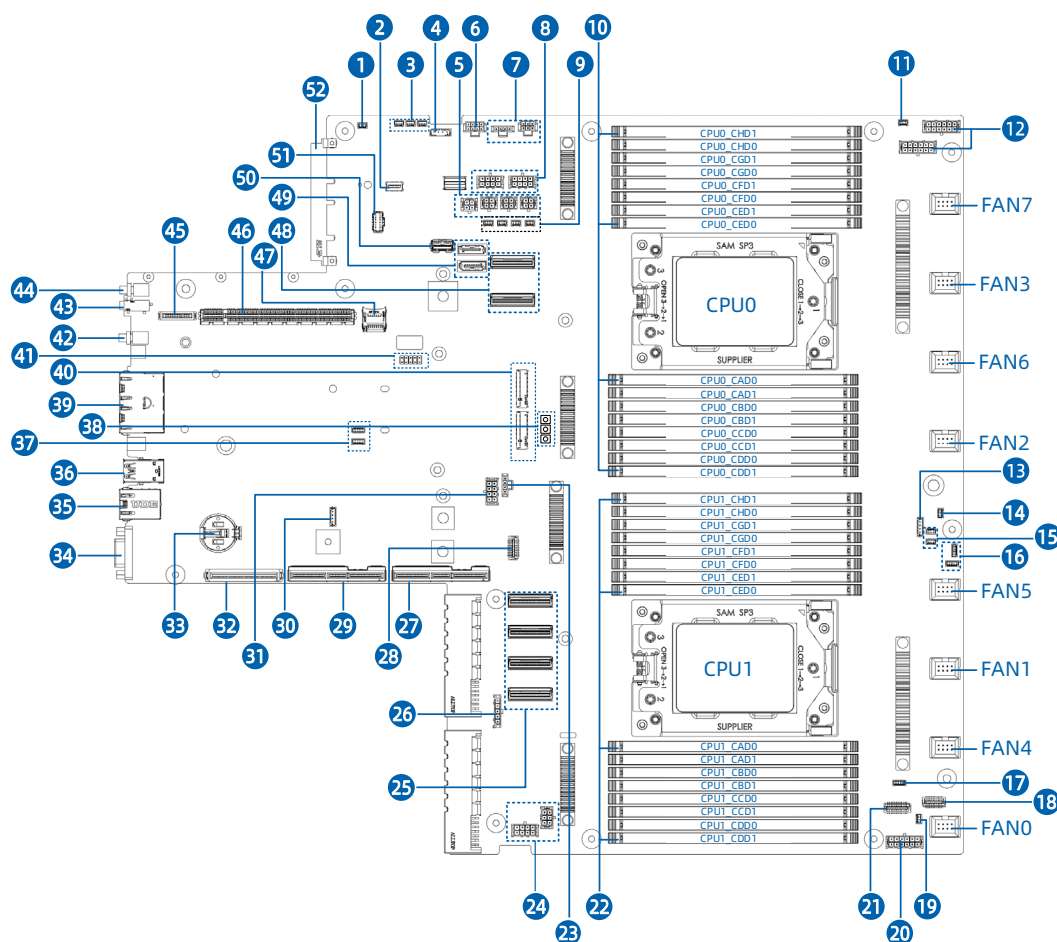
Item	Feature	Item	Feature
1	Rear Backplane I^{2}C Connector	27	PCIe_CPU1 Gen-Z Slot
2	TPM Connector	28	SGPIO Connector
3	I^{2}C Connector × 3	29	PCIe_CPU1 Gen-Z Slot
4	BMC TPM I^{2}C Connector	30	Gen-Z Slot Throttle Connector
5	Rear Backplane Power Connector × 4	31	GPU Power Connector

Item	Feature	Item	Feature
6	Mid-Backplane Power Connector	32	Power Connector for PCIe Gen-Z Card (Standby)
7	GPU Riser Power Connector × 2	33	Button Cell Battery Socket
8	GPU Power Connector × 2	34	VGA Port
9	Rear Backplane I^2C Connector × 4	35	BMC Management Network Port
10	DIMM Slots (CPU0)	36	USB 3.0 Port × 2
11	Front Backplane I^2C Connector	37	VPP Connector × 2
12	Front Backplane Power Connector × 2	38	CLR_CMOS Jumper
13	Intrusion Switch Connector	39	1 GbE Port × 2
14	Temperature Sensor Connector	40	M.2 SSD Connector × 2
15	Front Backplane I^2C Connector × 2	41	CPU0 Debug Connector
16	VPP Connector × 2	42	UID/BMC RST Button and LED
17	VPP Connector	43	System/BMC Serial Port
18	SGPIO Connector	44	OCP Hot-Plug Button and LED
19	Front Backplane I^2C Connector	45	Power Connector for PCIe_CPU0 x16 Card (Standby)
20	Front Backplane Power Connector	46	PCIe1_CPU0 x16 Slot
21	Left Control Panel Connector	47	TF Card Slot
22	DIMM Slots (CPU1)	48	MCIO_CPU0 Connector × 2
23	Riser Power Connector	49	SATA Connector × 2
24	GPU Power Connector × 2	50	USB 3.0 Port

Item	Feature	Item	Feature
25	MCIO_CPU1 Connector × 4	51	NC-SI Connector
26	Capacitor Board Connector	52	OCP NIC 3.0 Card Slot

6 System Specifications

6.1 Technical Specifications

Table 6-1 System Specifications

Item	Description
Launch Time	2022
Form Factor	1U rack server
Processor	Supports up to 2 AMD Milan processors. • Up to 64 cores (base frequency up to 2.45 GHz) • Max boost frequency at 3.7 GHz (8 cores) • 4 xGMI links at up to 18 GT/s • TDP up to 280 W
Memory	• Up to 32 DIMM • 8 memory channels per processor • Up to 2 DIMMs per channel • Up to 3,200 MT/s • RDIMMs and LRDIMMs • ECC supported
Storage Drive	Front: • 10 × 2.5-inch SATA/SAS/NVMe drive (up to 10 × NVMe drive) (hot-swap) • 4 × 3.5-inch + 4 × 2.5-inch SATA/SAS/NVMe drive (hot-swap) • 4 × 2.5-inch SATA/SAS/NVMe drive (hot-swap) Internal: • Up to 2 × SATA M.2 SSD or 1 × PCIe M.2 SSD
Network	• 1 × x16 OCP NIC 3.0 card • 2 × onboard 1 GbE port

Item	Description
I/O Expansion	• Up to 3 × standard PCIe expansion card and 1 × OCP NIC 3.0 card • 1 × FHHL PCIe 4.0 x16 card • 1 × HHHL PCIe 4.0 x8 card • 2 × HHHL PCIe 4.0 x16 card
Port	• 2 × rear USB 3.0 port • 1 × front USB 3.0 port • 1 × front VGA port • 1 × rear VGA port
Fan	8 hot-swap 4056 fans with N+1 redundancy
Power Supply	1+1 redundant PSUs with the output power of 550 W/800 W/1,300 W
System Management	Integrated with 1 independent 1,000 Mb/s network port, dedicated to IPMI remote management
Chassis Dimensions (W × H × D)	• With mounting ears: 482 × 43.05 × 811.8 mm (18.98 × 1.69 × 31.96 in.) • Without mounting ears: 438 × 43.05 × 780 mm (17.24 × 1.69 × 30.71 in.)
Outer Packaging Dimensions (L × W × H)	1,031 × 651 × 247 mm (40.59 × 25.63 × 9.72 in.)
Weight	• 4 × 3.5-inch + 4 × 2.5-inch drive configuration (including rear 2.5-inch drives): Net weight (unpacked): approx. 21 kg (46.30 lbs) Gross weight (packed, including chassis, packaging, rails, and accessory box): 31.5 kg (69.45 lbs) • 10 × 2.5-inch drive configuration (including rear 2.5-inch drives): Net weight (unpacked): approx. 21 kg (46.30 lbs) Gross weight (packed, including chassis, packaging, rails, and accessory box): 31 kg (68.34 lbs)

6.2 Environmental Specifications

Table 6-2 Environmental Specifications

Operating Temperature Specifications

Front Panel	Front Drive	CPU	PCIe NIC	T4 GPU	OCP NIC	Max. Supported Ambient Temperature
4 × 3.5-inch HDD + 4 × 2.5-inch SSD	4 × 3.5-inch	≤200 W	≤40 Gb/s	N/A	≤40 Gb/s	35°C (95°F)
4 × 3.5-inch HDD + 4 × 2.5-inch SSD	1 × 3.5-inch	≤200 W	≤40 Gb/s	2	≤40 Gb/s	35°C (95°F)
4 × 3.5-inch HDD + 4 × 2.5-inch SSD	2 × 3.5-inch	≤200 W	100 Gb/s supported	N/A	100 Gb/s supported	35°C (95°F)
10 × 2.5-inch NVMe	10 × 2.5-inch	≤200 W	≤40 Gb/s	N/A	≤40 Gb/s	35°C (95°F)
10 × 2.5-inch NVMe	2 × 2.5-inch	≤200 W	≤40 Gb/s	2	≤40 Gb/s	35°C (95°F)
10 × 2.5-inch NVMe	4 × 2.5-inch	≤200 W	100 Gb/s supported	N/A	100 Gb/s supported	35°C (95°F)
4 × 2.5-inch NVMe	4 × 2.5-inch	≤200 W	100 Gb/s supported	Not supported	100 Gb/s supported	35°C (95°F), not supported when a single fan fails
4 × 2.5-inch NVMe	4 × 2.5-inch	≤280 W	≤40 Gb/s	Not supported	≤40 Gb/s	35°C (95°F), not supported when a single fan fails

Physical Specifications

Table 6-3 Physical Specifications

Temperature	Operating: 5°C to 35°C (41°F to 95°F)[1,2,3] Storage (packed): -40°C to +70°C (-40°F to +158°F) Storage (unpacked): -40°C to +70°C (-40°F to +158°F)

Humidity	Operating: 5% - 90% RH Storage (packed): 5% - 95% RH Storage (unpacked): 5% - 95% RH Max. humidity gradient (operating and storage): 40% RH/h
Noise Levels (Bels) **(Noise Power)**[4,5,6]	Noise emissions are measured in accordance with ISO 7779 (ECMA 74) and declared in accordance with ISO 9296 (ECMA 109). Listed are the declared A-weighted sound power levels (LWAd) and the declared average bystander position A-weighted sound pressure levels (LpAm): Idle: LWAd: 6.1 B for normal configuration LpAm: 47.1 dB(A) for normal configuration Operating: LWAd: 7.4 B for normal configuration LpAm: 59.7 dB(A) for normal configuration
Altitude	Operating temperature: 5°C to 35°C (41°F to 95°F) at 0 - 914 m (0 - 3,000 ft) Operating temperature: 10°C to 27°C (50°F to 80.6°F) at 914 - 2,133 m (3,000 - 7,000 ft)

Note:

1.   For normal configurations, the maximum supported operating temperature is 35°C (95°F). To support a higher operating temperature, a review of the specific configuration should be performed.

2.   10°C to 35°C (50°F to 95°F) is the standard operating temperature.

For temperatures between 10°C and 35°C (50°F and 95°F), de-rate the maximum allowable temperature by 1°C per 305 m (1°F per 556 ft) above sea level. The altitude and maximum temperature gradient vary with server configuration.

Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.

3.   This document lists the LWAd and LpAm of the product at a 23°C (73.4°F)

ambient environment. All measurements are conducted in conformance with ISO 7779 (ECMA 74) and declared in conformance with ISO 9296 (ECMA 109). The listed sound levels apply to the maximum configuration. Additional options may result in increased sound levels. Contact your sales representative for more information.

4.   The sound levels shown here were measured based on the normal configuration of a specific server. Sound levels vary with server configuration. These values are for reference only and are subject to change without notice.

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

6.   The listed sound levels apply to the normal configuration. Additional options may result in increased noise.

6.3 Configuration Precautions

- SATA cards and SAS/RAID controller cards cannot be installed to the motherboard slot at the same time.

- SAS/RAID controller cards of different chip models cannot be installed at the same time.

- The M.2 SSD connectors support up to 2 SATA M.2 SSD or 1 SATA M.2 SSD and 1 NVMe M.2 SSD.

- Up to 2 single-slot GPUs are supported.

- For supported ambient temperatures of different configurations, see Section 11.1.

7 Operating System and Hardware Compatibility

This section describes the OS and hardware compatibility of the NF5180A6. For the latest compatibility configuration and the component models not listed in this document, contact your local sales representative.

ⓘ IMPORTANT

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

7.1 Supported Operating Systems

Table 7-1 Supported Operating Systems

OS	Version
Red Hat	Red Hat Enterprise Linux 8.3

7.2 Hardware Compatibility

7.2.1 CPU Specifications

Table 7-2 CPU Specifications

Three CPUs have been tested.

V0010G9000000000	CPU_AMD_7763-Xeon2.45_64C_256M_280W
V0010EM000000000	CPU_AMD_7713-EPYC2.0_64C_256M_225W

V0010G4000000000	CPU_AMD_7513-Xeon2.6_32C_128M_200W

7.2.2 DIMM Specifications

Table 7-3 DIMM Specifications

The tests of the following models have been completed.

V004051000000000	Memory_SA_32G_DDR4-3200ER_2R4_D36F
V00408N000000000	Memory_MT_32G_DDR4-3200ER_2R8_E18F
V004052000000000	Memory_SA_64G_DDR4-3200ER_2R4_A36F
V00404K000000000	Memory_SK_64G_DDR4-3200ER_2R4_A36J

7.2.3 Drive Specifications

Table 7-4 SAS/SATA Drive Specifications

The listed are the models with their maximum capacity. According to compatibility and BOM principle, the following models contain the small-capacity HDDs of the same series.

SATA

V0231XX000000000	HDD_S_18KT_ST18000NM000J_7.2K3_6_SC02
V0231XG000000000	HDD_S_16KT_ST16000NM001G_7.2K3_6_SCB3
V02324R000000000	HDD_S_10KT_ST10000NM017B_7.2K3_6_SCA1
V02320U000000000	HDD_S_8KT_ST8000NM000A_7.2K3_6_SC03
V02320T000000000	HDD_S_4KT_ST4000NM000A_7.2K3_6_TC03
V0231F2000000000	HDD_W_12KT_HUH721212ALE600_7.2K3_6_6B0
V0231T7000000000	HDD_W_10KT_WUS721010ALE6L4_7.2K3_6_9C0
V0231NM000000000	HDD_W_6KT_HUS726T6TALE6L4_7.2K3_6_4J0
V0231WU000000000	HDD_T_16KT_MG08ACA16TE_7.2K3_6_4303
V023196000000000	HDD_T_10KT_MG06ACA10TE_7.2K3_6_4304
V0231YK000000000	HDD_T_8KT_MG08ADA800E_7.2K3_6_4302

SAS

V0231LP000000000	HDD_S_16KS_ST16000NM002G_7.2K3_12_E003
V0231L6000000000	HDD_S_4KS_ST4000NM003A_7.2K3_12_N002_LC
V02310K000000000	HDD_HGST_12KS_HUH721212AL5200_7.2K3_12
V02317M000000000	HDD_W_8KS_HUS728T8TAL5204_7.2K3_12_460
V0231Q5000000000	HDD_S_2.4KS_ST2400MM0129_10k2_12_C004_LC
V0231Q7000000000	HDD_S_1.2KS_ST1200MM0009_10k2_12_N005_LC

V0231E6000000000	HDD_T_2.4KS_AL15SEB24EQ_10k2_12_1403
V0231QQ000000000	HDD_S_900S_ST900MP0006_15k2_12_N004

Table 7-5 SSD Specifications

The listed are the models with their maximum capacity. According to compatibility and BOM principle, the following models contain small-capacity SSDs of the same series.

V0231H9000000000	SSD_MT_7.68KTD_MTFDDAK7T6TDS_T2_6_801_PR
V02325S000000000	SSD_SA_960TD_MZ7L3960HBLT_T2_6_E004Q_897
V0231HC000000000	SSD_MT_3.84KTD_MTFDDAK3T8TDT_T2_6_401_MA

Table 7-6 U.2 NVMe SSD Specifications

The listed are the models with their maximum capacity. According to compatibility and BOM principle, the following models contain the small capacity drives of the same series.

V0231TD000000000	NVMe_I_7.68KU2D_SSDPF2KX076TZ_T2_16_100_5
V0231YQ000000000	NVMe_SA_7.68KU2D_MZQL27T6HBLA_T2_16_51C2Q
V02321L000000000	NVMe_I_3.2KU2D_SSDPE2KE032T8_T2_8_182_461

7.2.4 SAS/RAID Controller Card Specifications

Table 7-7 SAS/RAID Controller Card Specifications

RAID Controller Cards

V02000P000000000	RAID Controller Card_L_8R0_9560-8i_4G_HDM12G_PCIe4
V02000A000000000	RAID Controller Card_L_16R0_9460-16i_4GB_HDM12G_PCIe3
V02000R000000000	RAID Controller Card_L_16R0_9560-16i_8GB_SMSAS3_PCIe4
YZRA-01188-101	RAID Controller Card_PM8204_RA_8_2GB_SAS3_PCIe3
YZRA-01188-102	RAID Controller Card_PM8204_RA_8_4GB_SAS3_PCIe3
V020009000000000	RAID Controller Card_L_8R0_9460-8i_2GB_HDM12G_PCIe3
V02000J000000000	RAID Controller Card_BRCM_8R0_9440-8i_0_HDM12G_PCIe3

SAS Card

V04800T000000000	SAS Card_BRCM_8R0_9500-8i_SMSAS3_PCIe4
V04800B000000000	SAS Card_L_16R0_9400-16i_HDM12G_PCIe3
V04800U000000000	SAS Card_BRCM_16R0_9500-16i_SMSAS3_PCIe4

V04800A000000000	SAS Card_L_8R0_9400-8i_HDM12G_PCIe3
YZSA-01188-101	SAS Card_PM8222_SmartHBA_8_SAS3_PCIe3
YZSA-01188-102	SAS Card_PM8222_PM8222_8_SAS3_PCIe

7.2.5 NIC Specifications

Table 7-8 OCP NIC Specifications

V022073000000000	NIC_I_100G_E810CQDA2_LC_OCP3x16_2_XR

7.2.6 PSU Specifications

The NF5180A6 supports up to 2 hot-swap PSUs in 1+1 redundancy that follow the Intel Common Redundant Power Supply (CRPS) specification with standard electrical and structural design. The PSUs will lock automatically after being inserted into the power bay, enabling tool-less maintenance. The server offers various output powers, allowing customers to choose based on the actual configuration.

● The following rated 110 VAC - 230 VAC and 240 VDC power supplies with 1+1 redundancy are supported:

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

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

- 1,300 W Platinum level PSU: 1,000 W (110 VAC), 1,300 W (230 VAC), 1,300 W (240 VDC for China)

- 800 W Titanium level PSU: 800 W (110 VAC), 800 W (230 VAC), 800 W (240 VDC for China)

- 1,300 W Titanium level PSU: 1,000 W (110 VAC), 1,300 W (230 VAC), 1,300 W (240 VDC for China)

NOTE

At a rated voltage of 110 VAC, a 1,300 W or higher power supply will be derated to 1,000 W.

- Input voltage range:

110 VAC - 230 VAC: 90 V to 264 V

240 VDC: 180 V to 320 V

- The following rated 336 VDC power supplies with 1+1 redundancy are supported:

  - 800 W 336 VDC PSU: 800 W (336 VDC)

  - 1,300 W 336 VDC PSU: 1,300 W (336 VDC)

  - Input voltage range:

    336 VDC: 260 V to 400 V

- The following rated -48 VDC PSUs with 1+1 redundancy are supported:

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

  - 1,300 W -48 VDC PSU: 1,300 W (-48 VDC)

  - Input voltage range:

    -48 VDC: -40 V to -72 V

7.3 Intelligent Management System ISBMC

ISBMC, a remote server management system, supports mainstream management specifications in the industry such as IPMI 2.0 and Redfish 1.8. ISBMC features high operational reliability, easy serviceability for different business scenarios, accurate and comprehensive fault diagnosis capabilities, and industry-leading security reinforcement capabilities.

ISBMC supports:

- IPMI 2.0

- Redfish 1.8

- SNMP v1/v2c/v3

- HTML5/Java remote consoles (Keyboard Video Mouse)

- remote virtual media

- login via web browsers

- intelligent fault diagnosis

Table 7-9 ISBMC Features

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

Feature	Description
	to quickly capture the screen for easy inspection at a scheduled time
Dual Flash and Dual Image	Supports dual flash and dual image, enabling automatic flash failover in case of software or flash corruption, improving operational reliability
Power Capping	Supports power capping, increasing deployment density and reducing energy consumption.
IPv4/IPv6	Supports both IPv4 and IPv6, enhancing network deployment flexibility
Auto-Switching of Management Network Port	Supports auto-switching between the dedicated management network port and shared management network port, providing customers with flexible network deployment solutions for different management network deployment scenarios
ISBMC Self-Diagnosis and Self-Recovery System	• Supports the reliable dual watchdog mechanism for hardware and software, enabling automatic restoration of BMC in case of BMC abnormality • Provides a thermal protection mechanism, which is automatically triggered when the BMC is abnormal to ensure that the fan operates at safe speeds to avoid system overheating • Supports self-diagnosis of processors, memory modules, and storage devices of ISBMC, and automatically cleans the workload to restore to normal when the device usage rate is too high
Power Control	Supports virtual power buttons for power on/off, power cycle and reset.
UID LED	• Supports remote lighting of the UID LED for locating the server in the server room.
Secure Firmware Update	• Supports firmware updates based on secure digital signatures and mismatch prevention mechanism for firmware from different manufacturers and firmware for different server models • Supports firmware updates of BMC/BIOS/CPLD/PSU
Serial Port Redirection	Supports remote redirection of the system serial port, BMC serial port and other serial ports, and directs the server-side serial port output to the local administrator via the network for server debugging

Feature	Description
Storage Information Display	Displays RAID logical array information and drive information, supports remote RAID creation for improved deployment efficiency
User Role Management	Supports user detail management based on user roles and flexible creation of user roles with different privileges, and provides more user roles to allow administrators to grant different privileges to O&M personnel
Security Feature	Adopts the industry-leading server security baseline standard V2.0. SSH, HTTPS, SNMP and IPMI use secure and reliable algorithms. ISBMC offers capabilities including secure update and boot and security reinforcement mechanisms such as anti-replay, anti-injection, and anti-brute force

7.4 InManage

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

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

- lightweight deployment in multiple scenarios and full lifecycle management of devices

- high reliability and on-demand scalability enabled by 1 to N data collectors

- intelligent asset management and real-time tracking of asset changes

- comprehensive monitoring for overall business control

- intelligent fault diagnosis for reduced maintenance time

- second-level performance monitoring for real-time status of devices

- batch configuration, deployment and update, shortening the time needed to bring the production environment online

- improved firmware version management efficiency

- standardized northbound interfaces for easy integration and interfacing

Table 7-10 InManage Features

Feature	Description
Home	• Display of basic information (data centers, server rooms, cabinets, assets and alerts), quick addition of devices and custom home page
Assets	• Batch asset import, automatic asset discovery, and full lifecycle management of assets • Management of the full range of our server family, including general-purpose rack servers, AI servers, multi-node servers, edge servers and all-in-one servers • Management of our general-purpose disk arrays and distributed storage devices • Management of network devices (switches, routers, etc.), security devices (firewalls, load balancers, etc.), cabinets and clouds • Management of data centers • Asset warranty information management, asset inventory reports for server acceptance, asset attribute expansion, etc.
Monitor	• Display of real-time alerts, history alerts, blocked alerts and events • Fault prediction of drives and memories • Custom inspection plan and inspection result management • Notification record viewing • Intelligent fault diagnosis and analysis, automatic fault reporting and repair ticket viewing • Trap management and Redfish management • Management of monitoring rules, such as alert rules, notification rules, blocking rules, alert noise reduction

Feature	Description
	rules, compression rules and fault reporting rules, and redefinition of the above rules.
Control	• Quick start of firmware update, OS installation, power management, drive data erasing and stress test • Batch firmware update (BMC/BIOS/RAID Card/NIC/Drive/HBA Card/MB CPLD/BP CPLD/PSU) • Batch firmware configuration (BMC/BIOS) • Batch RAID configuration and OS deployment for servers • Secure and quick drive data erasing • CPU and memory stress test • Automatic firmware baseline management • BMC and BIOS snapshot management • Repositories for update files
Energy Efficiency	• Overview of data center power consumption trend chart and carbon emission trend chart • Setting of server dynamic power consumption policies and minimum power consumption policies • Carbon asset and carbon emission management
Log	• Fault log record management • Diagnosis record and diagnosis rule management
Topologies	• Centralized management of multiple data centers and panoramic 3D views, including dynamic display of power consumption, temperature, alerts and cabinet capacity of the data center • Network topologies
Reports	• Management of warranty information reports, alert reports, asset reports, hardware reports and performance reports • Export of reports in .xlsx format

Feature	Description
System	- Password management, alert forwarding and data dump - Customized InManage parameters
Security	Security control of InManage via a set of security policies such as user management, role management, authentication management (local authentication and LDAP authentication) and certificate management.

7.5 InManage Tools

Table 7-2 Features of InManage Tools

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

8 Appendix A

8.1 Operating Temperature Specification Limits

Table 9-1 Operating Temperature Specification Limits

Front Panel	Front Drive	CPU	PCIe NIC	T4 GPU	OCP NIC	Max. Supported Ambient Temperature
4 × 3.5-inch HDD + 4 × 2.5-inch SSD	4 × 3.5-inch	≤200 W	≤40 Gb/s	N/A	≤40 Gb/s	35°C (95°F)
4 × 3.5-inch HDD + 4 × 2.5-inch SSD	1 × 3.5-inch	≤200 W	≤40 Gb/s	2	≤40 Gb/s	35°C (95°F)
4 × 3.5-inch HDD + 4 × 2.5-inch SSD	2 × 3.5-inch	≤200 W	100 Gb/s supported	N/A	100 Gb/s supported	35°C (95°F)
10 × 2.5-inch NVMe	10 × 2.5-inch	≤200 W	≤40 Gb/s	N/A	≤40 Gb/s	35°C (95°F)
10 × 2.5-inch NVMe	2 × 2.5-inch	≤200 W	≤40 Gb/s	2	≤40 Gb/s	35°C (95°F)
10 × 2.5-inch NVMe	4 × 2.5-inch	≤200 W	100 Gb/s supported	N/A	100 Gb/s supported	35°C (95°F)
4 × 2.5-inch NVMe	4 × 2.5-inch	≤200 W	100 Gb/s supported	Not supported	100 Gb/s supported	35°C (95°F), not supported when a single fan fails
4 × 2.5-inch NVMe	4 × 2.5-inch	≤280 W	≤40 Gb/s	Not supported	≤40 Gb/s	35°C (95°F), not supported when a single fan fails

NOTE

- The maximum operating temperature will drop by 5°C (9°F) if a single fan fails.
- Single fan failure may affect system performance.
- If using the security panel with the configurations such as 100 Gb/s OCP NIC and GPU, the maximum operating temperature will drop by 3°C (5.4°F).
- It is recommended to deploy your servers at an interval of a 1U space to reduce server noise and improve server energy efficiency.

8.2 Model

Table 9-2 Model

Model	Description
NF5180A6	Global