# Inspur Server NF5180G7 Series White Paper

## Powered by Intel Processors

For NF5180-M7-A0-R0-00

Document Version: V0.92

Release Date: February 28, 2023

# Applicable Model

| Model | Maintenance | Cooling |
| --- | --- | --- |
| NF5180-M7-A0-R0-00 | Rear access | Air cooling |



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# Preface

## Abstract

This document describes the NF5180G7 Intel-based server's appearance, features, performance parameters, and software and hardware compatibility, providing in-depth information of NF5180G7.

## Intended Audience

This white paper is intended for:

- Inspur pre-sales engineers
- Pre-sales engineers of channel partners
- Enterprise 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 |
| --- | --- | --- |
| V0.92 | 2023/02/28 | Initial release |

# Table of Contents

# 1 Product Overview

The Inspur NF5180G7 Intel-based system is a 1U 2-socket high-density computing rack server. Powered by the 4th Gen Intel Xeon Scalable processor (Sapphire Rapids), it maximizes system performance, density and scalability. With the optimized air cooling channel, the NF5180G7 improves heat dissipation efficiency and still maintains maximum storage and compute density. Meanwhile, it offers multiple cooling options such as EVAC heatsink air cooling, cold plate liquid cooling, and immersion cooling. Thus, it is ideal for more compute-intensive business such as virtualization, high-performance computing, and online services and meets demands on new high-density data center deployment.

Figure 1-1 4 × 3.5-inch Drive + 2 × E1.S SSD + 2 × M.2 SSD Configuration

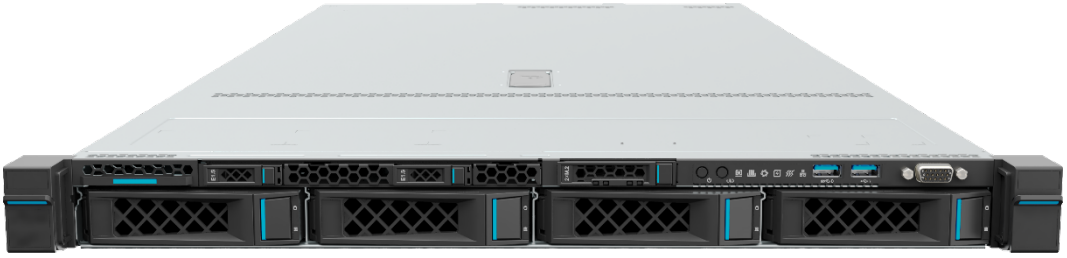


Figure 1-2 4 × 3.5-inch Drive + 4 × 2.5-inch Drive Configuration

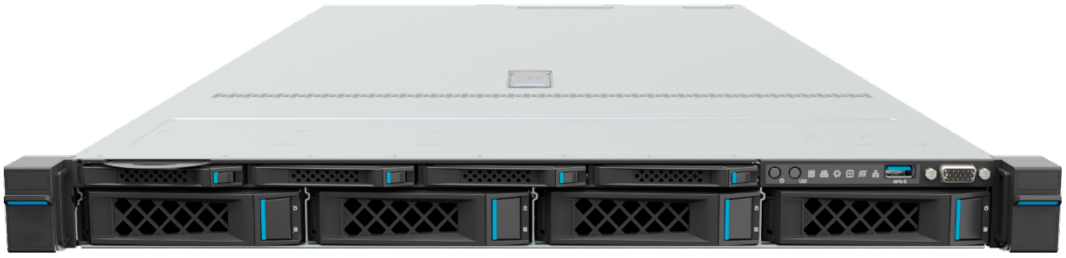


Figure 1-3 10 × 2.5-inch Drive Configuration

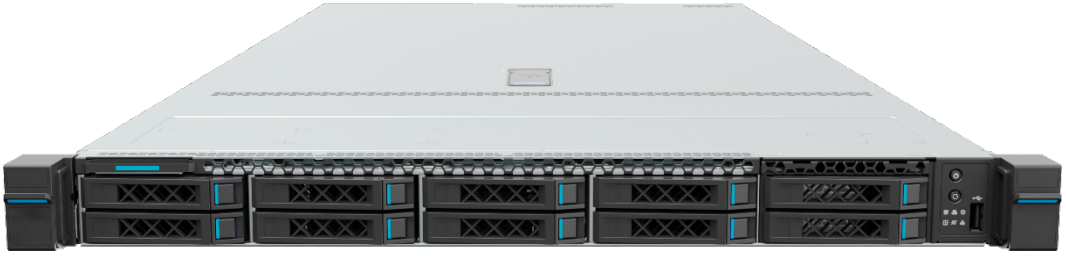
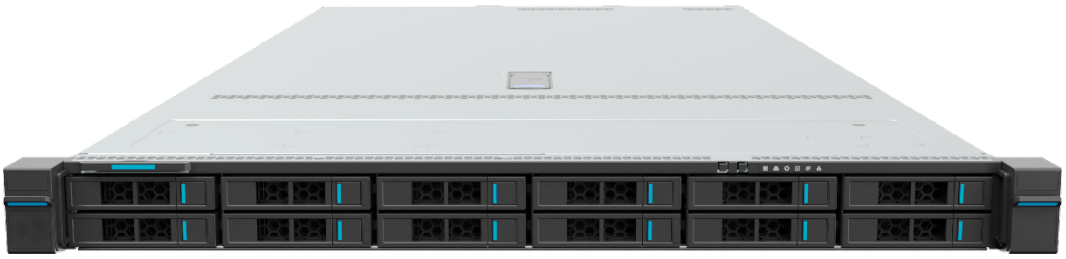


Figure 1-4 12 × 2.5-inch Drive Configuration



# 2 Features

## 2.1 Scalability and Performance

- Features the 4th Gen Intel Xeon Scalable processors (Sapphire Rapids), with up to 60 cores per CPU, a maximum TDP of 350 W, a Max Turbo frequency of 4.2 GHz, an L3 cache of 1.875 MB per core, and up to 4 UPI links per CPU at up to 16 GT/s, delivering unrivaled processing performance.
  - With the processor cache hierarchy optimization, a larger L2 cache of private 1 MB per core is provided, so that memory data can be put and processed directly in L2 cache, improving the memory access performance and reducing the demand on L3 cache capacity.
  - Supports Intel Turbo Boost Technology 2.0 and automatically scales CPU speeds up to the max Turbo frequency at peak workloads, allowing processor cores to exceed the thermal design power (TDP) for a limited time.
  - Supports Intel Hyper-Threading Technology, allowing up to 2 threads to run on each core to improve the performance of multi-threaded applications.
  - Supports Intel Virtualization Technology that provides hardware assist to the virtualization software, allowing the operating system to better use hardware to handle virtualized workloads.
  - Supports Intel Advanced Vector Extensions 512 (Intel AVX-512), significantly accelerating the workloads that are strongly floating point compute intensive.
  - Supports Intel DL Boost (VNNI) instructions, improving the performance for deep learning applications.
- Supports up to 32 DIMMs and multiple DIMM types:
  - Up to 32 DDR5 ECC DIMMs (4,400 MT/s, up to 512 GB per DIMM, RDIMMs), delivering superior speed and high availability.
  - Memory expansion capabilities (extra 16 memories) enabled by CXL technologies.
- Flexible drive configurations, providing elastic and scalable storage solutions to meet different capacity and upgrade requirements.

- Up to 12 hot-swap all-flash NVMe SSDs, providing an IOPS ten times that of high-end enterprise-class SATA SSDs and greatly increasing storage performance with the ultimate storage I/O.
- 24 Gbps Serial Attached SCSI (SAS), quadrupling the data transfer rate of internal storage of 6 Gbps SAS solution and maximizing the performance of storage I/O-intensive applications.
- With Intel integrated I/O technology, the processors integrate the PCIe 5.0 controller to reduce I/O latency and enhance overall system performance.
- Up to 3 standard PCIe x16 expansion cards (1 × FHHL slot + 2 × HHHL slots) and 1 mezz RAID card, further enhancing the I/O performance.
- Up to 2 optional OCP 3.0 cards with multiple network port options (1/10/25/100/200/400 Gb), delivering a more flexible network architecture.

## 2.2 Availability and Serviceability

- Supports hot-swap SAS/SATA/NVMe drives and RAID controller cards with RAID levels 0/1/1E/10/5/50/6/60 (with SAS/SATA drives), RAID cache and data protection enabled by the super-capacitor in case of power failures. Supported RAID levels vary with RAID controller cards.
- SSDs are much more reliable than traditional HDDs, increasing the system uptime.
- The UID and status LEDs for fault diagnosis on the front panel, the plug-in LCD module, and the ISBMC Web GUI indicate the status of key components and quickly lead technicians to failed (or failing) components, simplifying maintenance, speeding up troubleshooting, and enhancing system availability.
- The ISBMC management port on the rear panel enables local ISBMC O&M, improving O&M efficiency.
- Provides 2 hot-swap PSUs with 1+1 redundancy and 8 hot-swap 4056 fans with N+1 redundancy, improving system availability.
- The onboard ISBMC monitors system parameters in real time and sends alerts in advance, enabling technicians to take appropriate measures to ensure stable system operation and minimize system downtime.
- Online memory diagnosis helps service personnel quickly locate the DIMM that needs servicing, improving maintenance efficiency.

For documentation of the NF5180G7 system (such as product marketing materials, user manuals, product drivers, firmware, and product certifications), visit Inspur website: https://en.inspur.com.

## 2.3 Manageability and Security

- The onboard ISBMC monitors system operating status and enables remote management.
  - ISBMC, a self-developed intelligent management system, is included with the server.
  - ISBMC supports such mainstream management specifications in the industry as IPMI 2.0 and Redfish 1.13.
  - ISBMC improves operational reliability.
  - ISBMC delivers easy serviceability for different business scenarios.
  - ISBMC provides comprehensive and accurate fault diagnosis capabilities.
  - ISBMC offers industry-leading security reinforcement capabilities.
- The Network Controller Sideband Interface (NC-SI) feature allows a network port to serve as a management port and a service port. The NC-SI feature is disabled by default and can be enabled/disabled through the BIOS or ISBMC.
- The industry-standard UEFI improves the efficiency of setup, configuration and update, and simplifies the error handling process.
- The intelligent management software ISPIM allows centralized management of the server and full lifecycle management covering part-level asset management, intelligent monitoring and alerting, automatic inspection, fault diagnosis and reporting, energy consumption management, and firmware update/configuration.
- The ISIB system enables rapid server initialization and supports batch RAID configuration and OS deployment.
- The intelligent management system ISBMC provides various security features such as identification and authentication, authorization and access control, Web GUI security configuration, and log audit, offering industry-leading security reinforcement capabilities.
- Firmware update mechanism based on digital signatures prevents unauthorized firmware updates.
- Chassis intrusion detection enhances physical security.
- Flexible BMC access control policies, double-factor authentication and single sign on improve BMC management security.
- Dual-image mechanism for BMC and BIOS recovers firmware upon detection of firmware damage.

- BMC Secure Boot based on hardware root of trust protects BMC from malicious tampering.
- Optional Intel Platform Firmware Resilience (PFR) protects firmware from malicious tampering and restores detected corrupt firmware automatically.
- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks.
- Intel Software Guard Extensions (SGX) technology allows applications to run in its own isolated space, helping prevent malicious theft and modification of critical codes and data.
- BIOS Secure Boot based on Trusted Platform Module (TPM) protects BIOS from malicious tampering.
- BIOS Secure Flash and BIOS Lock Enable (BLE) reduce attacks from malicious software on the BIOS flash region.
- UEFI Secure Boot protects the system from malicious boot loaders.
- Hierarchical password protection in BIOS ensures system boot and management security.
- Optional secure system wiping functionality enabled by ISQP and BMC to wipe data on the storage device with one click.
- Optional Trusted Platform Module (TPM) and Trusted Cryptography Module (TCM) provide advanced encryption.
- The optional front bezel with a lock prevents unauthorized users from removing or installing drives, thus ensuring the security of local data.

NOTE

The NC-SI port supports the following features:

- The NC-SI port can be bonded to any network port of the OCP card or of PCIe NIC that supports NC-SI.
- Supports the enablement/disablement and configuration of Virtual Local Area Network (VLAN). VLAN is disabled by default and the default VLAN ID is 0.
- Supports IPv6 and IPv4 addresses. IP address, subnet mask, default gateway, and prefix length of IPv6 address can be configured.

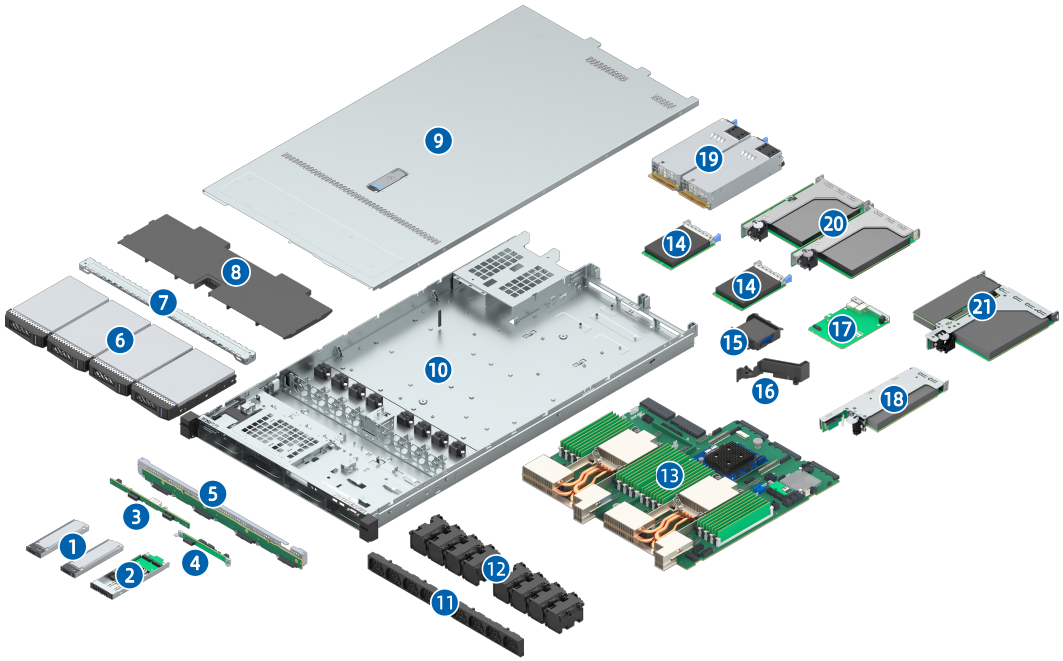
## 2.4 Energy Efficiency

- Equipped with 80 Plus Platinum/Titanium power supplies of different power efficiency levels, with power efficiency up to 96% at a load of 50%.

- Supports 1+1 power supply redundancy and AC/DC power input, improving power conversion efficiency.
- Features the high-efficiency single-board voltage regulator down (VRD) solution, reducing DC-DC conversion loss.
- Supports Proportional-Integral-Derivative (PID) 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.
- Provides power capping and power control measures.
- Supports staggered spin-up of drives, reducing power consumption during server startup.
- Supports Intel Intelligent Power Capability (IIPC) to optimize energy usage in the processor cores by turning computing functions on only when needed.
- Supports low-voltage 4$^{th}$ Gen Intel Xeon Scalable processors (Sapphire Rapids), consuming less energy and meeting the demands of data centers and telecommunications environments constrained by power and thermal limits.

# 3 System Parts Breakdown

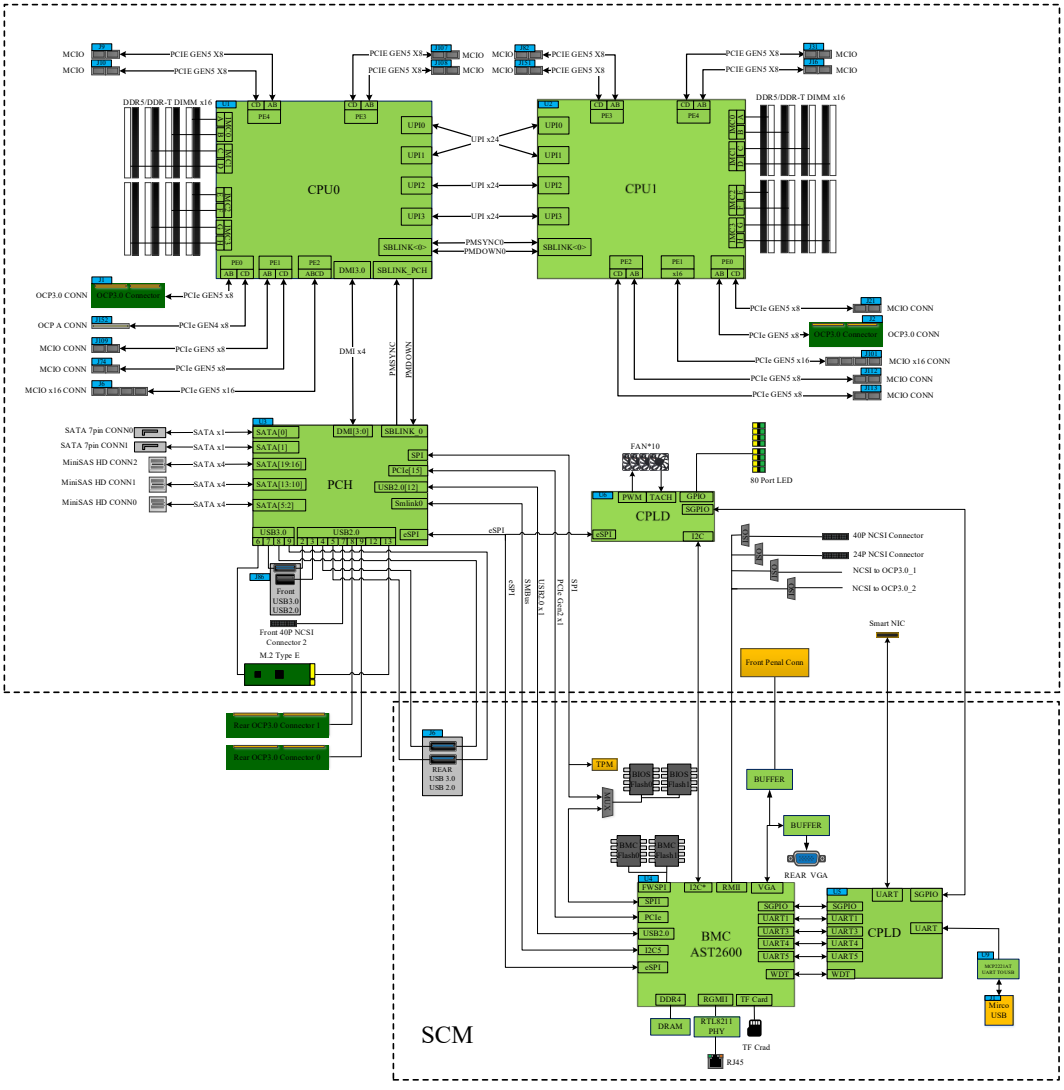
Figure 3-1 NF5180-M7-A0-R0-00 Exploded Diagram (4 × 3.5-inch Drive + 2 × E1.S SSD + 2 × M.2 SSD Configuration)




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | E1.S SSD × 2 | 2 | M.2 SSD Module (with 2 M.2 SSDs) |
| 3 | E1.S SSD Backplane (for 2 E1.S SSDs) | 4 | M.2 SSD Backplane (for 2 M.2 SSDs) |
| 5 | 3.5-inch Drive Backplane (for 4 drives) | 6 | 3.5-inch Drive × 4 |
| 7 | Reinforcement Crossbar | 8 | Air Duct |
| 9 | Top Cover | 10 | Chassis |
| 11 | Honeycomb Layer | 12 | Fan Module × 8 |
| 13 | Motherboard | 14 | OCP 3.0 Card × 2 |
| 15 | Super-Capacitor Module | 16 | PSU Air Duct |
| 17 | DC-SCM Board | 18 | PCIe Riser Card Assembly (LP PCIe Card) |
| 19 | PSU × 2 | 20 | PCIe Riser Card Assembly × 2 (FH PCIe Card) |
| 21 | PCIe Riser Card Assembly (Butterfly Riser Cage) | | |

# 4 System Logical Diagram

Figure 4-1 OCP x8 Motherboard Logical Diagram - NF5180G7 Series Intel-based System




- Up to two 4th Gen Intel Xeon Scalable processors (Sapphire Rapids).
- Up to 32 DIMMs.
- Up to 4 UPI links per CPU at up to 16 GT/s.
- Up to 6 PCIe 5.0 expansion slots with 1 OCP 3.0 card supported by CPU0 and CPU1 respectively and 1 mezz RAID card by CPU0.

- The mezz RAID card is connected to CPU0 via the PCIe bus, and is connected to the drive backplane via the SAS signal cable. Multiple local storage configurations are supported through different drive backplanes.
- The motherboard integrates the EBG Platform Controller Hub (PCH) to support 3 USB 3.0 ports, 14 SATA 3.0 connectors and 1 TF card adapter board.
- The DC-SCM board integrates a BMC management chip which supports a VGA port, a BMC management network port, a serial port, a TF card slot, and other connectors.

# 5 Hardware Description

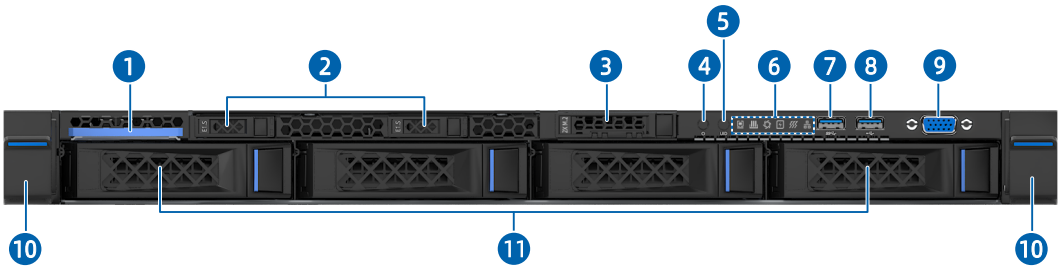
## 5.1 Front Panel

### 5.1.1 4 × 3.5-inch Drive + 2 × E1.S SSD + 2 × M.2 SSD Configuration

NOTE

The front panel applies to NF5180-M7-A0-R0-00.

Figure 5-1 Front View



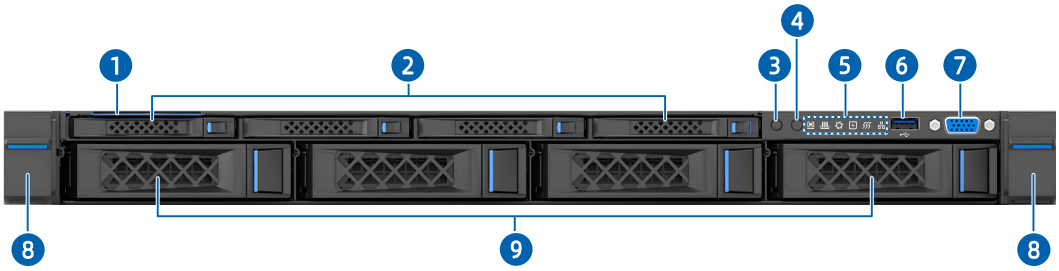

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Serial Label Pull Tag (with an SN label) | 2 | E1.S Drive Bay × 2 |
| 3 | M.2 Drive Bay (with 2 M.2 SSDs) | 4 | Power Button and LED |
| 5 | UID/BMC RST Button and LED | 6 | LEDs |
| 7 | USB 2.0/LCD Port | 8 | USB 3.0 Port |
| 9 | VGA Port | 10 | Ear Latch |
| 11 | 3.5-inch Drive Bay × 4 | | |

### 5.1.2 4 × 3.5-inch Drive + 4 × 2.5-inch Drive Configuration

NOTE

The front panel applies to NF5180-M7-A0-R0-00.

Figure 5-2 Front View



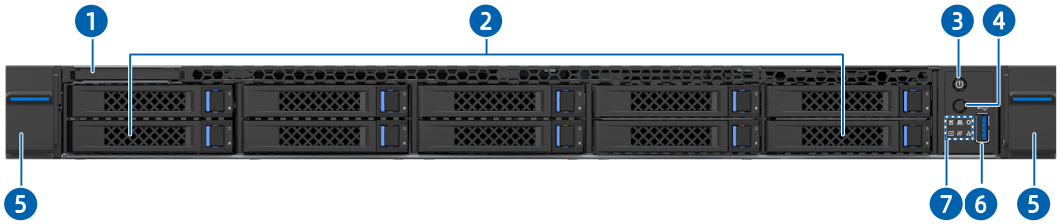

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Serial Label Pull Tag (with an SN label) | 2 | 2.5-inch Drive Bay× 4 |
| 3 | Power Button and LED | 4 | UID/BMC RST Button and LED |
| 5 | LEDs | 6 | USB 3.0 Port |
| 7 | VGA Port | 8 | Ear Latch |
| 9 | 3.5-inch Drive Bay × 4 | | |

## 5.1.3 10 × 2.5-inch Drive Configuration

NOTE

The front panel applies to NF5180-M7-A0-R0-00.

Figure 5-3 Front View



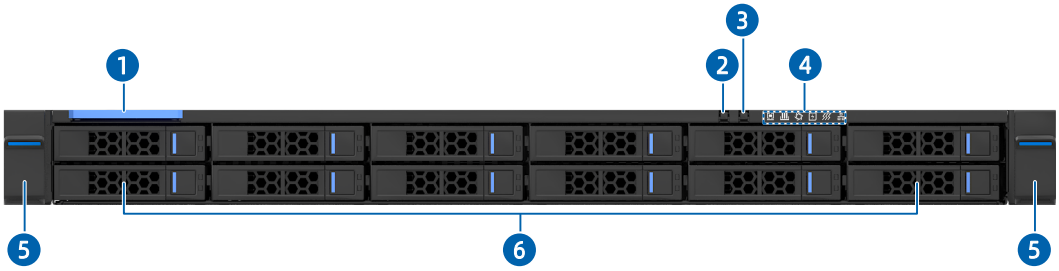

| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Serial Label Pull Tag (with an SN label) | 2 | 2.5-inch Drive Bay × 10 |
| 3 | Power Button and LED | 4 | UID/BMC RST Button and LED |
| 5 | Ear Latch | 6 | USB 3.0 Port |
| 7 | LEDs | | |

### 5.1.4 12 × 2.5-inch Drive Configuration

NOTE

The front panel applies to NF5180-M7-A0-R0-00.

Figure 5-4 Front View




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Serial Label Pull Tag (with an SN label) | 2 | Power Button and LED |
| 3 | UID/BMC RST Button and LED | 4 | LEDs |
| 5 | Ear Latch | 6 | 2.5-inch Drive Bay × 12 |

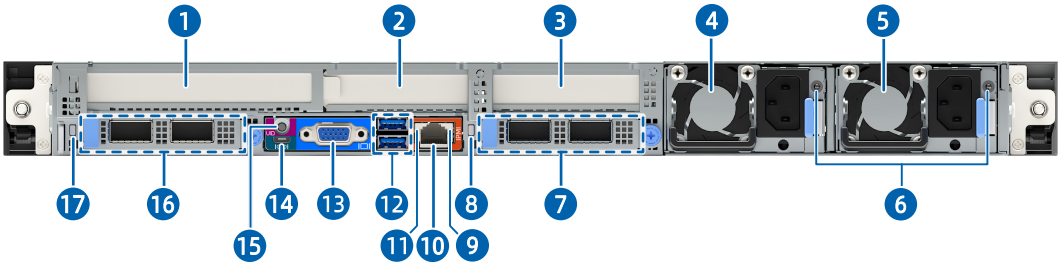
## 5.2 Rear Panel

### 5.2.1 Rear View - 3 × PCIe Slot

NOTE

The rear panel applies to NF5180-M7-A0-R0-00.

Figure 5-5 Rear View



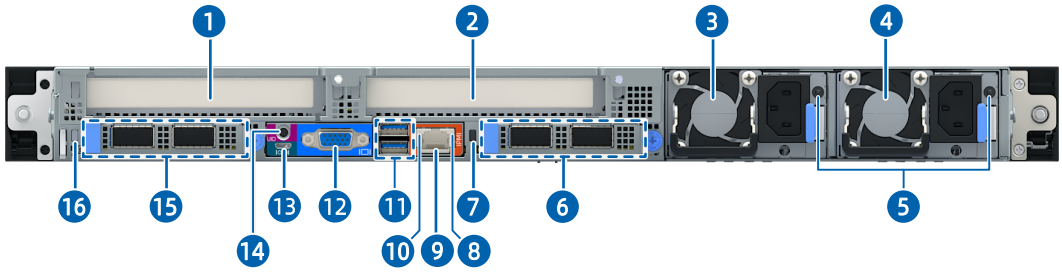
| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | PCIe Slot 0 | 2 | PCIe Slot 1 |
| 3 | PCIe Slot 2 | 4 | PSU0 |
| 5 | PSU1 | 6 | PSU LEDs |
| 7 | OCP 3.0 Card 1 | 8 | OCP Hot-Plug Button and LED 1 |
| 9 | Management Network Port Link Activity LED | 10 | BMC Management Network Port |
| 11 | Management Network Port Link Speed LED | 12 | USB 3.0 Port × 2 |
| 13 | VGA Port | 14 | BMC/System Serial Port |
| 15 | UID/BMC RST Button and LED | 16 | OCP 3.0 Card 0 |
| 17 | OCP Hot-Plug Button and LED 0 | | |

## 5.2.2 Rear View - 3 × PCIe Slot

NOTE

The rear panel applies to NF5180-M7-A0-R0-00.

Figure 5-6 Rear View




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | PCIe Slot 0 | 2 | PCIe Slot 1 |
| 3 | PSU0 | 4 | PSU1 |
| 5 | PSU LEDs | 6 | OCP 3.0 Card 1 |
| 7 | OCP Hot-Plug Button and LED 1 | 8 | Management Network Port Link Activity LED |
| 9 | BMC Management Network Port | 10 | Management Network Port Link Speed LED |

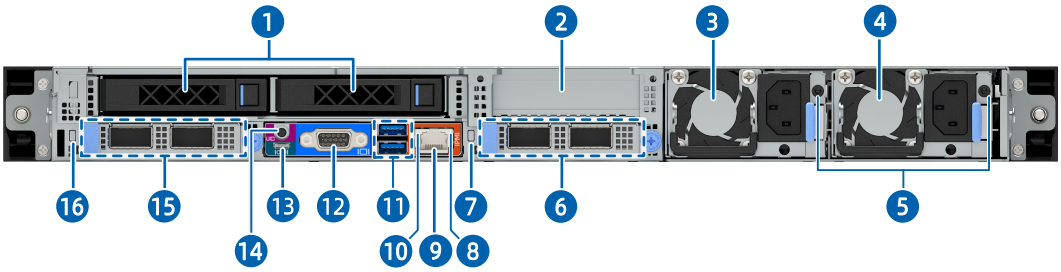
| Item | Feature | Item | Feature |
|---|---|---|---|
| 11 | USB 3.0 Port × 2 | 12 | VGA Port |
| 13 | BMC/System Serial Port | 14 | UID/BMC RST Button and LED |
| 15 | OCP 3.0 Card 0 | 16 | OCP Hot-Plug Button and LED 0 |

## 5.2.3 Rear View – 2 × 2.5-inch Drive + 1 × PCIe Slot

NOTE

The rear panel applies to NF5180-M7-A0-R0-00.

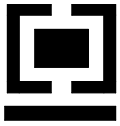
Figure 5-7 Rear View

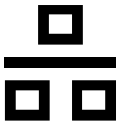



| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | 2.5-inch Drive Bay × 2 | 2 | PCIe Slot 2 |
| 3 | PSU0 | 4 | PSU1 |
| 5 | PSU LEDs | 6 | OCP 3.0 Card 1 |
| 7 | OCP Hot-Plug Button and LED 1 | 8 | Management Network Port Link Activity LED |
| 9 | BMC Management Network Port | 10 | Management Network Port Link Speed LED |
| 11 | USB 3.0 Port × 2 | 12 | VGA Port |
| 13 | BMC/System Serial Port | 14 | UID/BMC RST Button and LED |
| 15 | OCP 3.0 Card 0 | 16 | OCP Hot-Plug Button and LED |

## 5.3 LEDs & Buttons

Table 5-1 Rear Panel LED and Button Description

| Item | Icon | LED & Button | Description |
|---|---|---|---|
| 1 |  | Power Button and LED | • Solid green = Power on state<br>• Solid orange = Standby state<br>• Long press 4s to force a shutdown |
| 2 |  | UID/BMC RST Button and LED | • Solid blue = The UID LED turns on when activated by the UID button or via BMC<br>• Flashing blue = KVM has been launched or firmware update in process<br>• Long press 6s to force BMC to reset |
| 3 |  | System Status LED | • Off = Normal<br>• Solid red = A failure occurs<br>• Flashing red = A warning occurs |
| 4 |  | Memory Status LED | • Off = Normal<br>• Solid red = A failure occurs<br>• Flashing red = A warning occurs |
| 5 |  | Fan Status LED | • Off = Normal<br>• Solid red = Fan speed cannot read<br>• Flashing red = Speed read by BMC is abnormal |
| 6 |  | Power Status LED | • Off = Normal<br>• Solid red = A power failure occurs |

| Item | Icon | LED & Button | Description |
|---|---|---|---|
| | | | • Flashing red = Power state is abnormal |
| 7 |  | System Overheat LED | • Off = Normal<br>• Solid red = CPU/Memory overheats |
| 8 |  | Network Status LED | • Solid/Flashing green = Network connected<br>• Off = No network connection<br>Note: The LED only indicates the status of self-developed OCP card. |
| 9 | - | OCP Hot-Plug Button and LED | Press the button to hot plug the OCP 3.0 card.<br>LED:<br>• Solid on = OCP card powered on<br>• Flashing = OCP card is being powered on<br>• Off = OCP card not powered on |
| 10 | - | Management Network Port Link Speed LED | • Off = No network connection<br>• Solid green = Network connected with link speed at 1,000 Mbps<br>• Solid orange = Network connected with link speed at 10/100 Mbps |
| 11 | - | Management Network Port Link Activity LED | • Off = No network connection<br>• Solid green = Network connected without data being transmitted<br>• Flashing green = Network connected with data being transmitted |
| 12 | - | PSU LED | • Off = No AC or DC power input. |

| Item | Icon | LED & Button | Description |
| --- | --- | --- | --- |
| | | | • Flashing green (1 Hz) = PSU operating in standby state with normal AC or DC input<br>• Flashing green (2 Hz) = PSU firmware being updated<br>• Flashing green (off for 1 second, on for 2 seconds) = PSU in cold redundant state<br>• Solid green = Normal input and output.<br>• Flashing amber (1 Hz) = PSU warning event where the PSU continues to operate (possible causes: PSU overtemperature, PSU output overcurrent, excessively high or low fan speed).<br>• Solid amber = Normal input but no output (possible causes: PSU overtemperature protection, PSU output overcurrent or short circuit, output overvoltage, short circuit protection, component (not all components) failure). |

## 5.4 Port Description

Table 5-2 Rear Panel Port Description

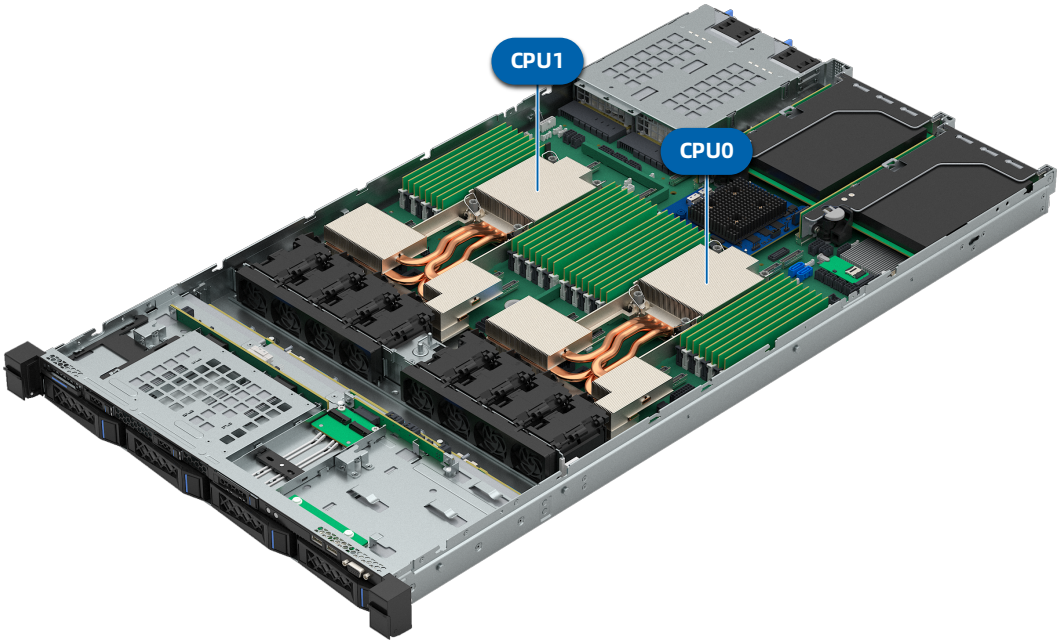
| Feature | Type | Quantity | Description |
| --- | --- | --- | --- |
| BMC Serial Port | Headphone jack | 1 | Enables you to capture the BMC logs and debug the BMC.<br>Note:<br>The serial port uses a standard 3.5 mm headphone jack with a default baud rate of 115,200 bit/s. |
| System Serial Port | Headphone jack | 1 | Enables you to print system logs.<br>Note: |

| Feature | Type | Quantity | Description |
|---|---|---|---|
| | | | The serial port uses a standard 3.5 mm headphone jack with a default baud rate of 115,200 bit/s. |
| USB 3.0 Port | USB 3.0 | 2 | Enables you to connect a USB 3.0 device to the system.<br>Important:<br>• The maximum current supported by the USB port is 0.9 A.<br>• Make sure that the USB device is in good condition or it may cause the server to work abnormally. |
| BMC Management Network Port | RJ45 | 1 | Enables you to manage the server.<br>Note:<br>The port is a Gigabit Ethernet port of 100/1000 M supporting self-negotiation. |
| VGA Port | DB15 | 1 | Enables you to connect a display terminal, for example, a monitor or KVM, to the system. |
| PSU Socket | - | 2 | Connected through a power cord. User can select PSUs as needed.<br>Note:<br>Make sure the rated power of every PSU is greater than rated power of the server. |

## 5.5 Processors

- Supports up to two 4th Gen Intel Xeon Scalable processors.
- If only 1 processor is configured, install it in the CPU0 socket.
- The processors used in a server must be of the same model.
- For specific processor options, consult your local Inspur sales representative or refer to 7.1.2 Hardware Compatibility.

Figure 5-8 Processor Layout



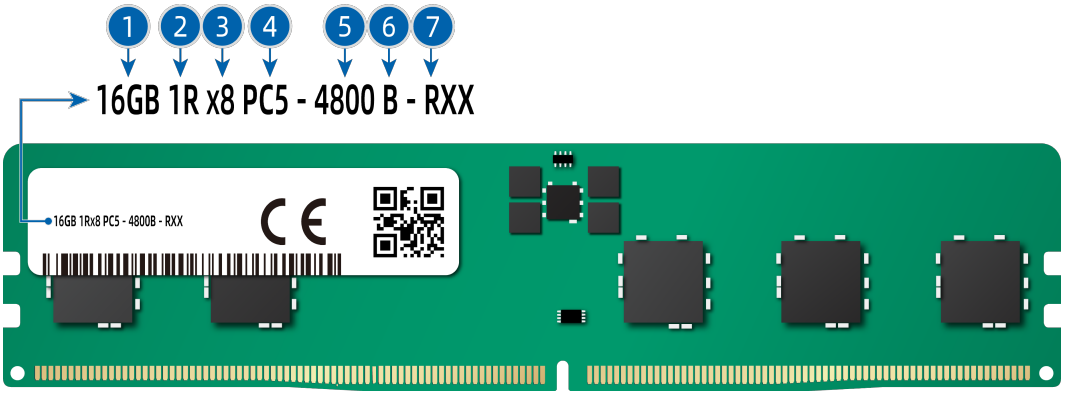

# 5.6 Memory

## 5.6.1 DDR5 DIMMs

### 1. Identification

To determine DIMM characteristics, refer to the label attached to the DIMM and the following figure and table.

Figure 5-9 DIMM Identification




| Item | Description | Example |
|---|---|---|
| 1 | Capacity | • 16 GB<br>• 32 GB |

| Item | Description | Example |
| --- | --- | --- |
| | | • 64 GB<br>• 128 GB<br>• 256 GB |
| 2 | Rank(s) | • 1R = Single rank<br>• 2R = Dual rank<br>• 2S2R = Two ranks of two high stacked 3DS DRAM<br>• 4DR = Four ranks of dual die packaged DRAM<br>• 4R = Quad rank |
| 3 | Data width of DRAM | • x4 = 4 bits<br>• x8 = 8 bits |
| 4 | DIMM slot type | • PC5 = DDR5 |
| 5 | Maximum memory speed | • 4,800 MT/s |
| 6 | CAS latency | • B=4800 40-39-39 |
| 7 | DIMM type | • R = RDIMM |

## 2. Memory Subsystem Architecture

The server supports 32 DIMM slots and 8 channels per CPU.

Within a channel, populate the DIMM slot with its silk screen ending with D0 first and second the DIMM slot with its silk screen ending with D1. For instance, within CPU0 Channel 0, populate CPU0_C0D0 first and second CPU0_C0D1.

Table 5-3 DIMM Slot List

| CPU | Channel ID | Silk Screen |
| --- | --- | --- |
| CPU0 | Channel 0 | CPU0_C0D0 |
| | | CPU0_C0D1 |
| | Channel 1 | CPU0_C1D0 |
| | | CPU0_C1D1 |
| | Channel 2 | CPU0_C2D0 |

| CPU | Channel ID | Silk Screen |
|---|---|---|
| | | CPU0_C2D1 |
| | Channel 3 | CPU0_C3D0 |
| | | CPU0_C3D1 |
| | Channel 4 | CPU0_C4D0 |
| | | CPU0_C4D1 |
| | Channel 5 | CPU0_C5D0 |
| | | CPU0_C5D1 |
| | Channel 6 | CPU0_C6D0 |
| | | CPU0_C6D1 |
| | Channel 7 | CPU0_C7D0 |
| | | CPU0_C7D1 |
| CPU1 | Channel 0 | CPU1_C0D0 |
| | | CPU1_C0D1 |
| | Channel 1 | CPU1_C1D0 |
| | | CPU1_C1D1 |
| | Channel 2 | CPU1_C2D0 |
| | | CPU1_C2D1 |
| | Channel 3 | CPU1_C3D0 |
| | | CPU1_C3D1 |
| | Channel 4 | CPU1_C4D0 |
| | | CPU1_C4D1 |
| | Channel 5 | CPU1_C5D0 |
| | | CPU1_C5D1 |
| | Channel 6 | CPU1_C6D0 |
| | | CPU1_C6D1 |
| | Channel 7 | CPU1_C7D0 |
| | | CPU1_C7D1 |

## 3. Compatibility

Refer to the following rules to select the DDR5 DIMMs.

IMPORTANT

- A server must use DDR5 DIMMs with the same part number (P/N code). All DDR5 DIMMs operate at the same speed, which is the lowest of:
  - Memory speed supported by a specific CPU.
  - Maximum operating speed of a specific memory configuration.
- Mixing DDR5 DIMM specifications (capacity, bit width, rank, height, etc.) is not supported.
- For specific system memory options, consult your local Inspur sales

representative or refer to 7.1.2 Hardware Compatibility.

- DDR5 DIMMs can be used with the 4th Gen Intel Xeon Scalable processors (Sapphire Rapids). The maximum memory capacity supported is identical for different CPU models.
- The total memory capacity is the sum of the capacities of all DDR5 DIMMs.

NOTE

The number of supported ranks per channel (up to 4 ranks for an RDIMM) has the following restrictions on the number of DIMMs supported per channel: Maximum number of DIMMs supported per channel ≤ Maximum number of ranks supported per channel/Number of ranks per DIMM.

Table 5-4 DDR5 DIMM Specifications

| **Item** | | **Value** | | | |
|---|---|---|---|---|---|
| Capacity per DDR5 DIMM (GB) | | 16 | 32 | 64 | 128 |
| Type | | RDIMM | RDIMM | RDIMM | RDIMM |
| Rated speed (MT/s) | | 4,800 | 4,800 | 4,800 | 4,800 |
| Operating voltage (V) | | 1.1 | 1.1 | 1.1 | 1.1 |
| Maximum number of DDR5 DIMMs supported in a server[a] | | 32 | 32 | 32 | 32 |
| Maximum capacity of DDR5 DIMMs supported in a server (GB)[b] | | 512 | 1,024 | 2,048 | 4,096 |
| Actual speed (MT/s) | 1DPC[c] | 4,800 | 4,800 | 4,800 | 4,800 |
| | 2DPC | 4,400 | 4,400 | 4,400 | 4,400 |
| a: The maximum number of DDR5 DIMMs supported is based on the 2-processor configuration. The number is halved for the 1-processor configuration.<br>b: It indicates the maximum memory capacity supported when all the DIMM slots are populated with DDR5 DIMMs.<br>c: DPC (DIMM per channel) is the number of DIMMs per memory channel.<br>The information above is for reference only, consult your local Inspur sales representative for details. | | | | | |

## 4. Population Rules

General population rules for DDR5 DIMMs:

- Install DIMMs only when the corresponding processor is installed.

- Install dummies in the empty DIMM slots.

Population rules for DDR5 DIMMs in specific modes:

- Memory sparing
  - Follow the general population rules.
  - Each channel must have a valid online spare configuration.
  - Each channel can have a different online spare configuration.
  - Each channel with a DIMM installed must have a spare rank.
- Memory mirroring
  - Follow the general population rules.
  - Each processor supports 2 integrated memory controllers (IMCs). Each IMC has 2 channels to be populated with DIMMs. Installed DIMMs must be of the same capacity and organization.
  - In a multi-processor configuration, each processor must have a valid memory mirroring configuration.

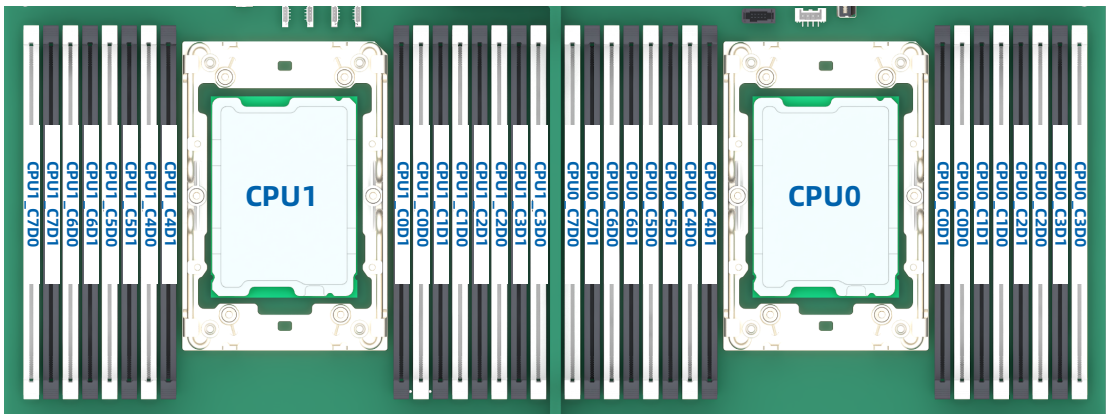
## 5. DIMM Slot Layout

Up to 32 DDR5 DIMMs can be installed in a server, and a balanced DIMM configuration is recommended for optimal memory performance. DIMM configuration must be compliant with the DIMM population rules.

IMPORTANT

At least 1 DDR5 DIMM must be installed in the corresponding D0 channel of each CPU.

Figure 5-10 DIMM Slot Layout




↓Front Panel

Table 5-5 DIMM Population Rules (1-Processor Configuration)

| DDR5 QTY | | 1 | 2 | 4 | 6 | 8 | 12 | 16 |
|---|---|---|---|---|---|---|---|---|
| CPU0 | C3D0 | | | | ● | ● | ● | ● |
| | C3D1 | | | | | | | ● |
| | C2D0 | | | ● | ● | ● | ● | ● |
| | C2D1 | | | | | | ● | ● |
| | C1D0 | | | | | ● | ● | ● |
| | C1D1 | | | | | | | ● |
| | C0D0 | ● | ● | ● | ● | ● | ● | ● |
| | C0D1 | | | | | | ● | ● |
| | C4D1 | | | | | | ● | ● |
| | C4D0 | | | ● | ● | ● | ● | ● |
| | C5D1 | | | | | | | ● |
| | C5D0 | | | | ● | ● | ● | ● |
| | C6D1 | | | | | | ● | ● |
| | C6D0 | | ● | ● | ● | ● | ● | ● |
| | C7D1 | | | | | | | ● |
| | C7D0 | | | | | ● | ● | ● |

Table 5-6 DIMM Population Rules (2-Processor Configuration)

| DDR5 QTY | | 2 | 4 | 8 | 12 | 16 | 24 | 32 |
|---|---|---|---|---|---|---|---|---|
| CPU0 | C3D0 | | | | ● | ● | ● | ● |
| | C3D1 | | | | | | | ● |
| | C2D0 | | | ● | ● | ● | ● | ● |
| | C2D1 | | | | | | ● | ● |
| | C1D0 | | | | | ● | ● | ● |
| | C1D1 | | | | | | | ● |
| | C0D0 | ● | ● | ● | ● | ● | ● | ● |
| | C0D1 | | | | | | ● | ● |
| | C4D1 | | | | | | ● | ● |
| | C4D0 | | | ● | ● | ● | ● | ● |
| | C5D1 | | | | | | | ● |
| | C5D0 | | | | ● | ● | ● | ● |
| | C6D1 | | | | | | ● | ● |
| | C6D0 | | ● | ● | ● | ● | ● | ● |
| | C7D1 | | | | | | | ● |
| | C7D0 | | | | | ● | ● | ● |
| CPU1 | C3D0 | | | | ● | ● | ● | ● |
| | C3D1 | | | | | | | ● |
| | C2D0 | | | ● | ● | ● | ● | ● |
| | C2D1 | | | | | | ● | ● |
| | C1D0 | | | | | ● | ● | ● |
| | C1D1 | | | | | | | ● |
| | C0D0 | ● | ● | ● | ● | ● | ● | ● |
| | C0D1 | | | | | | ● | ● |
| | C4D1 | | | | | | ● | ● |
| | C4D0 | | | ● | ● | ● | ● | ● |
| | C5D1 | | | | | | | ● |
| | C5D0 | | | | ● | ● | ● | ● |
| | C6D1 | | | | | | ● | ● |
| | C6D0 | | ● | ● | ● | ● | ● | ● |
| | C7D1 | | | | | | | ● |
| | C7D0 | | | | | ● | ● | ● |

### 6. Protection Technology

DDR5 DIMMs support the following memory protection technologies:

- Error Correcting Code (ECC)
- Memory Mirroring
- Memory Rank Sparing
- Single Device Data Correction (SDDC)
- Adaptive Double-Device Data Correction (ADDDC)
- Post Package Repair (PPR)

# 5.7 Storage

## 5.7.1 Drive Configurations

### 1. NF5180-M7-A0-R0-00

Table 5-7 Drive Configurations

| Configuration | Front Drives | Rear Drives | Internal Drives | Drive Management Mode |
|---|---|---|---|---|
| 4 × 3.5-inch Drive + 2 × E1.S SSD + 2 × M.2 SSD Config. | 4 × 3.5-inch drive + 2 × E1.S SSD + 2 × M.2 SSD | 2 × 2.5-inch drive | NA | SAS/SATA drive: 1 mezz RAID card or PCH |
| 4 × 3.5-inch Drive + 4 × 2.5-inch Drive Config. | 4 × 3.5-inch SAS/SATA drive + 4 × 2.5-inch SAS/SATA drive | 2 × 2.5-inch drive | NA | SAS/SATA drive: 1 mezz RAID card or PCH |
| 10 × 2.5-inch Drive Config. | 10 × 2.5-inch SAS/SATA/NVMe drive | 2 × 2.5-inch drive | NA | SAS/SATA drive: 1 mezz RAID card or PCH<br>NVMe drives: directly connected to CPUs |

| Configuration | Front Drives | Rear Drives | Internal Drives | Drive Management Mode |
|---|---|---|---|---|
| 12 × 2.5-inch Drive Config. | 12 × 2.5-inch SAS/SATA/NVMe drive | 2 × 2.5-inch drive | NA | SAS/SATA drive: 1 mezz RAID card or PCH<br>NVMe drives: directly connected to CPUs |

## 5.7.2 Drive Numbering

- 4 × 3.5-inch Drive + 2 × E1.S SSD + 2 × M.2 SSD Configuration

Figure 5-11 Drive Numbering


| Physical Drive No. | Drive No. Identified by the ISBMC | Drive No. Identified by the RAID Controller Card (3.5-inch Drive used with the RAID Controller Card) |
|---|---|---|
| 0 | 0 | - |
| 1 | 1 | - |
| 2 | 2 | - |
| 3 | 3 | - |
| 4 | 4 | 0 |
| 5 | 5 | 1 |
| 6 | 6 | 2 |
| 7 | 7 | 3 |

- 4 × 3.5-inch Drive + 4 × 2.5-inch Drive Configuration

Figure 5-12 Drive Numbering


| Physical Drive No. | Drive No. Identified by the ISBMC | Drive No. Identified by the RAID Controller Card |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 1 | 1 |
| 2 | 2 | 2 |

| Physical Drive No. | Drive No. Identified by the ISBMC | Drive No. Identified by the RAID Controller Card |
|---|---|---|
| 3 | 3 | 3 |
| 4 | 4 | 4 |
| 5 | 5 | 5 |
| 6 | 6 | 6 |
| 7 | 7 | 7 |

- 10 × 2.5-inch Drive Configuration

Figure 5-13 Drive Numbering


| Physical Drive No. | Drive No. Identified by the ISBMC | Drive No. Identified by the RAID Controller Card (used with 1 × 16i RAID Controller Card) |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 1 | 1 |
| 2 | 2 | 2 |
| 3 | 3 | 3 |
| 4 | 4 | 4 |
| 5 | 5 | 5 |
| 6 | 6 | 6 |
| 7 | 7 | 7 |
| 8 | 8 | 8 |
| 9 | 9 | 9 |

- 12 × 2.5-inch Drive Configuration

Figure 5-14 Drive Numbering

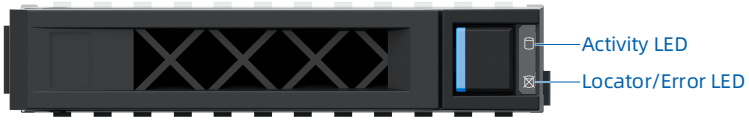

| Physical Drive No. | Drive No. Identified by the ISBMC | Drive No. Identified by the RAID Controller Card (used with 1 × 16i RAID Controller Card) |
|---|---|---|
| 0 | 0 | 0 |
| 1 | 1 | 1 |
| 2 | 2 | 2 |

| Physical Drive No. | Drive No. Identified by the ISBMC | Drive No. Identified by the RAID Controller Card (used with 1 × 16i RAID Controller Card) |
|---|---|---|
| 3 | 3 | 3 |
| 4 | 4 | 4 |
| 5 | 5 | 5 |
| 6 | 6 | 6 |
| 7 | 7 | 7 |
| 8 | 8 | 8 |
| 9 | 9 | 9 |
| 10 | 10 | 10 |
| 11 | 11 | 11 |

## 5.7.3 Drive LEDs

### 1. SAS/SATA Drive LEDs

Figure 5-15 SAS/SATA Drive LEDs

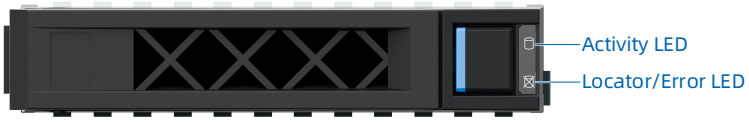



| Activity LED (Green) | Locator/Error LED (Blue/Red) | | | Description |
|---|---|---|---|---|
| | Blue | Red | | |
| Off | Off | RAID created | RAID not created | Drive absent |
| | | Solid on | Off | |
| Solid on | Off | Off | | Drive present but not in use |
| Flashing | Off | Off | | Drive present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

| Activity LED (Green) | Locator/Error LED (Blue/Red) | | Description |
|---|---|---|---|
| | Blue | Red | |
| Any status | Off | Solid on | Drive failed |

## 2. NVMe Drive LEDs

Figure 5-16 NVMe Drive LEDs




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

### 5.7.4 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 Inspur sales representative or refer to 7.1.2 Hardware Compatibility.

# 5.8 Network

NICs provide network expansion capabilities.

- The OCP I/O slot supports the OCP 3.0 card. Users can select the OCP 3.0 card as needed.

- The PCIe slots support PCIe NICs. Users can select the PCIe NICs based on their needs.
- For specific NIC options, consult your local Inspur sales representative or refer to 7.1.2 Hardware Compatibility.

# 5.9 I/O Expansion

## 5.9.1 NF5180-M7-A0-R0-00

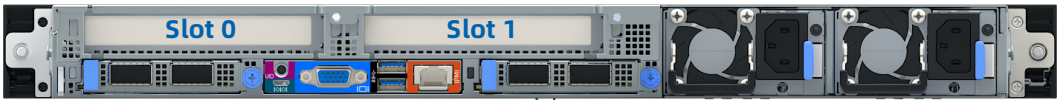
### 1. PCIe Cards

The PCIe cards provide system expansion capabilities.

- Supports up to 6 PCIe 5.0 expansion slots, including 1 OCP 3.0 card supported by CPU0 and CPU1 respectively and 1 mezz RAID card by CPU0.
- For specific PCIe card options, consult your local Inspur sales representative or refer to 7.1.2 Hardware Compatibility.

### 2. PCIe Slot Locations

Figure 5-17 PCIe Slots - 2 × PCIe Slot Configuration

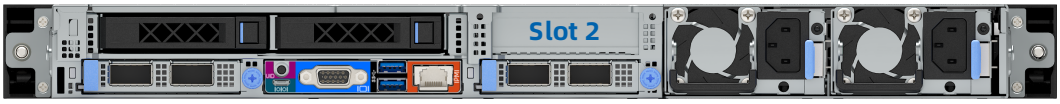



- Slot 0 resides in the left PCIe riser module.
- Slot 1 resides in the right PCIe riser module.

Figure 5-18 PCIe Slots - 3 × PCIe Slot Configuration


- Slot 0 and slot 1 reside in the left PCIe module.
- Slot 2 resides in the right PCIe module.

Figure 5-19 PCIe Slots - 2 × 2.5-inch Drive + 3 × PCIe Slot Configuration

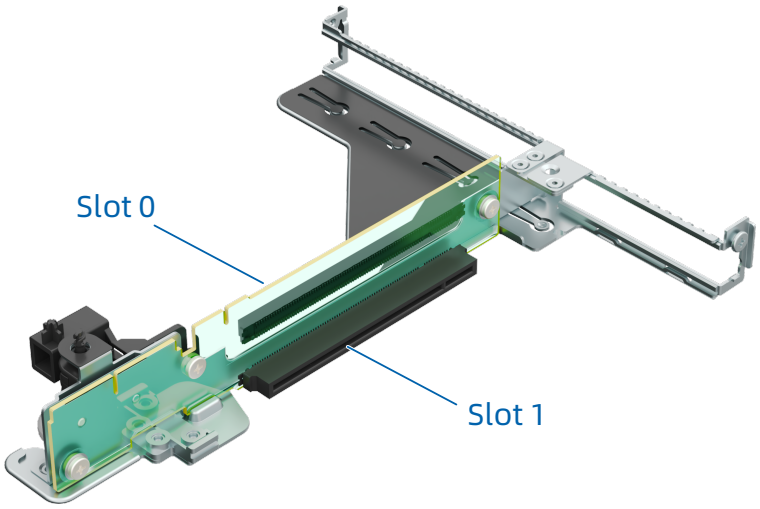



- Slot 2 resides in the right PCIe riser module.

## 3. PCIe Riser Modules

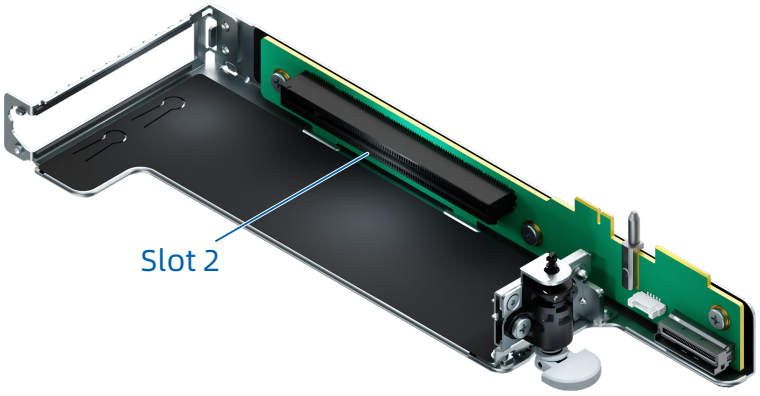
- PCIe Riser Module (Butterfly Riser Cage)
  - Slot 0 and slot 1 reside in this module.

  Figure 5-20 PCIe Riser Module (Butterfly Riser Cage)



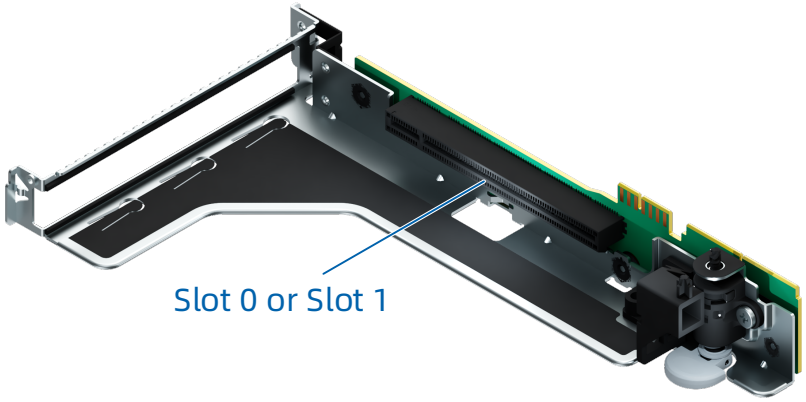

- PCIe Riser Module (LP PCIe Card)
  - Slot 2 resides in this module.

  Figure 5-21 PCIe Riser Module (LP PCIe Card)




- PCIe Riser Module (FH PCIe Card)
  - Slot 0 resides in this module when installed on the left.
  - Slot 1 resides in this module when installed on the right.

Figure 5-22 PCIe Riser Module (FH PCIe Card)




## 4. PCIe Slot Description

- Servers Configured with 2 Rear PCIe Riser Modules

Table 5-8 PCIe Slot Description 1

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| Slot 0 | CPU0 | PCIe 5.0 | x16 | x16 | PE1 | FHHL |
| Slot 1 | CPU0 | PCIe 5.0 | x16 | x16 | PE4 | HHHL |
| OCP 3.0 Slot | CPU0 | PCIe 5.0 | x8 | x8 | PE0 | Standard OCP 3.0 specs |
| OCP 3.0 Slot | CPU1 | PCIe 5.0 | x16 | x16 | PE0 | Standard OCP 3.0 specs |
| OCPA Slot | CPU0 | PCIe 5.0 | X8 | x8 | PE0 | - |

- Servers Configured with 3 Rear PCIe Riser Modules

Table 5-9 PCIe Slot Description 2

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| Slot 0 | CPU0 | PCIe 5.0 | x16 | x16 | PE1 | FHHL |
| Slot 1 | CPU0 | PCIe 5.0 | x16 | x16 | PE4 | HHHL |
| Slot 2 | CPU1 | PCIe 5.0 | x16 | x16 | PE2 | HHHL |
| OCP 3.0 Slot | CPU0 | PCIe 5.0 | x8 | x8 | PE0 | Standard OCP 3.0 specs |
| OCP 3.0 Slot | CPU1 | PCIe 5.0 | x16 | x16 | PE0 | Standard OCP 3.0 specs |
| OCPA Slot | CPU0 | PCIe 5.0 | x8 | x8 | PE0 | - |

- Servers Configured with 2 Rear 2.5-inch Drives and 1 Rear PCIe Riser Module

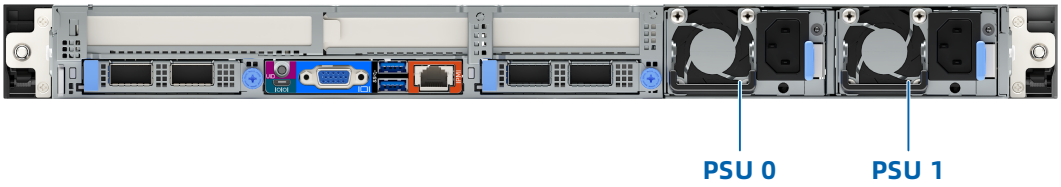
Table 5-10 PCIe Slot Description 3

| PCIe Slot | Owner | PCIe Standard | Connector Width | Bus Width | Port No. | Form Factor |
|---|---|---|---|---|---|---|
| Slot 2 | CPU1 | PCIe 5.0 | x16 | x16 | PE2 | HHHL |
| OCP 3.0 Slot | CPU0 | PCIe 5.0 | x8 | x8 | PE0 | Standard OCP 3.0 specs |
| OCP 3.0 Slot | CPU1 | PCIe 5.0 | x16 | x16 | PE0 | Standard OCP 3.0 specs |
| OCPA Slot | CPU0 | PCIe 5.0 | x8 | x8 | PE0 | - |

## 5.10 PSUs

- The server supports 1 or 2 PSUs.
- The server supports AC or DC power input.
- The PSUs are hot-swappable.
- The server supports 2 PSUs in 1+1 redundancy.
- The server must use PSUs with the same part number (P/N code).
- The server provides short-circuit protection, and provides PSUs supporting dual-live-wire input.

Figure 5-23 PSU Locations

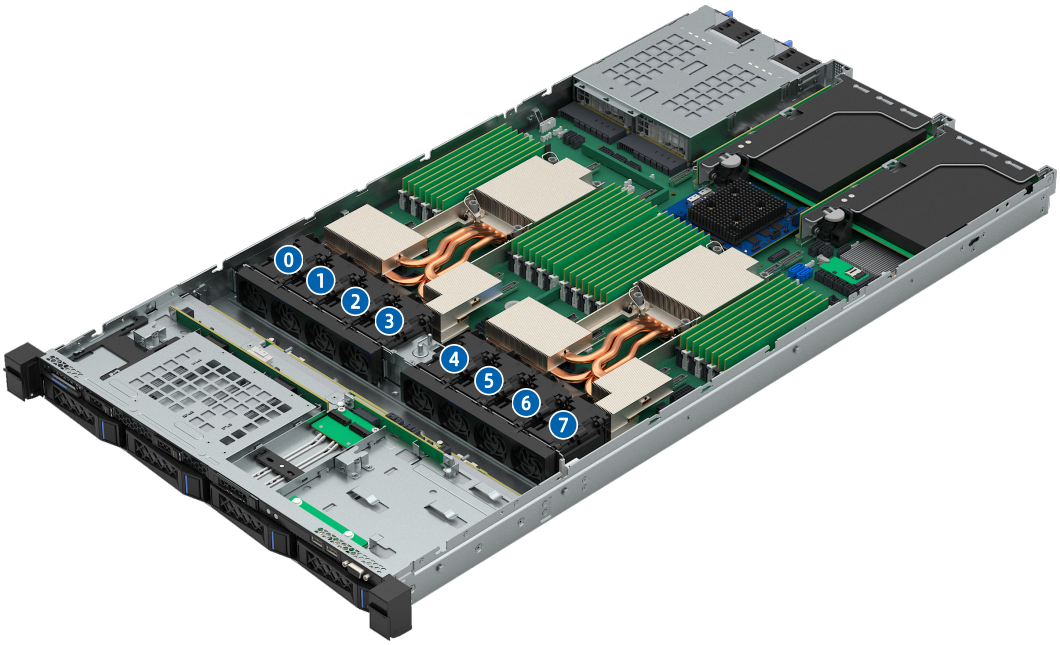



## 5.11 Fans

- The server supports 8 fan modules. Users can select low- or high-speed 4056 fans based on the configuration.
- The fans are hot-swappable.

- The server supports fans in N+1 redundancy, which means that the server can continue working properly when a single fan fails.
- The server supports intelligent fan speed control.
- The server must use fans with the same part number (P/N code).

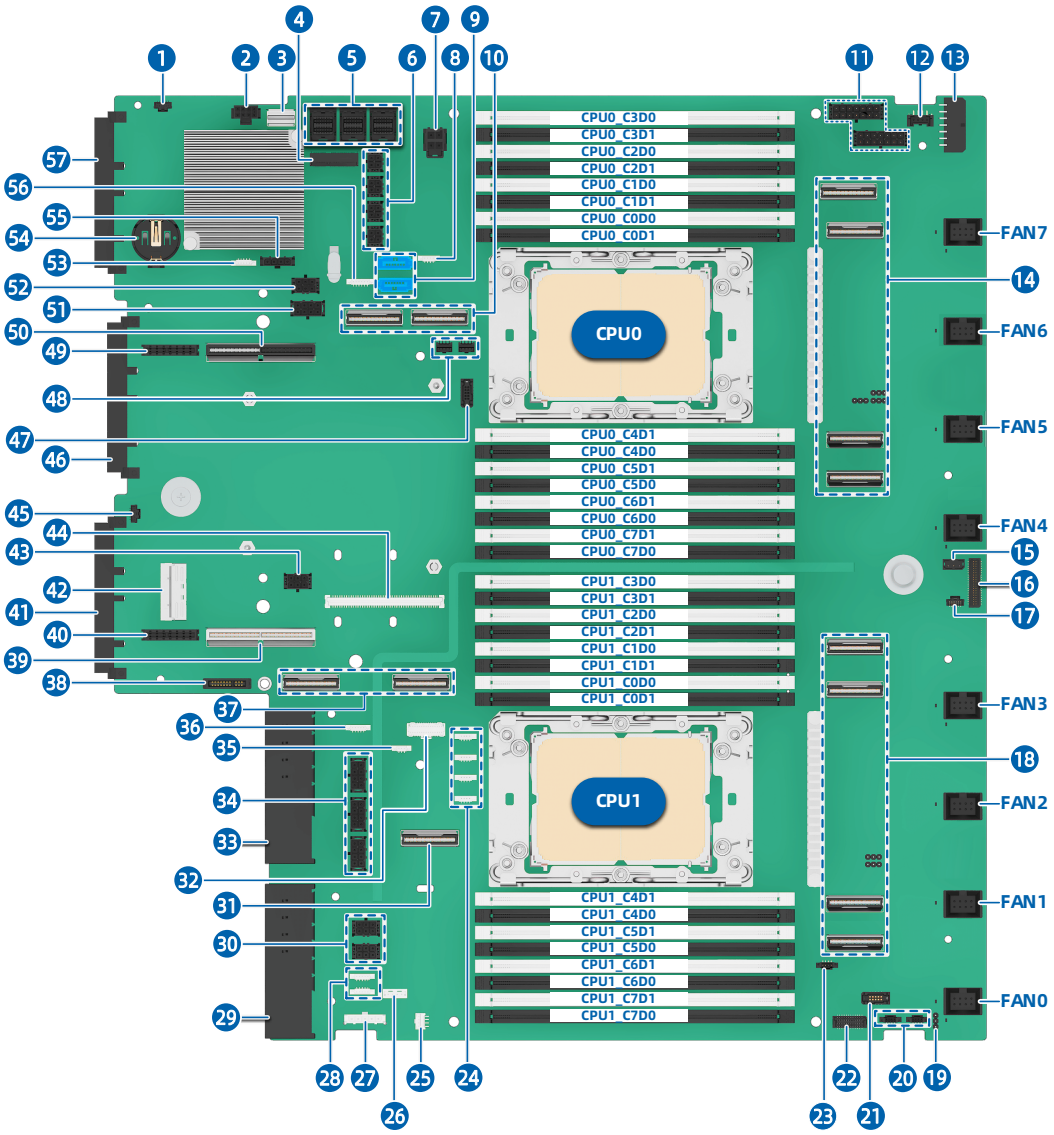
Figure 5-24 Fan Module Locations



# 5.12 Boards

## 5.12.1 Motherboard

Figure 5-25 Motherboard Layout




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | OCP 3.0_0 Hot-Plug Button and LED Connector | 2 | Mid-backplane Power Connector |
| 3 | Right Control Panel Connector | 4 | SYS_TF Connector |
| 5 | Mini SAS Connector × 3 | 6 | Rear Backplane Power Connector × 4 |
| 7 | Front OCP Power Connector | 8 | I²C Connector |
| 9 | SATA Connector × 2 | 10 | MCIO x8 Connector (CPU0) × 2 |

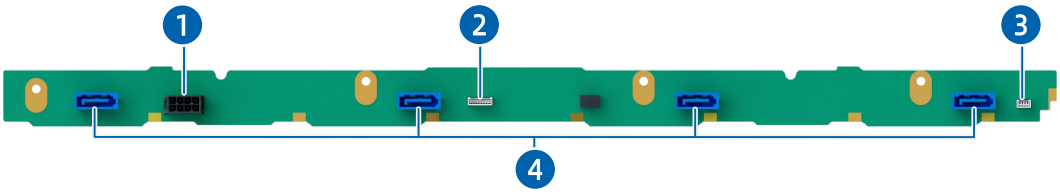
| Item | Feature | Item | Feature |
|---|---|---|---|
| 11 | Front Backplane Power Connector × 2 | 12 | Sensor Connector |
| 13 | Front Backplane Power Connector | 14 | MCIO x8 Connector (CPU0) × 4 |
| 15 | Intrusion Switch Connector | 16 | OCP2 Sideband Signal Connector |
| 17 | OCP 3.0_2 Hot-Plug Button and LED Connector | 18 | MCIO x8 Connector (CPU1) × 4 |
| 19 | CLR_CMOS Jumper | 20 | Backplane $I^2C$ Connector × 2 |
| 21 | VPP Connector | 22 | Left Control Panel Connector |
| 23 | Backplane $I^2C$ Connector | 24 | Backplane $I^2C$ Connector × 4 |
| 25 | IPMB Connector | 26 | RAID Key Connector |
| 27 | Capacitor Board Power Connector | 28 | $I^2C$ Connector × 2 |
| 29 | PSU1 Connector | 30 | GPU_Riser Power Connector × 2 |
| 31 | MCIO x8 Connector (CPU1) | 32 | NC-SI Connector |
| 33 | PSU0 Connector | 34 | GPU Power Connector × 3 |
| 35 | Smart NIC UART Connector | 36 | $I^2C$ Connector |
| 37 | MCIO x8 Connector (CPU1) × 2 | 38 | Riser Card Power Slot |
| 39 | MCIO x16 Connector (CPU1) | 40 | Riser Card Power Slot |
| 41 | OCP 3.0 Connector | 42 | OCP 3.0 MCIO Connector (CPU1) |
| 43 | GPU Riser Power Connector | 44 | OCPA Slot (CPU0) |
| 45 | OCP 3.0_1 Hot-Plug Button and LED Connector | 46 | SCM Slot |
| 47 | VPP Connector | 48 | Leak Detection Connector × 2 |
| 49 | Riser Card Power Slot | 50 | MCIO x16 Connector (CPU0) |
| 51 | GPU0 Power Connector | 52 | GPU_Riser0 Power Connector |
| 53 | $I^2C$ Connector | 54 | Button Cell Battery Socket |
| 55 | Smart NIC Power Connector | 56 | SGPIO Connector |
| 57 | OCP 3.0 Connector | | |

## 5.12.2 Drive Backplanes

### 1. Front Drive Backplane

- 4 × 3.5-inch SAS/SATA Drive Backplane

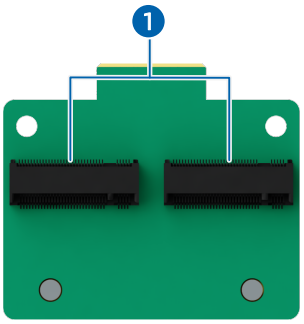
Figure 5-26 4 × 3.5-inch SAS/SATA Drive Backplane




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Connector | 2 | SGPIO Connector |
| 3 | BMC_I2C Connector | 4 | SATA 7-pin Connector |

- 2 × M.2 SATA Drive Backplane

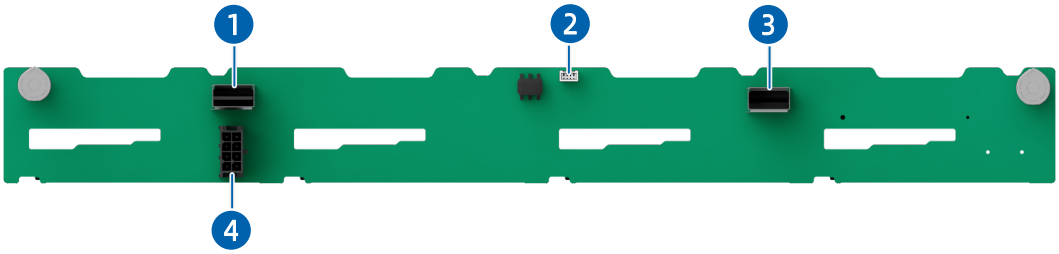
Figure 5-27 2 × M.2 SATA Drive Backplane




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | M.2 Drive Connector | | |

- 8 × 2.5-inch SAS/SATA Drive Backplane

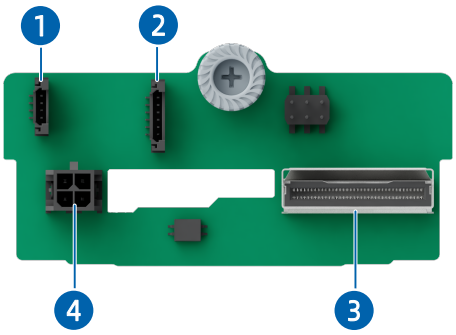
Figure 5-28 8 × 2.5-inch SAS/SATA Drive Backplane



| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Slimline Connector 4-7 | 2 | BMC_I2C Connector |
| 3 | Slimline Connector 0-3 | 4 | Power Connector |

- 2 × 2.5-inch NVMe Drive Backplane

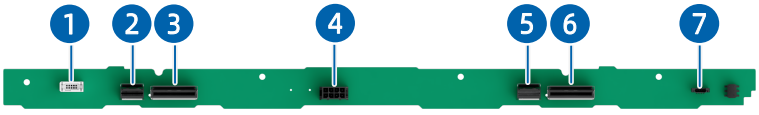
Figure 5-29 2 × 2.5-inch NVMe Drive Backplane




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | BMC_I2C Connector | 2 | SGPIO Connector |
| 3 | Power Connector | 4 | MCIO Connector |

- 4 × 3.5-inch SAS/SATA/NVMe Drive Backplane

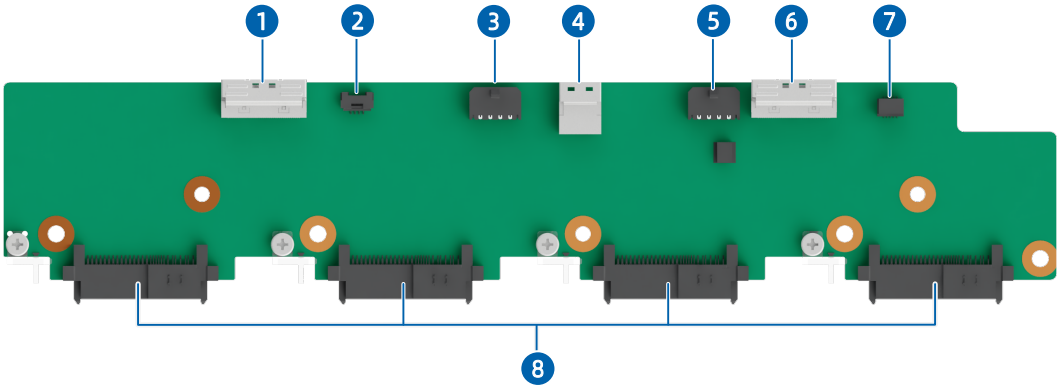
Figure 5-30 4 × 3.5-inch SAS/SATA/NVMe Drive Backplane




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | VPP Connector | 2 | Slimline Connector 2-3 |
| 3 | MCIO Connector 2-3 | 4 | Power Connector |
| 5 | Slimline Connector 0-1 | 6 | MCIO Connector 0-1 |
| 7 | BMC_I2C Connector | | |

- 4 × 2.5-inch SAS/SATA/NVMe Drive Backplane

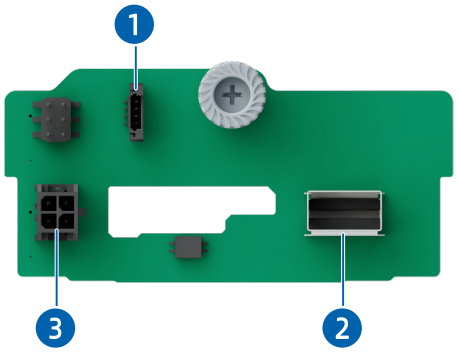
Figure 5-31 4 × 2.5-inch SAS/SATA/NVMe Drive Backplane




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | MCIO Connector 0-1 | 2 | VPP Connector |
| 3 | Power Connector 0 | 4 | Slimline Connector |
| 5 | Power Connector 1 | 6 | MCIO Connector 2-3 |
| 7 | BMC_I2C Connector | 8 | Drive Connector × 4 |

- 2 × 2.5-inch SAS/SATA Drive Backplane

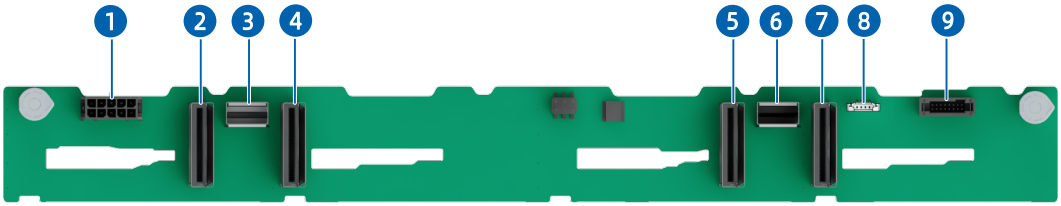
Figure 5-32 2 × 2.5-inch SAS/SATA Drive Backplane




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | BMC_I2C Connector | 2 | Slimline Connector 0-1 |
| 3 | Power Connector | | |

- 8 × 2.5-inch SAS/SATA/NVMe Drive Backplane

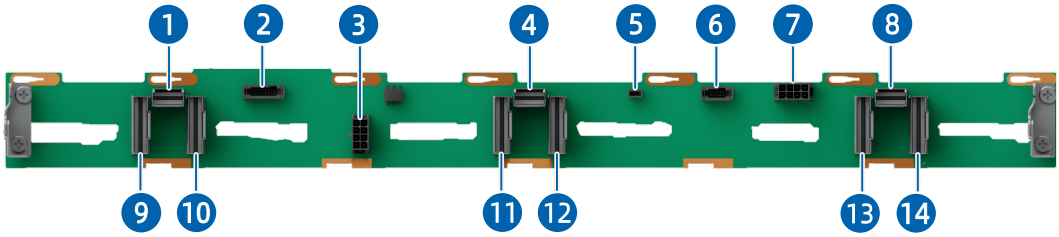
Figure 5-33 8 × 2.5-inch SAS/SATA/NVMe Drive Backplane




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Connector | 2 | MCIO Connector 0-1 |
| 3 | Slimline Connector 0-3 | 4 | MCIO Connector 2-3 |
| 5 | MCIO Connector 4-5 | 6 | Slimline Connector 4-7 |
| 7 | MCIO Connector 6-7 | 8 | BMC_I2C Connector |
| 9 | VPP Connector | | |

- 12 × 2.5-inch SAS/SATA/NVMe Drive Backplane

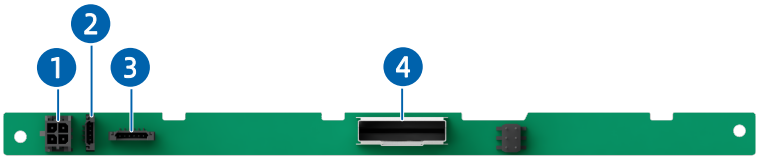
Figure 5-34 12 × 2.5-inch SAS/SATA/NVMe Drive Backplane




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | MCIO Connector 0-1 | 2 | Slimline Connector 0-3 |
| 3 | MCIO Connector 2-3 | 4 | Front Control Panel Connector |
| 5 | Power Connector 0 | 6 | MCIO Connector 4-5 |
| 7 | Slimline Connector | 8 | MCIO Connector 6-7 |
| 9 | BMC_I2C Connector | 10 | VPP Connector |
| 11 | Power Connector 1 | 12 | MCIO Connector 8-9 |
| 13 | Slimline Connector 8-11 | 14 | MCIO Connector 10-11 |

- 2 × E1.S Drive Backplane

Figure 5-35 2 × E1.S Drive Backplane

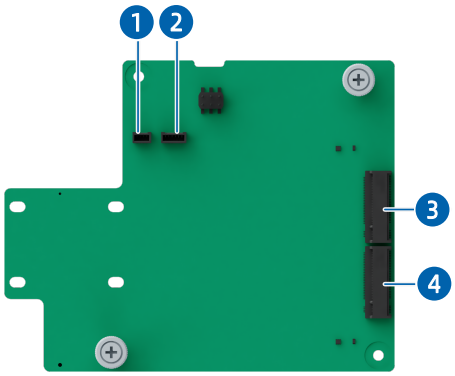



| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | Power Connector | 2 | BMC_I2C Connector |
| 3 | VPP Connector | 4 | Slimline Connector |

## 2. Internal Drive Adapter

- 2 × M.2 Adapter

Figure 5-36 2 × M.2 Adapter




| Item | Feature | Item | Feature |
|---|---|---|---|
| 1 | BMC_I²C Connector | 2 | VPP_I2C Connector |
| 3 | M.2 Drive Connector 1 | 4 | M.2 Drive Connector 0 |

# 6 Product Specifications

## 6.1 NF5180-M7-A0-R0-00

### 6.1.1 Technical Specifications

Table 6-1 Technical Specifications

| Item | Description |
| --- | --- |
| Form Factor | 1U rack server |
| Chipset | Intel C621A |
| Processor | • Up to two 4th Gen Intel Xeon Scalable processors (Sapphire Rapids)<br>• Integrated memory controllers and 8 memory channels per processor<br>• Integrated PCIe controllers and 80 PCIe 5.0 lanes per processor<br>• Up to 4 UPI links per CPU at up to 16 GT/s<br>• Up to 60 cores<br>• Max. Turbo frequency at 4.2 GHz<br>• 1.875 MB L3 cache per core<br>• TDP up to 350 W<br>Note:<br>The information above is for reference only, see 7.1.2 Hardware Compatibility for details. |
| Memory | • Supports 32 DIMM slots<br>• 8 memory channels per processor and up to 2 DIMM slots per channel<br>• Speed up to 4,800 MT/s at 1 DPC and 4,400 MT/s at 2 DPC<br>• Supports RDIMMs<br>• ECC, memory mirroring, and memory rank sparing<br>Note:<br>The information above is for reference only, see 7.1.2 Hardware Compatibility for details. |

| Item | Description |
| --- | --- |
| Storage Drive | • Supports multiple drive configurations, see 5.7.1 Drive Configurations for details.<br>• Supports 2 M.2 SSDs<br>• When the server is configured with an SND 9230 RAID controller card, the M.2 SSDs support RAID configuration.<br>• When the server is configured with an M.2 adapter, the PCIe M.2 SSDs support VROC.<br>Notes:<br>• It is recommended that the M.2 SSD is only used as a boot device for installing the OS.<br>• The M.2 SSD has low endurance and cannot be used as a data storage device, especially in scenarios with frequent data erasing and re-writing. The reason is that write limits can be reached within a short period of time, which will result in damage and unavailability.<br>• For data storage, use enterprise-class SSDs with higher DWPD or HDDs.<br>• Write-intensive business software will cause the M.2 SSD to reach write endurance and wear out; therefore, the M.2 SSD is not recommended for such business scenarios.<br>• Do not use the M.2 SSD as caching.<br>• Supports hot-swap SAS/SATA/NVMe drives<br>Notes:<br>When the server is configured with NVMe drives:<br>• When the VMD function is enabled and the latest VMD driver is installed, the NVMe drives support surprise hot-swap.<br>• Supports multiple models of RAID controller cards. See 7.1.2 Hardware Compatibility for details.<br>- Supports functions such as RAID configuration, RAID level migration, and disk roaming.<br>- Supports power failure protection enabled by the super-capacitor to protect user data.<br>- A standard RAID controller card occupies 1 PCIe slot. |
| Network | • 2 optional OCP 3.0 cards (1/10/25/40/100/200/400 Gb)<br>• 1/10/25/40/100 Gb PCIe NICs |
| I/O Expansion | Supports PCIe expansion slots.<br>• Server models with rear PCIe riser modules: 2 dedicated expansion slots for the OCP 3.0 card, 3 standard PCIe expansion slots and 1 slot for mezz RAID card.<br>• For details, see PCIe Slot Locations and PCIe Slot Description. |
| Port | Supports multiple ports<br>• Front: |

| Item | Description |
| --- | --- |
| | - 1 × USB 2.0 port<br>- 1 × USB 3.0 port<br>- 1 × DB15 VGA port<br>• Rear:<br>- 2 × USB 3.0 port<br>- 1 × DB15 VGA port<br>- 1 × COM port (Micro USB)<br>- 1 × BMC management network port<br>Note:<br>OS installation on the USB storage media is not recommended. |
| Display | Integrated VGA on the motherboard with a video memory of 64 MB and a maximum 16M color resolution of 1,920 × 1,200 at 60 Hz<br>Notes:<br>• The integrated VGA can support a maximum resolution of 1,920 × 1,200 only when the video driver matching the OS version is installed; otherwise only the default resolution of the OS is supported.<br>• When the front and rear VGA ports are both connected to monitors, only the monitor connected to the front VGA port works. |
| System Management | • UEFI<br>• ISBMC<br>• NC-SI<br>• Inspur Physical Infrastructure Manager |
| Security | • Intel Platform Firmware Resilience (PFR)<br>• Trusted Platform Module (TPM) 2.0 and Trusted Cryptography Module (TCM)<br>• Intel Trusted Execution Technology<br>• Firmware update mechanism based on digital signatures<br>• UEFI Secure Boot<br>• Double-factor authentication<br>• Single sign on<br>• BIOS secure boot based on TPM |

| Item | Description |
| --- | --- |
| | • BMC secure boot based on firmware<br>• BIOS Secure Flash and BIOS Lock Enable (BLE)<br>• BMC and BIOS dual-image mechanism<br>• Chassis intrusion detection<br>• Optional system secure wiping |

## 6.1.2 Environmental Specifications

Table 6-2 Environmental Specifications

| Parameter | Description |
| --- | --- |
| Temperature[1,2,3] | • Operating: 5°C to 45°C (41°F to 113°F)<br>• Storage (packed): -40°C to +70°C (-40°F to +158°F)<br>• Storage (unpacked): -40°C to +70°C (-40°F to +158°F) |
| Relative Humidity (RH, non-condensing) | • Operating: 5% to 90% RH<br>• Storage (packed): 5% to 95% RH<br>• Storage (unpacked): 5% to 95% RH |
| Operating Altitude | ≤3,050 m (10,007 ft)<br>• 0 to 900 m (0 to 2,953 ft): Operating temperature ranges from 5°C to 45°C (41°F to 113°F)<br>• 900 to 3,050 m (2,953 to 10,007 ft): Operating temperature ranges from 10°C to 35°C (50°F to 95°F) |
| Acoustic Noise [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) at a server operating temperature of 23°C (73.4°F):<br>• Idle: |

| Parameter | Description |
| --- | --- |
| | - LWAd: 5.92 B for standard configuration<br>- LpAm: 42.3 dBA for standard configuration<br>• Operating:<br>- LWAd: 6.14 B for standard configuration<br>- LpAm: 46.3 dBA for standard configuration |

Notes:

1. Not all configurations support an operating temperature range of 5°C to 45°C (41°F to 113°F). The temperature range for continuous operation is 5°C to 35°C (41°F to 95°F).
2. Standard operating temperature:
   - 10°C to 35°C (50°F to 95°F) is the standard operating temperature range at sea level. For temperatures between 10°C and 35°C (50°F and 95°F), derate the maximum allowable temperature by 1°C per 305 m (1°F per 556 ft) above sea level. The maximum temperature gradient is 20°C/h (36°F/h) and the maximum operating altitude is 3,050 m (10,007 ft), both varying with server configuration.
   - Any fan failure or operations above 30°C (86°F) may lead to system performance degradation.
3. Expanded operating temperature
   - For certain approved configurations, the supported system inlet ambient temperature can be expanded to 5°C to 10°C (41°F to 50°F) and 35°C to 45°C (95°F to 113°F) at sea level. At an altitude of 900 to 3,050 m (2,953 to 10,007 ft), de-rate the maximum allowable temperature by 1°C per 175 m (1°F per 319 ft).
   - For certain approved configurations, the supported system inlet ambient temperature can be expanded to 35°C to 45°C (95°F to 113°F) at sea level. At an altitude of 900 to 3,050 m (2,953 to 10,007 ft), derate the maximum allowable temperature by 1°C per 125 m (1°F per 228 ft).
   - Any fan failure or operations under expanded operating temperature may lead to system performance degradation.
4. This document lists the LWAd and the 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 standard configuration. Additional options may result in increased sound levels. Contact your sales representative for more information.

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

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

## 6.1.3 Physical Specifications

Table 6-3 Physical Specifications

| Item | Description |
| --- | --- |
| Chassis Dimensions (H × W × D) | 10 × 2.5-inch drive configuration (with standard heatsinks):<br>• With mounting ear: 43.05 × 482 × 830 mm (1.69 × 18.98 × 32.68 in.)<br>• Without mounting ear: 43.05 × 438 × 815.2 mm (1.69 × 17.24 × 32.09 in.)<br>12 × 2.5-inch drive configuration:<br>• With mounting ear: 43.05 × 482.1 × 881.3 mm (1.69 × 18.98 × 34.70 in.)<br>• Without mounting ear: 43.05 × 438 × 857.85 mm (1.69 × 17.24 × 33.77 in.)<br>Other configurations:<br>• With mounting ear: 43.05 × 482 × 879.5 mm (1.69 × 18.98 × 34.63 in.)<br>• Without mounting ear: 43.05 × 438 × 865.2 mm (1.69 × 17.24 × 34.06 in.) |
| Outer Packaging Dimensions (L × W × H): | 1,090 × 600 × 240 mm (42.91× 23.62 × 9.45 in.) |
| Installation Dimension Requirements | Installation requirements for the cabinet are as follows:<br>• General cabinet compliant with the International Electrotechnical Commission 297 (IEC 297) standard<br>• Width: 482.6 mm (19 in.) |

| Item | Description |
| --- | --- |
| | • Depth: Above 1,000 mm (39.37 in.)<br>Installation requirements for the server rails are as follows:<br>• L-bracket static rail kit: Distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.)<br>• Ball-bearing rail kit: Distance between the front and rear mounting flanges ranges from 609 to 914 mm (23.98 to 35.98 in.) |
| Weight | 12 × 2.5-inch drive configuration (Twelve 2.5-inch drives loaded)<br>• Net weight: 19.96 kg (44.00 lbs)<br>• Gross weight: 28.16 kg (62.08 lbs, including server, packaging box, rails and accessory box)<br>10 × 2.5-inch drive configuration (Ten 2.5-inch drives and three GPUs loaded)<br>• Net weight: 19.59 kg (43.19 lbs)<br>• Gross weight: 27.98 kg (61.69 lbs, including server, packaging box, rails and accessory box)<br>4 × 3.5-inch drive + 4 × 2.5-inch drive configuration (Four 3.5-inch and four 2.5-inch drives loaded)<br>• Net weight: 20.33 kg (44.82 lbs)<br>• Gross weight: 29.27 kg (64.53 lbs, including server, packaging box, rails and accessory box) |

# 7 Operating System and Hardware Compatibility

This section describes the OS and hardware compatibility of the server. For the latest compatibility configuration and the component models not listed in this document, contact your local Inspur 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 in them may lead to performance variation in the application and test software.

- For requirements on the performance of specific application software, contact Inspur 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 NF5180-M7-A0-R0-00

### 7.1.1 Supported Operating Systems

Table 7-1 Supported Operating Systems

| OS | OS Version |
|---|---|
| Windows | Windows Server 2019 |
| | Windows Server 2022 |
| Red Hat | Red Hat Enterprise 8.6 |
| | Red Hat Enterprise 9.0 |
| SUSE | SLES 15.4 |
| | SLES 12.5 |
| Oracle | Oracle Linux 7.9 |
| | Oracle Linux 8.2 |

## 7.1.2 Hardware Compatibility

### 1. CPU Specifications

The server supports up to 2 Intel CPUs (Sapphire Rapids) based on Eagle Stream platform.

Table 7-2 CPU Specifications

| Model | Cores | Threads | Base Frequency (GHz) | Max. Turbo Frequency (GHz) | Cache (MB) | TDP （W） |
|---|---|---|---|---|---|---|
| 8480+ | 56 | 112 | 2.00 | 3.80 | 105 | 350 |
| 8468 | 48 | 96 | 2.10 | 3.80 | 105 | 350 |
| 6430 | 32 | 64 | 2.10 | 3.40 | 60 | 270 |
| 6454S | 32 | 64 | 2.20 | 3.40 | 60 | 270 |
| 6418H | 24 | 48 | 2.10 | 4.00 | 60 | 185 |
| 6416H | 18 | 36 | 2.20 | 4.20 | 45 | 165 |

### 2. DIMM Specifications

The server supports up to 32 DDR5 DIMMs. Each processor supports 8 memory channels with 2 memory slots per memory channel. The supported memory types include RDIMM.

Table 7-3 DIMM Specifications

| Type | Capacity (GB) | Frequency (MT/s) | Data Width | Organization |
|---|---|---|---|---|
| RDIMM | 16 | 4,800 | x80 | 1R x8 |
| RDIMM | 32 | 4,800 | x80 | 1R x4/2R x8 |
| RDIMM | 64 | 4,800 | x80 | 2R x4 |
| RDIMM | 128 | 4,800 | x80 | 4R x4 |

### 3. Drive Specifications

Table 7-4 SAS/SATA Drive Specifications

| Type | Speed in rpm | Capacity | Max. Qty. |
|---|---|---|---|
| 2.5-inch SAS | 10K | 600 GB/1.2 TB/1.8 TB/2.4 TB | 12 |
| | 15K | 300 GB/600 GB/900 GB | 12 |

Table 7-5 SSD Specifications

| Type | Capacity | Max. Qty. |
|---|---|---|
| SATA SSD | 240 GB | 12 |
| SATA SSD | 480 GB | 12 |
| SATA SSD | 960 GB | 12 |
| SATA SSD | 1.92 TB | 12 |
| SATA SSD | 3.84 TB | 12 |
| SATA SSD | 7.68 TB | 12 |
| SAS SSD | 960 GB | 12 |
| SAS SSD | 1.92 TB | 12 |
| SAS SSD | 3.84 TB | 12 |

Table 7-6 U.2 NVMe SSD Specifications

| Type | Capacity | Max. Qty. |
|---|---|---|
| U.2 NVMe SSD | 960 GB | 12 |
| U.2 NVMe SSD | 1.6 TB | 12 |
| U.2 NVMe SSD | 1.92 TB | 12 |
| U.2 NVMe SSD | 3.2 TB | 12 |
| U.2 NVMe SSD | 3.8 TB | 12 |
| U.2 NVMe SSD | 6.4 TB | 12 |
| U.2 NVMe SSD | 7.68 TB | 12 |
| U.2 NVMe SSD | 8 TB | 12 |
| U.2 NVMe SSD | 12.8 TB | 12 |
| U.2 NVMe SSD | 15.36 TB | 12 |

Table 7-7 M.2 SSD Specifications

| Type | Capacity | Max. Qty. |
|---|---|---|
| M.2 SATA SSD | 240 GB | 2 |
| M.2 SATA SSD | 480 GB | 2 |
| M.2 PCIe SSD | 960 GB | 2 |
| M.2 PCIe SSD | 1.92 TB | 2 |
| M.2 PCIe SSD | 3.84 TB | 2 |

# 4. SAS/RAID Controller Card Specifications

Table 7-8 SAS/RAID Controller Card Specifications

| Type | Manufacturer | Description |
|---|---|---|
| SAS Controller Card | Inspur | SAS Controller Card_Inspur_PM8222_PM8222_8_SAS3_PCIE |
| | | SAS Controller Card_Inspur_PM8222_SmartHBA_8_SAS3_PCIE3 |
| | | SAS Controller Card_Inspur_Zhongqiu_8242_24R0_SAS3_PCIE3_MCTP |
| | | SAS Controller Card_Inspur_Zhongqiu _8242_24R0_SAS3_PCIE3_MCTP |
| | | SAS Controller Card_Inspur_MT0801M6E_SHBA_8_SAS4_P4E |
| | | SAS Controller Card_Inspur_MT0800M6H_HBA_8_SAS4_P4E |
| | LSI | SAS Controller Card_BRCM_8R0_9500-8i_SMSAS3_PCIE4 |
| | | SAS Controller Card_BRCM_16R0_9500-16i_SMSAS3_PCIE4 |
| | | SAS Controller Card_BRCM_16R0_9500-16i_SMSAS3_PCIE4 |
| RAID Controller Card | Inspur | RAID Controller Card_Inspur_PM8204_RA_8_2GB_SAS3_PCIE3 |
| | | RAID Controller Card_Inspur_PM8204_RA_8_4GB_SAS3_PCIE3 |
| | | RAID Controller Card_Inspur_MT0804M6R_RA_8_4GB_SAS4_P4E |
| | | RAID Controller Card_Inspur_MT0808M6R_RA_8_8GB_SAS4_P4E |
| | LSI | RAID Controller Card_BRCM_8R0_9540-8i_0_SMSAS3_PCIE4 |
| | | RAID Controller Card_L_8R0_9560-8i_4G_HDM12G_PCIE4 |
| | | RAID Controller Card_L_16R0_9560-16i_8GB_SMSAS3_PCIE4 |
| | SND | RAID Controller Card_SND_2R0_9230_N_M.2_PCIE2_v1 |

# 5. NIC Specifications

Table 7-9 OCP NIC Specifications

| Type | Description | Speed (Gbps) | Port Qty. |
|---|---|---|---|
| OCP 3.0 Card | NIC_SND_1G_I350_RJ_OCP3x4_2_XR | 1 | 2 |
| | NIC_Inspur_Andes-M6_X710_10G_LC_OCP3x8_2 | 10 | 2 |
| | NIC_I_10G_X710-DA2_LC_OCP3x16_2_XR | 10 | 2 |
| | NIC_I_10G_X710T4L_RJ_OCP3x8_4_XR | 10 | 4 |
| | NIC_SND_10G_X550_RJ_OCP3x4_2_XR | 10 | 2 |
| | NIC_M_25G_MCX562A-ACAB_LC_OCP3x16_2_XR | 25 | 2 |
| | NIC_M_25G_MCX623432AN_LC_OCP3x16_2_XR | 25 | 2 |
| | NIC_M_25G_MCX631432AN_LC_OCP3x8_2_XR | 25 | 2 |
| | NIC_Inspur_Andes-M6_E810_25G_LC_OCP3x8_2 | 25 | 2 |
| | NIC_M_100G_MCX623436AN_LC_OCP3x16_2_XR | 100 | 2 |
| | NIC_BROADCM_100G_57508_LC_OCP3x16_2_XR | 100 | 2 |
| | NIC_I_100G_E810CQDA2_LC_OCP3x16_2_XR | 100 | 2 |
| | NIC_M_200G_MCX623435AN_LC_OCP3x16_XR | 200 | 1 |

Table 7-10 PCIe NIC Specifications

| Type | Description | Speed (Gbps) | Port Qty. |
|---|---|---|---|
| PCIe NIC | NIC_SND_W_I350-AM2_RJ_PCI-E4X_1KM_Dual | 1 | 2 |
| | NIC_Inspur_Vostok_I350_1G_RJ_PCIEx4_4 | 1 | 2 |
| | NIC_Intel_W_I350-T2V2_RJ_PCI-E4X_1KM_Dual | 1 | 2 |
| | NIC_I_10G_X710DA2_LC_PCIEx8_2_XR | 10 | 2 |
| | NIC_I_10G_EX710DA2_LC_PCIEx8_2_XR_Lmt | 10 | 2 |
| | NIC_Inspur_Vostok_X710_10G_LC_PCIEx8_2 | 10 | 2 |
| | NIC_SOLARFL_25G_9250_LC_PCIEx8_2_XR_PlUS | 10 | 2 |
| | NIC_Inspur_Sbt_X722_10G_LC_PCIEx8-G3_2 | 10 | 2 |
| | NIC_Inspur_X550_10G_RJ45_PCIEX8_Dual | 10 | 2 |
| | NIC_I_10G_X710T2L_RJ_PCIEx8_2_XR | 10 | 2 |
| | NIC_M_25G_MCX512A-ACAT_LC_PCIEx8_2_XR | 25 | 2 |
| | NIC_M_25G_MCX631102AN_LC_PCIEx8_2_XR | 25 | 2 |
| | NIC_Inspur_Andes-M6_E810_25G_LC_PCIEx8_2 | 25 | 2 |
| | NIC_I_25G_E810XXVDA2_LC_PCIEx8_2_XR | 25 | 2 |
| | NIC_BROADCM_25G_57414_LC_PCIEx8_2_XR_42C | 25 | 2 |
| | NIC_I_25G_E810XXVDA4_LC_PCIEx16_4_XR | 25 | 4 |
| | NIC_I_40G_EXL710QDA2_LC_PCIEx8_2_XR | 40 | 2 |
| | NIC_M_100G_MCX623106AN_LC_PCIEx16_2_XR | 100 | 2 |
| | NIC_BROADCM_100G_508_LC_PCIEx16_2_XR | 100 | 2 |
| | NIC_I_100G_E810CQDA2_LC_PCIEx16_2_XR | 100 | 2 |
| | NIC_M_200G_MCX623105AN_LC_PCIEx16_XR | 200 | 1 |

## 6. HBA/HCA Card Specifications

Table 7-11 HBA Card Specifications

| Type | Description |
|---|---|
| HBA Card | HBA Card_E_8R0_LPE31000-M6_FC16G_PCIE |
| | HBA Card_E_8R2_LPE31002-M6_FC16G_PCIE |
| | HBA Card_QL_4R1_QLE2690-ISR-BK_FC16G_PCIE |
| | HBA Card_QL_4R2_QLE2692-ISR-BK_FC16G_PCIE |
| | HBA Card_E_0R1_LPE32000-AP_FC32G_PCIE |
| | HBA Card_E_8R2_LPE32002-AP_FC32G_PCIE |
| | HBA Card_QL_8R1_QLE2740_FC32G_PCIE |
| | HBA Card_QL_8R2_QLE2742-ISR-BK_FC32G_PCIE |

| Type | Description |
|---|---|
| | HBA Card_E_0R1_LPE35000-AP_FC32G_PCIE |
| | HBA Card_E_0R2_LPE35002_FC32G_PCIE |
| | HBA Card_Marvell_0R1_QLE2770_FC32G_PCIE_4.0 |
| | HBA Card_Marvell_0R2_QLE2772_FC32G_PCIE_4.0 |
| | HBA Card_E_0R1_LPE36000_FC64G_PCIE |
| | HBA Card_E_0R2_LPE36002_FC64G_PCIE |

Table 7-12 HCA Card Specifications

| Type | Description | Speed (Gbps) | Port Qty |
|---|---|---|---|
| HCA Card | MCX653105A-ECAT PCIe 3.0/4.0 x16 | 100 | 1 |
| | MCX653106A-ECAT PCIe 3.0/4.0 x16 | 100 | 2 |
| | MCX653105A-HDAT PCIe 3.0/4.0 x16 | 100 | 1 |
| | MCX653106A-HDAT PCIe 3.0/4.0 x16 | 100 | 2 |
| | HCA Card_NV_1-NDR_MCX75310AAS-NEAT_PCIE | 200 | 1 |

# 7. GPU/Graphics Card Specifications

Table 7-13 GPU/Graphics Card Specifications

| Type | Model | Max. Qty. |
|---|---|---|
| GPU | GPU_NV_16G_NVIDIA-A2-PCIe4_128b | 3 |
| Graphics Card | Graphics Card_NV_8G_T1000_128b_P | 3 |
| | Graphics Card_NV_4G_T400_64b_P | 3 |

# 8. PSU Specifications

The server supports up to 2 PSUs in 1+1 redundancy that follow the Intel Common Redundant Power Supply (CRPS) specification. The PSUs share a common electrical and structural design that allows for hot-swap and tool-less installation into the server with the PSUs locking automatically after being inserted into the power bay. The CRPS PSUs are 80 Plus Platinum or Titanium rated with various output powers, allowing customers to choose as needed.

- The following rated 110 VAC to 230 VAC and 240 VDC PSUs in 1+1 redundancy are supported:

- 550 W Platinum PSU: 550 W (110 VAC), 550 W (230 VAC), 550 W (240 VDC for China)
- 800 W Platinum PSU: 800 W (110 VAC), 800 W (230 VAC), 800 W (240 VDC for China)
- 1,300 W Platinum PSU: 1,000 W (110 VAC), 1,300 W (230 VAC), 1,300 W (240 VDC for China)
- 1,600 W Platinum PSU: 1,000 W (110 VAC), 1,600 W (230 VAC), 1,600 W (240 VDC for China)
- 2,000 W Platinum PSU: 1,000 W (110 VAC), 2,000 W (230 VAC), 2,000 W (240 VDC for China)
- 800 W Titanium PSU: 800 W (230 VAC), 800 W (240 VDC for China)
- 1,300 W Titanium PSU: 1,000W (110 VAC), 1,300 W (230 VAC), 1,300 W (240 VDC for China)
- 1,600W Titanium PSU: 1,000W (110 VAC), 1,600 W (230 VAC), 1,600W (240 VDC for China)
- 2,000W Titanium PSU: 1,000W (110 VAC), 2,000 W (230 VAC), 2,000W (240 VDC for China)

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 NOTE

At a rated input voltage of 110 VAC, the output power of a 1,300/1,600/2,000 W PSU will be derated to 1,000 W.

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Operating voltage range:

- 110 to 230 VAC: 90 to 264 VAC
- 240 VDC: 180 to 320 VDC

- The following rated 336 VDC PSUs in 1+1 redundancy are supported:
  - 800 W PSU: 800 W (336 VDC)
  - 1,300 W PSU: 1,300 W (336 VDC)

  Operating voltage range:
  - 336 VDC: 260 to 400 VDC
  - 230 VAC: 176 to 264 VAC
- The following rated -48 VDC PSUs in 1+1 redundancy are supported:

- 800 W PSU: 800 W (-48 VDC)
- 1,300 W PSU: 1,300 W (-48 VDC)

Operating voltage range:

- -48 VDC: -40 to -72 VDC

# 8 Regulatory Information

## 8.1 Safety

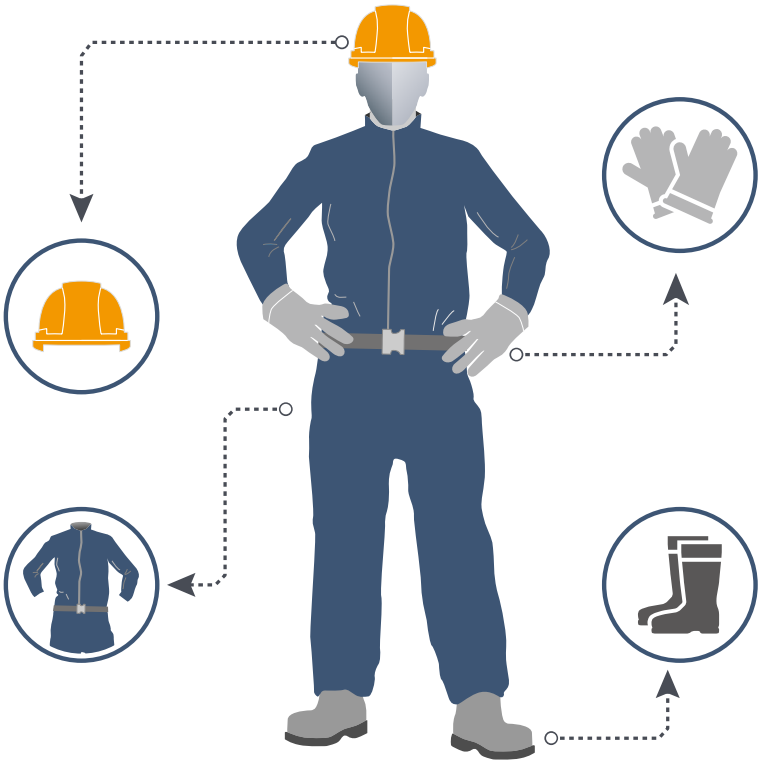
### 8.1.1 General

- Strictly comply with local laws and regulations while installing the equipment. The safety instructions in this section are only a supplement to local safety regulations.
- To ensure personal safety and to prevent damage to the equipment, all personnel must strictly observe the safety instructions in this section and on the device labels.
- People performing specialized activities, such as electricians and electric forklift operators, must possess qualifications recognized by the local government or authorities.

### 8.1.2 Personal Safety

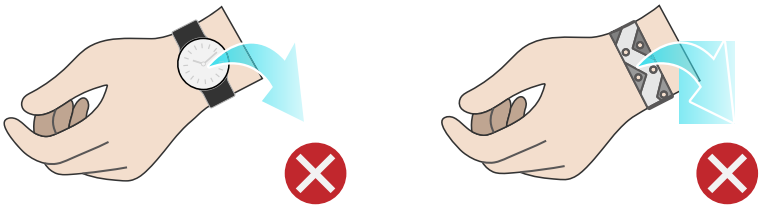
- Only personnel certified or authorized by Inspur are allowed to perform the installation procedures.
- Stop any operation that could cause personal injury or equipment damage. Report to the project manager and take effective protective measures.
- Working during thunderstorms, including but not limited to handling equipment, installing cabinets and installing power cords, is forbidden.
- Do not carry the weight over the maximum load per person allowed by local laws or regulations. Arrange appropriate installation personnel and do not overburden them.
- Installation personnel must wear clean work clothes, work gloves, safety helmets and safety shoes, as shown in Figure 8-1.

Figure 8-1 Protective Clothing



- Before touching the equipment, put on ESD clothes and ESD gloves or an ESD wrist strap, and remove any conductive objects such as wrist watches or metal jewelry, as shown in Figure 8-2, in order to avoid electric shock or burns.

Figure 8-2 Removing Conductive Objects



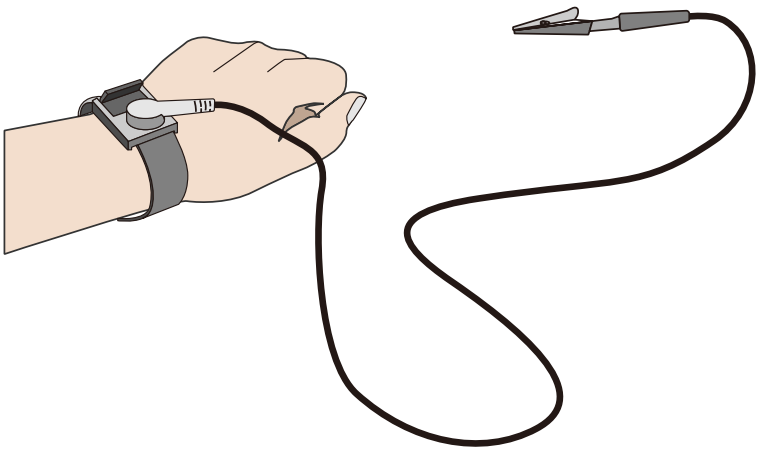
How to put on an ESD strap (Figure 8-3).

a. Put your hand through an ESD wrist strap.

b. Tighten the strap buckle to ensure a snug fit.

c. Plug the alligator clip of the ESD wrist strap into the corresponding jack on the grounded cabinet or grounded chassis.

Figure 8-3 Wearing an ESD Wrist Strap



- Use tools correctly to avoid personal injury.
- When moving or lifting equipment above shoulder height, use lifting devices and other tools as necessary to avoid personal injury or equipment damage due to equipment slippage.
- The power sources of the server carry a high voltage. Direct contact or indirect contact through damp objects with the high-voltage power source is fatal.
- To ensure personal safety, ground the server before connecting power.
- When using ladders, always have someone hold and guard the bottom of the ladders. In order to prevent injury, never use a ladder alone.
- When connecting, testing or replacing optical fiber cable, avoid looking into the optical port without eye protection in order to prevent eye damage from laser light.

### 8.1.3 Equipment Safety

- To ensure personal safety and prevent equipment damage, use only the power cords and cables that come with the server. Do not use them with any other equipment.
- Before touching the equipment, put on ESD clothing and ESD gloves to prevent static electricity from damaging the equipment.
- When moving the server, hold the bottom of the server. Do not hold the handles of any module installed in the server, such as PSUs, fan modules, drive modules, or motherboard. Handle the equipment with care at all times.
- Use tools correctly to avoid damage to the equipment.
- Connect the power cords of active and standby PSUs to different PDUs to ensure high system reliability.

- To ensure equipment safety, always ground the equipment before powering it on.

## 8.1.4 Transportation Precautions

Contact the manufacturer for precautions before transportation as improper transportation may damage the equipment. The precautions include but not limited to:

- Hire a trusted logistics company to move all equipment. The transportation process must comply with international transportation standards for electronic equipment. Always keep the equipment being transported upright. Avoid collision, moisture, corrosion, packaging damage or contamination.
- Transport the equipment in its original packaging.
- If the original packaging is unavailable, separately package heavy and bulky components (such as chassis, blade servers and blade switches), and fragile components (such as optical modules and PCIe cards).
- Power off all equipment before shipping.

## 8.1.5 Manual Handling Weight Limits

 CAUTION

Observe local laws or regulations regarding the manual handling weight limits per person. The limits shown on the equipment and in the document are recommendations only.

Table 8-1 lists the manual handling weight limits per person specified by some organizations.

Table 8-1 Manual Handling Weight Limits per Person

| Organization | Weight Limit (kg/lbs) |
|---|---|
| European Committee for Standardization (CEN) | 25/55.13 |
| International Organization for Standardization (ISO) | 25/55.13 |
| National Institute for Occupational Safety and Health (NIOSH) | 23/50.72 |
| Health and Safety Executive (HSE) | 25/55.13 |
| General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China (AQSIQ) | Male: 15/33.08<br>Female: 10/22.05 |

# 9 Inspur Limited Warranty

This limited warranty applies only to the original purchasers of Inspur's products who are direct customers or distributors of Inspur (“Customer”).

Inspur warrants all Inspur-branded hardware products, if properly used and installed, to be free from defects in material and workmanship within the warranty period. The term “Inspur Hardware Product” is limited to the hardware components and required firmware. The term “Inspur Hardware Product” DOES NOT include software applications or programs, non-Inpsur products, or non-Inspur branded peripherals. Inspur may, at its discretion, repair or replace the defective parts. Repair or replacement parts may be new, used, or equivalent to new in performance and reliability. Repair or replacement parts are warranted to be free of defects in material or workmanship for ninety (90) calendar days or for the remainder of the warranty period of the product, whichever is longer.

Any warranty services of Inspur equipment are not provided by default outside China’s mainland, and global customers may purchase corresponding service products on demand.

Service offerings may vary by geographic region. Please contact your Inspur representative to identify service levels and needs for your region.

## 9.1 Warranty Service

Inspur warranty service includes 24 × 7 remote technical support, RMA (Return Material Authorization) Service, ARMA (Advanced Return Material Authorization) Service, 9 × 5 × NBD (Next Business Day) Onsite Service and 24 × 7 × 4 Onsite Service.

### 9.1.1 Remote Technical Support

The 24 × 7 remote technical support can be obtained through hotline, e-mail, and Service Portal*[1]. Through hotline and e-mail support, Inspur engineers help customers diagnose the causes of malfunctions and provide solutions. Service Portal*[1] provides access to firmware, customized update files, and related manuals for Inspur Hardware Products. Customer may also access the Service Portal*[1] to submit an RMA request or an ARMA request for parts replacement or repair.

Information needed when requesting support:

- Contact name, phone number, e-mail address
- System serial number, part number, model and location (address) of the product needing service

- Detailed description of problem, logs (SELs and blackbox logs, and any other related logs from OS), screenshot of issue, pictures of damaged/faulty parts, etc.

Table 9-1 Support Contact Information

| Type | Description | Support Window |
|---|---|---|
| Global Hotline | • Global: (+1) 844-860-0011/(+1) 325-880-0011<br>• China: (+86) 400-860-0011<br>• CIS: (+7) 499-371-3961<br>• Germany: (+49) 800-850-0011/(+49) 7112-064-9400<br>• Japan: (+81) 0800-600-0118/(+81) 0505-840-2667<br>• Korea: (+82) 80-560-0011/(+82) 70-4228-7340 | 24 × 7 × 365 |
| Email | • Global: serversupport@inspur.com<br>• China: lckf@inspur.com<br>• CIS: serversupport_ru@inspur.com<br>• Germany: serversupport_de@inspur.com<br>• Japan: serversupport_jp@inspur.com<br>• Korea: serversupport_kr@inspur.com<br>• US: serversupportusa@inspur.com | 24 × 7 × 365 |

## 9.1.2 RMA Service

**Standard Replacement**: When a hardware failure occurs, Customer may submit an RMA request to Inspur via e-mail or Service Portal*1. Inspur will review and approve the RMA submission at its own discretion, and provide an RMA number and return information that Customer may use to return the defective part(s) for the RMA service. Inspur will ship out replacement part(s) within one (1) business day after receiving the defective part(s) and cover one-way shipment.

NOTE

- Customer should return the defective parts in their original packaging to the Inspur designated service center at their own expense.
- After Inspur's further diagnosing and testing, if the defective parts conform to Inspur's repair policy, Inspur will ship out the repair or replacement parts at our own expense; otherwise, Inspur will return the defective parts at Customer's expense.
- If Customer needs to designate a logistics company, allocation of the shipping cost to Inspur/Customer will be redefined.

### 9.1.3 ARMA Service

**Advanced Replacement**: If a problem with Inspur Hardware products cannot be resolved via hotline or e-mail support and replacement part(s) are required, Inspur will ship out replacement part(s) in advance within one (1) business day. Customer should return defective part(s) within five (5) business days after receiving the replacement(s). Inspur will cover two-way shipment.

NOTE

- Customer should return the defective parts in their original packaging to the Inspur designated service center.
- Inspur will ship out the replacement parts at our own expense after completing remote diagnosis.
- If Customer needs to designate a logistics company, allocation of the shipping cost to Inspur/Customer will be redefined.

### 9.1.4 9 × 5 × NBD Onsite Service

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

NOTE

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

5:00 pm local time will require an additional day for the service engineer to arrive.

### 9.1.5 24 × 7 × 4 Onsite Service

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

NOTE

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

## 9.2 Inspur Service SLA

Inspur offers a variety of Service Level Agreements (SLA)*[2] to meet customer requirements.

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

## 9.3 Warranty Exclusions

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

The Limited Warranty does do not apply to

- expendable or consumable parts, such as, but not limited to, batteries or protective coatings that are designed to diminish over time, unless failure has occurred during DOA period due to a defect in material or workmanship;

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

In no event will Inspur be liable for any direct loss of use, interruption of business, lost profits, lost data, or indirect, special, incidental or consequential damages of any kind regardless of the form of action, whether in contract, tort (including negligence), strict liability or otherwise, even if Inspur has been advised of the possibility of such damage, and whether or not any remedy provided should fail of its essential purpose.

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

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

# 10 System Management

## 10.1 Intelligent Management System

ISBMC, an Inspur self-developed remote server management system, supports mainstream management specifications in the industry such as IPMI 2.0 and Redfish 1.13. ISBMC features high operational reliability, easy serviceability for different business scenarios, accurate and comprehensive fault diagnosis capabilities, and industry-leading security reinforcement capabilities.

ISBMC supports:

- IPMI 2.0
- Redfish 1.13
- SNMP v1/v2c/v3
- HTML5/Java remote consoles (Keyboard, Video, Mouse)
- remote virtual media
- login via web browsers
- intelligent fault diagnosis

Table 10-1 ISBMC Features

| Feature | Description |
| --- | --- |
| Management Interface | Supports extensive remote management interfaces for various server O&M scenarios. The supported interfaces include:<br>• IPMI<br>• SSH CLI<br>• SNMP<br>• HTTPS<br>• Web GUI<br>• Redfish<br>• RESTful<br>• DCMI<br>• Syslog |

| Feature | Description |
| --- | --- |
| Accurate and Intelligent Fault Location | IDL, a self-developed 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 Inspur, displaying abundant information of the server and components, and offers easy-to-use Web GUIs. |
| Crash Screenshot and Manual Screenshot | Supports automatic crash screenshot with the last screen before crash saved, and provides manual screenshot, which can quickly capture the screen for easy inspection at scheduled time. |
| Dual Flash and Dual Image | Supports dual flash and dual image, enabling automatic flash failover in case of software faults or flash damage, 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.<br>• Provides a thermal protection mechanism, which is automatically triggered when the BMC is abnormal to |

| Feature | Description |
| --- | --- |
| | ensure that the fan operates at safe speeds to avoid system overheating.<br>• 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 Supply Control | Supports virtual power buttons for startup, shutdown, restart, and restart after shutdown. |
| UID LED and Remote Control LED | Supports remote lighting of the UID LED for locating the server in the server room, and supports remote control LED. The UID LED flashes when a user remotely logs in via web, KVM, or SSH to inform the on-site personnel that an administrator is accessing the server. |
| Secure Firmware Update | Supports firmware update based on secure digital signatures, mismatch prevention mechanism for firmware from different manufacturers and firmware for different server models, and firmware update of BMC/BIOS/CPLD/ PSU. |
| Serial Port Redirection | Supports remote redirection of the system serial port, BMC serial port and other serial ports, and directs the server-side serial port output to the local administrator via the network for server debugging. |
| Storage Information Display | Displays RAID logical array information and drive information, 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 Inspur server security baseline standard V3.0. SSH, HTTPS, SNMP and IPMI use secure and reliable algorithms. ISBMC offers capabilities including secure update and boot and security reinforcement mechanisms such as anti-replay, anti-injection, and anti-brute force. |

## 10.2 Inspur Physical Infrastructure Manager (ISPIM)

The server is compatible with the latest version of Inspur Physical Infrastructure

Manager (ISPIM).

ISPIM is a new-generation infrastructure O&M management platform for industry data centers. Based on cutting-edge O&M concepts, ISPIM provides users with leading and efficient overall management solutions for data centers to ensure the advanced infrastructure management. This platform provides a rich set of functions such as centralized resource management, in-depth fault diagnosis, second-level performance monitoring, intelligent energy consumption management, 3D automatic topology, and stateless automatic deployment. With these functions, users can implement central 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. ISPIM has the following key features:

- Lightweight deployment in multiple scenarios and full lifecycle management of devices
- High reliability and on-demand node scalability enabled by 1 to N data collectors
- Intelligent asset management and real-time tracking of asset changes
- Comprehensive monitoring, understanding the whole picture of the business
- Intelligent fault diagnosis for reduced maintenance time
- Second-level performance monitoring for real-time status control of devices
- Batch configuration, deployment and update, shortening the deployment time
- Improved version management efficiency
- Standardized northbound interfaces for easy integration and interfacing

Table 10-2 ISPIM Features

| Feature | Description |
| --- | --- |
| Centralized Device Management | Supports centralized management of network-wide devices, including:<br>• servers (the full range of Inspur server family, including general-purpose rack servers, AI servers, blade servers, all-in-one servers and other high-end server products, and third-party servers)<br>• storage devices (Inspur general-purpose disk arrays, distributed storage devices, and storage devices of other manufacturers)<br>• network devices (Inspur switches, third-party switches, and third-party firewall devices) |

| Feature | Description |
| --- | --- |
| Monitoring | • Centralized display, search, blocking and email notifications of device alerts<br>• Creation of alert rules, notification rules and blocking rules<br>• Alert severity level setting<br>• Alert forwarding and southbound settings<br>• Device performance monitoring<br>• Distributed monitoring |
| Stateless Computing | • BMC/BIOS update and configuration of Inspur servers<br>• RAID configuration of Inspur servers<br>• Automatic firmware baseline management<br>• Repository for update files |
| OS Deployment | • Batch deployment of OSs via BMC interfaces<br>• One-click deployment with automatic and detailed logging and with no manual intervention needed<br>• Concurrent deployment of up to 40 devices |
| Asset Management | • Part-level asset management<br>• Multi-dimensional asset report<br>• 3D data centers<br>• Asset maintenance management |
| Inspection | • Active inspection<br>• Alert-triggered passive inspection<br>• Intelligent fault diagnosis and analysis<br>• Call home |
| Power Consumption Management | • Multi-dimensional report of power consumption<br>• Intelligent power capping strategies<br>• A variety of power consumption optimization analyses, including cooling analysis, server utilization analysis, server power consumption analysis, and load distribution analysis |

| Feature | Description |
| --- | --- |
| | • Intelligent power consumption prediction |
| Security Management | Implements security control of ISPIM via a set of security policies such as user management, role management, authentication management (local authentication and LDAP authentication), and certificate management. |

## 10.3 Inspur Server Intelligent Boot (ISIB)

The server is compatible with the latest version of Inspur Server Intelligent Boot (ISIB) system, a self-developed automatic O&M management system throughout the server lifecycle. Based on the SSH and PXE technologies, it is compatible with the full range of Inspur servers, and offers more efficient and reliable automatic deployment and software and hardware configuration management. ISIB has the following key features:

- Full lifecycle management from deployment to automatic O&M
- One-stop and one-click deployment for bare metal servers
- Flexible task scheduling with O&M capabilities in multiple scenarios
- Large-scale deployment of technical architecture, shortening the deployment time
- Zero network deployment with plug-and-play support
- Accurate logging and instruction-level tracing of execution results
- Rich built-in O&M scripts and management schemes

Table 10-3 ISIB Features

| Feature | Description |
| --- | --- |
| Home | Provides multi-dimensional report of assets, repositories, operations and jobs, displays jobs 24 hours dynamically and column bars of jobs in the last 30 days. |
| Asset | Supports automatic device discovery, OS information collection, and out-of-band/in-band power supply management. |
| Repository | Enables you to manage images, software, firmware, configuration files, scripts and sources for easy OS deployment and firmware update. |
| Operation | • Firmware update<br>• Hardware configuration |

| Feature | Description |
| --- | --- |
| | • Automatic OS installation via PXE<br>• Installation template management<br>• Image cloning and restoration |
| Task | • Supports job scheduling, and scheduled and periodic task execution.<br>• Provides visual multi-dimensional task display and detailed logging. |

# 11 Certifications

## 11.1 NF5180-M7-A0-R0-00

Table 11-1 Certifications

| Country/Region | Certification | Mandatory/Voluntary |
|---|---|---|
| China | China Environmental Labelling | Voluntary |
| International Mutual Recognition | CB | Voluntary |
| EU | CE | Mandatory |
| US | FCC | Mandatory |
| | UL | Voluntary |

# 12 Appendix A

## 12.1 Operating Temperature Specification Limits

### 12.1.1 NF5180-M7-A0-R0-00

Table 12-1 Operating Temperature Specification Limits

| Config. | | Max. Operating Temp. 30°C (86°F) | Max. Operating Temp. 35°C (95°F) | Max. Operating Temp. 40°C (104°F) | Max. Operating Temp. 45°C (113°F) |
|---|---|---|---|---|---|
| 4 × 3.5-inch Drive or 10/12 × 2.5-inch Drive Config | NIC Config | All options supported | • All options except CPS supported<br>• CPS ≤8 (drive and NIC full configuration)<br>• CPS ≥8 supported when CPUs <300 W | • CPUs ≤225 W supported<br>• CPS not supported<br>• NICs ≥100 Gb not supported | • CPU ≤225 W supported<br>• CPS not supported<br>• NICs ≥100 Gb not supported |
| | GPU Config | All options supported | • CPU ≤270 W supported<br>• CPS ≤8 (drive and GPU full configuration)<br>• CPS ≥8 supported when CPUs <250 W | • CPU ≤225 W supported<br>• CPS not supported<br>• GPUs not supported | • CPU ≤225 W supported<br>• CPS not supported<br>• GPUs not supported |

| Config. | | Max. Operating Temp. 30°C (86°F) | Max. Operating Temp. 35°C (95°F) | Max. Operating Temp. 40°C (104°F) | Max. Operating Temp. 45°C (113°F) |
|---|---|---|---|---|---|
| | Drive Config | All options supported | • CPU ≤270 W supported<br>• CPS ≤8 (drive full configuration)<br>• CPS ≥8 supported when CPUs <300 W | • CPU ≤225 W supported<br>• CPS not supported<br>• Rear drives not supported | • CPU ≤225 W supported<br>• CPS not supported<br>• Rear drives not supported |

## 12.2 Model

Table 12-2 Model

| Certified Model | Description |
|---|---|
| NF5180-M7-A0-R0-00 | Global |

## 12.3 RAS Features

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

## 12.4 Sensor List

Table 12-3 Sensor List

| Sensor | Description | Sensor Location |
|---|---|---|
| Inlet_Temp | Air inlet temperature | / |
| Outlet_Temp | Air outlet temperature | / |
| PVCCIN_CPUX | CPU core voltage | CPUx<br>x indicates the CPU number with a value of 0 - 1 |
| PVCCFA_FIVR_CPUX | UPI IIO voltage | CPUx |

| Sensor | Description | Sensor Location |
|---|---|---|
| | | x indicates the CPU number with a value of 0 - 1 |
| PVCCINFAON_CPUX | CPU boot voltage | CPUx<br>x indicates the CPU number with a value of 0 - 1 |
| PVCCFA_EHV_CPUX | Controller voltage | CPUx<br>x indicates the CPU number with a value of 0 - 1 |
| PVCCD_HV_CPUX | Memory controller voltage | CPUx<br>X indicates the CPU number with a value of 0 - 1 |
| CPUX_VR_Temp | CPUx VR temperature | CPUx<br>x indicates the CPU number with a value of 0 - 1 |
| PSUX_VIN | PSUx input voltage | PSUx<br>x indicates the PSU number with a value of 0 - 1 |
| PSUX_VOUT | PSUx output voltage | PSUx<br>x indicates the PSU number with a value of 0 - 1 |
| SYS_12V | System 12 V voltage (output by HSC) | Motherboard |
| SYS_5V | System 5 V voltage | Motherboard |
| SYS_3V3 | System 3.3 V voltage | Motherboard |
| RTC_Battery | RTC battery voltage on motherboard | Motherboard |
| PVNN_MAIN_CPUX | CPUx voltage | Motherboard |
| P12V_CPUX_DIMM | CPUx DIMM voltage | Motherboard |
| PVNN_PCH_STBY | PCH core voltage | Motherboard |
| P1V05_PCH_STBY | PCH logic voltage | Motherboard |
| CPUX_Temp | CPUx core temperature | CPUx<br>x indicates the CPU number with a value of 0 - 1 |
| CPUx_DTS | CPU_DTS temperature<br>CPU margin temperature before it reaches the throttling frequency | CPUx<br>X indicates the CPU number with a value of 0 - 1 |
| CPUx_DIMM_T | The maximum temperature among DDR5 DIMMs of CPUx | CPUx<br>x indicates the CPU number with a value of 0 - 1 |
| PCH_Temp | PCH temperature | Motherboard |
| PSU_Inlet_Temp | PSU temperature | PSU |

| Sensor | Description | Sensor Location |
|---|---|---|
| Total_Power | Total power | Motherboard |
| FAN_Power | Total fan power | Fan |
| PSUX_PIN | PSUx input power | PSUx<br>x indicates the PSU number with a value of 0 - 1 |
| PSUX_POUT | PSUx output power | PSUx<br>x indicates the PSU number with a value of 0 - 1 |
| CPU_Power | Total CPU power (obtained through ME) | Motherboard |
| Memory_Power | Total memory power (obtained through ME) | Motherboard |
| FANN_F_Speed, FANN_R_Speed | FanN speed | Fan |
| RAID_Temp | Non-mezz RAID controller card temperature (Max temp. will be taken in case of multiple RAID controller cards, including SAS, RAID, and HBA) | RAID controller card |
| HDD_MAX_Temp | Maximum temperature among all drives | / |
| OCP_RAID_Temp | Mezz RAID controller card temperature | Mezz RAID controller card |
| NVME_Temp | Maximum temperature among all NVMe drives | / |
| OCP_NIC_SFP_Temp | OCP NIC SFP temperature | SFP optical module |
| PCIe_NIC_SFP_T | PCIe NIC SFP temperature | SFP optical module |
| OCP_NIC_Temp | OCP NIC temperature (Max temp. will be taken in case of multiple OCP NICs) | NICs |
| PCIE_NIC_Temp | PCIe NIC temperature (Max temp. will be taken in case of multiple PCIe NICs) | NICs |
| MEM_ResourceRate | Memory utilization rate | / |
| CPU_ResourceRate | CPU utilization rate | / |
| GPUX_Temp | GPUx core temperature | GPU |
| CPUN_Status | CPUn status (n:0~n) | CPUn |

| Sensor | Description | Sensor Location |
|---|---|---|
| | | n indicates the CPU number with a value of 0 - 1 |
| SEL_Status | SEL status | / |
| PSU_Mismatch | PSU models mismatch | / |
| PSU_Redundant | PSU redundant status | / |
| FANN_Status | FANn status | FanN<br>N indicates the fan number with a value of 0 - 9 |
| FAN_Redundant | Fan redundancy status | / |
| PCIe_Status | The status of PCIe device (including PCIe bus, slots and cards) | / |
| POST_Status | System firmware and POST status | / |
| PWR_CAP_Fail | Power capping failure | / |
| CPUN_CNDN | Motherboard memory silkscreen | / |
| CPU_Config | CPU configuration status (mixing of CPUs, or primary CPU not installed) | / |
| PSUN_Status | PSUn status (n:0~1) | PSU |
| K_HDDx | Drive | Drive<br>• K denotes front, internal and rear, with a value of F/I/R respectively<br>• x indicates the drive number |
| ACPI_PWR | ACPI status | / |
| Sys_Health | System health status | / |
| BMC_Boot_Up | BMC boot up complete | / |
| BIOS_Boot_Up | BIOS boot up complete | / |
| Intrusion | Chassis-opening activity | Top cover |
| LeakageSensor | Leak Detection | Leak Detection Cable |
| ME_FW_Status | ME health status | ME |
| TPM_Verify | TPM verification status | / |

# 13 Appendix B Acronyms and Abbreviations

## 13.1 A - E

**A**

| | |
|---|---|
| AC | Alternating Current |
| ACPI | Advanced Configuration and Power Interface |
| ADDDC | Adaptive Double Device Data Correction |
| AEP | Apache Pass |
| AI | Artificial Intelligence |
| API | Application Programming Interface |
| AQSIQ | General Administration of Quality Supervision, Inspection and Quarantine of the People's Republic of China |
| ARMA | Advanced Return Material Authorization |
| AVX | Advanced Vector Extensions |

**B**

| | |
|---|---|
| BIOS | Basic Input Output System |
| BLE | BIOS Lock Enable |
| BMC | Baseboard Management Controller |

**C**

| | |
|---|---|
| CAS | Column Address Strobe |
| CB | Certification Body |
| CE | Conformite Europeenne |

| | |
|---|---|
| CEN | European Committee for Standardization |
| CLI | Command-Line Interface |
| CMOS | Complementary Metal-Oxide-Semiconductor |
| COM | Communication |
| CPLD | Complex Programmable Logic Device |
| CPS | Crow Pass |
| CPU | Central Processing Unit |
| CRPS | Common Redundant Power Supply |
| CXL | Compute eXpress Link |

**D**

| | |
|---|---|
| DC | Direct Current |
| DCMI | Data Center Manageability Interface |
| DDR5 | Double Data Rate 5 |
| DIMM | Dual In-Line Memory Module |
| DL | Deep Learning |
| DOA | Dead on Arrival |
| DPC | DIMM Per Channel |
| DRAM | Dynamic Random-Access Memory |
| DTS | Digital Thermal Sensor |
| DWPD | Drive Writes Per Day |

**E**

| | |
|---|---|
| EBG | Emmitsburg |
| ECC | Error-Correction Code |
| ECMA | European Computer Manufacturers Association |

| | |
|---|---|
| ESD | Electrostatic Discharge |
| EVAC | Extended Volume Air Cooling |

## 13.2 F - J

**F**

| | |
|---|---|
| FCC | Federal Communications Commission |
| FHHL | Full-Height Half-Length |
| FW | Firmware |

**G**

| | |
|---|---|
| GB | GigaByte |
| GPU | Graphics Processing Unit |
| GUI | Graphical User Interface |

**H**

| | |
|---|---|
| HBA | Host Bus Adapter |
| HCA | Host Channel Adapter |
| HDD | Hard Disk Drive |
| HHHL | Half-Height Half-Length |
| HSE | Health and Safety Executive |
| HTTPS | Hypertext Transfer Protocol Secure |

**I**

| | |
|---|---|
| I/O | Input/Output |
| IDL | Inspur Diagnosis Log |

| | |
|---|---|
| IEC | International Electrotechnical Commission |
| IIPC | Intel Intelligent Power Capability |
| IMC | Integrated Memory Controller |
| IOPS | Input/Output Operations Per Second |
| IP | Internet Protocol |
| IPMB | Intelligent Platform Management Bus |
| IPMI | Intelligent Platform Management Interface |
| ISBMC | Inspur Server Baseboard Management Controller |
| ISIB | Inspur Server Intelligent Boot |
| ISO | International Organization for Standardization |
| ISPIM | Inspur Physical Infrastructure Manager |
| ISQP | Inspur Server Quick Provisioning |

## 13.3 K - O

**K**

| | |
|---|---|
| KVM | Keyboard Video Mouse |

**L**

| | |
|---|---|
| LCD | Liquid Crystal Display |
| LDAP | Lightweight Directory Access Protocol |
| LED | Light Emitting Diode |
| LP | Low Profile |

**M**

| | |
|---|---|
| MCIO | Mini Cool Edge IO |

| | |
|---|---|
| ME | Management Engine |

**N**

| | |
|---|---|
| NBD | Next Business Day |
| NC-SI | Network Controller Sideband Interface |
| NIC | Network Interface Controller |
| NIOSH | National Institute for Occupational Safety and Health |
| NVMe | Non-Volatile Memory Express |

**O**

| | |
|---|---|
| OCP | Open Compute Project |
| OS | Operating System |

## 13.4 P - T

**P**

| | |
|---|---|
| PCH | Platform Controller Hub |
| PCI | Peripheral Component Interconnect |
| PCIe | Peripheral Component Interconnect Express |
| PFR | Platform Firmware Resilience |
| PID | Proportional-Integral-Derivative |
| POST | Power-On Self-Test |
| PPR | Post Package Repair |
| PSU | Power Supply Unit |
| PWR | Power |
| PXE | Preboot Execution Environment |

**R**

| | |
|---|---|
| RAID | Redundant Arrays of Independent Disks |
| RAS | Reliability, Availability, Serviceability |
| RDIMM | Registered Dual In-Line Memory Module |
| RH | Relative Humidity |
| RJ45 | Registered Jack 45 |
| RMA | Return Material Authorization |
| RST | Reset |
| RTC | Real Time Clock |

**S**

| | |
|---|---|
| SAS | Serial Attached SCSI |
| SATA | Serial Advanced Technology Attachment |
| SCSI | Small Computer System Interface |
| SDDC | Single Device Data Correction |
| SEL | System Event Log |
| SFF | Small Form Factor |
| SFP | Small Form-Factor Pluggable |
| SGPIO | Serial General Purpose Input/Output |
| SLA | Service Level Agreements |
| SLES | SUSE Linux Enterprise Server |
| SN | Serial Number |
| SNMP | Simple Network Management Protocol |
| SSD | Solid-State Drive |
| SSH | Secure Shell |

**T**

| | |
|---|---|
| TCM | Trusted Cryptography Module |
| TDP | Thermal Design Power |
| TPM | Trusted Platform Module |

## 13.5 U - Z

**U**

| | |
|---|---|
| UART | Universal Asynchronous Receiver Transmitter |
| UEFI | Unified Extensible Firmware Interface |
| UID | User Identification |
| UL | Underwriters Laboratories |
| UPI | Ultra Path Interconnect |
| USB | Universal Serial Bus |

**V**

| | |
|---|---|
| VGA | Video Graphics Array |
| VLAN | Virtual Local Area Network |
| VMD | Volume Management Device |
| VNC | Virtual Network Console |
| VNNI | Vector Neural Network Instructions |
| VPP | Virtual Pin Point |
| VR | Voltage Regulator |
| VRD | Voltage Regulator-Down |
| VROC | Virtual RAID on CPU |