NML72-GB300 User Manual

Revision History

Refer to the table below for changes made on this version of the NML72-GB300 User Manual.

Date	Version	Updates
9/16/2025	FIRST DRAFT	
10/22/2025	V1.00	

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Publication Date: August 2026

Penguin Solutions

Table of Contents

About this Document

This document provides a comprehensive technical overview of the system, including detailed installation and component replacement instructions. It provides specific technical specifications and offers best practices for component installation.

Introduction

System Description

1RU GB300 NVL compute tray with Hybrid-cooled system

- System architecture consists of two NVIDIA GB300 HPMs for compute boards, two ConnectX-8 mezzanine network boards for AI networking (E-W), one BlueField-3 FHHL AIC for cloud networking (N-S), and four E1.S NVMe for GPU data storages
- Supports Rack 48-54V Busbar power solution (~7.3kW per compute tray)
- Featuring NVIDIA GB300 NVL72 rack-scale 5th generation NVLink across 72 NVDIA Blackwell B300 GPUs and 36 NVIDIA Grace CPUs, optimized for AI and data centers
- Support Maximum Acceleration and Flexibility For LLM, AI/Deep Learning, and HPC Applications

KEY FEATURES

- Compute node consist of 2x GB300 HPMs
- 2x 72-core NVIDIA Grace Arm Neoverse V2 CPUs, up to 960GB memory
- 4x NVIDIA Blackwell B300 GPUs, up to 1152GB memory
- 4x E1.S SSD for data storages
- Support 2x dual OSFP ports NVIDIA ConnectX-8 VPI with 800Gb/s InfiniBand for AI networking
- Support 1x dual QSFP112 NVIDIA BlueField-3 VPI with 400Gb/s InfiniBand and Ethernet for cloud networking
- ORv3 48-54V power busbar compatible in 19” MGX Rack
- Supporting Insyde BMC and GPU Management
- Whole System Server Health Monitoring Supported

Product Specifications

Processor and Memory

Item	Description
CPU	2x NVIDIA Grace Arm Neoverse V2 CPUs
CPU Cores	144-core
CPU Memory	960GB of LPDDR5X memory with ECC
Power (TDP)	600W (300W / CPU)

Accelerator and Memory

Item	Description
GPU	4x NVIDIA Blackwell B300 GPUs
GPU Memory	1152GB HBM3e
CPU-GPU Interconnection	NVLink-C2C, 900GB/s of coherent bandwidth
GPU-GPU Interconnection	5th generation NVLink of 1.8TB bandwidth / GPU
Power (TDP)	5600W (1400W / GPU)

Storage

Item	Description
Boot Drive	1x 22110 M.2 NVMe SSD
Data storage	4x EDSFF E1.S NVMe SSDs

I/O

Item	Description
I/O Ports	• 1 System Power LED/ Button • 1 System Identify LED/Button • 1 Reset Button • 1 Mini Display Port • 1 USB3.0 Type-A • 1 Micro USB (COM) • 1 BMC Management LAN 1GbE RJ45 • 1 System OS Management LAN 1GbE RJ45 • 1 BlueField-3 Management LAN 1GbE RJ45
Networking	• 4 NVIDIA NVLink Switch ports • 2 Dual OSFP ports support 800GbE / NDR InfiniBand

	• 1 Dual QSFP ports support 400GbE / NDR InfiniBand and Ethernet

System Monitoring and Management

Item	Description
System Monitoring	System power status Front ID indicator System fault status NVLink health status
Management	Aspeed AST2600
Security	Microchip CEC1736
GPU-GPU Interconnection	5th generation NVLink of 1.8TB bandwidth / GPU

Power Input and Operating System

Item	Description
Power (TDP)	5600W (1400W / GPU)
Power Supply	ORv3 Power Busbar 48-54V, 1400A
Power per System (TDP)	~136kW
Operating Temperature	40°C

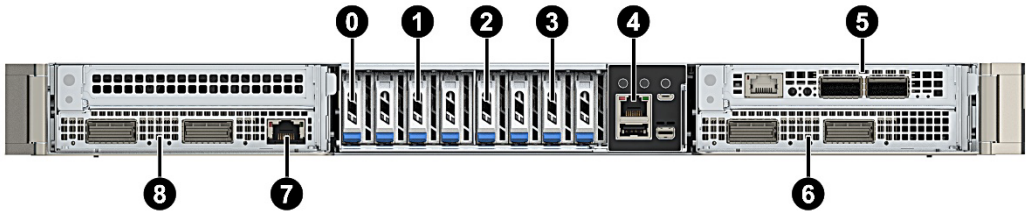
Note: Power supply is not included in this product.

Physical Characteristics

Item	Description
Chassis	1RU Rackmount (Hybrid – Cooling)
System Dimensions	W x D x H: 17.2” (438mm) x 30” (768mm) x 1.7” (43.6mm)

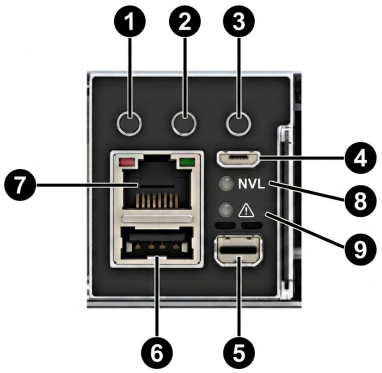
System Tour

Front View



Item	Description	Root port
0-1	PCIe5 x2 E1.S NVMe	ConnectX-8 Mezzanine Network Board 0
2-3	PCIe5 x2 E1.S NVMe	ConnectX-8 Mezzanine Network Board 1
4	Front IO panel	
5	BlueField-3/1 FHHL AIC	CPU1 UPHY3
6	OSFP Board 1	ConnectX-8 Mezzanine Network Board 1
7	1G NIC Board	CPU0 UPHY2 via PCIeSwitch
8	OSFP Board 0	ConnectX-8 Mezzanine Network Board 0

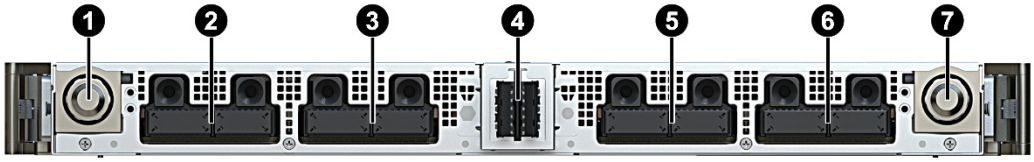
Front Control panel



Item	Description
1	Button with power & status LED
2	Button with unit identification LED
3	System reset button
4	CPU UART0 COM Port (debug)
5	Mini-DisplayPort

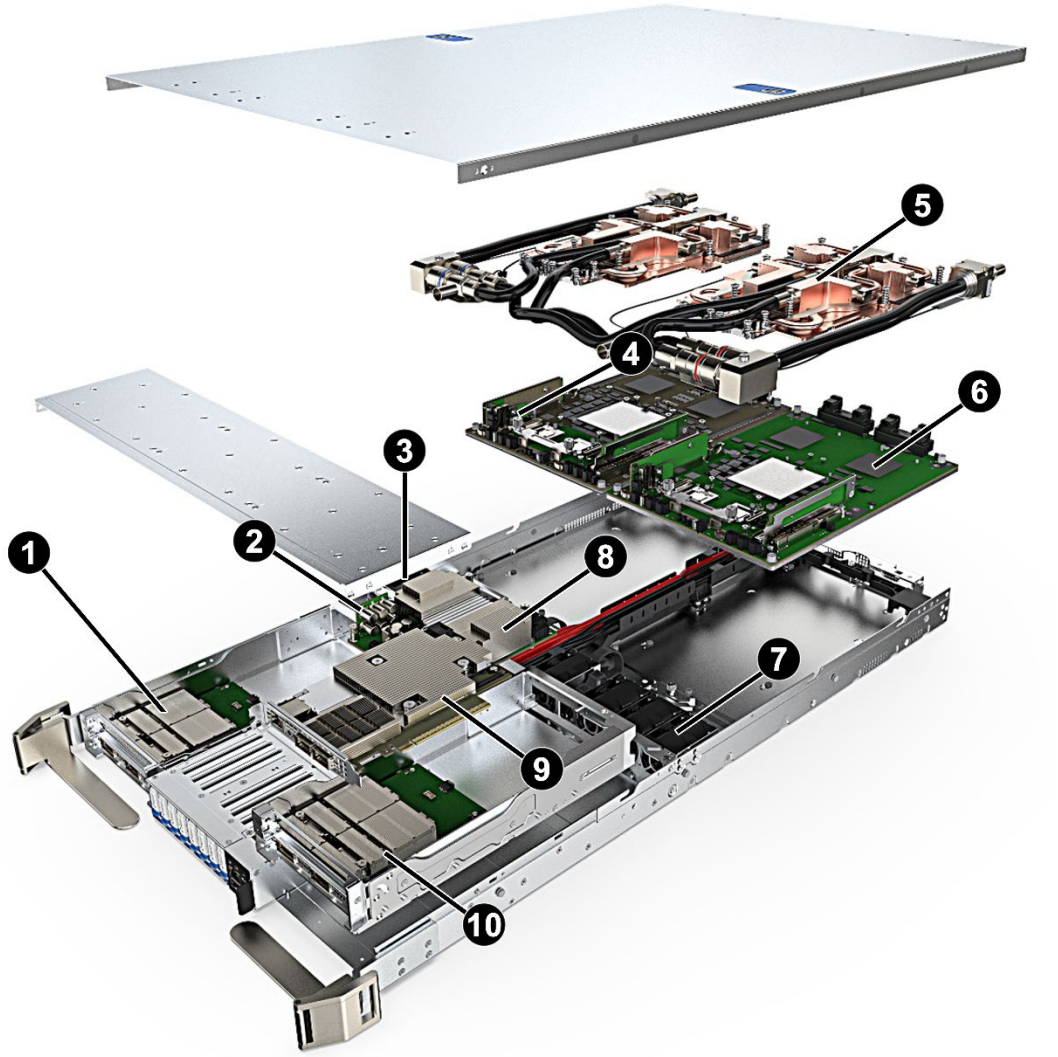
6	USB3.0 type-A connector
7	BMC OOB ethernet (1GbE)
8	NVLink health status LED
9	System fault status LED

Rear View



Item	Description
1	Manifold – Liquid outlet
2	GPU2 NVLink 4x19 connector
3	GPU3 NVLink 4x19 connector
4	ORv3 Busbar Clip – Compute tray power input
5	GPU0 NVLink 4x19 connector
6	GPU1 NVLink 4x19 connector
7	Manifold – Liquid inlet

Server Components



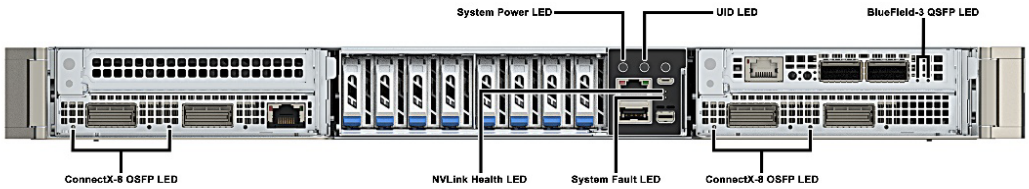
Item	Description
1	OSFP Board 0
2	Interposer Card
3	BMC
4	TPM
5	Cold Plate
6	HMC
7	Fan Module

8	Power Distribution Board
9	BlueField-3/1 FHHL AIC
10	OSFP Board 1

Status LED Indicators

The status LED indicators aid in problem diagnosis by indicating the status of system components and operations of the server.

Front panel LED indicators



E1.S NVMe Drive LED Behavior

LED	Color	State	Description
Status LED	Green	Solid on	Hard drive powered
	Green	Flicker/Activity	Hard drive read/write
	Amber	Solid on	Hard drive fault
	White	Solid on	Hard drive ready to remove

BlueField-3 QSFP LED Behavior

LED	Color	State	Description
Status LED	Green	Solid on	Cable asserted, Ports Link Up
	Amber	Solid on	Cable asserted, Ports Link Down
	None	Off	Cable de-asserted

ConnectX-8 OSFP LED Behavior

LED	Color	State	Description
Status LED	Green	Solid on	Cable asserted, Ports Link Up
	Amber	Solid on	Cable asserted, Ports Link Down
	None	Off	Cable de-asserted

System Power LED Behavior

LED	Color	State	Description
System power status	Green	Solid on	System power on
	Green	Flashing (4 Hz)	System running POST

	Green	Flashing (1 Hz)	Stand by (HMC/BMC booted)
	Green	Off	System off

UID LED Behavior

LED	Color	State	Description
Front ID indicator	Blue	Flashing (1Hz)	Identify server location
	Blue	Off	ID off status/system normal
	Note: ID button should implement toggle functionality. If LED was turned on remotely, pressing the button turns off the ID LED. If the LED was off, pressing the button turns on ID LED.		

System Fault LED Behavior

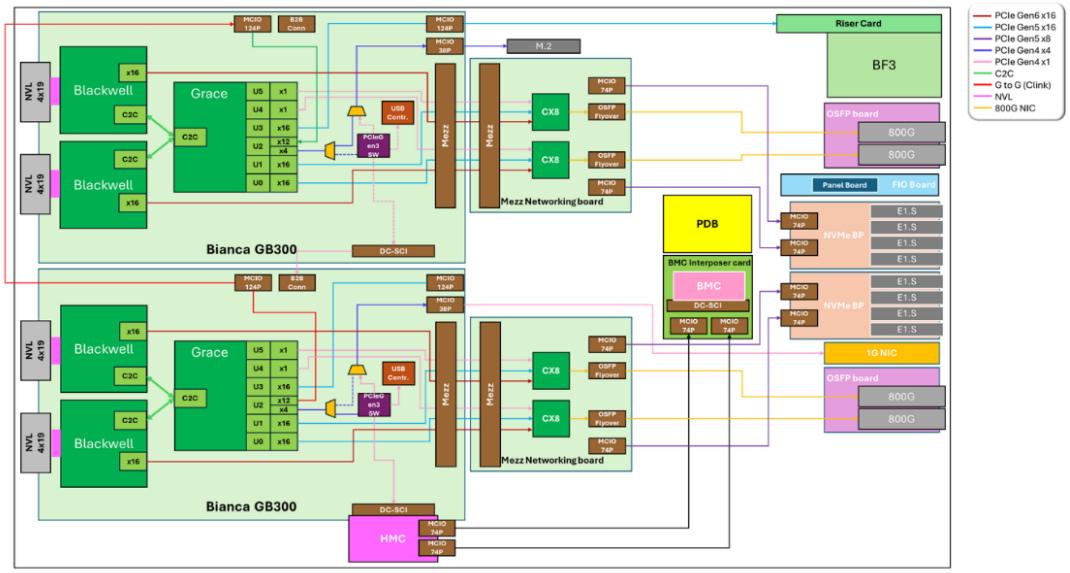
LED	Color	State	Description
System fault status	Amber	Solid on	System faulted (any component)
	Amber	Blinking (4 Hz)	Leak detected
	Amber	Off	System normal

NVLink Health LED Behavior

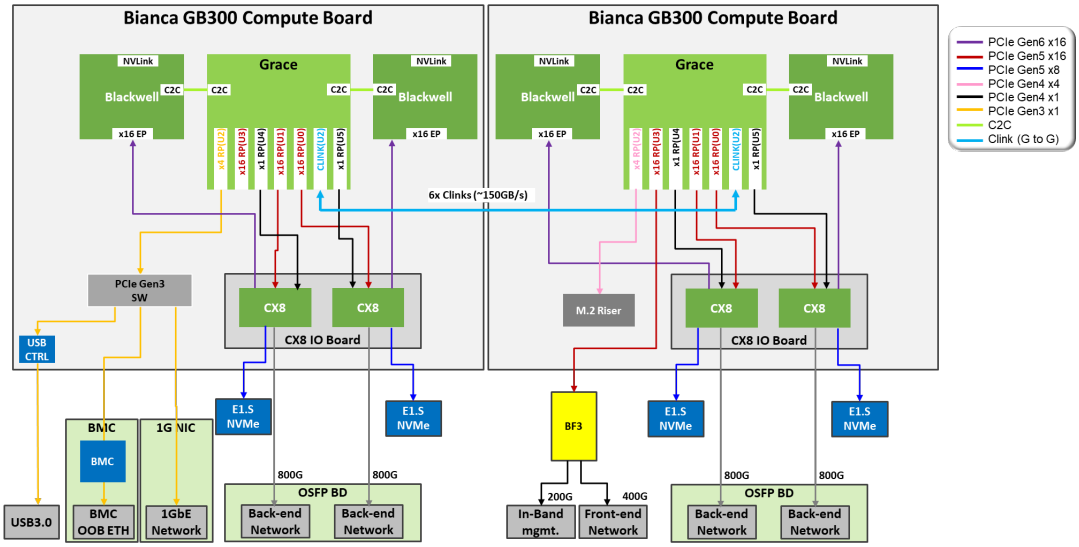
LED	Color	State	Description
NVLink health status	Green	Solid on	Link connected: no traffic
	Green	Blinking (0.5 Hz)	Link connected: active
	Amber	Solid on	Physical link state on any NVLink
	Amber	Blinking (1 Hz)	Beacon (locate) on any NVLink
	Bi-color LED	Off	No link on any NVLink

System Architecture

System Block Diagram



PCIe Topology



PHY	Capability	Interface Connector	End Point
UPHY0	PCIe Gen5 x16	Mirror Mezz connector	ConnectX-8 Mezzanine Network Board
UPHY1	PCIe Gen5 x16	Mirror Mezz connector	ConnectX-8 Mezzanine Network Board
UPHY2	PCIe Gen5 x12	124-pin MCIO connector	C-link interface
	PCIe Gen5 x4	38-pin MCIO connector	M.2 SSD Drive / PCIe Gen3 switch for interface with BMC, USB controller, and 1G NIC
UPHY3	PCIe Gen5 x16	124-pin MCIO connector	BlueField-3 DPU Card
UPHY4	PCIe Gen5 x1	Mirror Mezz connector	ConnectX-8 Mezzanine Network Board
UPHY5	PCIe Gen5 x1	Mirror Mezz connector	ConnectX-8 Mezzanine Network Board

Safety Considerations

Before performing service procedures, review all the safety information. The server should be installed in a restricted area that is accessible only to technicians.

Preventing Electrostatic Discharge

To prevent damaging the system, be aware of the precautions you must follow when setting up the system or handling parts. A discharge of static electricity from a finger or other conductor may damage mainboards or other static-sensitive devices. This type of damage may reduce the life expectancy of the device.

To prevent electrostatic damage:

Avoid hand contact by transporting and storing products in static-safe containers.

Keep electrostatic-sensitive parts in their containers until they arrive at static-free workstations.

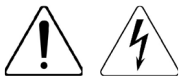
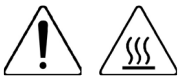
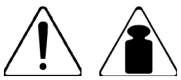
Place parts on a grounded surface before removing them from their containers.

Avoid touching pins, leads, or circuitry.

Always be properly grounded when touching a static-sensitive component or assembly.

Symbols on equipment

The following symbols may be placed on equipment to indicate the presence of potentially hazardous conditions.

	This symbol indicates the presence of hazardous energy circuits or electric shock hazards. Refer all servicing to qualified personnel. **WARNING:** To reduce the risk of injury from electric shock hazards, do not open this enclosure. Refer all maintenance, upgrades, and servicing to qualified personnel.
	This symbol indicates the presence of electric shock hazards. The area contains no user or field serviceable parts. Do not open for any reason. **WARNING:** To reduce the risk of injury from electric shock hazards, do not open this enclosure.
	This symbol indicates the presence of a hot surface or hot component. If this surface is contacted, the potential for injury exists. **WARNING:** To reduce the risk of injury from a hot component, allow the surface to cool before touching.
 29.76 kg 65.61 lb	This symbol indicates that the component exceeds the recommended weight for one individual to handle safely. **WARNING:** To reduce the risk of personal injury or damage to the equipment, observe local occupational health and safety requirements and guidelines for manual material handling.

This symbol indicates the presence of a moving fan blade.
WARNING: To reduce the risk of personal injury or damage to the equipment, please keep body parts away from fan blades if access panel is open.

Warnings and cautions

Before installing a server, be sure that you understand the following warnings and cautions.

⚠ **WARNING:** To reduce the risk of electric shock or damage to the equipment:

Do not disable the power cord grounding plug. The grounding plug is an important safety feature.
Connect the power cord into a grounded (earthed) electrical outlet that is easily accessible at all times.
Disconnect the power cord from the power supply to disconnect power to the equipment.
Do not route the power cord where it can be walked on or pinched by items placed against it. Pay particular attention to the plug, electrical outlet, and the point where the cord extends from the rack.

⚠ **CAUTION:** Do not operate the server for long periods with the access panel open or removed. Operating in this manner results in improper airflow and improper cooling that can lead to thermal damage.

System Battery

If the server no longer automatically displays the correct date and time, you might have to replace the battery that provides power to the real-time clock. Under normal use, battery life is 5 to 10 years.

⚠ **WARNING:** To reduce the risk of personal injury from hot surfaces, allow the drives and the internal system components to cool before touching them.

⚠ **WARNING:** The computer contains an internal lithium manganese dioxide, a vanadium pentoxide, or an alkaline battery pack. A risk of fire and burns exists if the battery pack is not properly handled. To reduce the risk of personal injury:

Do not attempt to recharge the battery.

Do not expose the battery to temperatures higher than 70°C (158°F).

Do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water.

Replace only with the spare designated for this product.

To remove the system battery:

1. Power down the server.
2. Disconnect all peripheral cables from the server.
3. Remove the access panel.
4. Remove the air baffle.
5. Locate the battery on the mainboard.
6. Remove the battery.

To replace the component, reverse the removal procedure.

⚠ **CAUTION:** Risk of fire or explosion if the battery is replaced by an incorrect type. Please follow local regulations for disposal of used batteries.

For more information about battery replacement or proper disposal, contact an authorized reseller or an authorized service provider.

安全注意事項

在執行任何維修程序之前，請先詳閱所有安全資訊。伺服器應安裝於僅限技術人員進入的限制區域內。

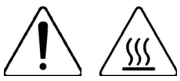
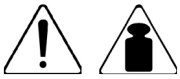
防止靜電放電（ESD）

為防止系統受損，請注意在安裝系統或處理零件時必須遵守的防靜電措施。
手指或其他導體釋放的靜電可能會損壞主機板或其他對靜電敏感的元件，此類損壞可能會縮短元件的使用壽命。為防止靜電損害，請遵守以下指示：

- 產品在搬運與儲存時，請放置於**防靜電包裝容器**內，避免直接以手接觸。
- **在抵達防靜電工作區前，請勿拆開防靜電包裝。**
- **拆封前，請先將零件放置於接地表面上。**
- **避免觸摸接腳、導線或電路部分。**
- **當接觸靜電敏感元件或模組時，請確保已正確接地。**

設備符號說明

以下符號可能標示於設備上，用以提醒使用者注意潛在的危險狀況：

	此符號表示設備內含高能電路或觸電危險。 警告： 為降低觸電或人身傷害的風險，請勿打開外殼。所有維修作業僅限合格人員執行。
	此符號表示區域內含高壓電危險，且無可由使用者或現場人員維修的零件。警告： 為避免觸電或人身傷害，請勿因任何理由打開此外殼。
	此符號表示存在高溫表面或零件，接觸可能造成燙傷。 警告： 為防止燙傷，在接觸前請先讓表面充分冷卻。
 29.76 kg 65.61 lb	此符號表示該元件的重量超出單人安全搬運的建議值。 警告： 為避免人身傷害或設備損壞，請遵守當地職業安全與衛生相關的手動搬運規範與指導方針。
	此符號表示設備內含旋轉中的風扇葉片。 警告： 為避免人身傷害或設備損壞，在開啟維修面板時，請勿將身體部位靠近風扇葉片。

警告與注意事項

在安裝伺服器之前，請確實了解以下警告與注意事項。

⚠ **警告**： 為避免觸電或設備損壞：
請勿移除電源線上的接地插腳，該插腳為重要的安全設計。
請將電源線插入隨時可輕易拔除的接地（接地良好）插座。
若需完全切斷設備電源，請拔除電源線與電源供應器的連接。
請勿將電源線放置於行走路徑上或被物品壓迫的位置，特別注意插頭、插座
電源線從機架引出的部分。

⚠ **注意**： 請勿在開啟或移除外殼面板的情況下長時間操作伺服器。如此操作將導致氣流不正確與散熱不足，可能造成系統過熱損壞

電池

當伺服器無法自動顯示正確的日期與時間時，可能需要更換主機板上的電池。在正常使用情況下，電池壽命約為 5 至 10 年。

⚠ **警告**：為避免因高溫表面導致燙傷，請在接觸硬碟或內部零件前，先讓系統充分冷卻。

⚠ **警告**：本設備內含鋰錳二氧化物、五氧化二釩或鹼性電池模組。不當處理可能導致火災或燙傷風險。為降低人身傷害風險：
請勿嘗試為電池充電。請勿使電池暴露於超過 70° C (158° F) 的環境中。
請勿拆解、壓碎、刺穿、短路外部接點，或丟棄於火中或水中。
僅使用為本產品指定的相容備用電池替換。

更換系統電池步驟

A. 關閉伺服器電源。
B. 拔除所有外接線纜。
C. 拆下上蓋面板。
D. 移除導風罩。
E. 找到主機板上的電池位置。
F. 取下電池。

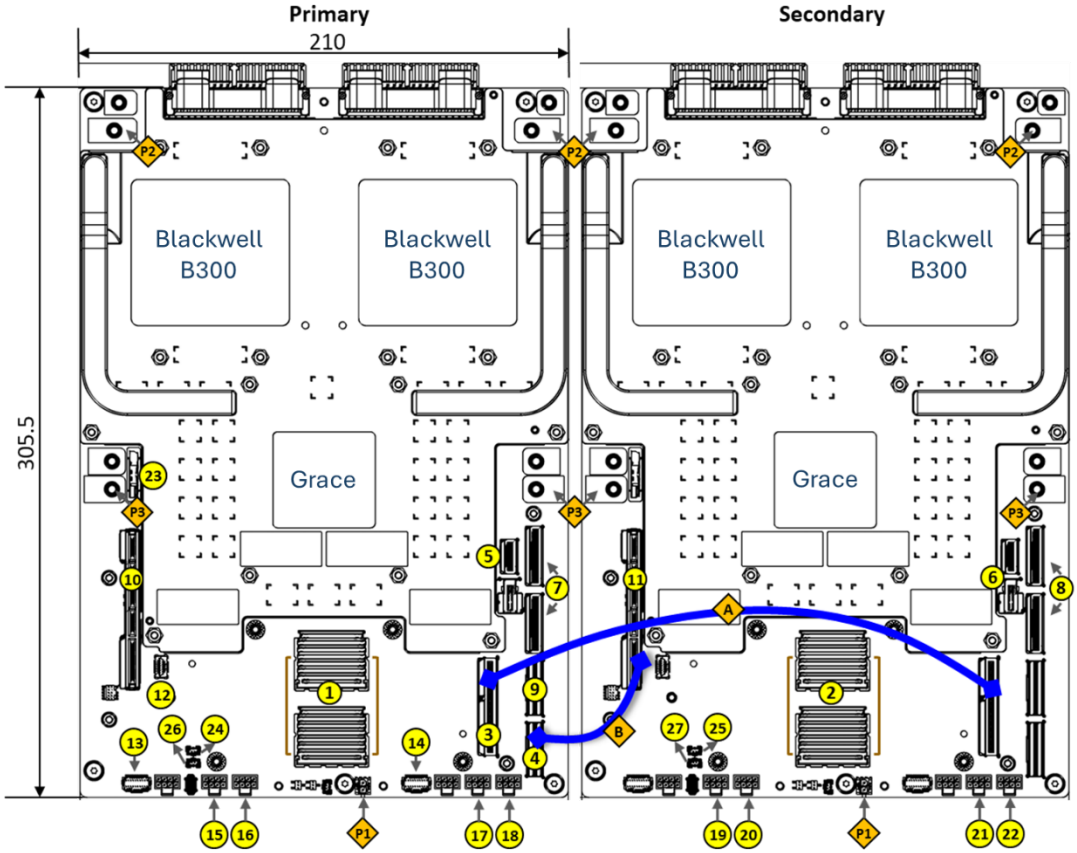
若需安裝新電池，請**依照相反順序重新安裝**。

⚠ **注意**： 若使用不正確的電池型號，可能導致火災或爆炸風險。請依照當地法規正確處理廢棄電池。如需更多關於電池更換或正確處理的資訊，請聯繫授權經銷商或授權維修服務提供商。

乾電池回收標誌圖樣： 

System Boards

HPM (Main planar)

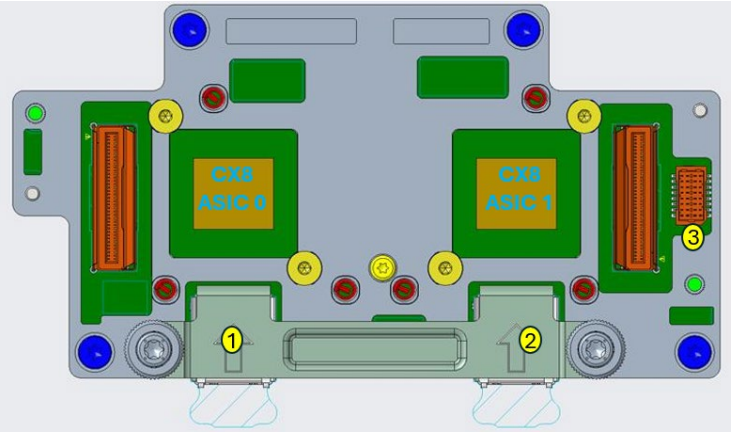


Item	Location	Description
1	J115, J116	(Primary) ConnectX-8 Mezzanine Network Board 0 connector
2	J115, J116	(Secondary) ConnectX-8 Mezzanine Network Board 1 connector
3	J107	MCIOx16 connector for CLINK connection between 2 Grace CPUs
4	J79	(Primary) SlimSAS connector for 2 HPMs management sideband connection
5	J117	(Primary) MCIOx4 connector for 1G NIC board (PCIe3 x1)
6	J117, J23	(Secondary) Multi-Trak + MCIOx4 connector for M.2 riser board (12V, PCIe5 x4)

7	J10, J80	(Primary) 2* MCIOx8 connectors for BlueField-3 FHHL card 0 (PCIe x16)
8	J10, J80	(Secondary) 2* MCIOx8 connectors for BlueField-3 FHHL card 1 (PCIe x16)
9	J82	SlimSAS connector for Front IO board
10	J58	(Primary) DC-SCI connector for HMC module
11	J58	(Secondary) DC-SCI connector for 2 HPMs management sideband connection
12	J55	TPM Board connector
13	J86	NCSI connector for BlueField-3 FHHL card 0
14	JSB2	PDB sideband connector for PDB
15	J46	FAN0 connector
16	J97	FAN1 connector
17	J95	FAN2 connector
18	J38	FAN3 connector
19	J46	FAN4 connector
20	J97	FAN5 connector
21	J95	FAN6 connector
22	J38	FAN7 connector
23	J34	RTC battery socket
24	J18	(Primary) Bianca leak sensor cable header
25	J18	(Secondary) Bianca leak sensor cable header
26	J125	Inlet manifold leak sensor cable header (Y-cable)
27	J125	Outlet manifold leak sensor cable header (Y-cable)
P1	J13	GB300 HPM 12V standby cable connector
P2	MEC39, MEC43	GB300 HPM 12V1 inner busbar
P3	MEC40, MEC44	GB300 HPM 12V2 inner busbar
A	Cable	2 Grace CPUs CLINK connection cable

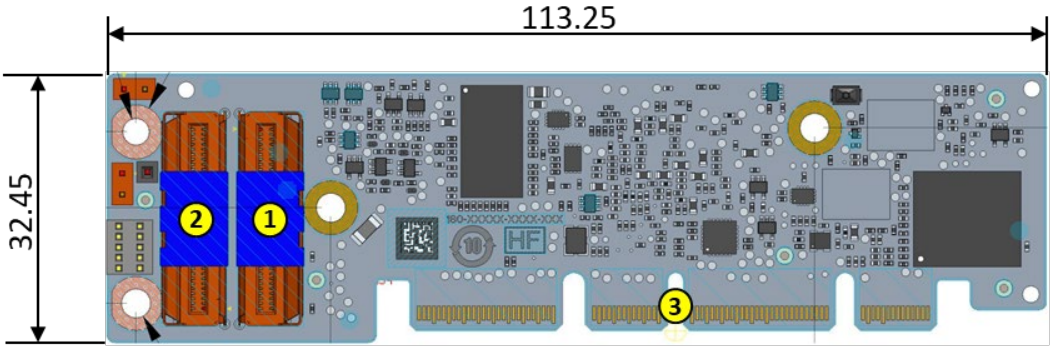
B	Cable	2 HPMs management connection cable

ConnectX-8 Mezzanine Network Board



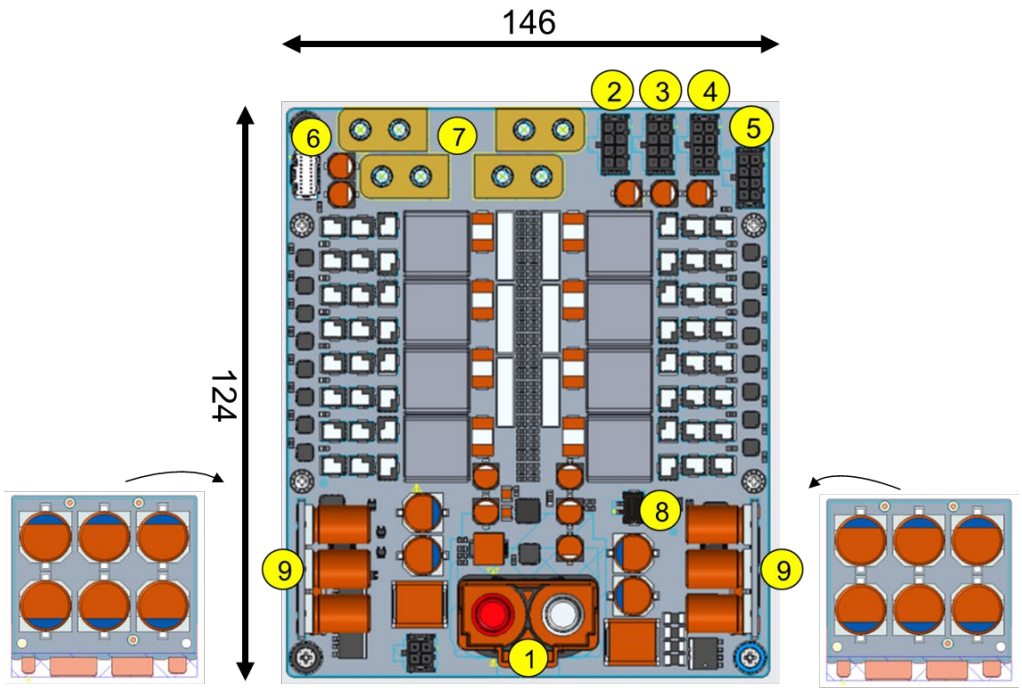
Item	Location	Description
1	-	(CX8 ASIC 0) OverPass to UltraPass cable connector for OSFP board
2	-	(CX8 ASIC 1) OverPass to UltraPass cable connector for OSFP board
3	J2	OSFP board sideband connector

HGX Management Controller (HMC)



Item	Location	Description
1	J21	MCIOx8 connector for interconnection between HMC and BMC (To Interposer board J3)
2	J22	MCIOx8 connector for interconnection between HMC and BMC (To Interposer board J4)
3	-	DC-SCI (4C+) golden finger for plug-in on HPM

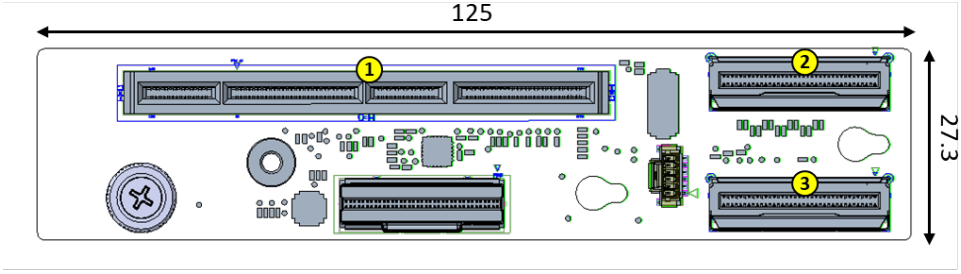
Power Distribution Board (PDB)



Item	Location	Description
1	J59	CoolPowerHD connector for 48-54V rack busbar cable power input
2	J55	Micro-Fit 8P connector for 12V power cable OSFP board(L)
3	J56	Micro-Fit 8P connector for 12V power cable 1G NIC board, E1.S backplane(L), E1.S backplane(R)
4	J57	Micro-Fit 8P connector for 12V power cable PCIe riser(R), OSFP board(R) , and BlueField-3 external(R)
5	J58	Micro-Fit 8P connector for 12V standby power cable Front IO board, Primary HPM, Secondary HPM
6	J50	Wire-to-Board 20P connector for PDB sideband
7	MEC20, MEC21	12V power inner busbar for primary HPM

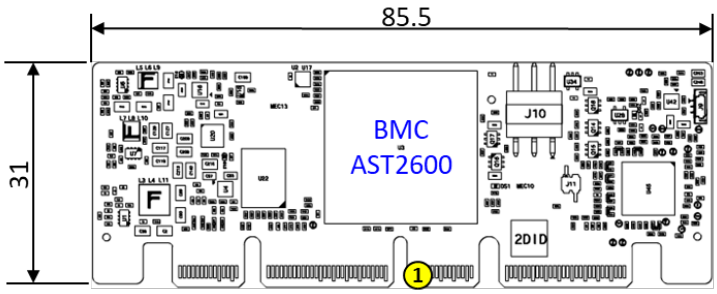
8	MEC22, MEC23	12V power inner busbar for secondary HPM
9	J61	Wire-to-Board 2P connector for 48-54V rack busbar power detection
10	J64, J65	Mounting hole for Cap board

Interposer Board



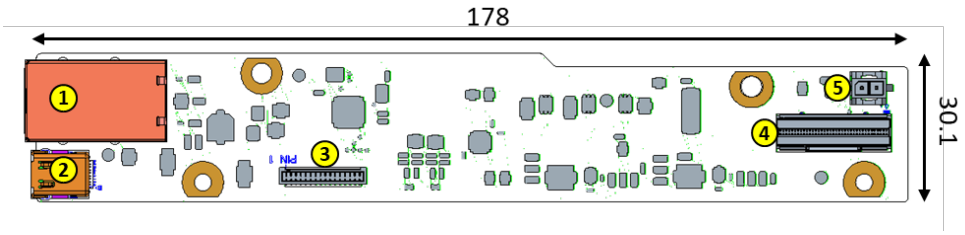
Item	Location	Description
1	J1	DC-SCI (4C+) connector for plug-in BMC board
2	J4	MCIOx8 connector for interconnection between HMC and BMC (To HMC board J22)
3	J3	MCIOx8 connector for interconnection between HMC and BMC (To HMC board J21)

Baseboard Management Controller (BMC)



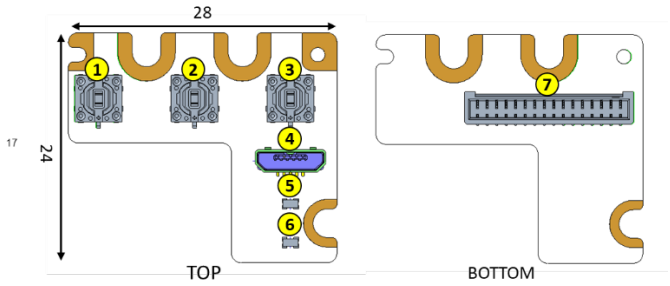
Item	Location	Description
1	CN2	DC-SCI (4C+) golden finger for plug-in on Interposer board

Front IO Board (FIO)



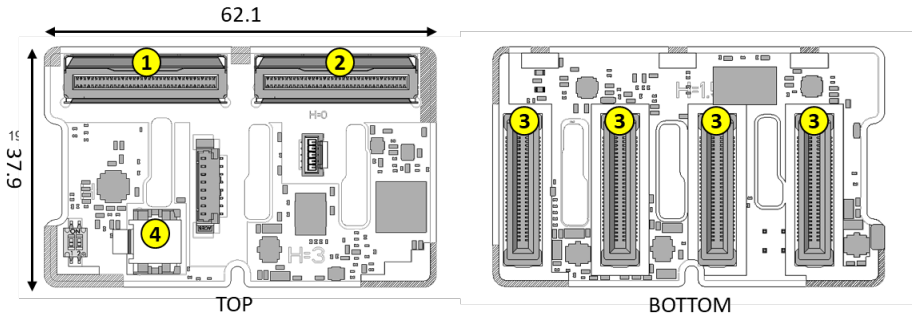
Item	Location	Description
1	J13	1GbE RJ45 connector for BMC OOB ethernet
2	J12	Mini-DP connector
3	J3	Wire-to-Board 16P connector for interconnection between FIO and Panel board
4	J9	SlimSAS connector for FIO cable connection on HPM
5	J1	Micro-Fit 2P connector for 12V standby power cable

FIO Panel Board



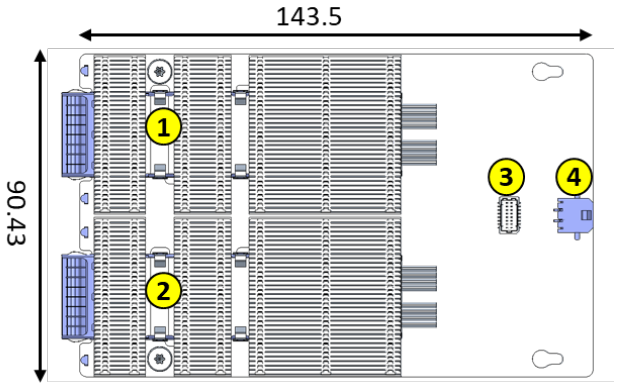
Item	Location	Description
1	SW1	Power button/LED switch
2	SW3	UID button/LED switch
3	SW2	Reset button switch
4	J8	Micro USB connector for CPU UART0 (COM) port
5	LED1	NVLink health status indicator LED
6	LED2	System fault status indicator LED
7	J1	Wire-to-Board 16P connector for interconnection between FIO and Panel board

E1.S Backplane Board



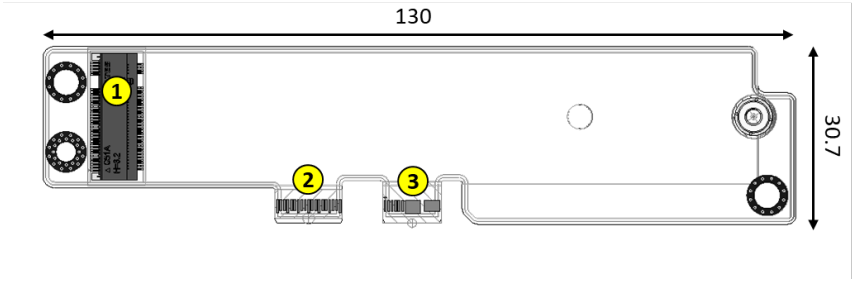
Item	Location	Description
1	J12	MCIOx8 connector for CX8 module connection (PCIe5 x8) (To CX8 module J4)
2	J11	MCIOx8 connector for CX8 module connection (PCIe5 x8) (To CX8 module J3)
3	J1, J2, J3, J4	4* EDSFF E1 connector for E1.S NVMe (PCIe5 x4)
4	J15	Micro-Fit 4P connector for 12V power cable

OSFP Board



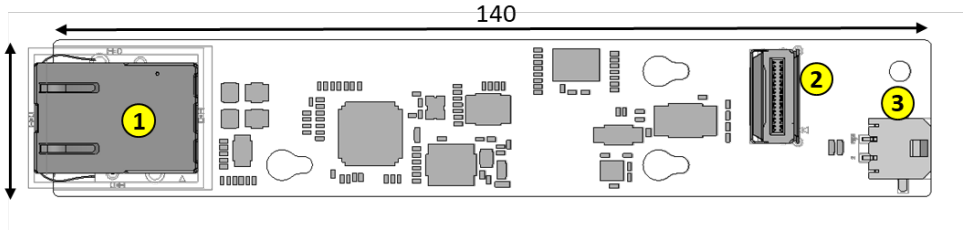
Item	Location	Description
1	J2	UltraPass cable assembly for CX-8 ASIC 0
2	J3	UltraPass cable assembly for CX-8 ASIC 1
3	J1	OSFP board sideband connector
4	JP1	Micro-Fit 2P connector for 12V power cable

M.2 Riser Board



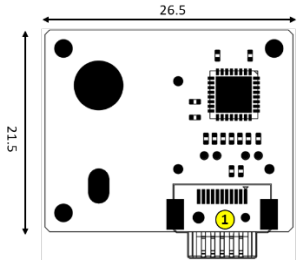
Item	Location	Description
1	J1	NGFF M.2 connector for M.2 NVMe (PCIe5 x4)
2	CN117	MCIOx4 golden finger for plug-in on HPM
3	CN23	Multi-Trak golden finger for 12V power connection

1G NIC Board



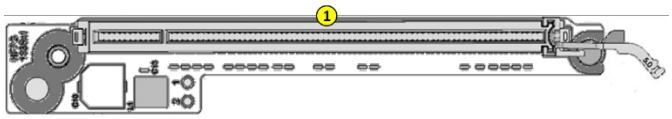
Item	Location	Description
1	J58	1GbE RJ45 connector for system OOB ethernet
2	J1	MCIOx4 connector for 1G NIC board cable connection on HPM (PCIe3 x1)
3	JP1	Micro-Fit 2P connector for 12V power cable

TPM Board



Item	Location	Description
1	J55	TPM board connector for plug-in on HPM

PCIe CEM Riser Board



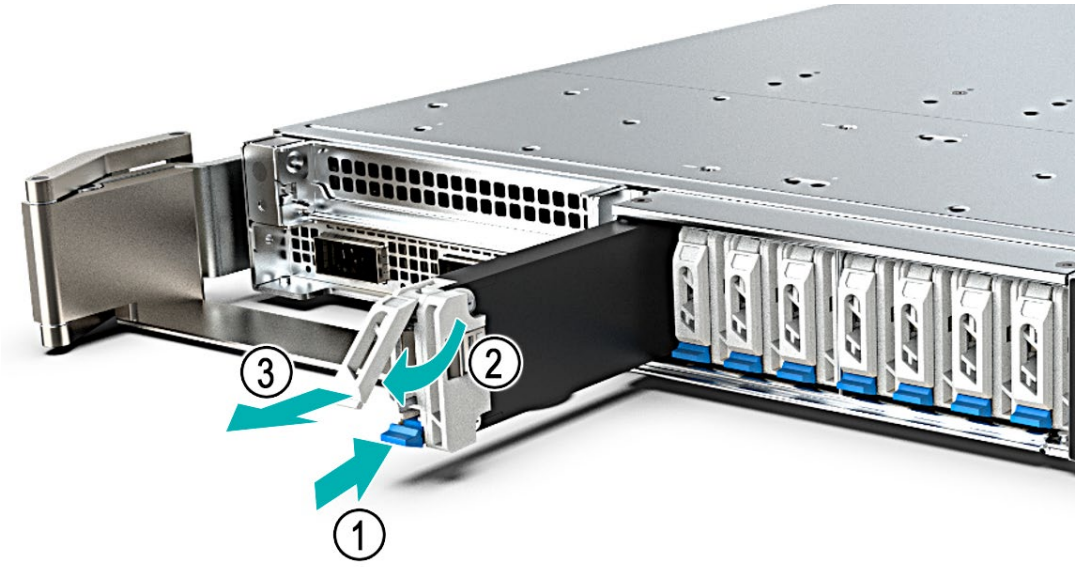
Item	Location	Description
1	J1	PCIe5 x16 connector (cable mount)

CRU Part Assembly Guide

E1.S HDD Disassembly

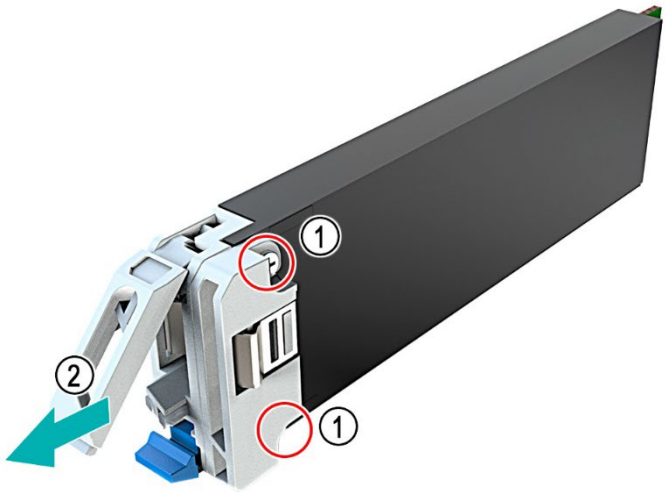
A. Remove the E1.s NVMe carrier assembly from the chassis:

1. Push the drive carrier button to disengage the drive carrier bezel.
2. Pull the drive carrier bezel to detach the carrier assembly from the chassis.
3. Remove the carrier assembly from the chassis.



B. Remove the E1.s NVMe drive from the carrier:

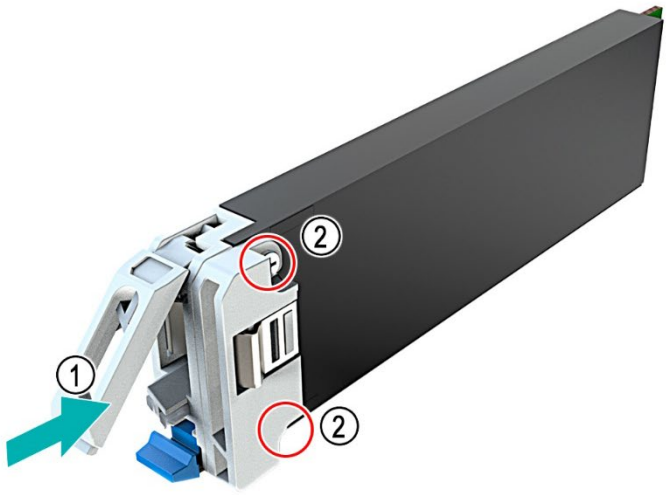
1. Remove the two screws.
2. Remove the E1.s NVMe drive from the carrier.



E1.S HDD Assembly

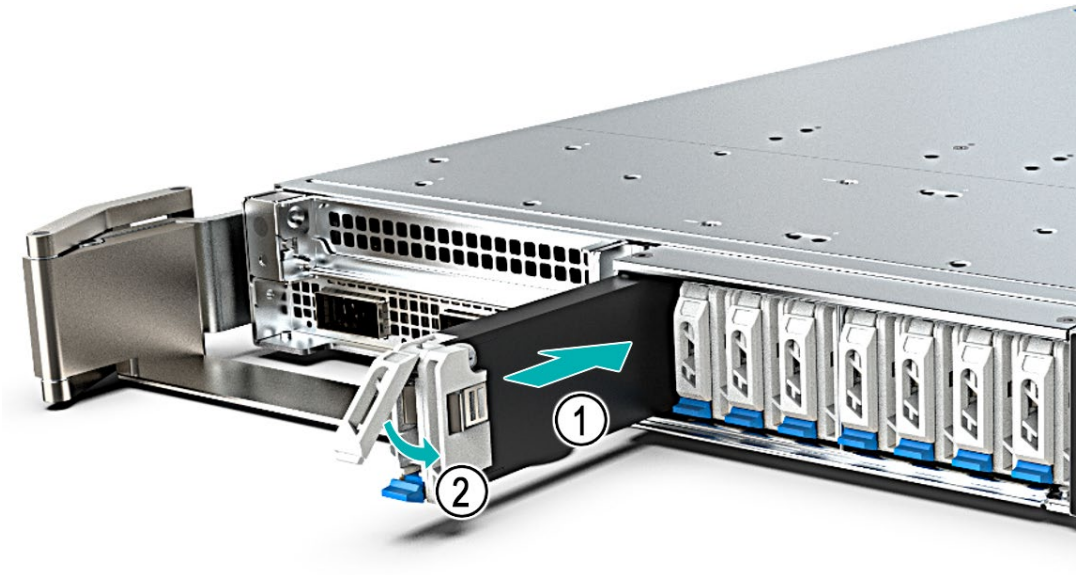
A. Install the E1.s NVMe drive to the carrier:

1. Place the E1.s NVMe drive into the chassis.
2. Use two screws to secure the E1.s NVMe drive to the carrier.



B. Install E1.s NVMe carrier assembly to the chassis:

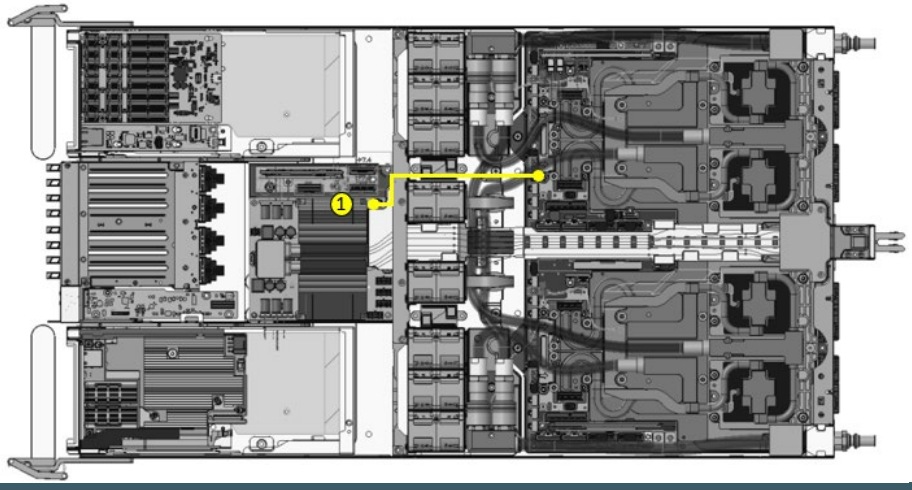
1. Place the E1.s NVMe carrier assembly into the chassis.
2. Push the carrier assembly into the chassis until it latches into place.



Cabling

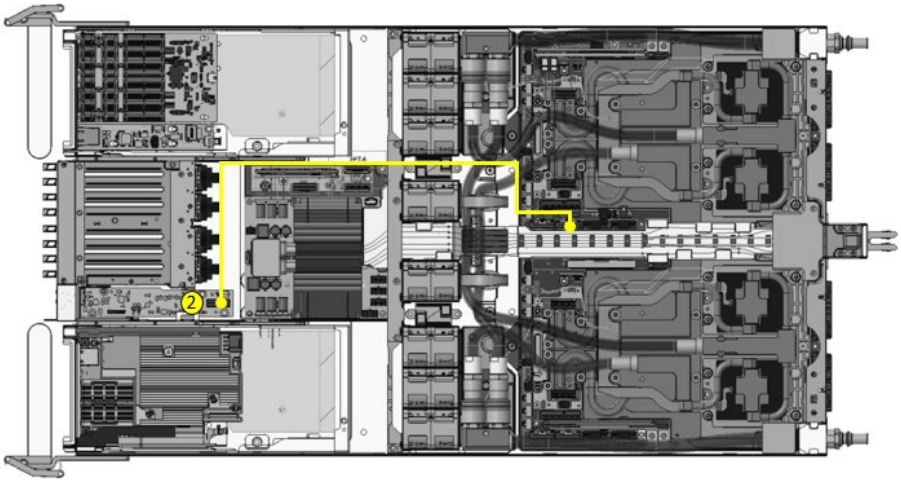
Compute Tray Signal Cable Connectivity

PDB Control Sideband Cable



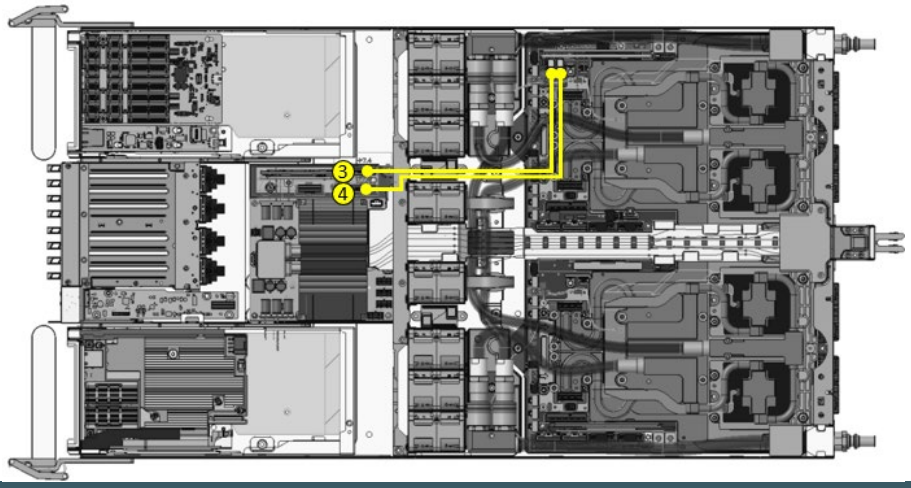
Item	Part No.	Source / Destination
1		HPM1 (JSB2) – PDB (J50)

Front IO Cable



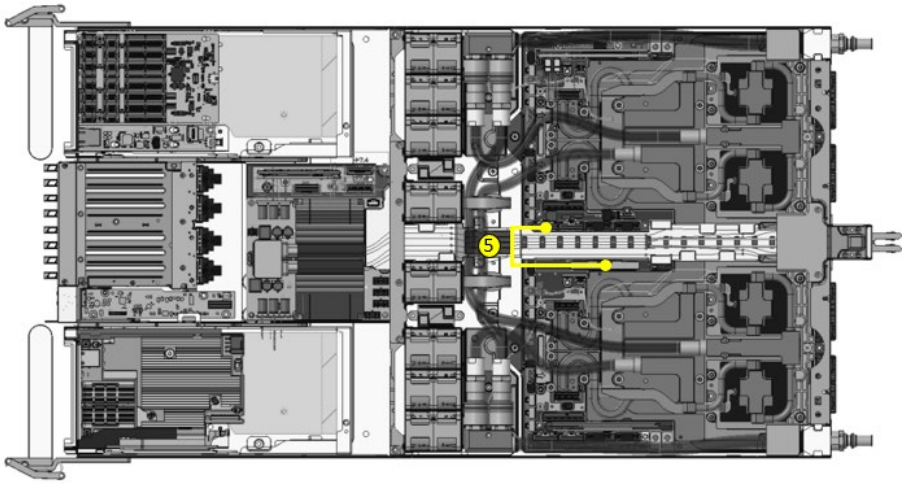
Item	Part No.	Source / Destination
2		HPM1 (J82) – Front IO board (J9)

HMC-BMC MCIO Cable



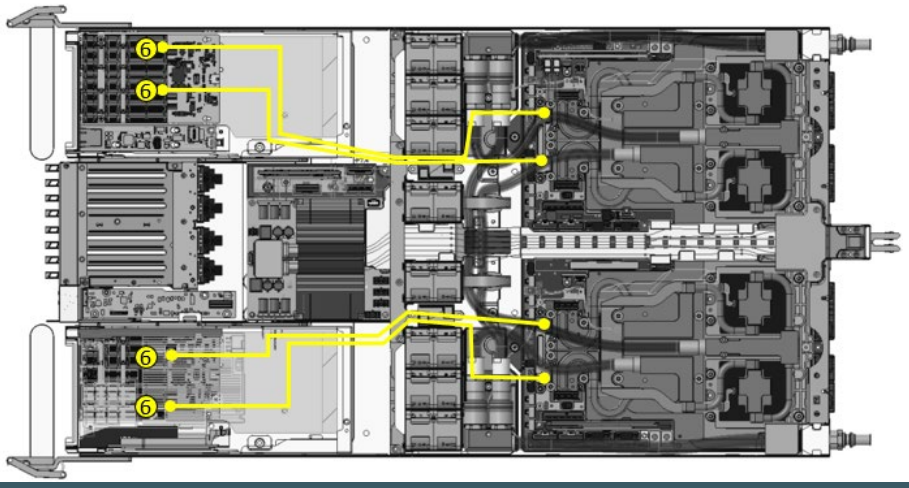
Item	Part No.	Source / Destination
3		HMC (J22) – BMC Interposer board (J4)
4		HMC (J21) – BMC Interposer board (J3)

2P Management Custom Cable



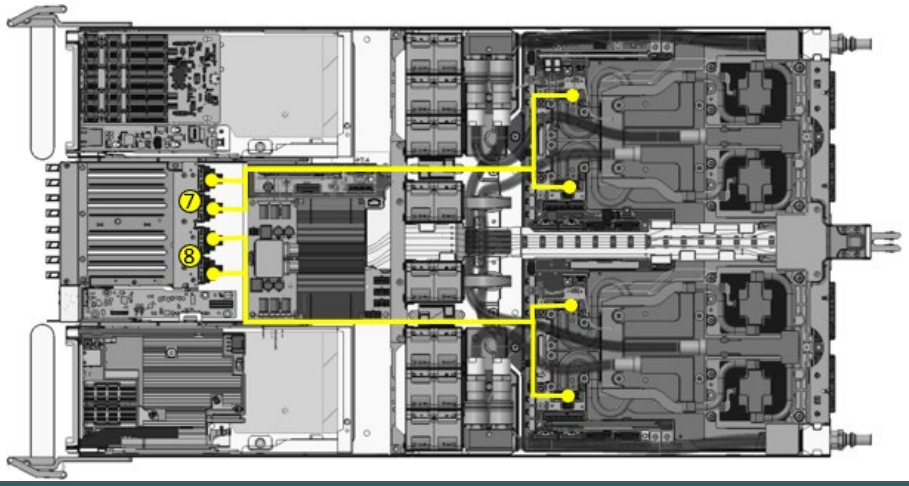
Item	Part No.	Source / Destination
5		HPM1 (J79) – HPM2 (J58)

Ultrapass Cable



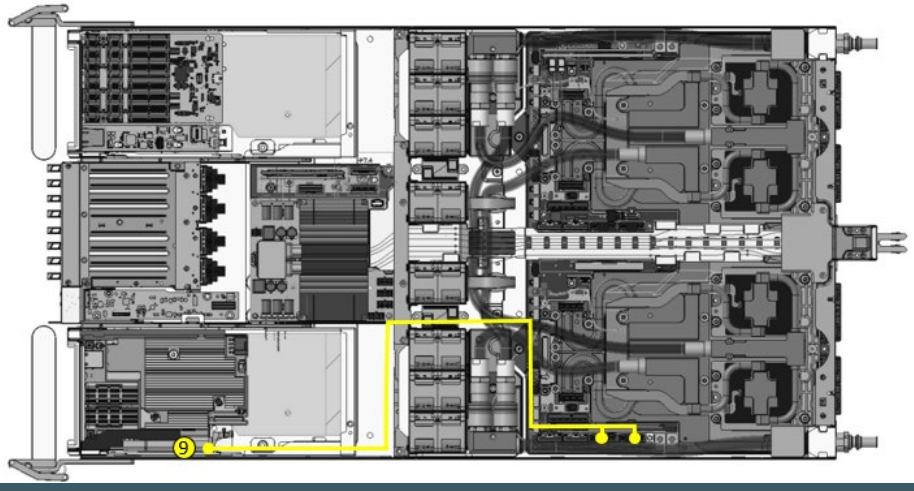
Item	Part No.	Source / Destination
6		ConnectX-8 Mezzanine Network board (Flyover Conn.) – OSFP board cable assembly

E1.S MCIO x8 Cable



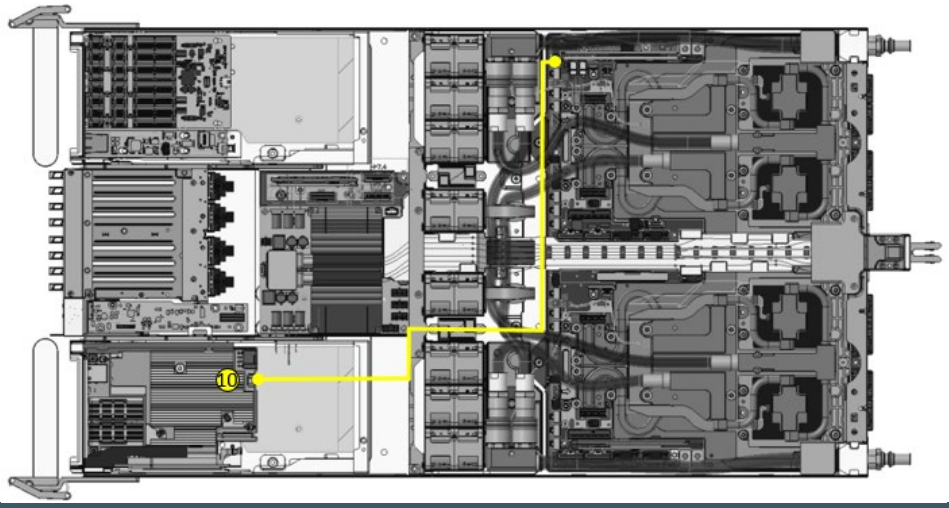
Item	Part No.	Source / Destination
7		CX8 module (J3/J4) – E1.S Backplane (J11/J12) (Left)
8		CX8 module (J3/J4) – E1.S Backplane (J11/J12) (Right)

PCIe CEM Riser Cable



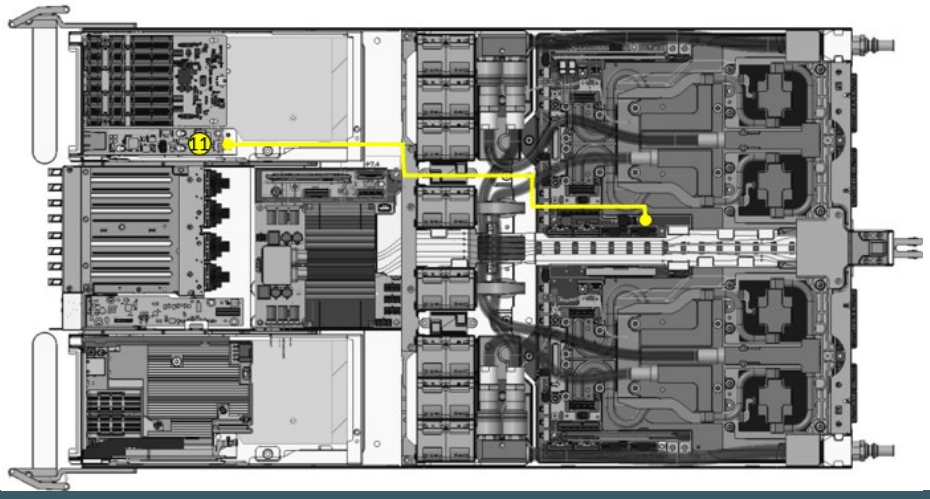
Item	Part No.	Source / Destination
9		HPM1 (J10/J80) – PCIe CEM Riser cable (Right)

BlueField-3 NCSI Cable



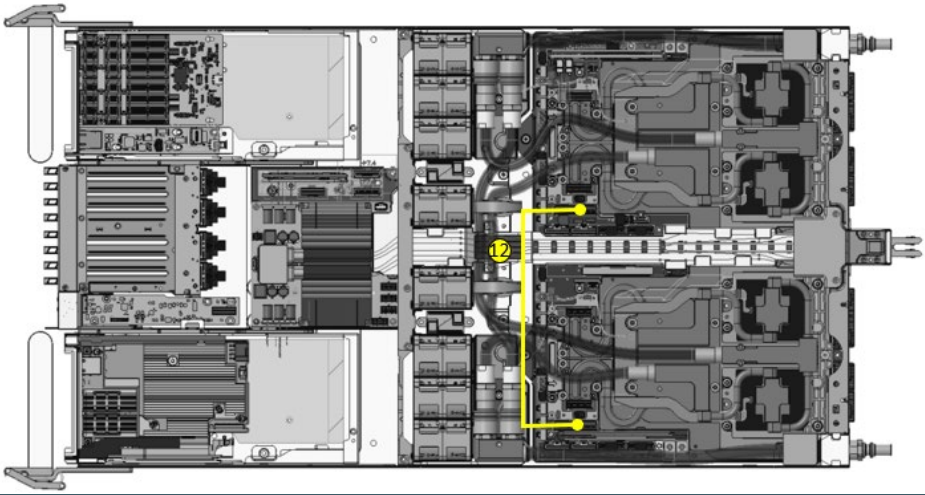
Item	Part No.	Source / Destination
10		HPM1 (J86) – BlueField-3 FHHL AIC NCSI

MCIO x4 to 1G NIC Cable



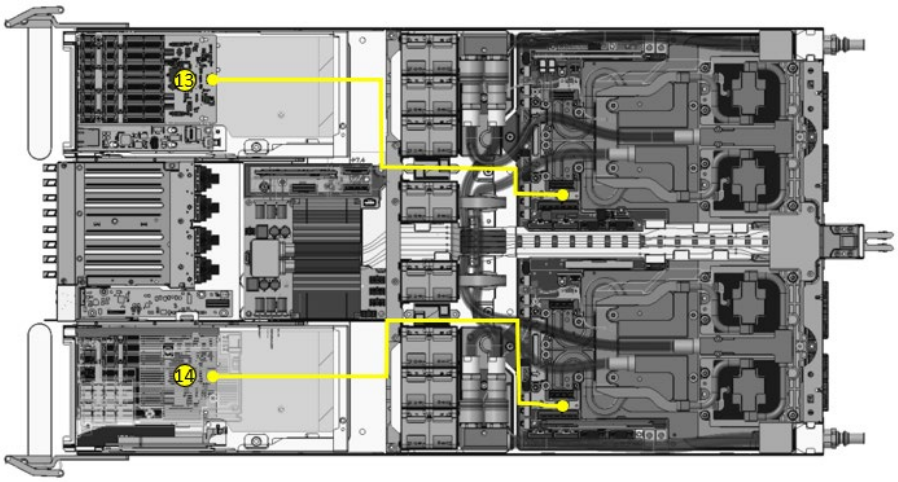
Item	Part No.	Source / Destination
11		HPM1 (J117) – 1G NIC board (J1)

C-Link Cable



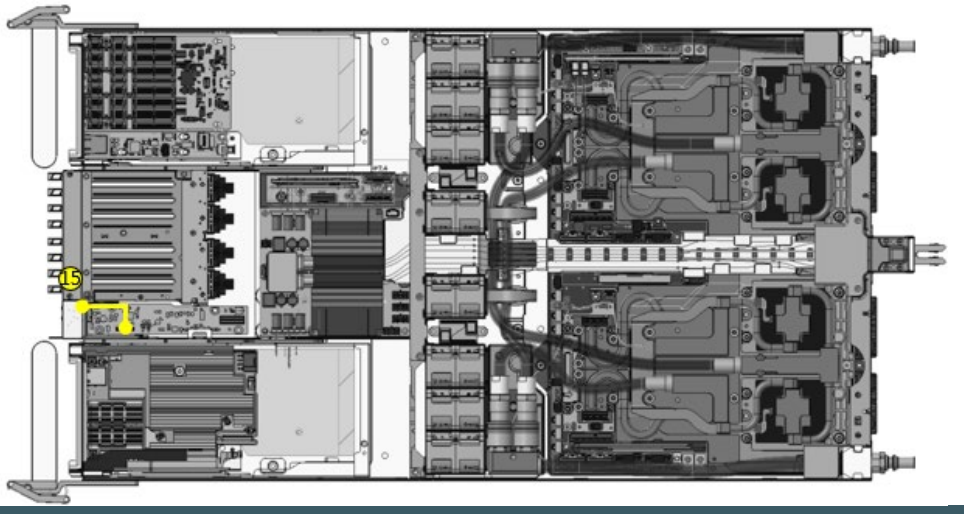
Item	Part No.	Source / Destination
12		HPM1 (J107) – HPM2 (J107)

OSFP Sideband Cable



Item	Part No.	Source / Destination
13		ConnectX-8 Mezzanine Network board – OSFP board (J1) (Left)
14		ConnectX-8 Mezzanine Network board – OSFP board (J1) (Right)

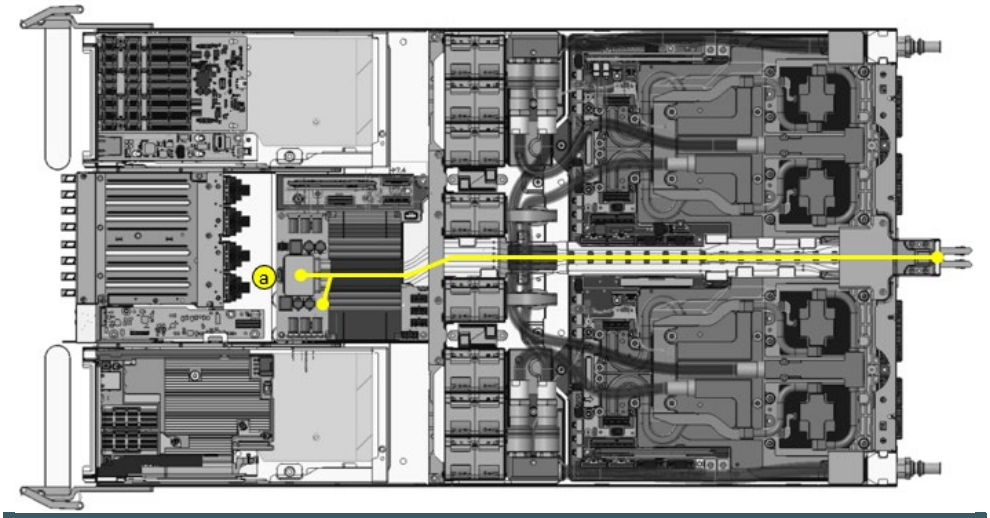
Front IO Panel Cable



Item	Part No.	Source / Destination
15		Front IO board (J3) – FIO Panel board (J1)

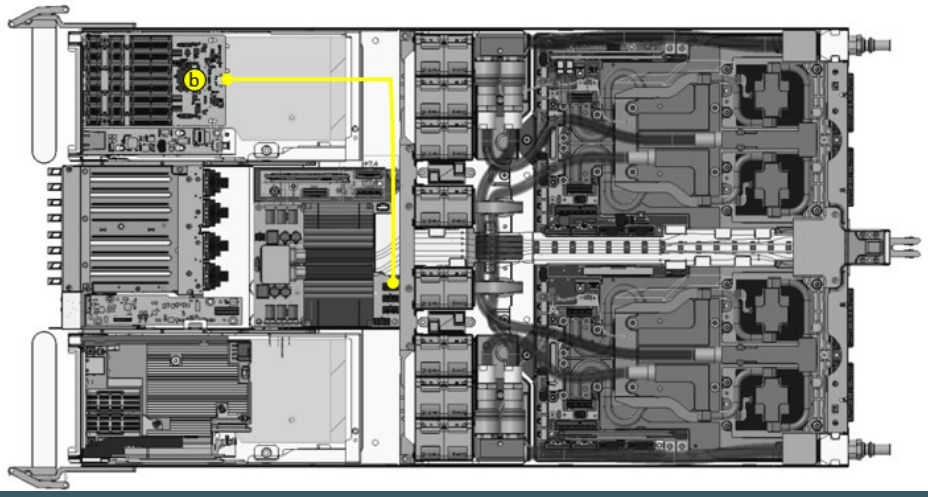
Compute Tray Power Cable Connectivity

54V Busbar Cable



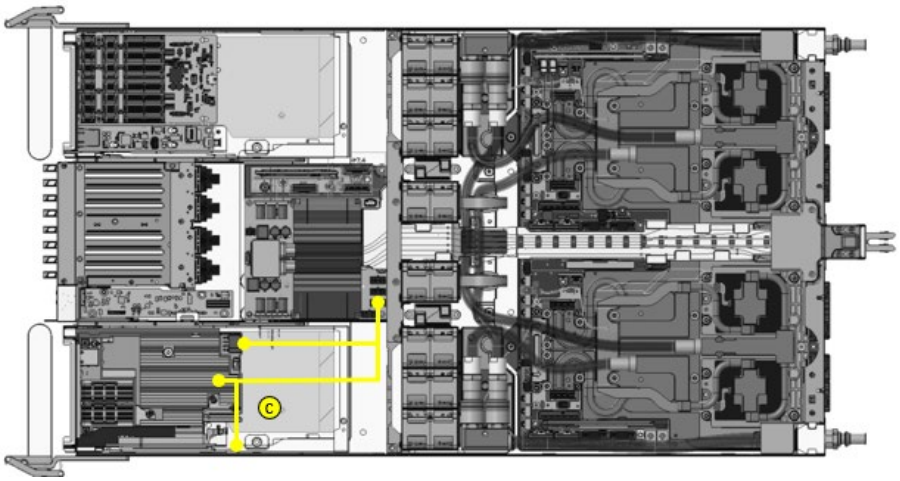
Item	Part No.	Source / Destination
a		Power Busbar Clip – PDB (J59)

12V Multi-end Power Cable: Left Tray



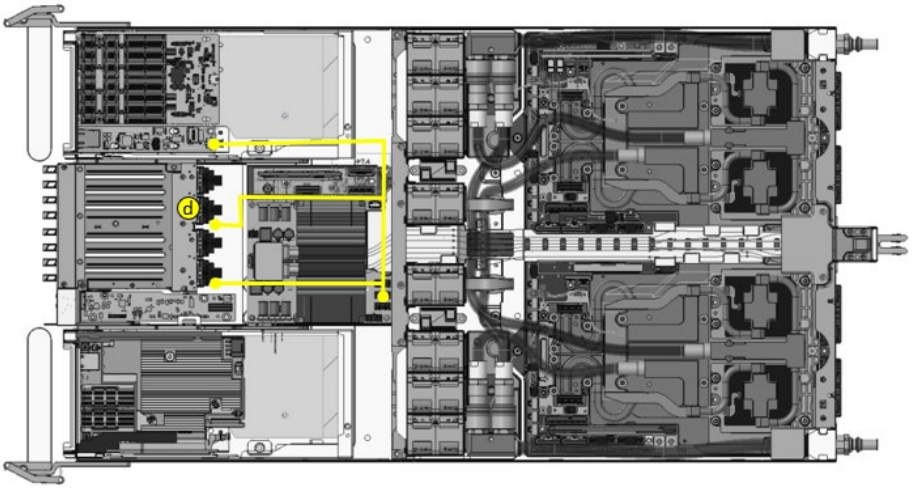
Item	Part No.	Source / Destination
b		PDB (J55) – OSFP board (JP1)

12V Multi-end Power Cable: Right Tray



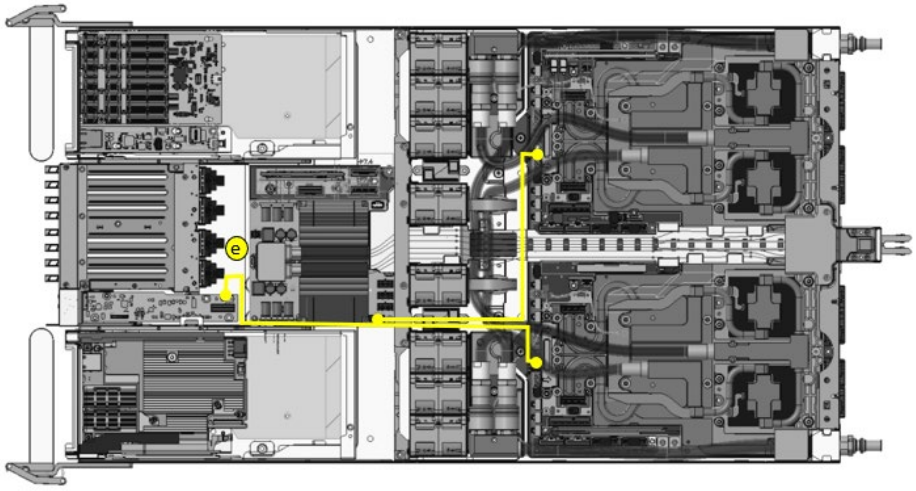
Item	Part No.	Source / Destination
c		PDB (J57) – OSFP board (JP1) – PCIe CEM Riser – BlueField-3 Ext.

12V Multi-end Power Cable: Middle Tray



Item	Part No.	Source / Destination
d		PDB (J56) – 1G NIC board (JP1) – E1.S Backplane (Left) (J15) – E1.S Backplane (Right) (J15)

MB 12V Standby Cable



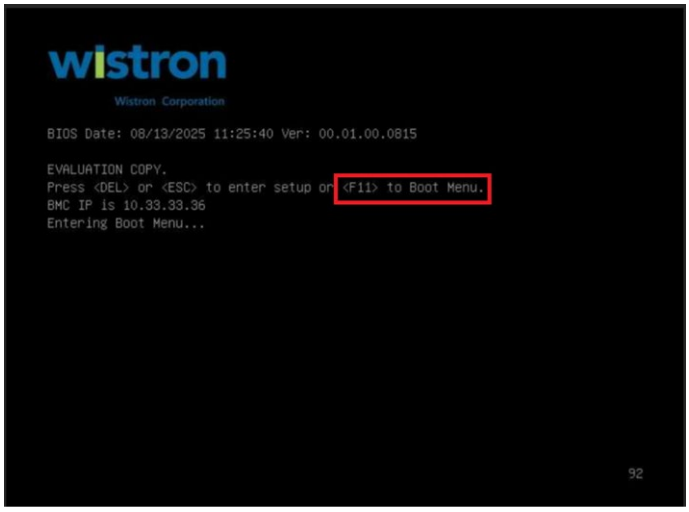
Item	Part No.	Source / Destination
e		PDB (J58) – Front IO board (J1) – HPM1 (J13) – HPM2 (J13)

System utilities

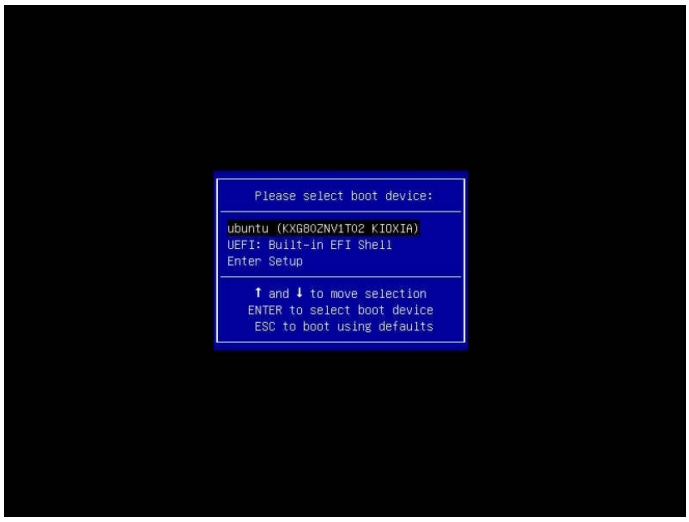
Boot Menu

Accessing the Boot menu screen

1. To access the Boot menu screen, turn on the server. If the server is already turned on, save your data and close all open applications, then restart the server.
2. During POST, press **F11** key to enter Boot menu.



NOTE: The server will take around 3 minutes from turning the power on, booting the system and loading system setup. If you fail to press F11 key before POST is completed, you will need to restart the server.

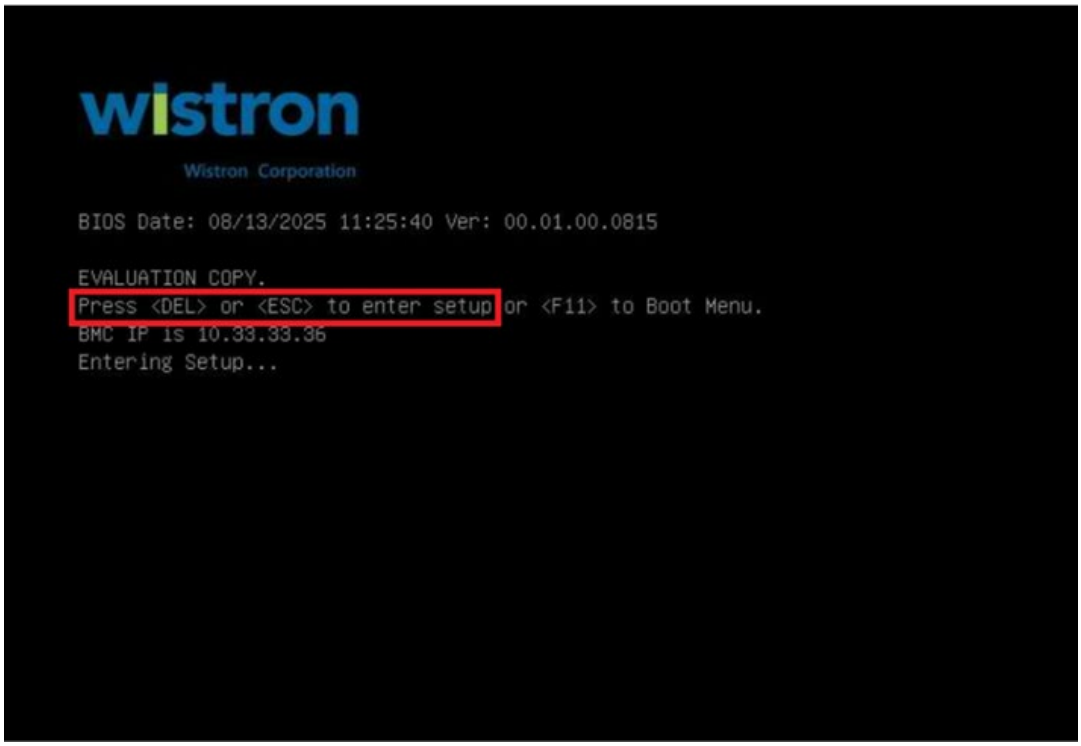


Use the Up/Down arrow keys to move between the menu options, then press **ENTER** to select boot device. Press **ESC** to boot using default device.

BIOS setup

Accessing the BIOS setup menu screen

1. To access the BIOS setup menu screen, turn on the server. If the server is already turned on, save your data and close all open applications, then restart the server.
2. During POST, press **DEL** or **ESC** key to enter BIOS setup menu.



NOTE: The server will take around 3 minutes from turning the power on, booting the system and loading system setup. If you fail to press **DEL** or **ESC** key before POST is completed, you will need to restart the server.

Use the Left/Right arrow keys to move between the menu screens, then press **ENTER** to view that menu tab.

Use the Up/Down arrow keys to move between the menu options, then press **ENTER** to execute that option.

Some options lead to pop-up dialog boxes that prompt you to verify that you wish to execute that option. Other options lead to dialog boxes that prompt you for information.

Some options (marked with a ►) lead to submenus that enable you to change the values for the option.

Use the Up/Down/Left/Right arrow keys to scroll through the items in the submenu.

Navigating the BIOS setup menu screen

Use the keys listed on the bottom right of the Setup screen to work your way through the various BIOS menu and submenu screens. The table below lists these keys and their respective functions.

Key	Function
Left / Right arrow keys	Move the cursor to the menu screen you want. The currently selected screen will be highlighted and the items it contains will be shown.
Up / Down arrow keys	Move the cursor to the item you want. The currently selected field will be highlighted.
Enter	• To open the page for the currently selected menu/submenu • To apply a field value.
+ / - keys	To select a value for the currently selected field (only if it is user-configurable). Press these keys repeatedly to display all possible entries. A parameter that is enclosed in square brackets [ ] is user-configurable. Black font parameters are not user-configurable for one of the following reasons: • The field value is auto-configured or auto-detected. • The field value is informational only. • The field is password-protected.
F1	To bring up the General Help window. The General Help window describes other setup navigation keys that are not displayed on the legend bar.
F2	Restore the saved User Default settings.
F3	Load optimized default system values.
F4	Save and exit the BIOS setup screen.
Esc	If you press this key: • On one of the primary menu screens, the Exit menu displays. • On a submenu screen, the previous screen displays. • When you are making selections from a pop-up menu, closes the pop-up without selecting.

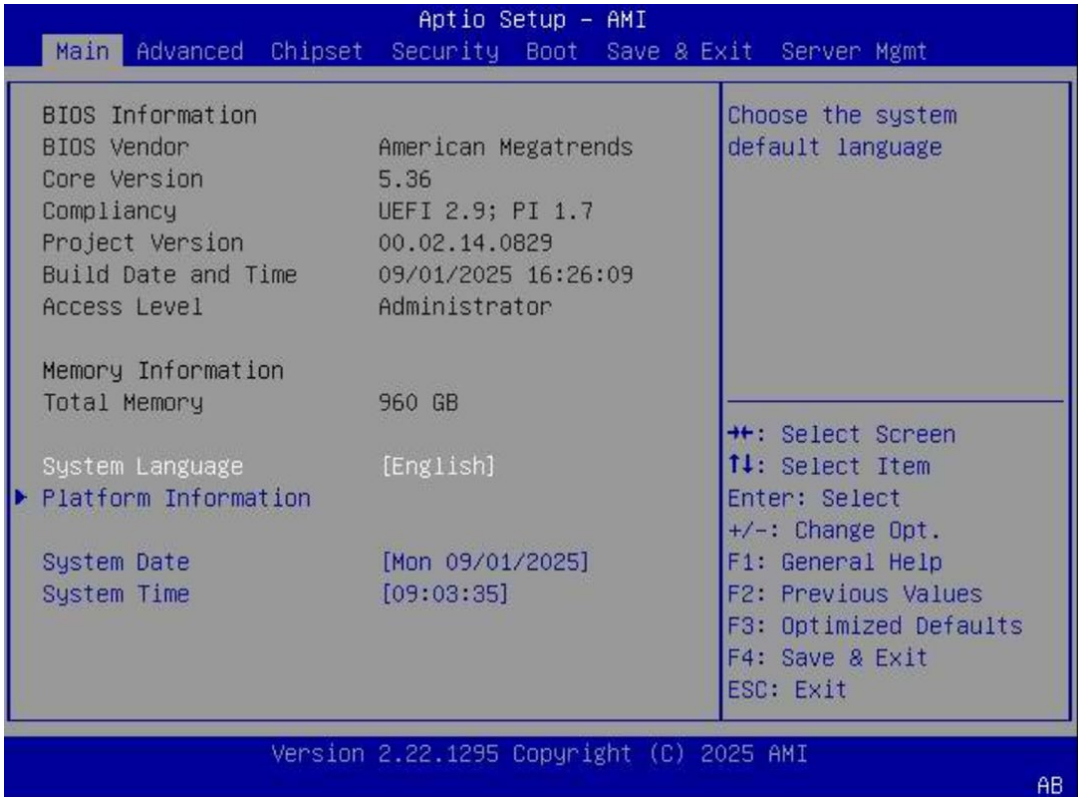
Remote Flash BIOS

To remotely flash BIOS on the NML72-GB300 Server, contact your Penguin Solutions Service Representative for complete step-by-step instructions.

BIOS setup menu screen

NOTE: The screenshots used in this section are for illustration only. The values displayed may not be the same as those on your server. In the descriptive tables following each of the menu screen illustrations, settings in **boldface** are the default and suggested settings.

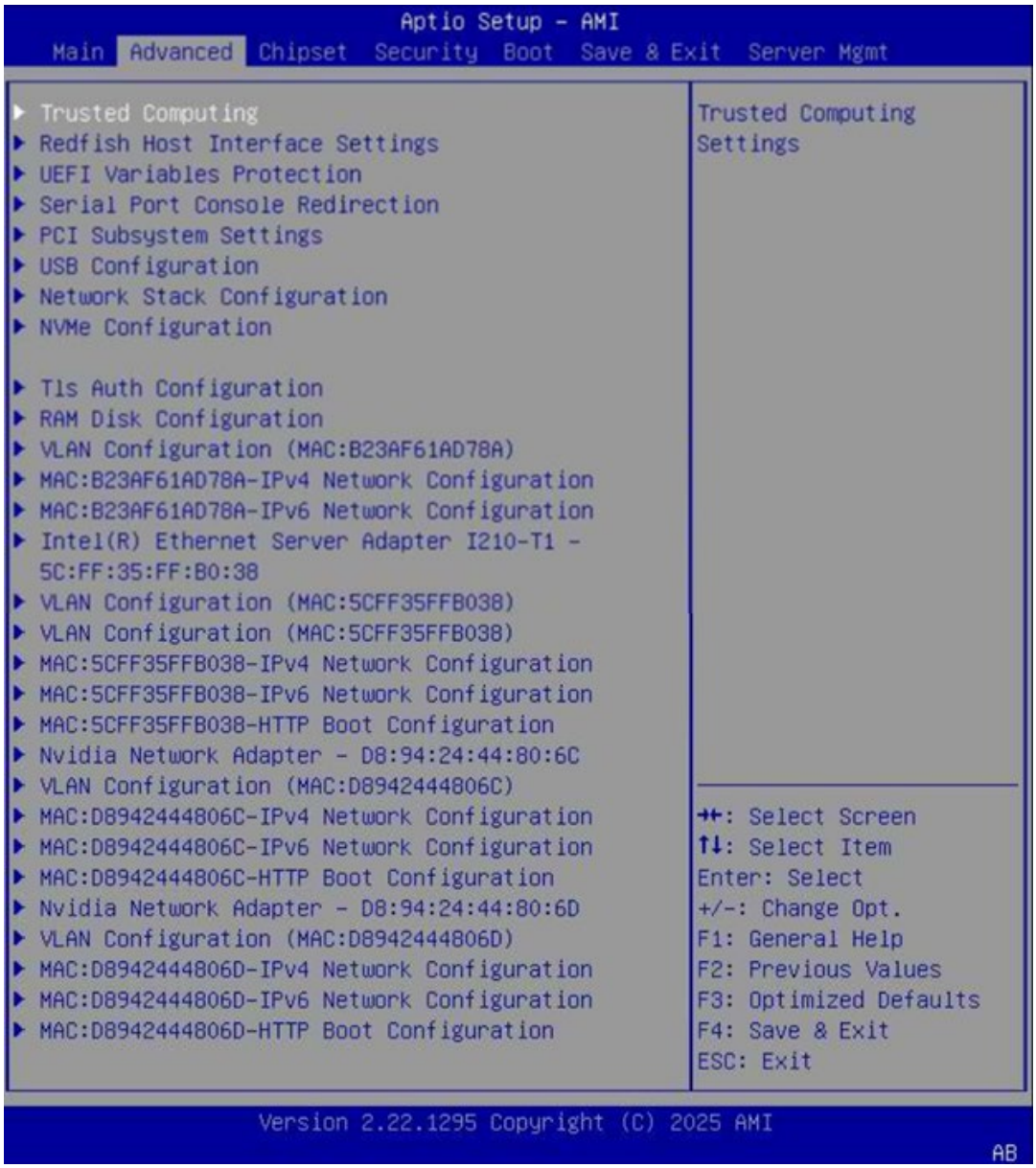
Main menu



Parameter	Description	Value
BIOS Information		
BIOS Vendor	BIOS Vendor	American Megatrends
Core Version	Current system Core version.	5.36
Compliancy	BIOS compliancy information.	UEFI 2.9; PI 1.7
Project Version	Official project version code of the server.	
BIOS Build Date and Time	Date when the system BIOS was built.	09/01/2025 16:26:09

Access Level	Current access level of the logged-in user.	Administrator
Memory Information		
Total Memory	Size of system memory detected during boot-up.	Total Memory: 960 GB
System Language	Choose the system default language	**English**
System Date	Set the Data. Use Tab to switch between Data elements. Default Ranges: Year: 1998-9999 Months: 1-12 Days: dependent on month Range of Years may vary	[Mon 09/01/2025]
System Time	Set the Time. Use Tab to Switch between Time elements.	[09:03:35]

Advanced menu



Parameter	Description
Trusted Computing	Trusted Computing Settings
Redfish Host Interface Settings	Redfish Host Interface Parameters
UEFI Variables Protection	NVRAM Runtime Variable Protection Settings

Serial Port Console Redirection	Serial Port Console Redirection
PCI Subsystem Settings	PCI Subsystem Settings
USB Configuration	USB Configuration Parameters
Network Stack Configuration	Network Stack Settings
NVMe Configuration	NVMe Device Options Settings
Tls Auth Configuration	Press <Enter> to select Tls Auth Configuration.
RAM Disk Configuration	Press <Enter> to add/remove RAM disks.
VLAN Configuration	VLAN Configuration
MAC: -IPv4 Network Configuration	Configure network parameters
MAC: -IPv6 Network Configuration	Configure IPv6 network parameters
Intel(R) Ethernet Server Adapter	Configure Gigabit Ethernet device parameters
Nvidia Network Adapter	Configure Device parameters

Chipset menu

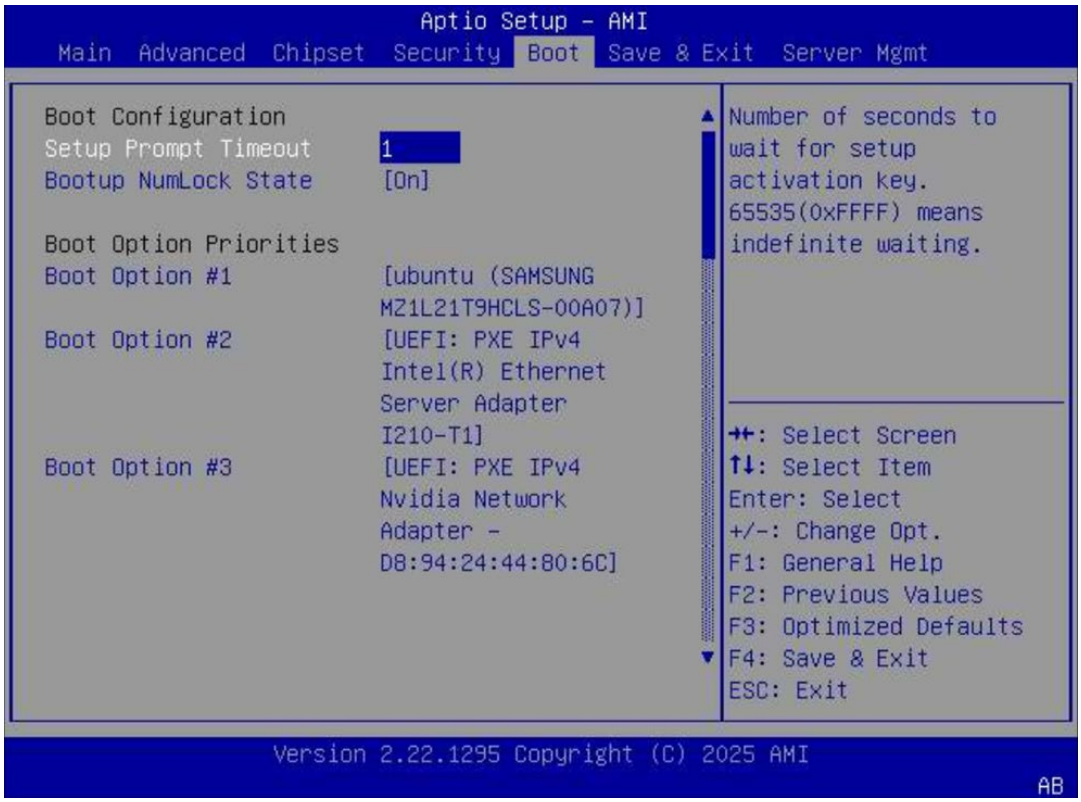
Parameter	Description
NVDIA Configuration	NVDIA Configuration
CPU Information	CPU Information

Security menu

Parameter	Description	Value
Disable Block Sid and Freeze Lock	Override to allow SID authentication of TCG Storage device and to skip freeze lock command for SAT3 device. Modified value will be applicable only for next boot.	**Disabled** Enabled
Administrator Password	Set Administrator password.	
User Password	Set User Password.	

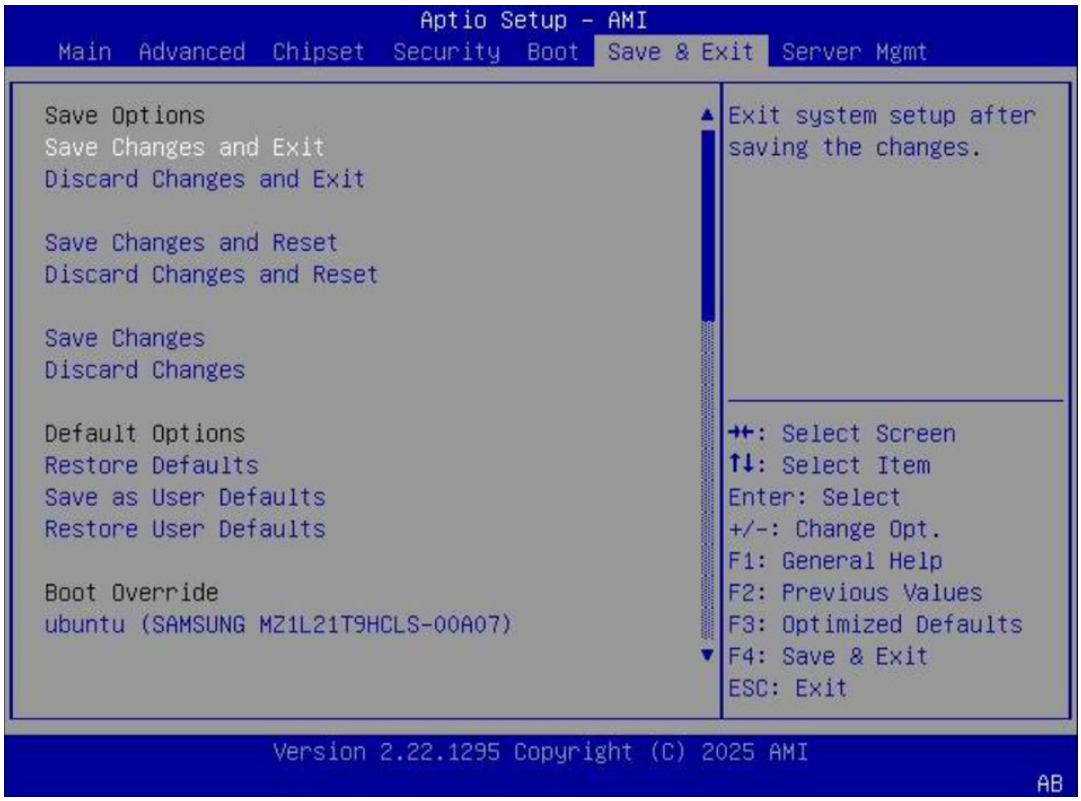
Secure Boot	Secure Boot configuration	
TCG Storage Security Configuration	TCG Storage Security Configuration	

Boot menu



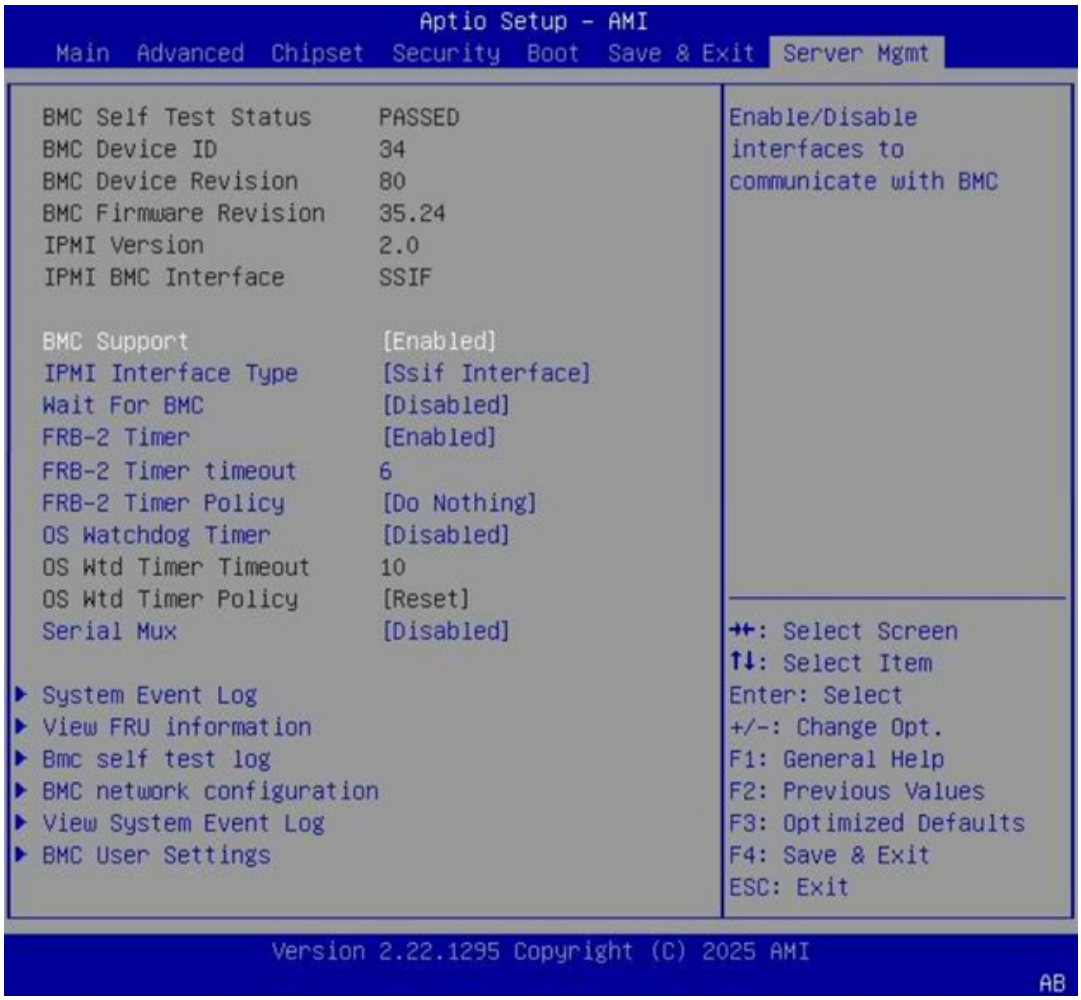
Parameter	Description	Value
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.	**1**
Bootup NumLock State	Select the keyboard NumLock state	**On** Off
Boot Option #	Sets the system boot order	
Fast Boot	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.	**Disabled** Enabled

Save & Exit menu



Parameter	Description
Save Changes and Exit	Exit system setup after saving the changes.
Discard Changes and Exit	Exit system setup without saving any changes.
Save Changes and Reset	Reset the system after saving the changes.
Discard Changes and Reset	Reset system setup without saving any changes.
Save Changes	Save Changes done so far to any of the setup options
Discard Changes	Discard Changes done so far to any of the setup options
Restore Defaults	Restore/Load Default values for all the setup options.
Save as User Defaults	Save the changes done so far as User Defaults.
Restore User Defaults	Restore the User Defaults to all the setup options.

Server Management menu



Parameter	Description	Value
BMC Support	Enable/Disable interfaces to communicate with BMC	**Enabled** Disabled
IPMI Interface Type	Type of Interface to communicate BMC from HOST	**Ssif Interface**
Wait For BMC	Wait For BMC response for specified time out. In PILOTII, BMC starts at the same time when BIOS starts during AC power ON. It takes around 30 seconds to initialize Host to BMC interfaces.	Enabled **Disabled**
FRB-2 Timer	Enable or Disable FRB-2 Timer (POST timer)	**Enabled** Disabled

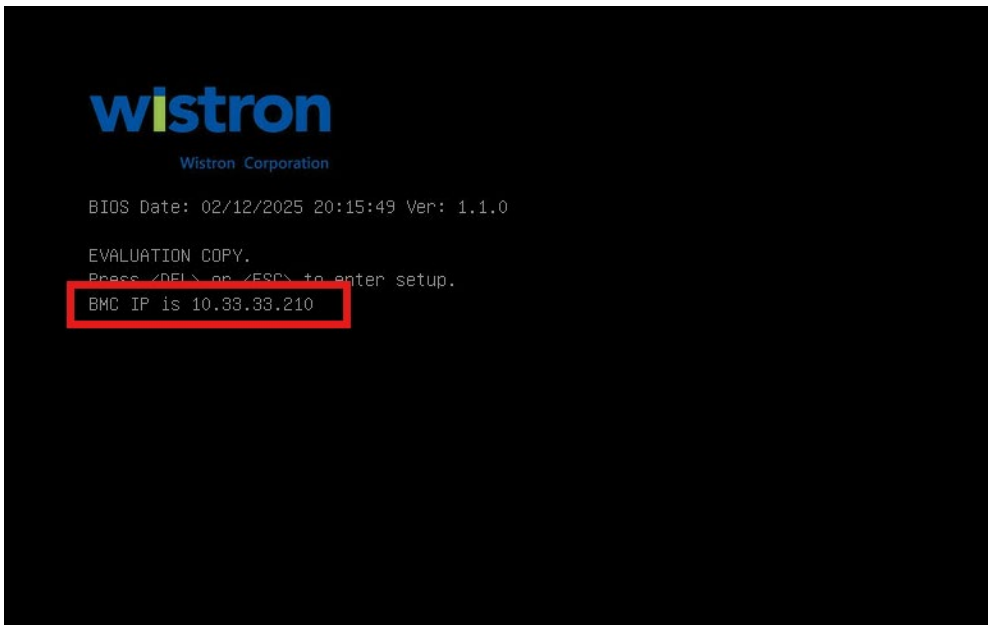
FRB-2 Timer timeout	Enter value Between 1 to 30 min for FRB-2 Timer Expiration	**6**
FRB-2 Timer Policy	Configure how the system should respond if the FRB-2 Timer expires. Not available if FRB-2 Timer is disabled.	**Do Nothing** Reset Power Down Power Cycle
OS Watchdog Timer	If enabled, starts a BIOS timer which can only be shut off by Management Software after the OS loads. Helps determine that the OS successfully loaded or follows the OS Boot Watchdog Timer policy.	Enabled **Disabled**
OS Wtd Timer Timeout	Enter the value Between 1 to 30 min for OS Boot Watchdog Timer Expiration. Not available if OS Boot Watchdog Timer is disabled.	**10**
OS Wtd Timer Policy	Configure how the system should respond if the OS Boot Watchdog Timer expires. Not available if OS Boot Watchdog Timer is disabled.	Do Nothing **Reset** Power Down Power Cycle
Serial Mux	Press <Enter> to enable or disable Serial Mux configuration.	Enabled **Disabled**
System Event Log	Press <Enter> to change the SEL event log configuration.	
View FRU information	Press <Enter> to view FRU information.	
Bmc self test log	logs the report returned by BMC self test command	
BMC network configuration	Configure BMC network parameters.	
View System Event Log	Press <Enter> to view the System Event Log Records	
BMC User Settings	Press <Enter> to Add, Delete and Set Privilege level for users.	

BMC User Interface

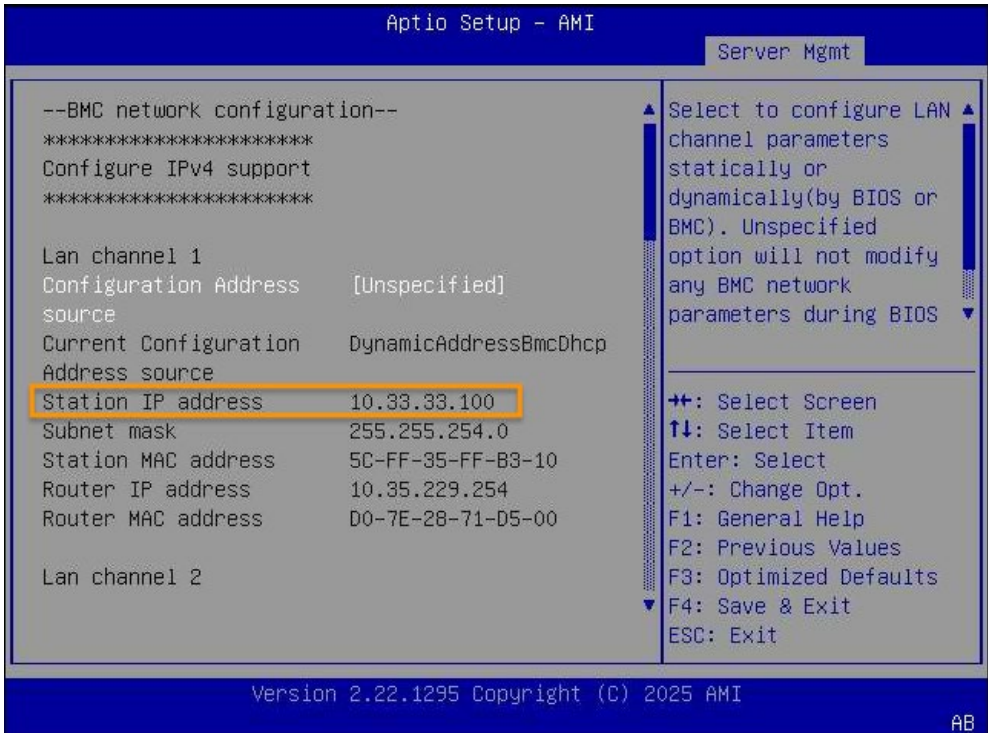
Get BMC IP

This section describes how to get the BMC IP during POST, from the BIOS Setup menu, and from the OS in-band command.

To get BMC IP during POST:



To get BMC IP from BIOS Setup Menu, go to **BIOS Setup Menu > Server Mgmt > BMC network configuration**:



To get the BMC IP using the OS in-band command:

IPMI Command format:

ipmitool lan print

```
root@PS:~# ipmitool lan print
Set in Progress         : Set Complete
Auth Type Support       :
Auth Type Enable        : Callback :
                        : User     :
                        : Operator :
                        : Admin    :
                        : OEM      :
IP Address Source       : DHCP Address
IP Address              : 10.35.229.148
Subnet Mask             : 255.255.254.0
MAC Address             : 5c:ff:35:ff:b1:e7
SNMP Community String   : public
BMC ARP Control         : ARP Responses Enabled, Gratuitous ARP Disabled
Gratituous ARP Intrvl   : 2.0 seconds
Default Gateway IP      : 10.35.229.254
Default Gateway MAC     : d0:7e:28:71:d5:00
Backup Gateway IP       : 0.0.0.0
Backup Gateway MAC      : 00:00:00:00:00:00
802.1q VLAN ID          : Disabled
802.1q VLAN Priority    : 0
RMCP+ Cipher Suites     : 17
Cipher Suite Priv Max   : aaaaaaaaaaaaaaa
                        :     X=Cipher Suite Unused
                        :     c=CALLBACK
                        :     u=USER
                        :     o=OPERATOR
                        :     a=ADMIN
                        :     O=OEM
```

Web GUI

The web GUI is HTML5 based and added security with SSL (HTTPS).

Function		Description
Overview	BMC time	Show current time and SOL console shortcut link
	System Information	Show the information of Server, Firmware, Network and power
	Status information	Show the total number of critical and warning events and System identify LED
Dashboard	Virtual front panel	Simulate Front Panel LED status
	Date and time	Show current UTC time
	Current user	Show current user information
	Virtual media	Show the status of virtual media
	Screen Preview	TBD
	System Information	Show the information of the BMC system
	Networks	Show the NIC_0 / NIC_1 information
	Temperature	Show the healthy status of the sensors
	Voltage	Show the healthy status of the voltage
	Fan	Show the healthy status of the fan
	System event log	Show the asserted event log
	Power Statistics	Show the wattage of all the subsystem
Logs	Event Logs	Show the event log page. Will display all the event logs that have occurred in this device.
	System event log	System Log page will display all the system events that have occurred in this device that have been already configured.
	POST code	The POST code comparison with current boot and previous boot
	SOL log	
	BIOS log	

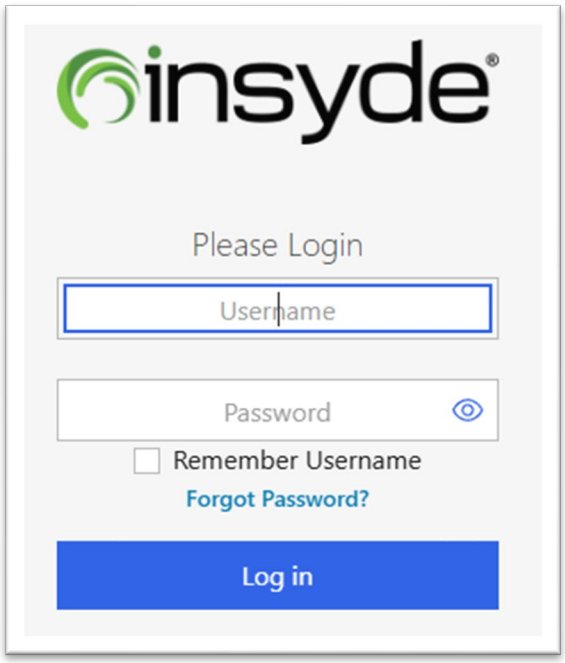
	Host video recorder	
	System diagnostics	
Hardware status	System information	
	FRU information	
	CPU information	
	DDR information	
	Inventory and LEDs	
	Sensor readings	
	NIC information (BIOS)	
	NIC information (BMC)	
	NVME/HDD information (BIOS)	
	NVMe information (BMC)	
	System Component	
	SMBIOS	
Operations	Factory reset	
	KVM	
	Firmware	This page shows the version of BMC and component firmware. Provide update firmware function by web.
	Reboot BMC	BMC Reboot function
	SOL console	SOL console redirects the server’s serial port output to this window.

	Server power operations	
	Virtual front panel	This page shows the power status of the server.
	Virtual Media	
	Boot config	
Settings	Alerts	
	Alert policies	
	Alert email	
	Date and time	
	Networks	
	VLAN	
	SOL	
	SNMP	
	IKVM and virtual media	
	Dynamic DNS	
	Syslog settings	
	Backup restore	
	Power restore policy	
Security and access	Current users	
	LDAP	
	RADIUS	
	TACACS+	
	Users	
	Policies	
	Certificate management	
	Kerberos authentication	
	Security settings	

	IP access control	
Remote Control	Power	
	Power statistics	
	Power schedule	
BIOS		

Log in

Initial access of BMC prompts you to enter the Username and Password. A sample screenshot of the login screen is given below.



Default User Name and Password

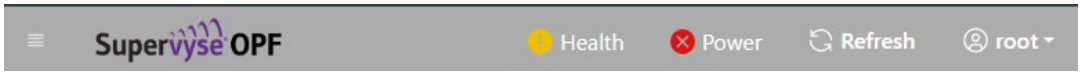
Username: root

Password: 0penBmc

Warning:
Once you log in to the application, it is recommended not to use the following options.
- Refresh button of the browser
- Refresh menu of the browser
- Back and Forward options of the browser
- F5 on the keyboard
- Backspace on the keyboard

Menu Bar (row)

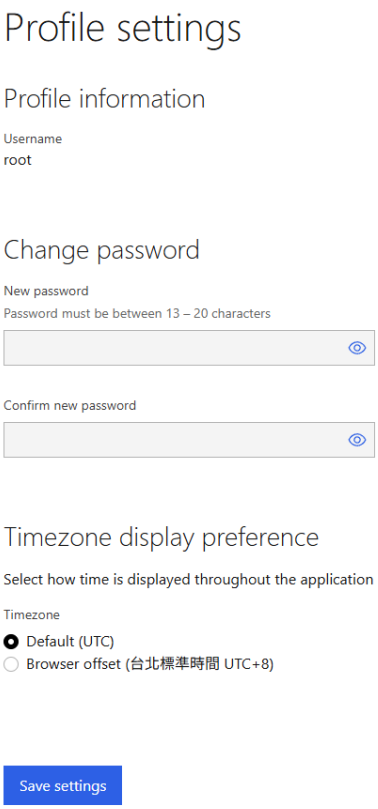
The **Menu Bar** is located at the **top-right corner** of the Web UI and provides quick access to essential functions, status indicators, and user account controls.



Below is an explanation of each icon/button, starting from **left to right**:

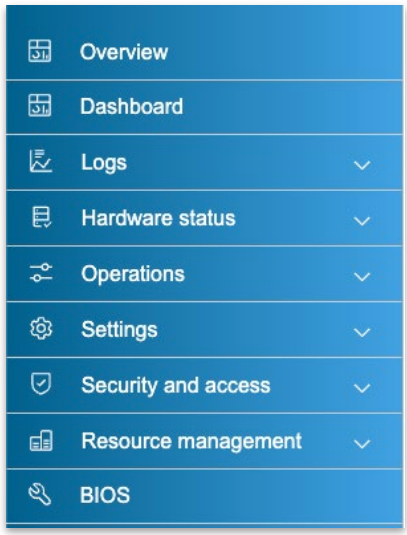
Item	Description
Logo	Click the Logo to navigate to the Overview page.
Health	Click this icon to navigate to Logs -> Event logs page. The icon will change based on the severity status of current event logs. Leveling as Critical/ Warning/ OK.
Power	Click this icon to navigate to Operation -> Server power operations page. Status should be On or Off.
Refresh	Click the icon to reload the current page.
User	Clicking this area will show two options: Profile settings: Click to navigate to Profile settings page. Please refer to section 1.3.2 Profile settings. Log out: Click to log out of Web UI.

Profile Settings



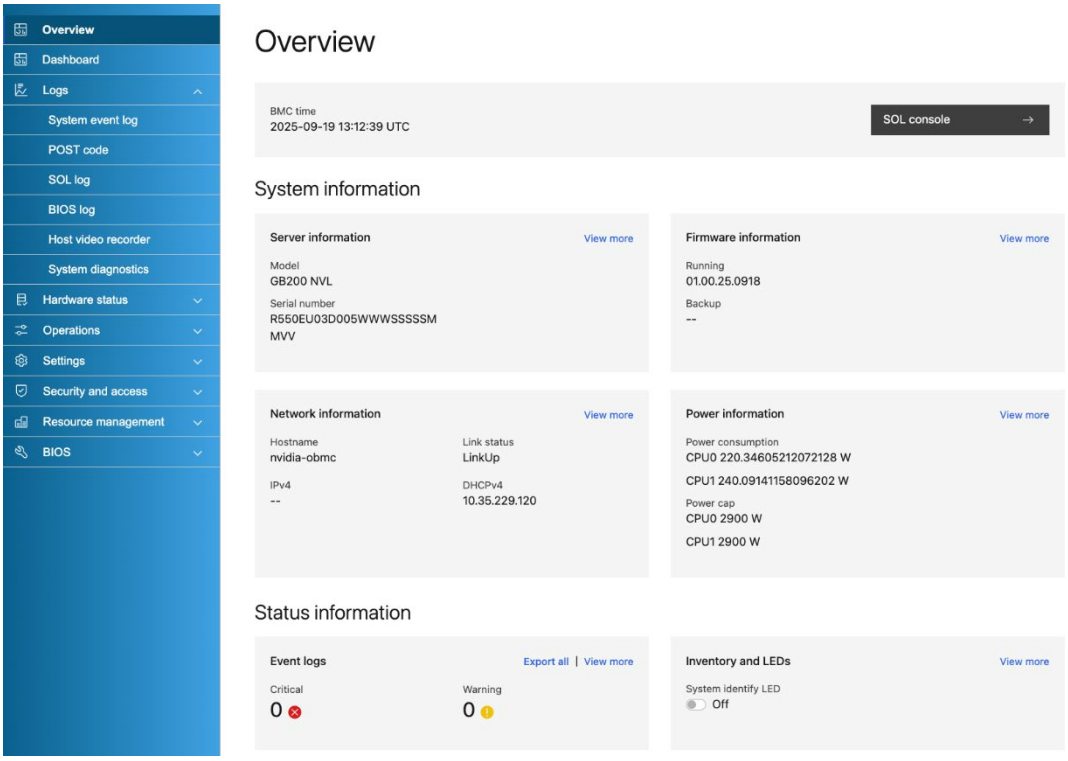
Menu Bar (column)

The menu bar displays the following.

• Overview • Dashboard • Logs • Hardware status • Operations • Settings • Security and access • Resource management • BIOS	

Overview

The **Overview** provides a quick summary of the system's information, current status, and a shortcut to the SQL console. From this page, users can quickly assess system information, status information, BMC time, monitor activities, and navigate to related management functions. Firmware Information will be displayed with the latest version, date and time details.

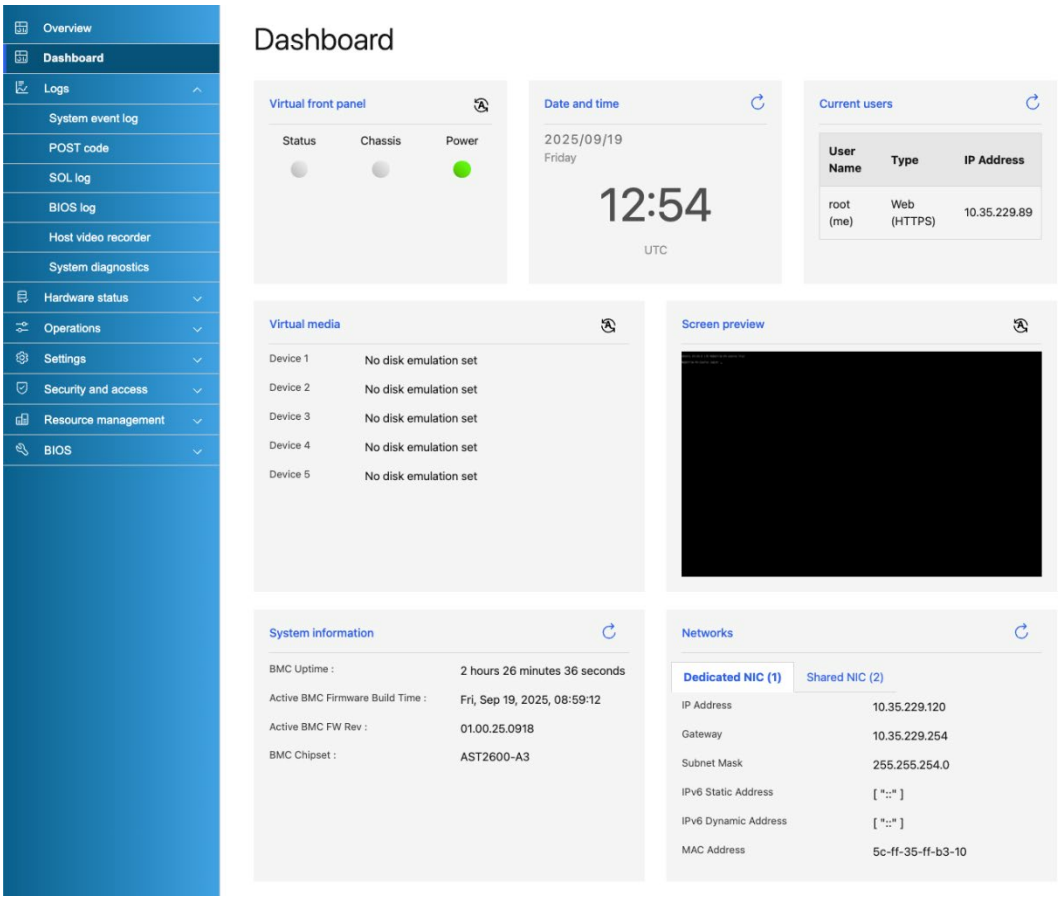


Item	Description
BMC Time	Displays the current BMC time in UTC
	Provides a shortcut link to open the **SOL console**
System Information	**Server Information**: Shows details such as model and serial number of the server.
	Firmware Information: Displays the current version of the BMC and component firmware (running and backup versions).
	Network Information: Provides network details, including hostname, link status, and IP address configuration.
	Power Information: Shows power consumption and power cap settings
Status Information	**Event Logs**: Displays the number of critical and warning events. Users can export or view detailed logs

	Inventory and LEDs: Shows the state of the system identify LED, which can be toggled on or off to locate the server physically

Dashboard

The Dashboard provides a centralized view of the system's current status, active connections, and important operational controls. From this page, users can quickly assess hardware conditions, monitor activities, and navigate to related management functions.



Field Name	Description
Virtual Front Panel	**Navigation:** *Operations → Virtual Front Panel* Displays the live status of key front panel indicators: • **Status LED** – Shows the system's overall health condition. • **Chassis LED** – Indicates chassis identification or alert status. • **Power LED** – Displays whether the system is powered on or off. These LEDs mirror the physical front panel indicators, allowing administrators to verify hardware states remotely without direct physical access.

DateTime	Shows the current system date and time in **UTC** format. Maintaining accurate time is critical for system logs, scheduled tasks, and event tracking.

Current Users	**Navigation:** *Security and Access → Current Users*
	Lists all users currently connected to the BMC interface, along with their connection details:
	• **User Name** – The account currently logged in.
	• **Type** – The connection method used:
	  ○ **Web (HTTPS)** – Standard secure web browser connection.
	  ○ **IKVM** – Integrated Keyboard, Video, and Mouse session.
	  ○ **VM** – Virtual Media session.
	  ○ **Redfish** – Connection via the Redfish API.
	• **IP Address** – The source IP address of the connection.
	This helps administrators monitor access and detect unauthorized sessions in real time.

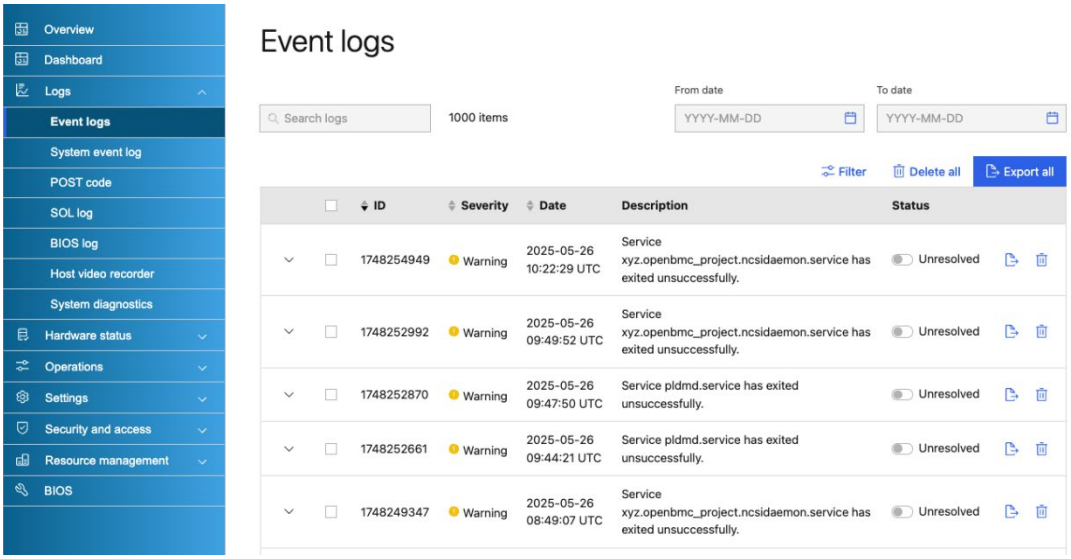
Virtual Media	**Navigation:** *Operations → Virtual Media* Displays the current status of all virtual media devices (e.g., virtual CD/DVD, USB drives). This section shows which devices are mounted, making it easy to confirm or troubleshoot virtual media operations.
Screen Preview	**Navigation:** *Operations → KVM* Provides a thumbnail preview of the host system's screen. This feature allows quick visual checks of the host's operating state without launching a full KVM session, saving time when monitoring multiple systems.

Logs

Logs are a critical component of the BMC system, providing detailed information about system operation status, errors, and warnings through various log types. Each log has its specific purpose, helping administrators monitor, troubleshoot, and diagnose the system at different levels. These logs are crucial for maintaining system stability, improving fault diagnosis efficiency, and ensuring hardware health.

Event logs

The event logs capture various changes and critical events related to the server's hardware status, offering detailed insights for monitoring and troubleshooting. These logs assist system administrators in promptly identifying hardware issues, diagnosing failures, and enhancing the server's stability and reliability. They cover a range of events, including hardware status changes, system startups and shutdowns, sensor data, firmware updates, and error warnings, enabling administrators to efficiently track the server's performance and take appropriate actions.



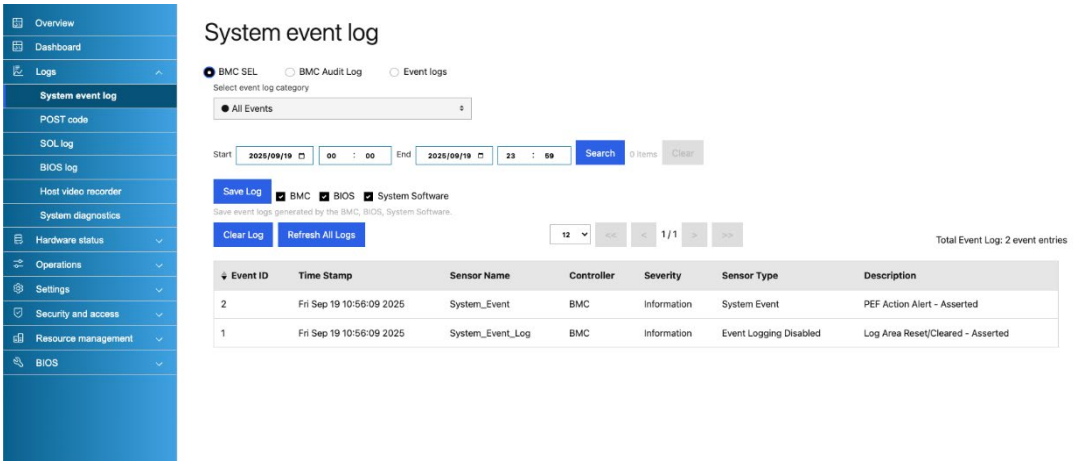
Displays all system-generated events with details such as:

- **ID**: Unique identifier for each log entry.
- **Severity**: Indicates the level of importance (e.g., Critical, Warning, or Informational).
- **Date**: Timestamp in UTC when the event occurred.
- **Description**: Provides detailed information about the event or service failure.
- **Status**: Shows whether the event is **Unresolved** or marked as **Resolved**.
- Provides controls for **filtering**, **searching**, and specifying a date range.

- Logs can be **deleted individually**, **cleared entirely**, or **exported** for analysis.

System Event logs

To go to **System event log** page. Click **Logs -> System event log** from the main menu. This page is used to display System event log (SEL) information.



The BMC system event log helps track and manage various events related to system hardware and administrative actions. It provides detailed logs for both hardware issues and user activities. There are two key types for viewing these logs:

BMC SEL: Displays logs of hardware-related events, such as power failures, temperature alerts, and hardware issues, typically used for diagnosing system problems.

BMC Audit Log: Displays logs of administrative actions on the BMC, including user logins, configuration changes, and system management activities, helping track security and compliance.

Basic operations

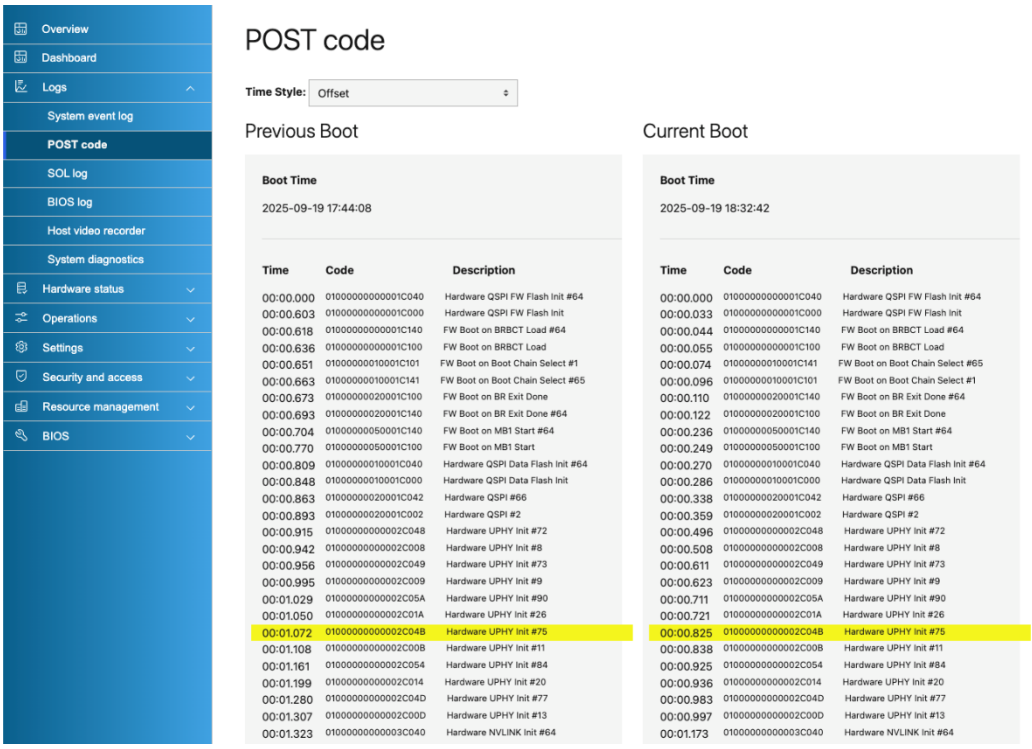
Option	Task
Filter by time	Allows users to view event logs that occur within a specific time range, making it easier to analyze and troubleshoot events during that period.
Save Log	Select the event log source (BMC, BIOS, and system software) you want to download and click the download button. It then downloads the logs as a file named SELLOG.zip for further review and analysis.

Clear Log	Deletes all event logs. When clicked, a confirmation dialog will pop up, prompting the user to confirm the action before proceeding.
Refresh All Logs	Reloads the event logs, ensuring that the most up-to-date information is displayed.

POST Code

To go to **POST code** page. Click **Logs -> POST code** from the main menu.

The **POST code** page provides an overview of recent Power-On Self-Test (POST) results, helping users monitor and analyze the host's boot progress. The page displays POST codes for both the previous boot and the current boot. The current boot codes will be moved to the previous boot section when the system is rebooted.



Move the mouse cursor over a record. The web page will automatically highlight other records in the logs with the same code, helping you to identify the specific status (code).

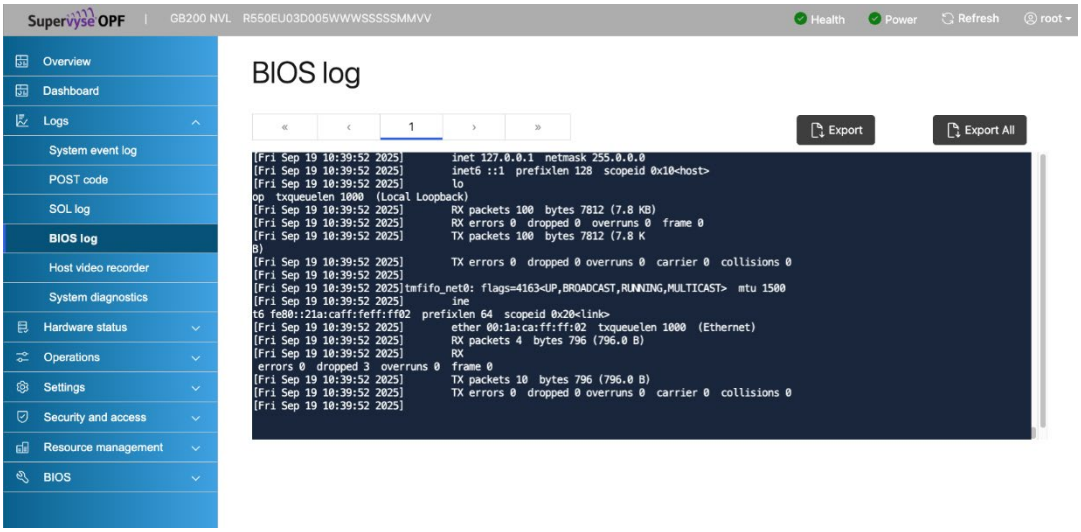
- Shows **Power-On Self-Test (POST) codes** captured during the boot process.
- Helps diagnose hardware initialization errors when the system fails to boot properly.

SOL log

To go to **SOL log** page. Click **Logs -> SOL log** from the main menu. This page provides access to the Serial Over LAN (SOL) log, which captures text-based console output over the network. It is useful for remote troubleshooting, monitoring boot messages, and tracking hardware or system-level events. The SOL log buffer has a maximum capacity of **1,540,000 bytes** (approximately **1503.91 KB** or **1.47 MB**). When the buffer reaches its limit, older log entries are automatically archived. Upon accessing the SOL Log page, the most recent log entries are always retrieved for review.

BIOS log

To go to **BIOS log** page. Click **Logs -> BIOS log** from the main menu. This page allows users to view, navigate, and export system BIOS logs. These logs provide detailed records of system events and errors generated during boot.

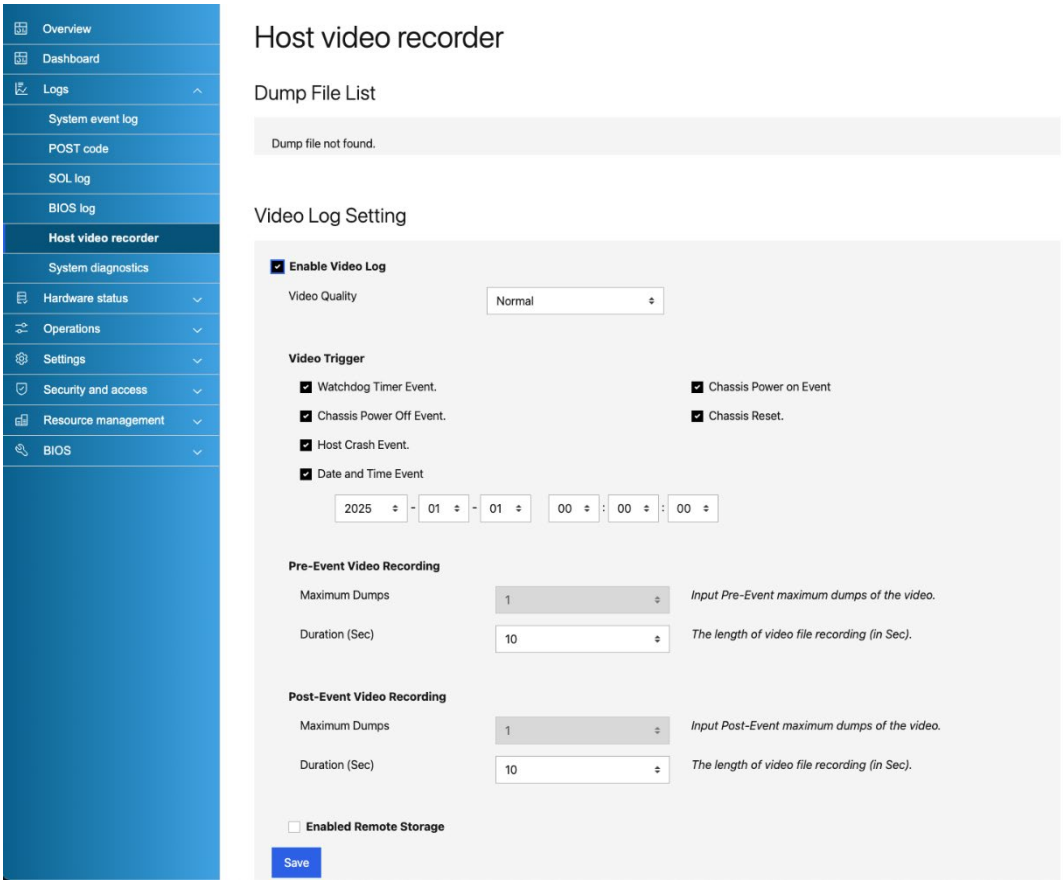


- Displays BIOS-related messages recorded during system startup and operation
- Supports troubleshooting firmware-level issues.

Host View Recorder

To go to **Host video recorder** page. Click **Logs -> Host video recorder** from the main menu.

The Host Video Recorder feature allows users to record and manage video of the host's critical events. This feature aids in diagnosing issues and monitoring system health by providing a video record of key moments.



Record Event Trigger:

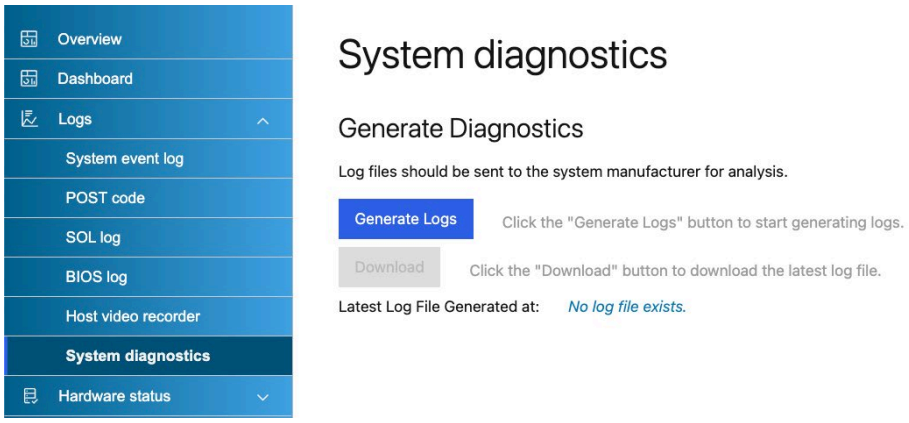
Option	Task
Watchdog Timer Event	Triggers video recording when IPMI watchdog commands (such as Hard Reset, Power Down, and Power Cycle) are issued.
Chassis Reset	Triggers video recording when the chassis is reset.
Host Crash Event	Triggers video recording upon detecting a host crash. **Notice: CPER for Nvidia**

OS SEL Event	Triggers video recording when the operating system encounters a critical error (such as a BSoD (Blue Screen of Death) or Kernel Panic).

System Diagnostics

To go to the **System diagnostics** page. Click **Logs -> System diagnostics** from the main menu. This page offers features designed to assist developers in analyzing and troubleshooting issues. These tools enable efficient debugging and ensure the system operates reliably.

This page includes various platform-specific sections, which may or may not be available depending on the platform.



These sections include **Intel Dump Log (ACD)**, **RAS Support List**, and other related features.

Notice: Intel Dump Log (ACD) *only supported on Intel platforms.*

Notice: RAS Support List *only supported on platforms that support RAS offload.*

As the user clicks “Generate Logs”, it will gray out until the task completed.

System diagnostics

Generate Diagnostics

Log files should be sent to the system manufacturer for analysis.

Generate Logs Click the "Generate Logs" button to start generating logs.

Download Click the "Download" button to download the latest log file.

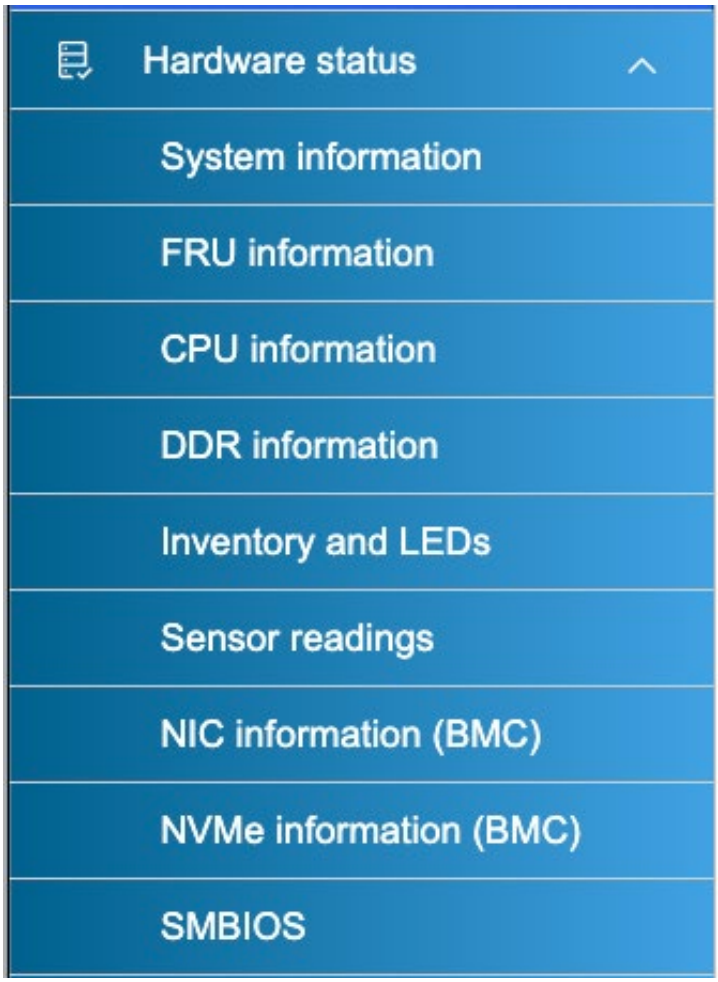
Latest Log File Generated at: *Generating system debug log - 23%*

Hardware Status

Hardware status refers to the monitoring and display of the current condition of key hardware components within a system. This feature typically provides real-time information on the health and performance of the system's critical hardware, allowing users to quickly assess whether components are functioning properly or if any issues are detected.

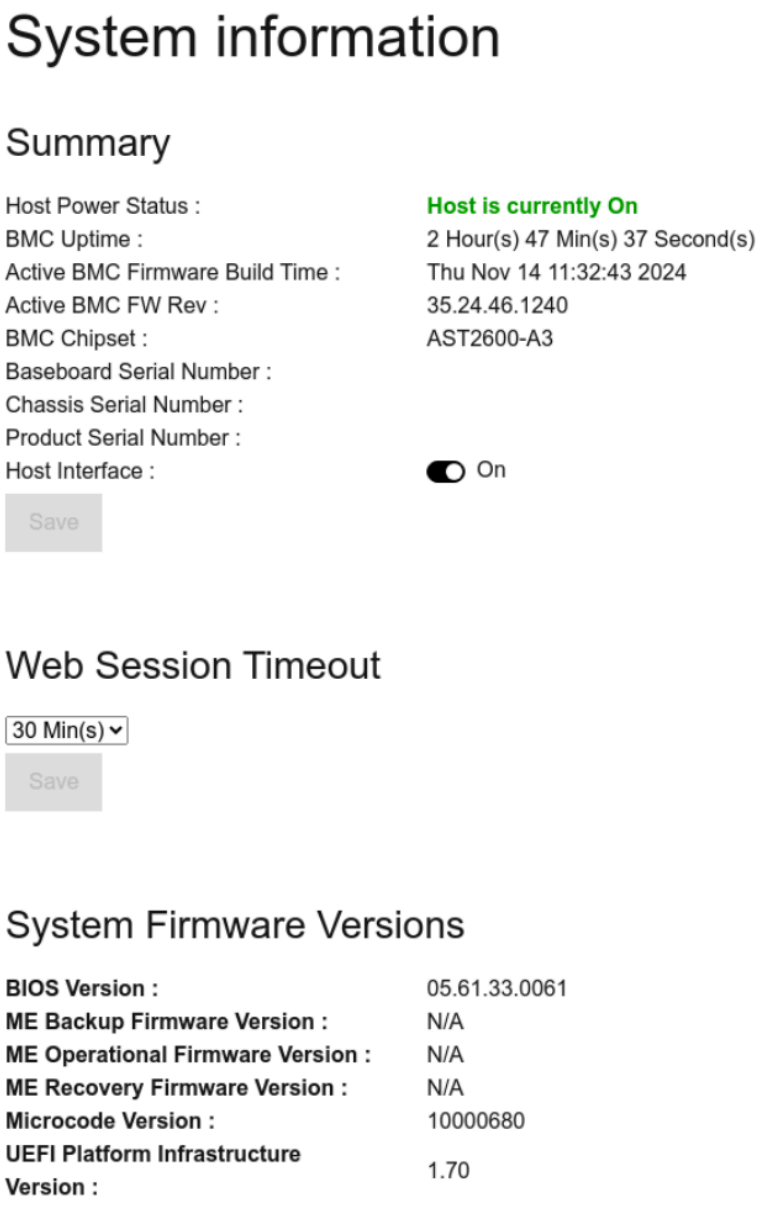
The Hardware status page displays all the hardware related information.

A screenshot of this page is given below.



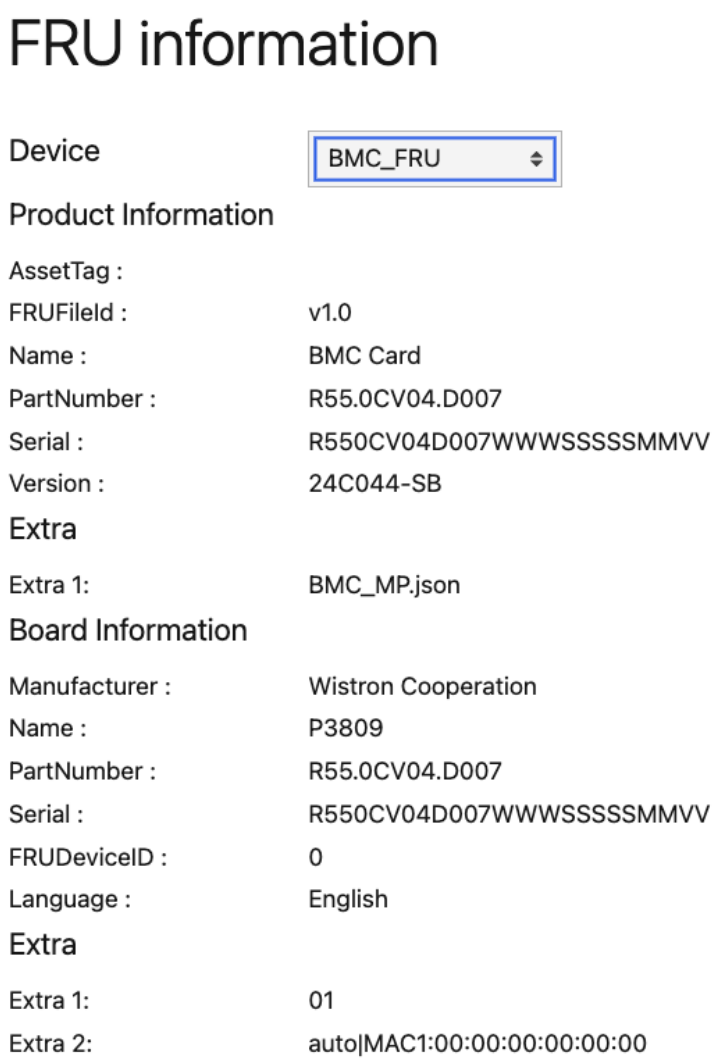
System Information

System Information page displays the system device information. System page shows information like Host Information, BMC Information, Board Information and Product Information of the system device.



FRU Information

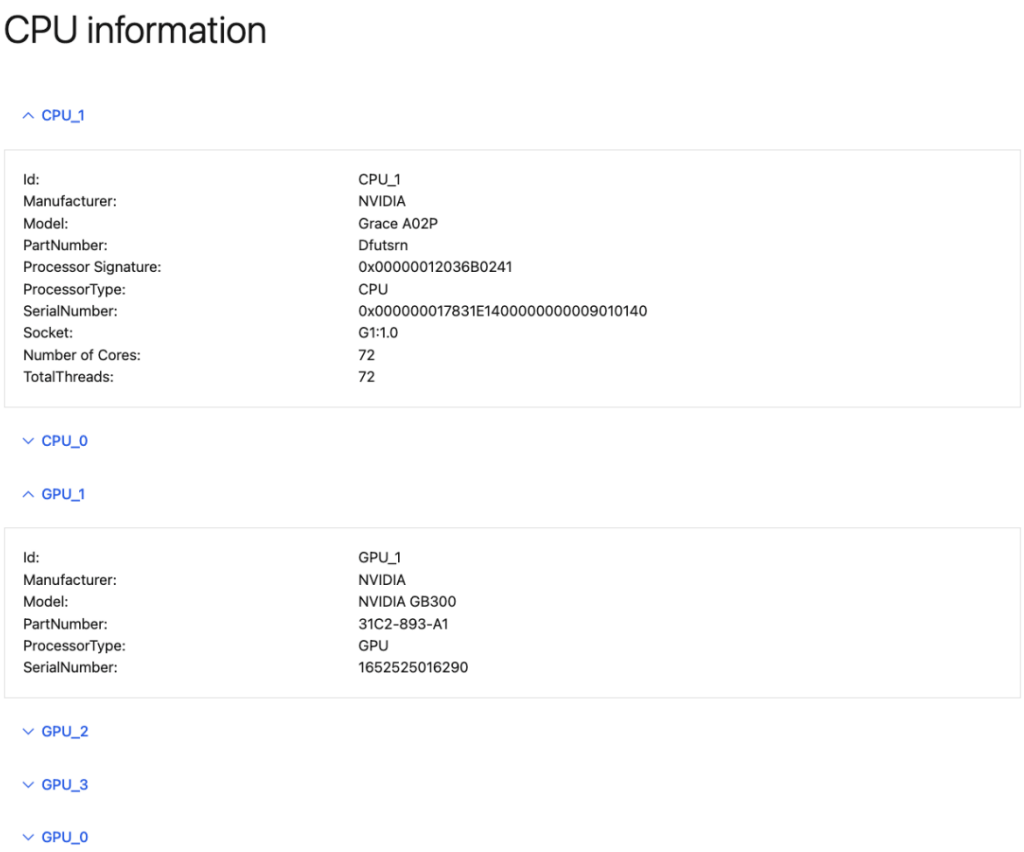
FRU Information page displays the BMC's FRU device information. FRU page shows information like Basic Information, Chassis Information, Board Information and Product Information of the FRU device.



CPU Information (Insyde BIOS joint feature)

To go to CPU information page. Click Hardware -> CPU information from the main menu. This page is used to display CPU information.

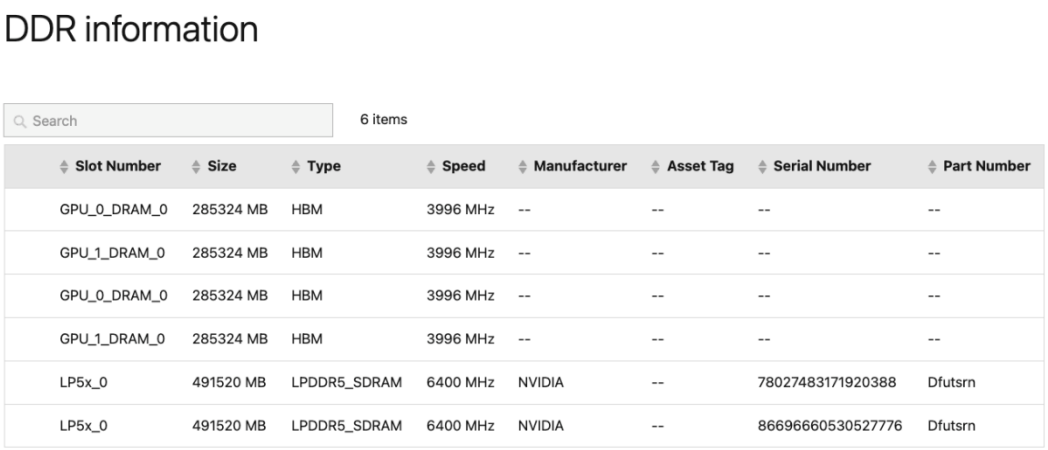
This is Insyde BIOS joint feature. You should turn on the host and wait for the BIOS to upload the relevant data.



Notice: *For more data information, please refer to https://www.dmtf.org/standards/smbios*

DDR Information

To go to **DDR information** page. Click **Hardware -> DDR information** from the main menu. This page is used to display DDR related information.

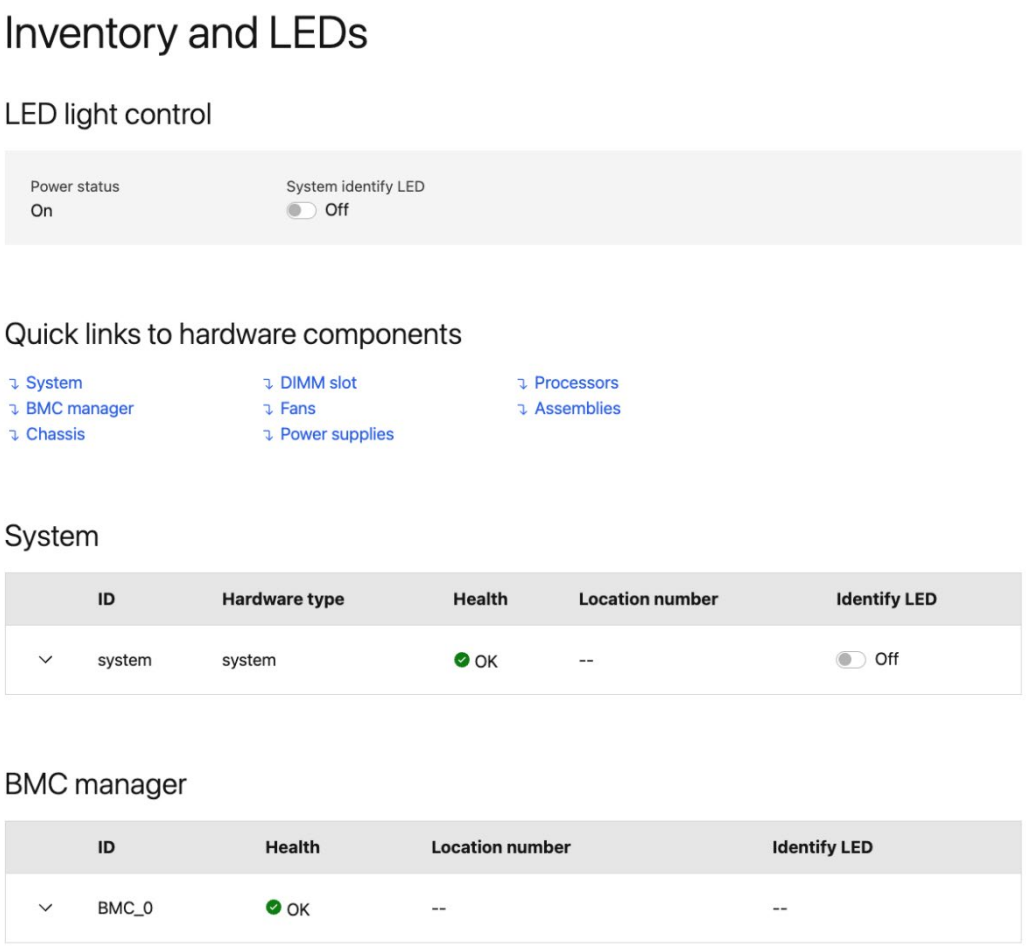


Inventory and LEDs

To go to **Inventory and LEDs** page. Click **Hardware status -> Inventory and LEDs** from the main menu. This page is used to display Inventory and LEDs related information.

This page typically includes two main sections:

- **LEDs**: Shows the LED status of various hardware components. These LEDs indicate different system states, such as power status, drive health, or fault conditions. Users can use the LED indicators to diagnose system issues.
- **Inventory**: Displays all the hardware components in the system, such as motherboards, power supplies, fans, storage devices, and more. Users can view detailed information for each component, including model, status, and health information.



This page displays inventory information in eight tables, each representing a specific hardware category, providing essential details and status updates for efficient monitoring and management. This page helps

users quickly understand the hardware configuration and current status of the system, making it an essential tool for managing and maintaining a BMC system.

System

The complete server or system configuration, including all essential hardware components.

BMC manager

A Baseboard Management Controller (BMC) that enables remote monitoring and management of the server, even when powered off.

Chassis

The physical enclosure that houses and protects the server's internal components, such as the motherboard and storage devices.

DIMM slot

Slots on the motherboard where Dual Inline Memory Modules (DIMMs)are installed to provide system memory (RAM).

Fans

Cooling components help maintain optimal temperatures by dissipating heat from critical system components.

Power supplies

Units that convert electrical power from the grid into the appropriate voltage for the server, often with redundancy for reliability.

Processors

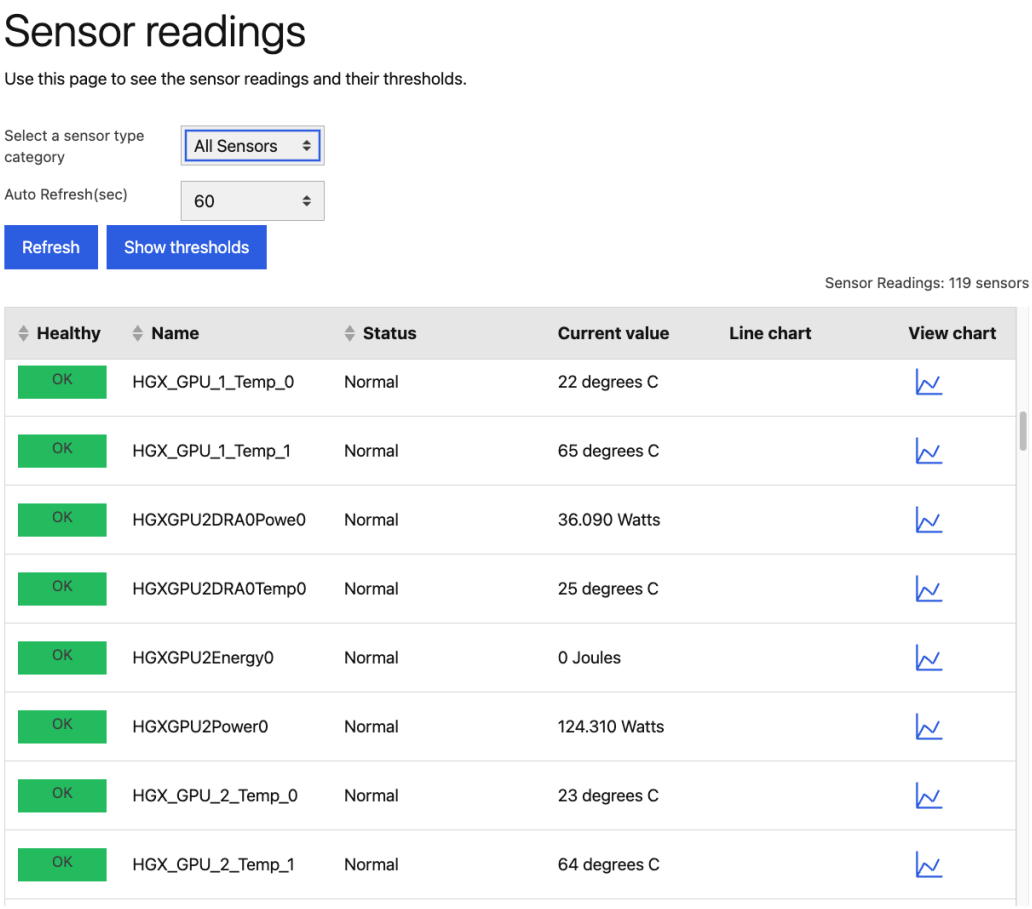
Central processing units (CPUs) that execute instructions and perform calculations to run the system.

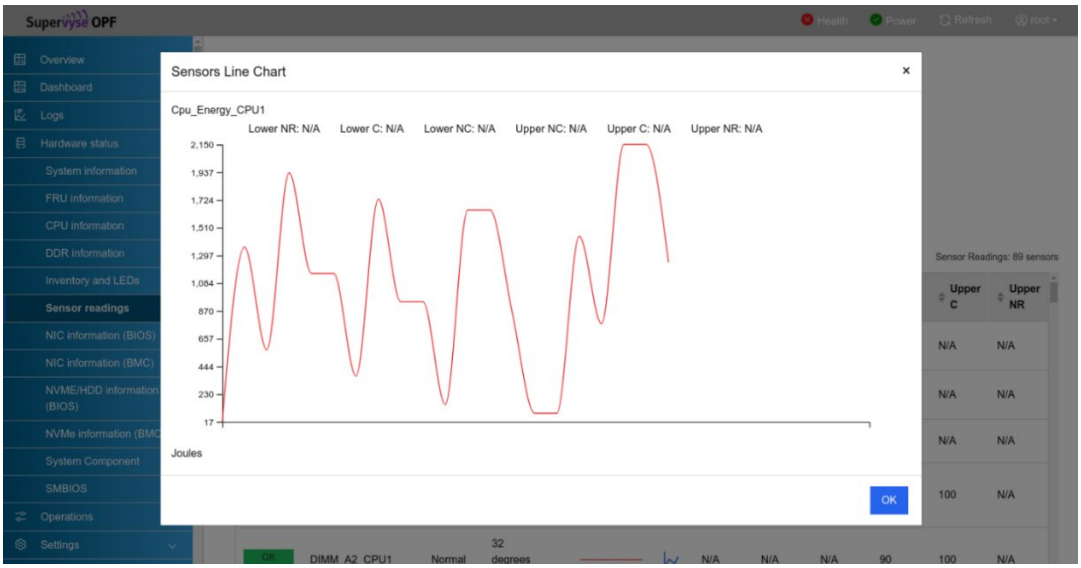
Assemblies

Pre-assembled groups of components, such as motherboards or cooling units, that function as complete units within the system.

Sensor readings

The Sensor Reading page typically shows real-time data from server hardware sensors, which monitor and provide crucial information about the system's health. For instance, it can display parameters such as temperature, fan speed, voltage, and power, enabling system administrators to keep track of the server's hardware performance.




Supervyse OPF
Health
Power
Refresh
root
Overview
Dashboard
Logs
Hardware status
System information
FRU information
CPU information
DDR information
Inventory and LEDs
Sensor readings
NIC information (BIOS)
NIC information (BMC)
NVME/HDD information (BIOS)
NVMe information (BMC)
System Component
SMBIOS
Operations
Settings
Sensors Line Chart
Cpu_Energy_CPU1
Lower NR: N/A
Lower C: N/A
Lower NC: N/A
Upper NC: N/A
Upper C: N/A
Upper NR: N/A
2,150
1,937
1,724
1,510
1,297
1,084
870
657
444
230
17
Joules
OK
Sensor Readings: 89 sensors
Upper C
Upper NR
N/A
N/A
N/A
N/A
N/A
N/A
100
N/A
DIMM_A2_CPU1
Normal
32
degrees
N/A
N/A
N/A
90
100
N/A

NIC information (BMC)

To go to **NIC information (BMC) page**. Click **Hardware Status -> NIC information (BMC)** from the main menu.

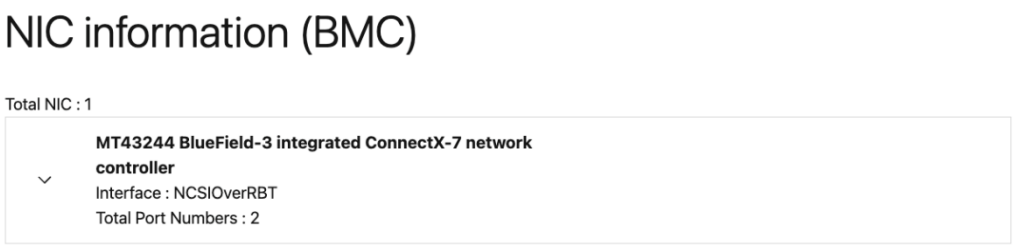
This page is used to display NIC related information from BMC.

NIC information consists of two parts: NIC Entry and Channel Entry.

Each NIC entry will display this NIC's ID, total channels, and device name. By clicking the NIC entry, it will expand detail Manufacturer, Vendor Name, Device Name, Subsystem Name, Subdevice ID, Firmware Name, NC-SI Firmware Version (Hex), and all of its channel entry. The detail manufacturer information and firmware version are from NC-SI Command Get Version ID.

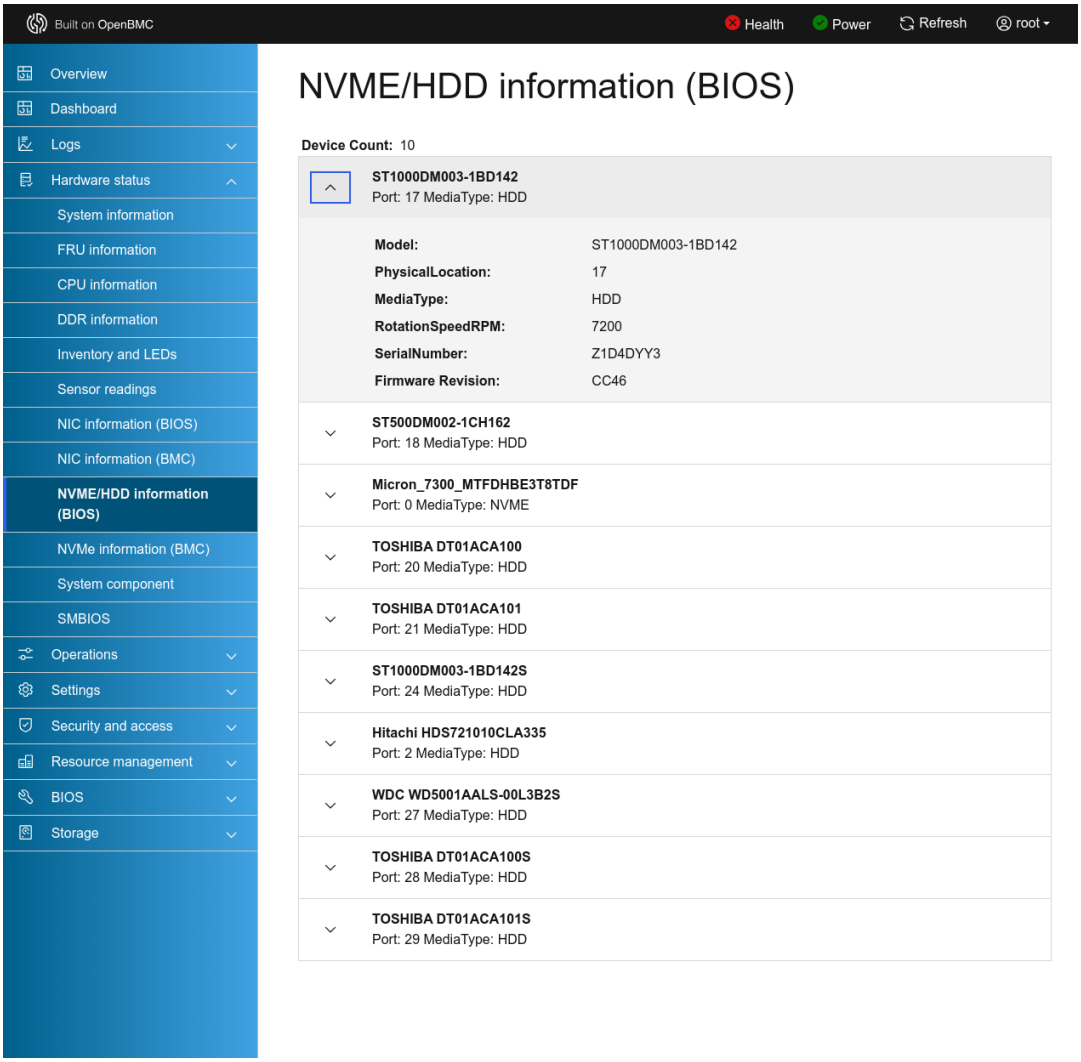
Each channel entry will display this port's ID, link status(up/down) and MAC Address.

Notice: *The NIC card must support MCTP to be displayed on this page.*



NVMe/HDD information (BIOS)

InSyde BIOS joint feature. To go to **NVME/HDD information (BIOS)** page. Click **Hardware Status -> NVME/HDD information (BIOS)** from the main menu. This page is used to display NVME/HDD related information about the server.



NVMe information (BMC)

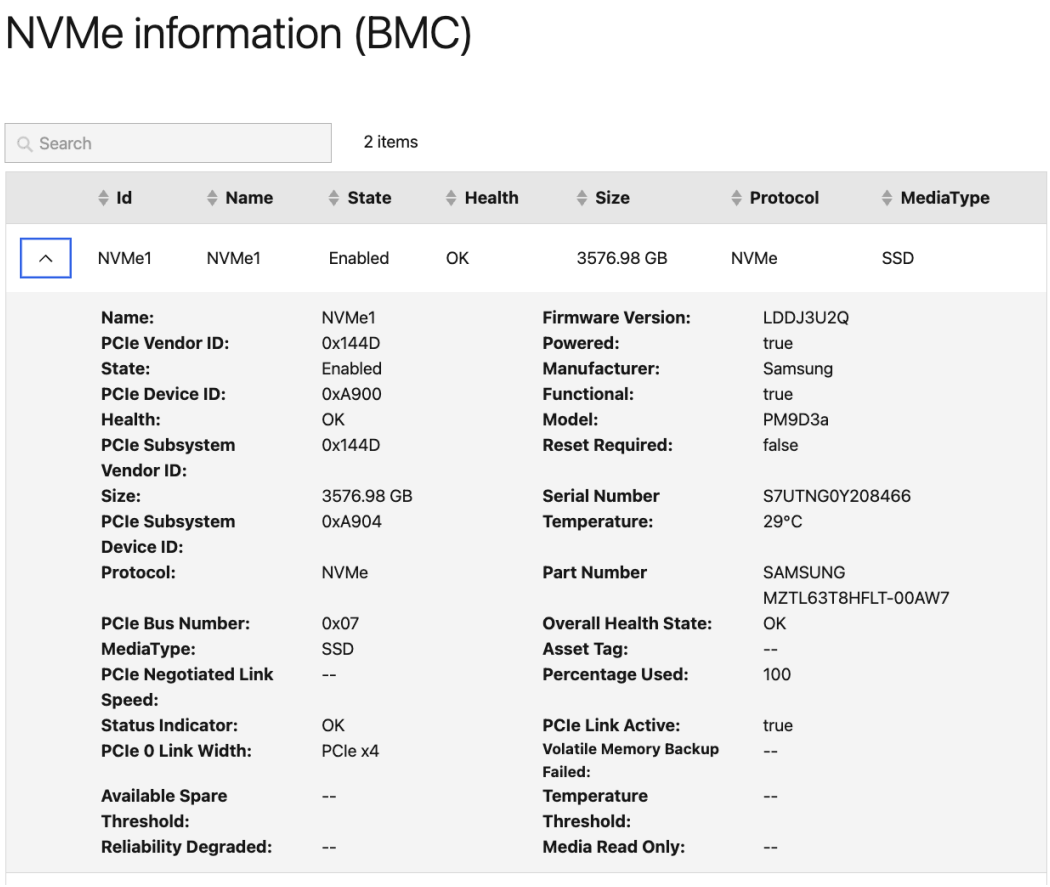
To go to **NVMe information (BMC)** page. Click **Hardware Status -> NVMe information (BMC)** from the main menu. This page displays status and information that NVMe device information from the host.

Each NVMe entry will display this NVMe's id, NVMe name, state, health, size, protocol and media type. By clicking the NVNe entry, it will expand to display the details of this NVMe device.

Notice: *NVMe SSD must support MCTP to obtain SSD information.*

Notice: *If the value of property shows --, it means it is not supported on this NVMe device.*

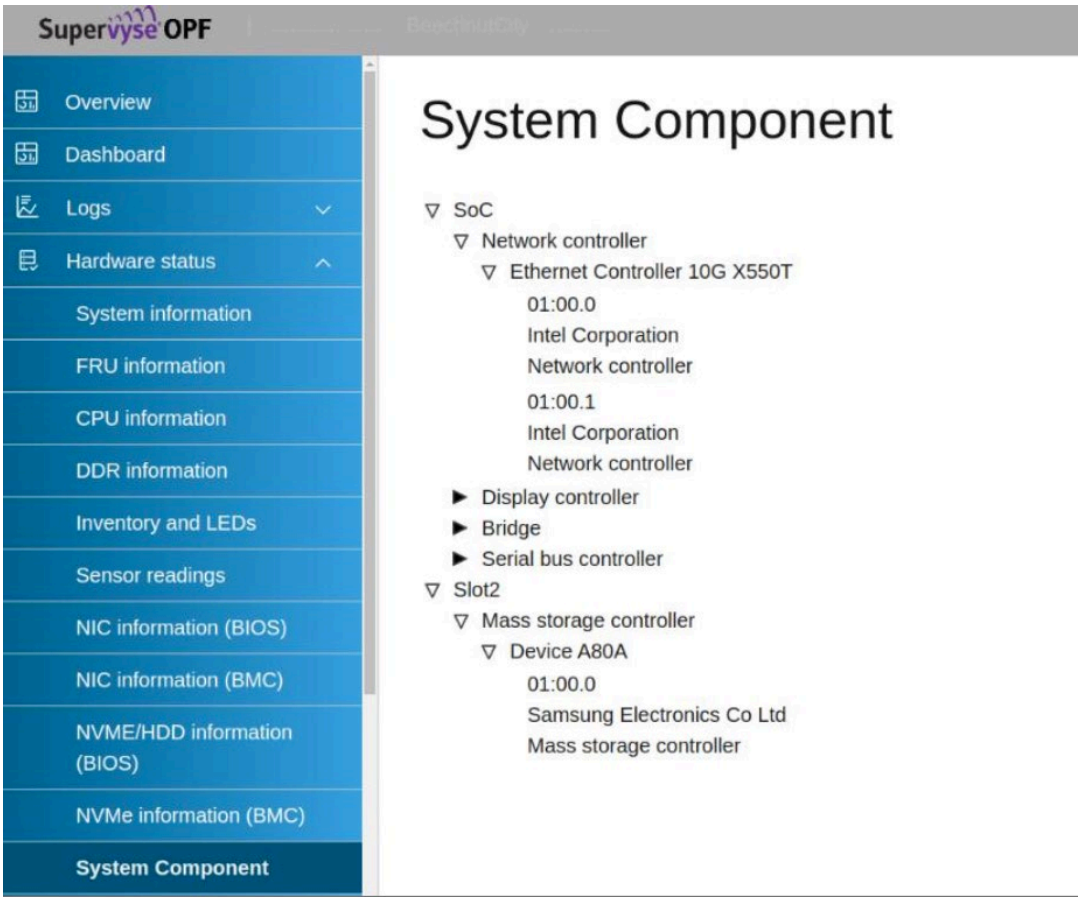
Notice: *The PFA LED display interface depends on whether the device supports this feature. A detailed description of the PFA LED display will be provided in the following content.*



System Component

To go to the **System Component** page. Click **Hardware Status -> System Component** from the main menu. This page provides detailed information about the hardware components of the system, organized hierarchically for easy navigation.

Notice: *This page is related to Insyde BIOS Joint Features functionality. The content will only be displayed after the BIOS uploads the relevant data to the BMC via the host interface.*



SMBIOS

To go to the **SMBIOS** page. Click **Hardware status -> SMBIOS** from the main menu. This page offers an interface for viewing and configuring SMBIOS settings.

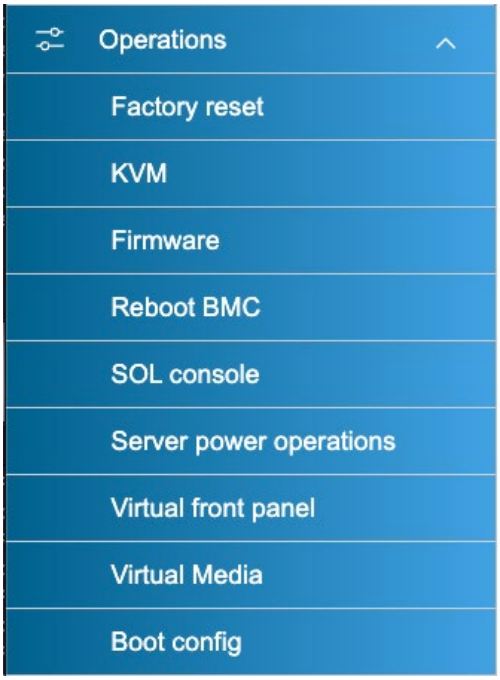
SMBIOS (System Management BIOS) is a standardized interface that allows the operating system to obtain information about hardware components, such as processors, memory, hard drives, motherboards, and more.

SMBIOS provides structured tables that describe detailed hardware information, typically provided by the BIOS, which can be read by the operating system or other management tools. Through this page, you can view and modify the SMBIOS data.

Notice: *For more information, please refer to https://www.dmtf.org/standards/smbios. This page is related to Insyde BIOS Joint Features functionality. The content will only be displayed after the BIOS uploads the relevant data to the BMC via the host interface.*

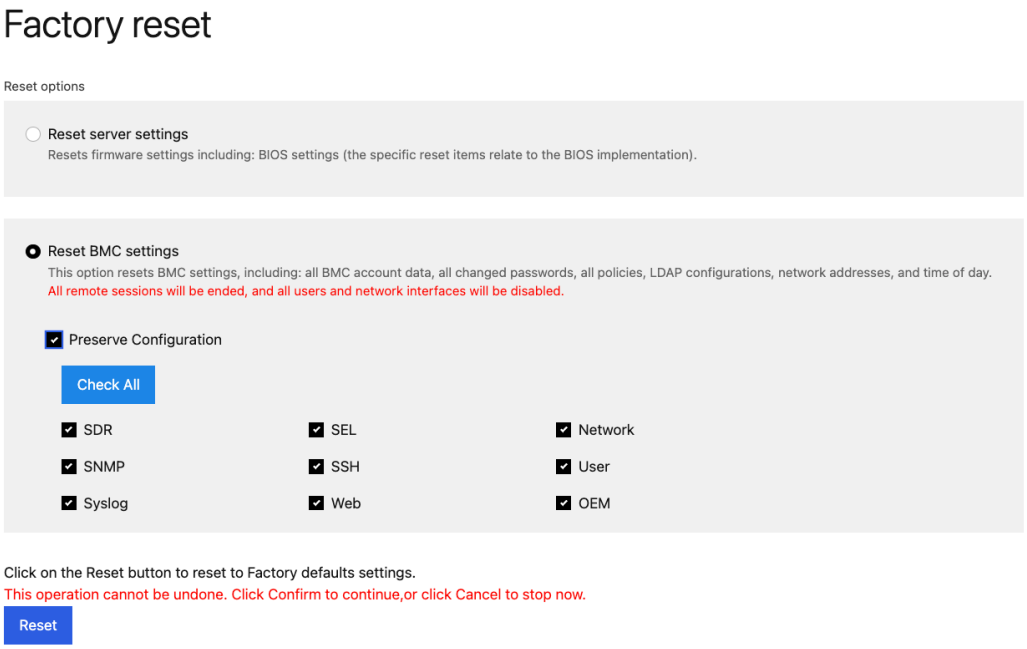
Operations

Operations provide a series of functions for remote management and maintenance of servers, enabling efficient remote server administration.



Factory reset

This page is used to display factory reset options. Click on the Reset button to reset factory settings. Offering various reset options.



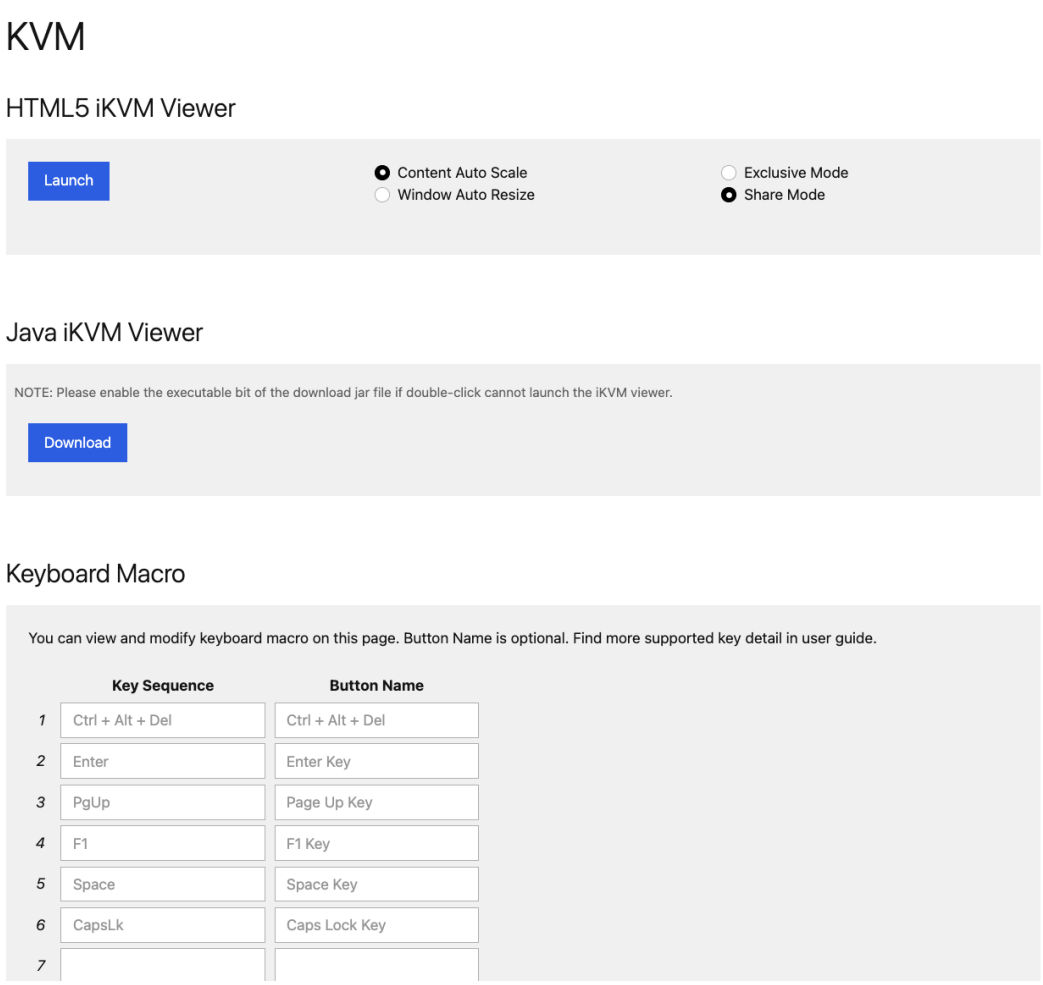
Option	Task
Reset server settings	Reset BIOS settings (the specific reset items relate to the BIOS implementation). Does not affect BMC or network related configurations.
Reset BMC settings	Resets BMC settings.
Reset	Click the button to start the reset process. When clicked, a confirm action dialog will pop up, click **Confirm** to continue, or click **Cancel** to abort.

Factory reset options: others will reserve the configurations.

Option	Task
SEL	Preserve system event log.
SSH	SSH RSA key, it will be re-generated if it's not preserved.
OEM	Preserve files under folder /nv/oem and /nv/oemnv in BMC file system.

KVM

The KVM page provides three main features: two types of KVM viewers (HTML5 iKVM Viewer and Java iKVM Viewer) and the Keyboard Macro setting feature. KVM is used to redirect the client's **Keyboard** and **Mouse** inputs to the host system, while the **Video** is exported the host system display to client. These features enable efficient remote system management with flexible access and customizable keyboard macros

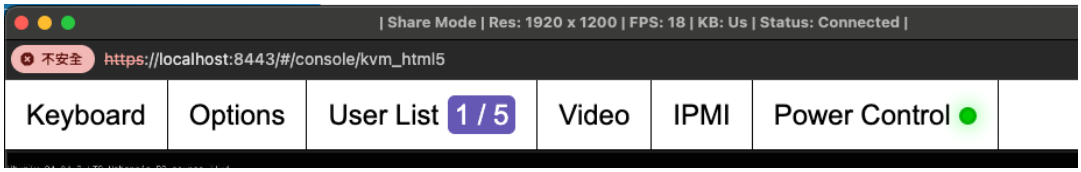


HTML5 iKVM Viewer

1. Launch - Click on the Launch button to launch the HTML5 iKVM Viewer.
2. Window scale - Select one of the two options: Content Auto Scale or Window Auto Resize.
    a. Content Auto Scale: If this function is enabled, the host content in the iKVM display area will automatically scale to match the window size, maintaining the aspect ratio and displaying the entire content within the window.

b. Window Auto Resize: If this function is enabled, the iKVM window will automatically resize to show the full host display. When the window size is reduced, it will focus on a specific area of the host content, and only part of the host screen will be visible.

3. Session mode - Select one of the two options: Exclusive Mode or Share Mode
    a. Exclusive Mode: If this function is enabled, the iKVM Server will only accept one connection, and others will be rejected.
    b. Shared Mode: If this function is enabled, the iKVM Server will allow multiple clients to connect simultaneously and share the desktop
4. Download - Click the 'Download' button to download the Java iKVM Viewer jar file. (For more details, please refer to the Supervyse IKVM Java Viewer User Guide.)
5. Save - Click to save the Keyboard Macro settings
6. Key Sequence - Enter the desired key sequence (e.g., Ctrl + Alt + Del) to define the macro
7. Button Name (Optional) - Enter a custom name for the button that triggers the key sequence. Notice: If left blank, it will automatically use the same value as the Key Sequence field.



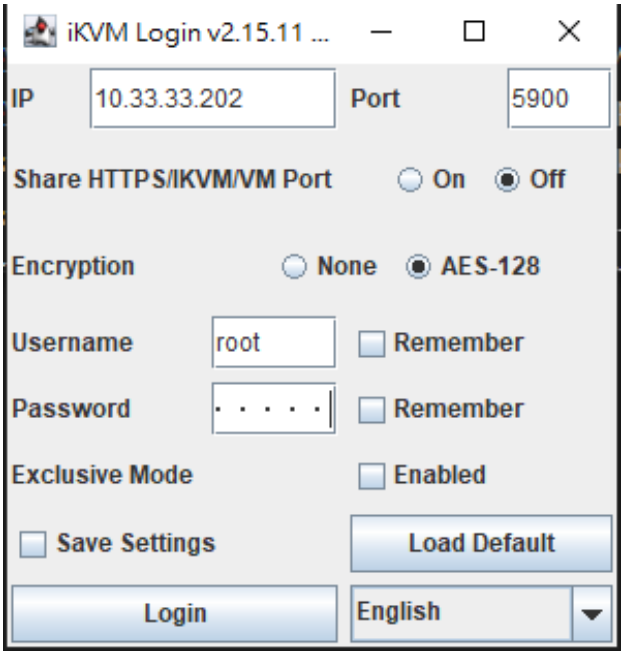
KVM Features:

Category	Option	Task
Keyboard	Virtual Keyboard	Virtual Keyboard is an on-screen keyboard. Users can use mouse to send keyboard event • Click the button "Keyboard" -> "Virtual Keyboard" to launch the virtual keyboard.
	Keyboard Macro	This feature provides many keyboard-macros as an easy way to send keyboard events. A keyboard macro is a composition of several keys. Such as Ctrl+Alt+Del. The keyboard macro is used to trigger reboot on UEFI shell or un-lock the window on Windows.
Options	Keyboard/ Mouse hotplug	If host has no action when BMC bypass user's keyboard/mouse events to host, user can try to click the "Keyboard Mouse Hotplug" to recovery. This function simulates a USB re-plug action from BMC to the host.

	Preferences	The preferences provide custom settings. C. Click “Preferences” to open “Preferences” window. • Must click “Apply” button to store your setting.
User List	Chat room	Users can do some interaction with others using chatroom. You can also send whisper messages.
	User List	• Click to open user list window. • iKVM users, the yellow head bar is the current privilege owner who can control iKVM, and the grey head is **view-only**. • The user can click the Privilege Request button to request iKVM control privileges.
Video	Video Recording control	• Start to record video of iKVM. The video format is .webm. • Stop the video recording then save file to local filesystem. • Capture the screen of iKVM then save PNG file to local filesystem. • Setup recording time for timer recording function, default value is 1 minute.
	Video streaming control	• Play the host display • Pause the host display • Refresh the host display • Zoom in/out the host display
IPMI	IPMI Command	Enter the IPMI command to input field and press "Enter" key to send. The maximum length of each command is 500 characters.
Power Control	Host Power Control	Same definitions as WebUI operations.
	Display Power Control	

How to use Java viewer:

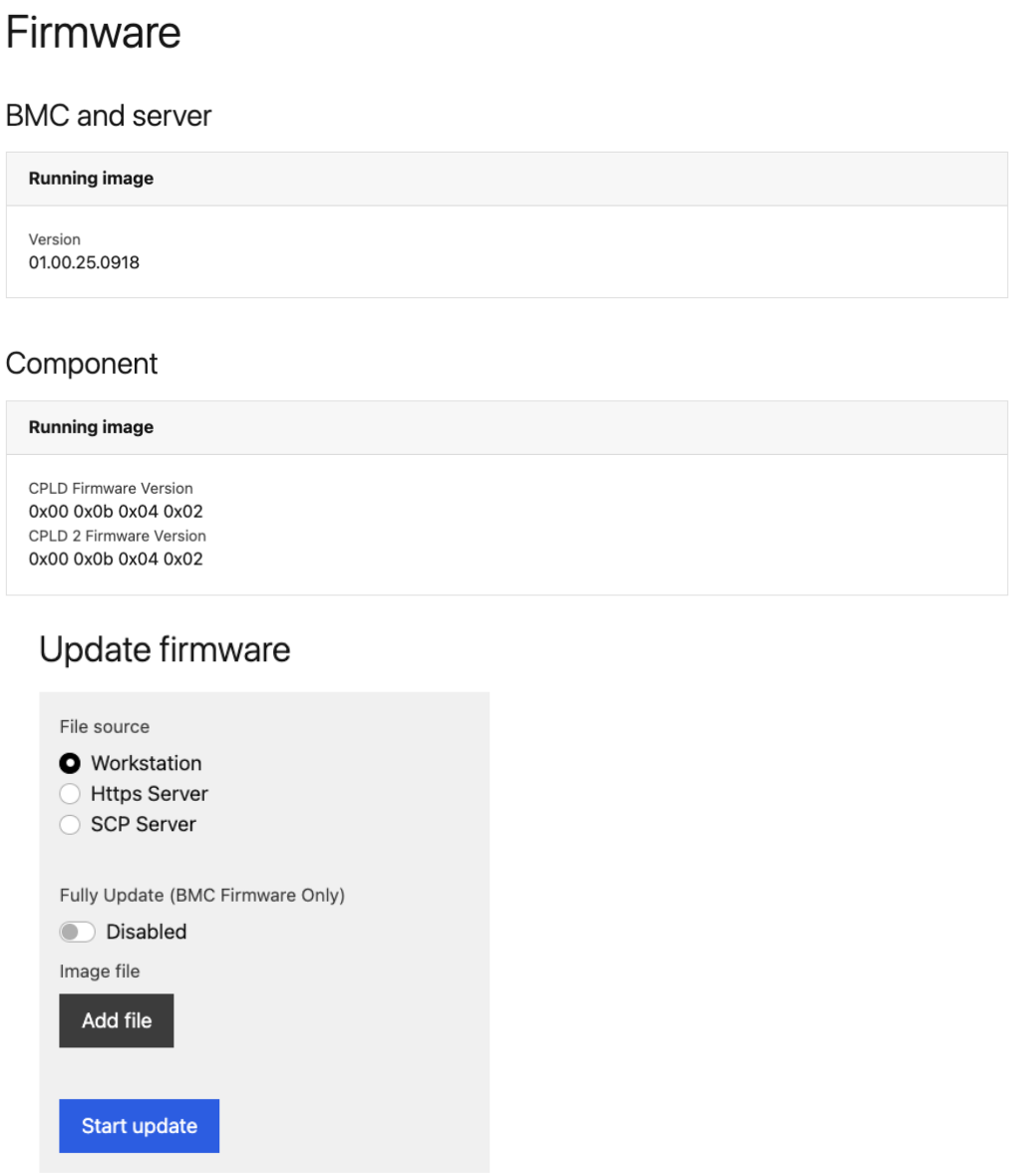
1. Login to BMC web.
2. Go to page Operation > KVM.
3. Click the "Launch" button under "Java iKVM Viewer" and download.
4. Double click to launch the iKVMViewer.jar
    a. You will see a login screen like this. Fill in the required IP, Port, Username, and Password fields
    b. If Share HTTPS/IKVM/VM Port was configured to On, please fill in the port HTTPS (Web) using to Port.
    c. If Exclusive Mode is Enabled, only one user can use KVM
5. Press the "Login" button to connect to KVM server.
6. After login, the main window of KVM viewer will display.



Firmware

To go to **Firmware** page. Click **Operations -> Firmware** from the main menu.

The firmware page includes a firmware version entry and the update firmware entry.



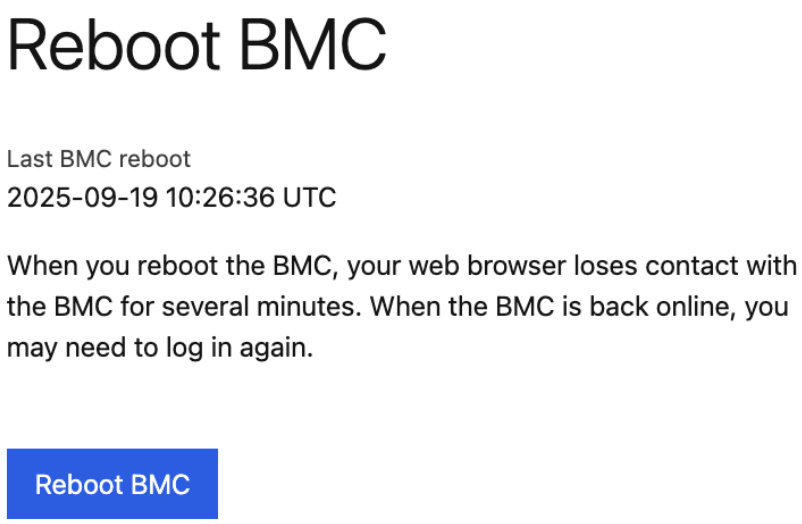
Option	Task
File source select	Chooses to update the image source from either the local system or TFTP.
Fully Update (BMC Firmware Only)	Enables factory reset update function. Note that the factory reset is performed after the firmware update.

	This feature is only applicable to BMC firmware and cannot perform factory updates on other firmware images.
Add File	Uploads the firmware image file from the client-side disks.
Start Update	Starts the update process and for more information. It will show a pop-up to input Password, click “AUTH” for continue, click “Cancel” to do nothing.

Reboot BMC

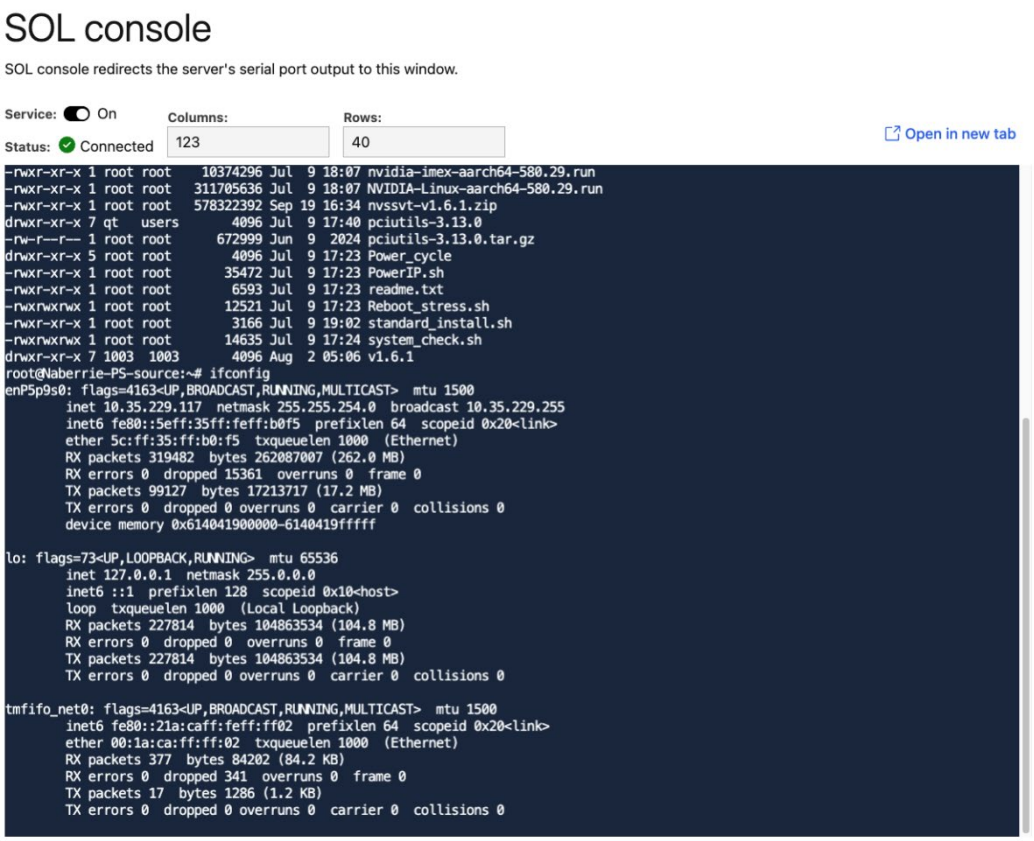
To go to the **Reboot BMC** page. Click **Operations -> Reboot BMC** from the main menu.

This page provides users with the ability to restart the BMC. This feature is essential for troubleshooting and maintaining system stability when configuration changes or issues arise.



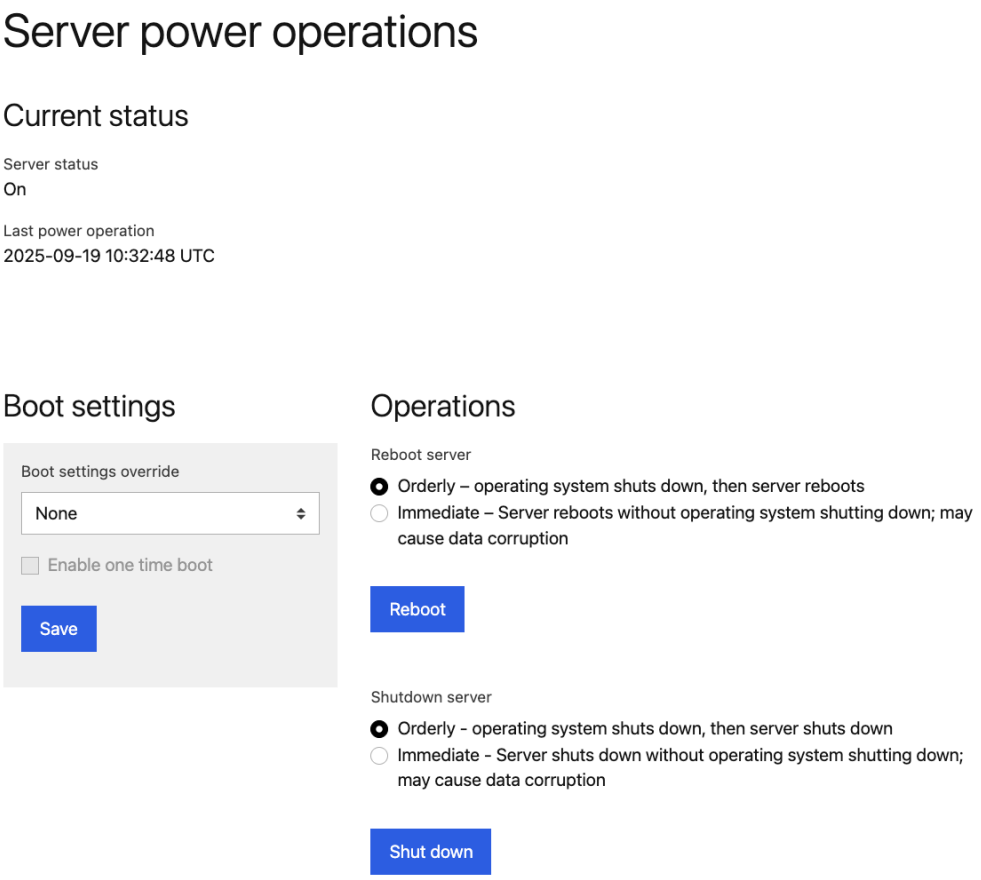
SOL console

To go to **SOL (Serial Over Lan)** console page. Click **Operations -> SOL console** from the main menu. This page is used to display the SOL console.



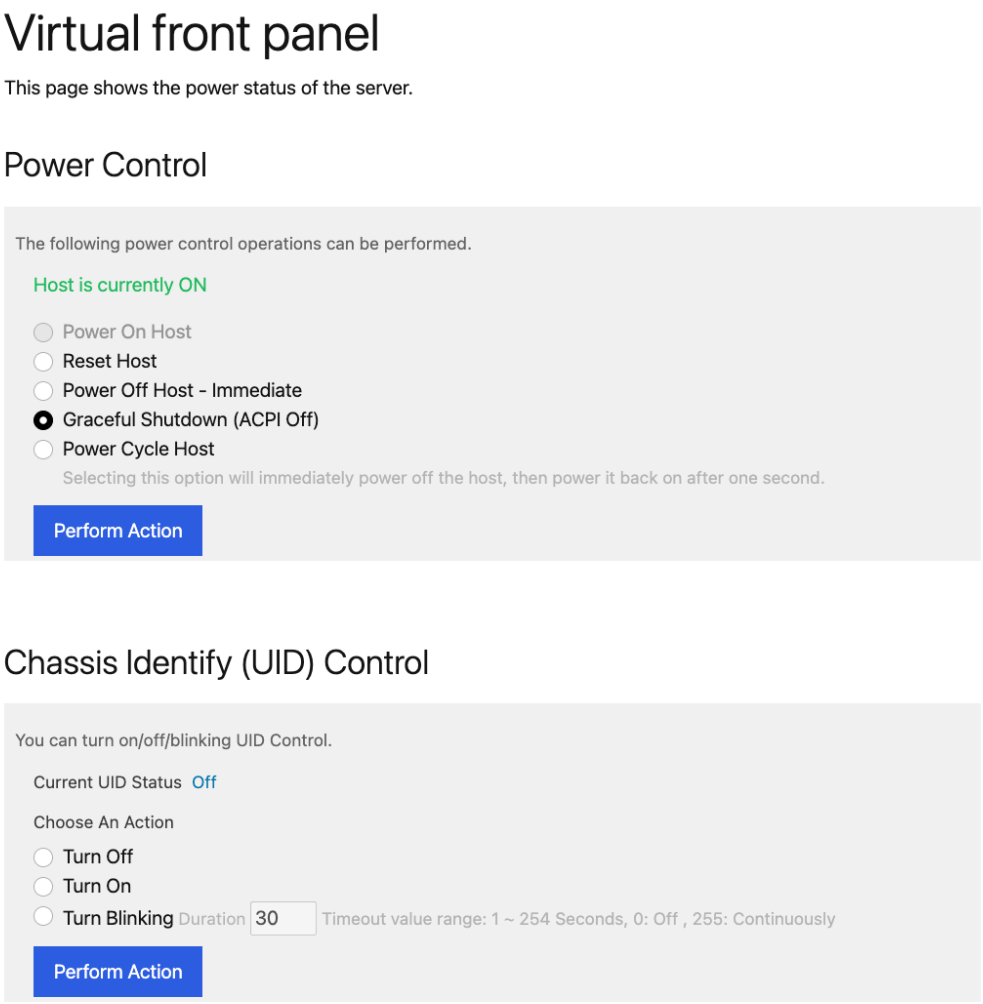
Server power operations

This page allows you to manage and control the server's power state. From this page, you can perform operations such as rebooting, shutting down, or configuring boot settings for the server. This page provides options for both immediate and orderly power operations, allowing for flexible and controlled management of the server's power state.



Virtual front panel

To go to **Virtual front panel** page. Click **Operations -> Virtual front panel** from the main menu. This page provides users with remote control and monitoring capabilities for the server's power status and chassis UID (Unique Identifier). This interface replicates the functionality of a physical front panel, offering a convenient way to manage the server without requiring physical access.

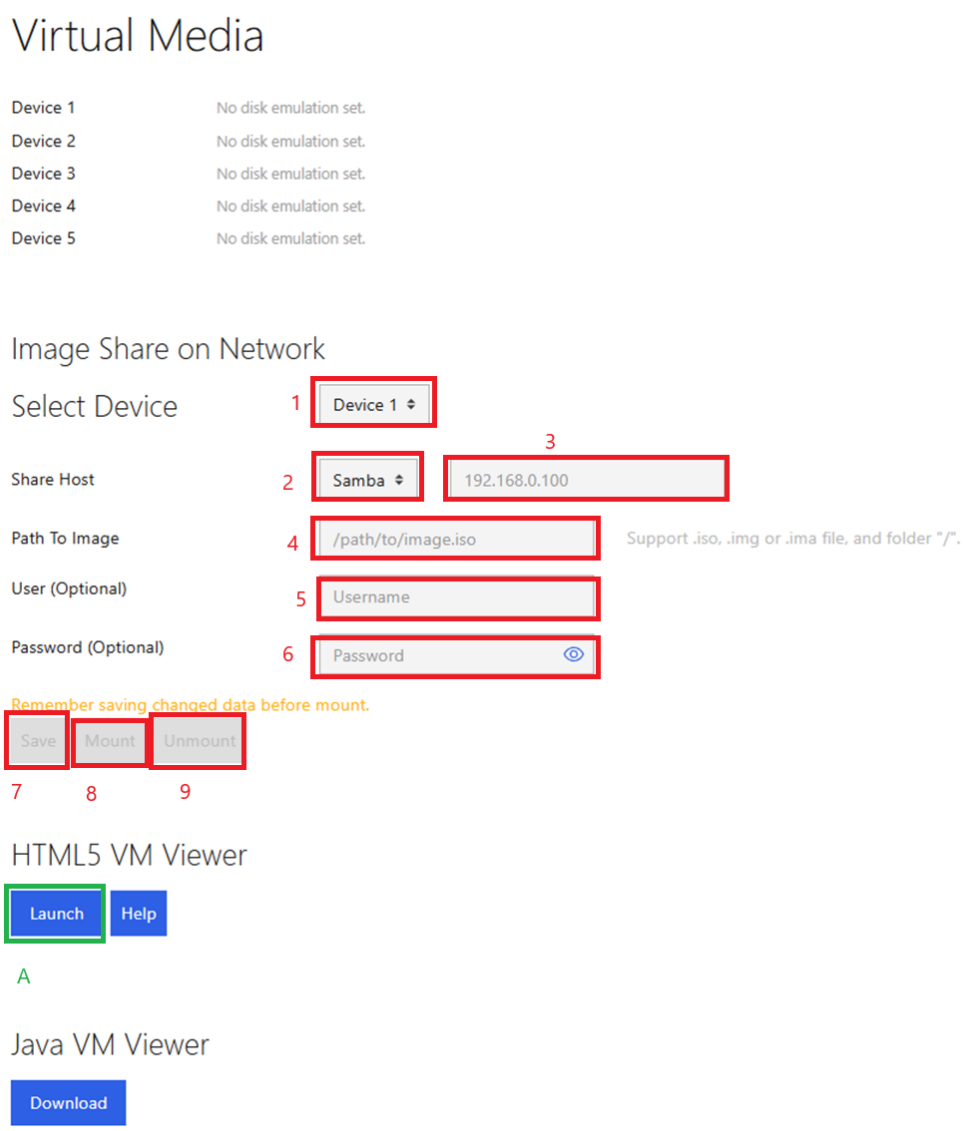


UID Turn Blinking:

- Default Duration: 30 seconds.
- Duration Range: 1 to 254 seconds.
- Special Values:
    - 0: Turns the blinking off.
    - 255: Enables continuous blinking.

Virtual Media

To go to **Virtual Media** page, click **Operations -> Virtual Media** from the main menu. This section demonstrates various methods for using Virtual Media, such as HTTPS, Samba, NFS, and HTML5, to share ISO images or folders from a client to a host.

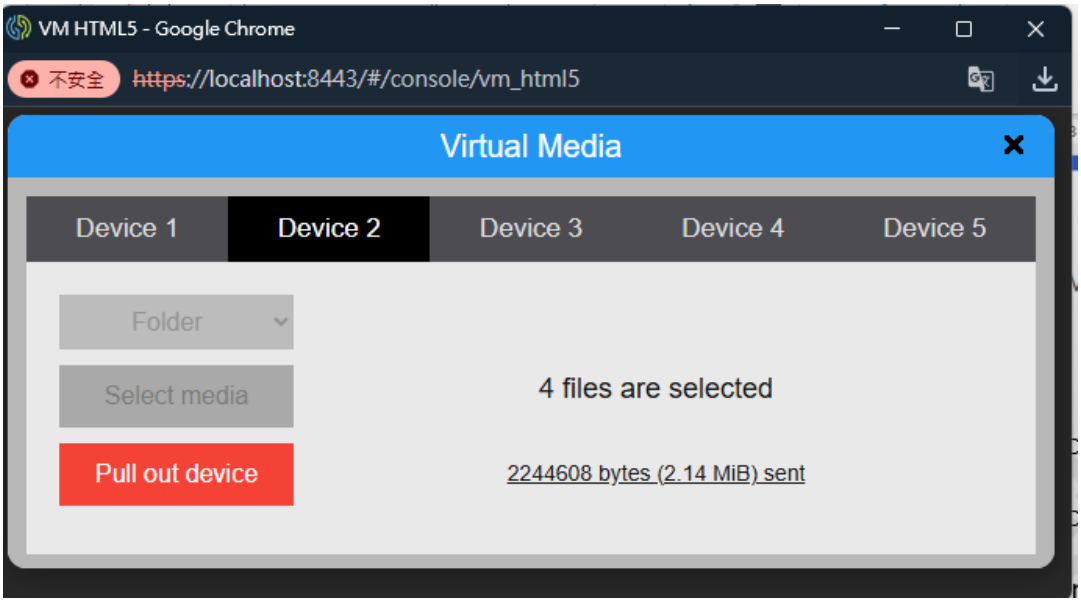


1. Select a device in the dropdown menu.
2. Select [Samba] from the dropdown list.
3. Enter Share Host.
4. Enter Image Path.

5. Enter User.
6. Enter Password.
7. Press Save button and see if “Success” message shows on right top corner.
8. Press the Mount button. If the mounting process is successful, the corresponding device status will display a "Mounted message”, and the shared content will also be visible on the host.
9. Press the Unmount button to plug out the image.

VM HTML Viewer

Click **Launch**. The main window of VM over HTML5 will pop up.



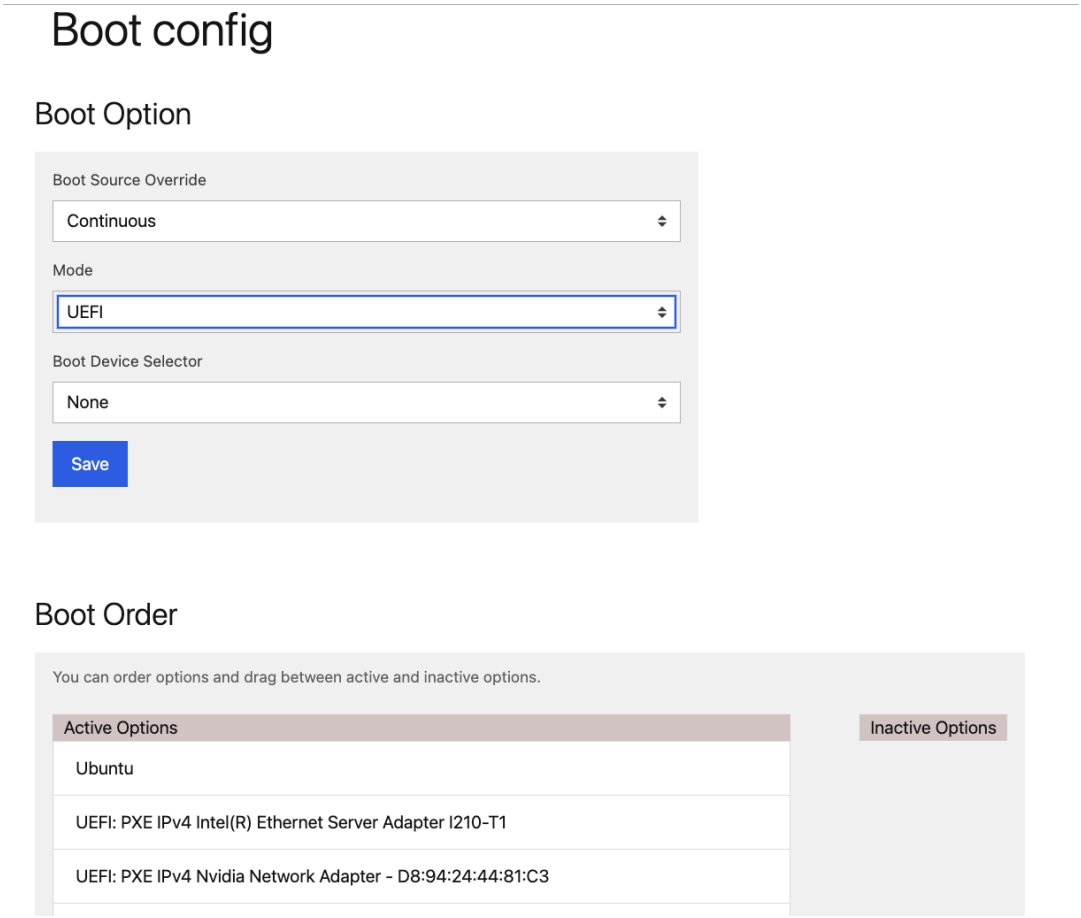
Note: Do NOT close the operation window while using Virtual Media over HTML5, as this will terminate all connections.

Media Types:

- ISO -> Mount a local ISO file to the host.
- Folder -> Mount a local folder to the host.
- IMG/IMA -> Mount a IMG or IMA file to the host.

Boot config

BIOS joint feature. This page allows users to configure boot options and order for the system. It is divided into two sections: Boot Option and Boot Order.



Boot Options:

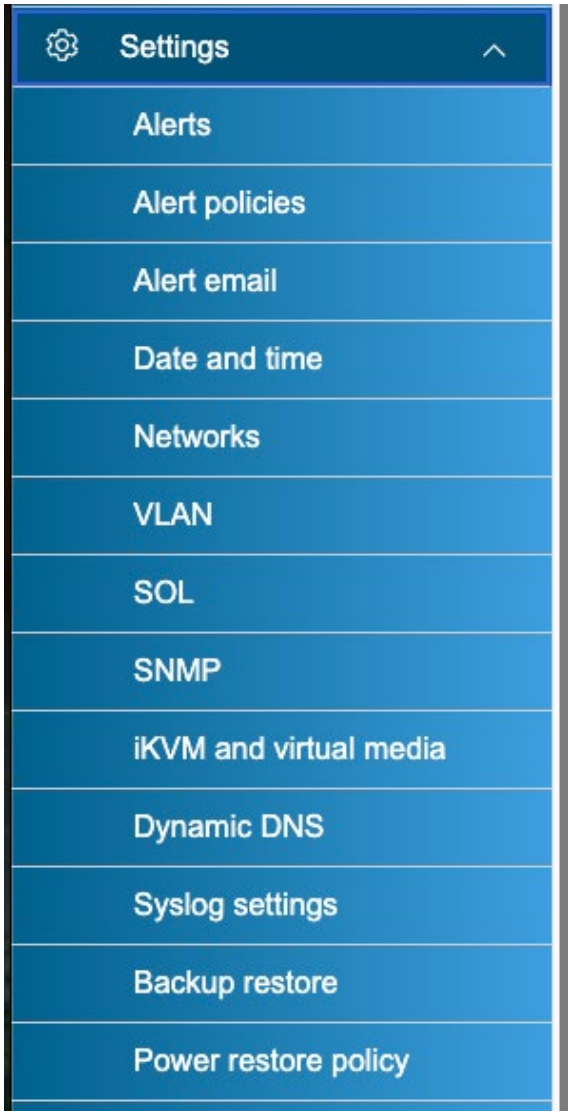
This section provides options to control the boot behavior and source.

Option	Task
Boot Source Override	Temporarily overrides the default boot source. Options value: • **Disabled**: No override; use the system's default boot source. • **Once**: Override the boot source for the next boot only. • **Continuous**: Continuously override the boot source for all subsequent boots until changed.

Mode	Select either **Legacy** or **UEFI** depending on your system requirements. Legacy for traditional BIOS-based booting and UEFI for modern firmware-based booting with advanced features.
Save	Save the current configuration settings. A toast notification will display the result of the save operation (success or failure). If the save is successful, a message box will appear reminding you to restart the host to apply the changes. It will also advise verifying that the system boots from the selected boot device and checking the device status if the boot fails.

Settings

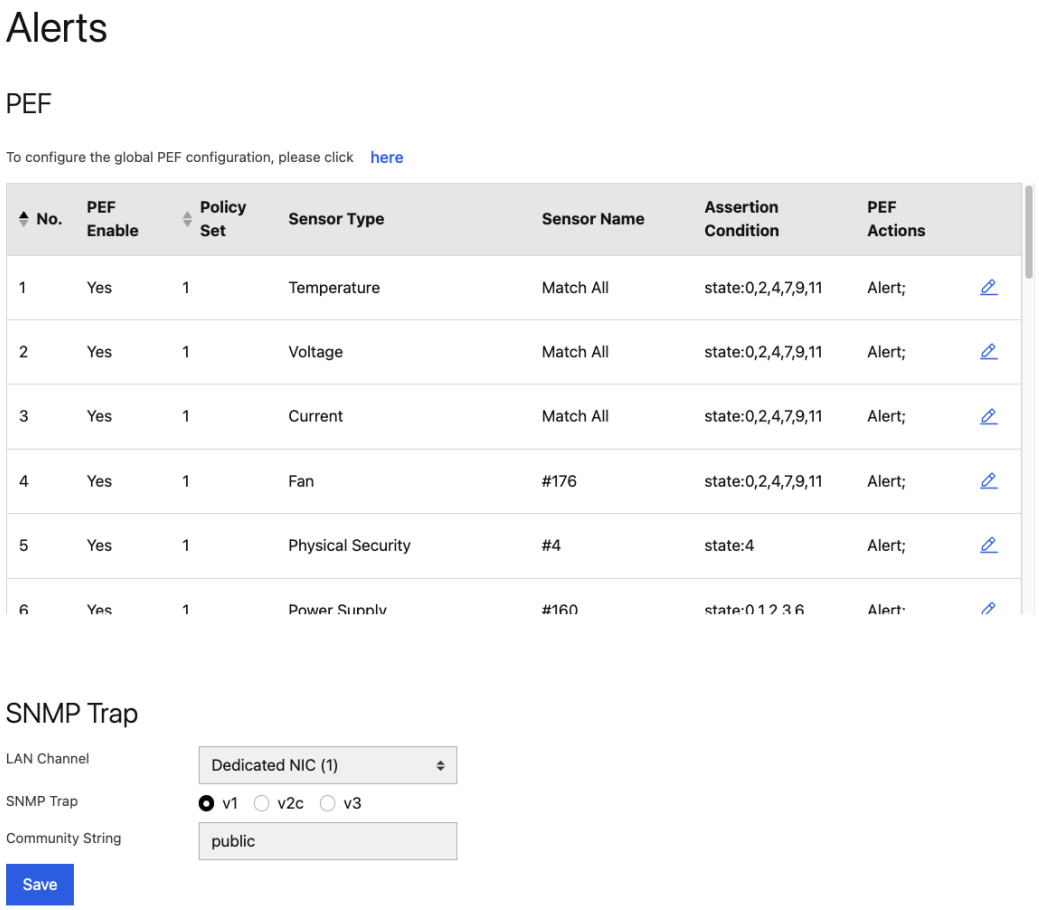
The **Settings** section contains various options related to system configuration and management. These settings allow you to adjust alert notifications, network configurations, remote management tools, log recording, and other functionalities according to your needs, thereby improving system management efficiency, enhancing system stability, and simplifying troubleshooting.



Alert

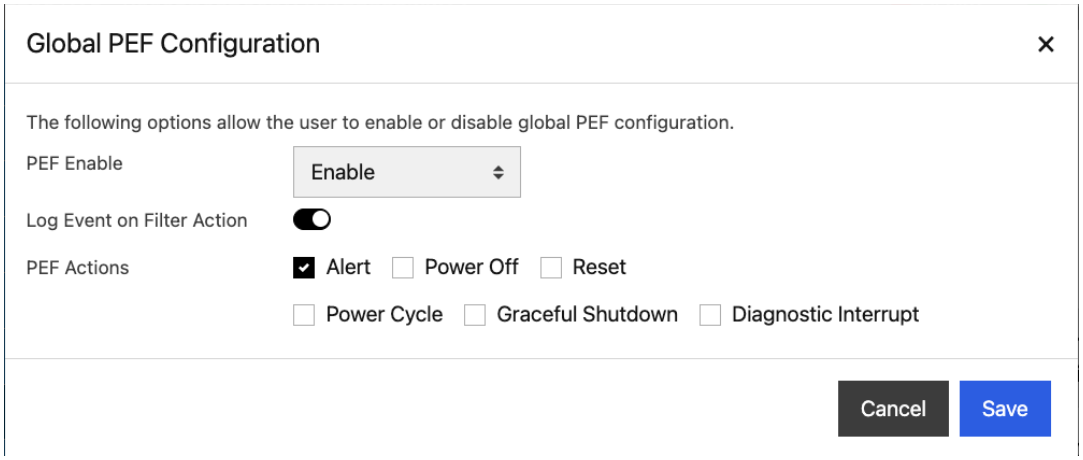
To go to **Alerts** page. Click **Settings -> Alerts** from the main menu. Use this page to configure which system events should trigger alerts and the destination for those alerts. Up to five destinations can be selected for each LAN channel lists the options to select the events that should trigger alerts and where the alerts are to be sent.

Alerts page comprises three key components: PEF (Platform Event Filtering), SNMP Trap, and Alert Destination. These elements work in tandem to monitor system health and deliver alerts when issues arise.



PEF (Platform Event Filtering)

PEF is used to filter and manage system events. It triggers alerts based on specific hardware conditions, such as temperature spikes or power failures. Administrators can set rules to ensure alerts are only triggered by relevant events, allowing for more efficient monitoring.

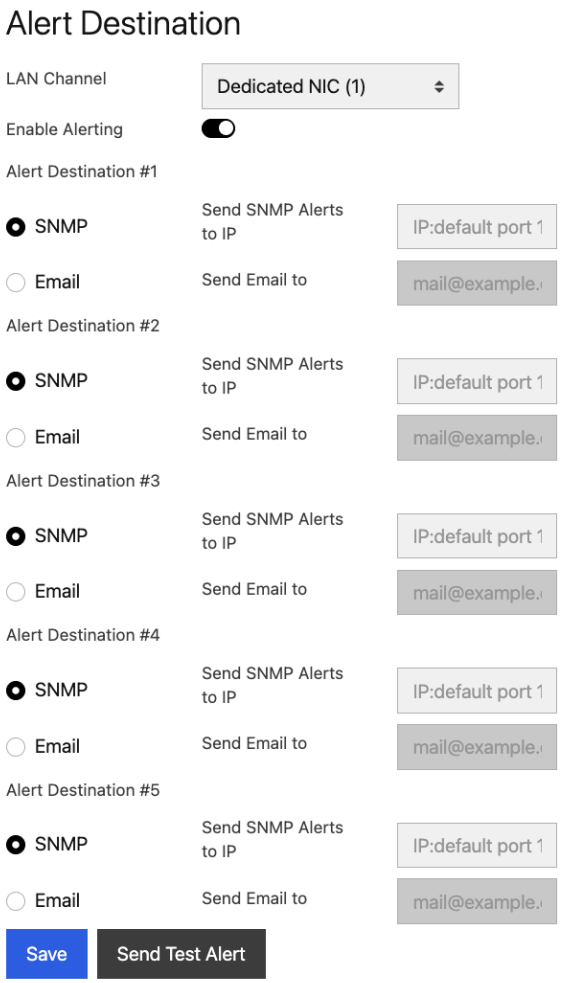


SNMP Trap

SNMP (Simple Network Management Protocol) Trap is a notification mechanism that sends event information to a management system when critical alerts occur. It helps IT administrators receive real-time notifications of hardware or system issues for prompt action.

Alert Destination

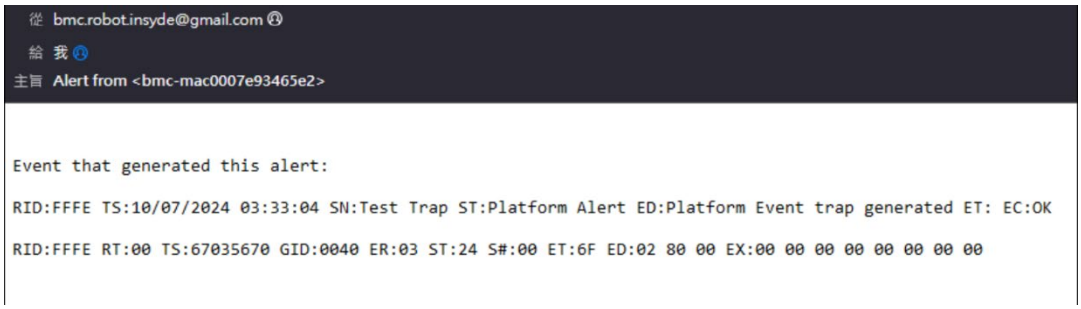
Alert Destination defines where the alerts are sent, such as email, SNMP management systems. BMC allows multiple destinations to be configured, with up to five per LAN channel, ensuring alerts are directed to the appropriate recipients.



Example: Send an alert via SMTP email server

***Prerequisite**: "Alert Email" must be configured.*

1. Configure one Alert Destination, select "**Email**" and input an alert target mail address.
2. Click the "**Send Test Alert**" button, and an alert email will be received in the target mailbox.



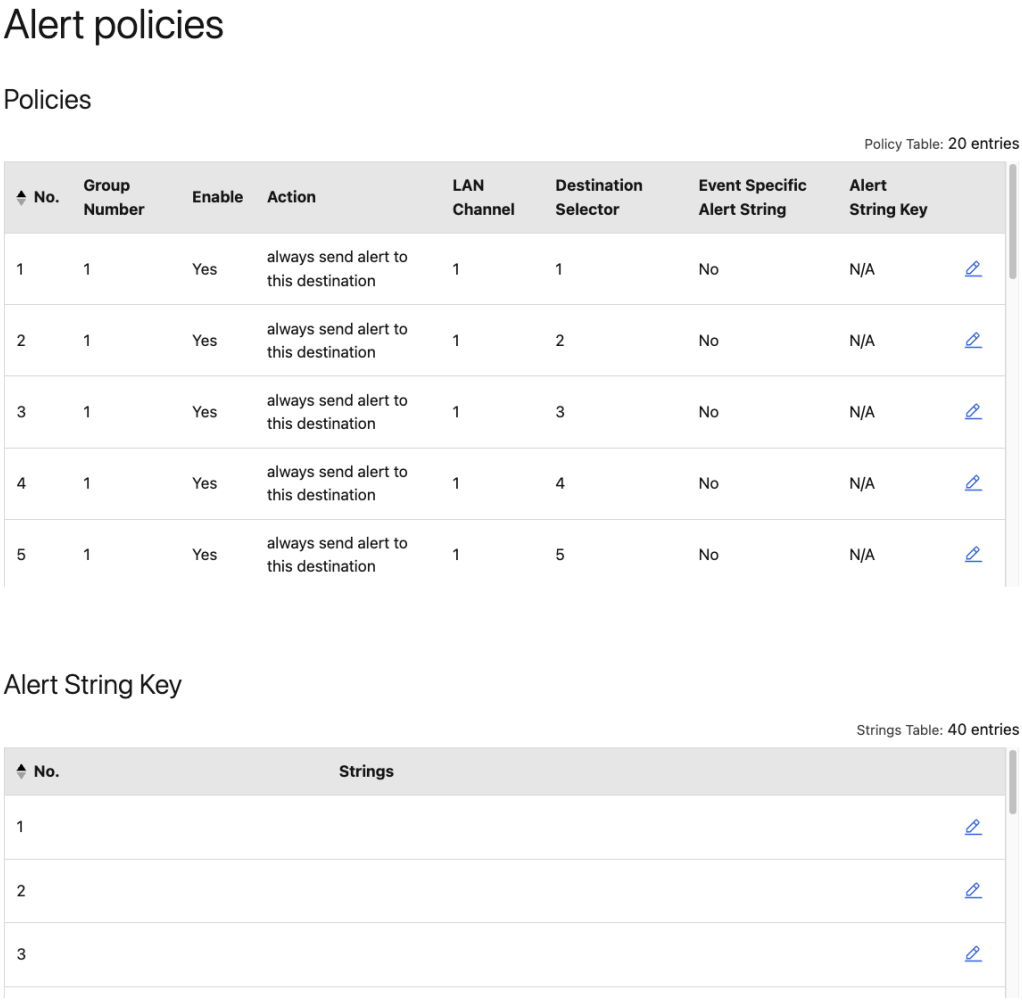
Alert Policies

To go to **Alert** policies page. Click **Settings -> Alert** policies from the main menu. This page is used to display Alert policies related information.

When an alert is triggered via PEF, the alerting process is managed by an alert policy, which consists of one or more alert destinations. These destinations can include various types and channels, processed sequentially. The use of each destination can be configured based on the success or failure of the previous alert.

The Policies data is stored in the Alert Policy Table, a part of the PEF configuration parameters. The system supports multiple policies, each identified by a unique policy number, which is referenced in the Event Filter Entry to determine which policy to apply when a match occurs.

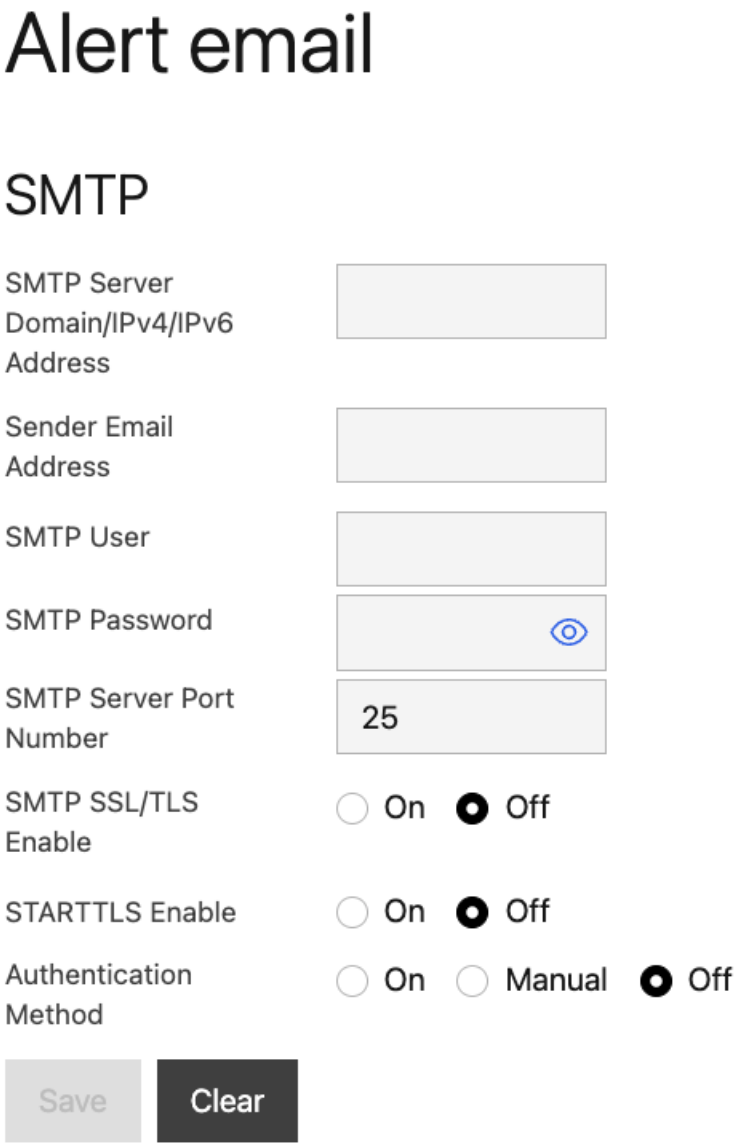
The Alert String Key is used to associate an alert with predefined conditions, event filters, or alert policies. It allows the system to recognize the nature of the event, what triggered it, and how it should be handled. Typically, the alert string key follows a specific format to ensure it is distinct and easily identifiable, enabling administrators to quickly diagnose and respond to issues.



(The Strings Table fixed limit of 40 entries.)

Alert email

To go to **Alert email** page. Click **Settings -> Alert email** from the main menu. This page is used to configure alert email related information.



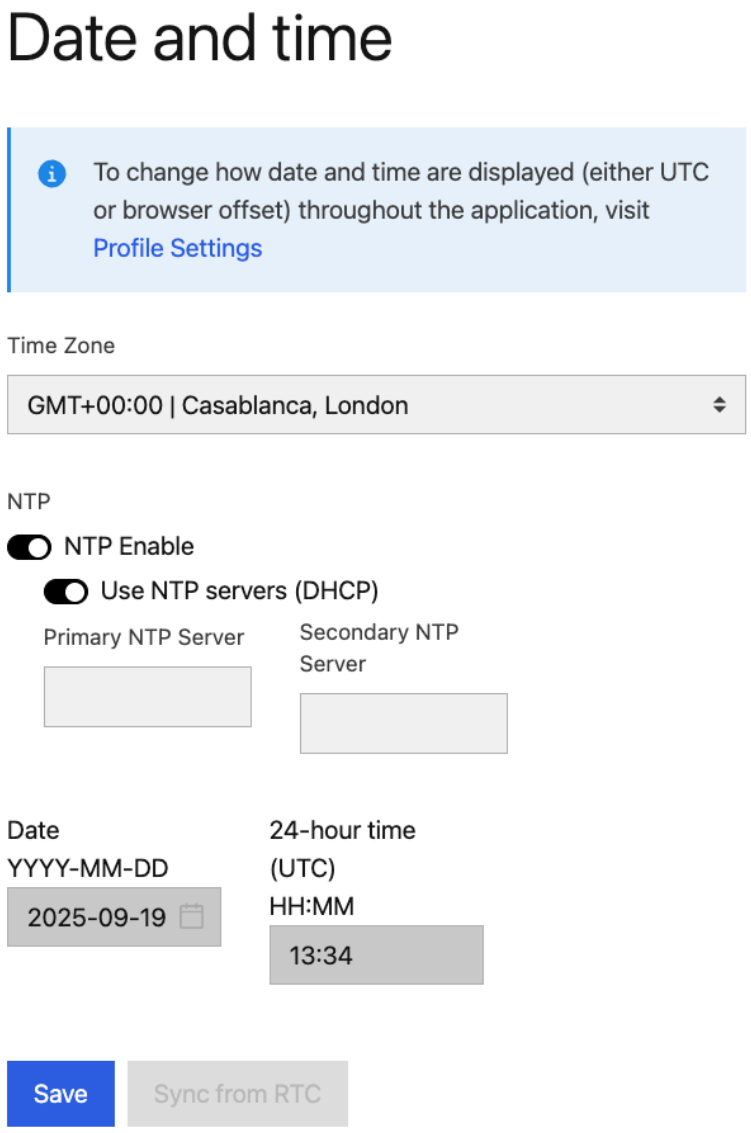
Example: Using Gmail configuration

Reference Google SMTP configuration
https://support.google.com/mail/answer/7126229?hl=en&sjid=10907887383758912285-AP#zippy=%2Cstepchange-smtp-other-settings-in-your-email-client

Date and Time

To go to **Date and time** page. Click **Settings -> Date** and time from the main menu. This page is used to display and modify BMC date and time information.

The Network Time Protocol (NTP) is a server used to synchronize the time of network devices.



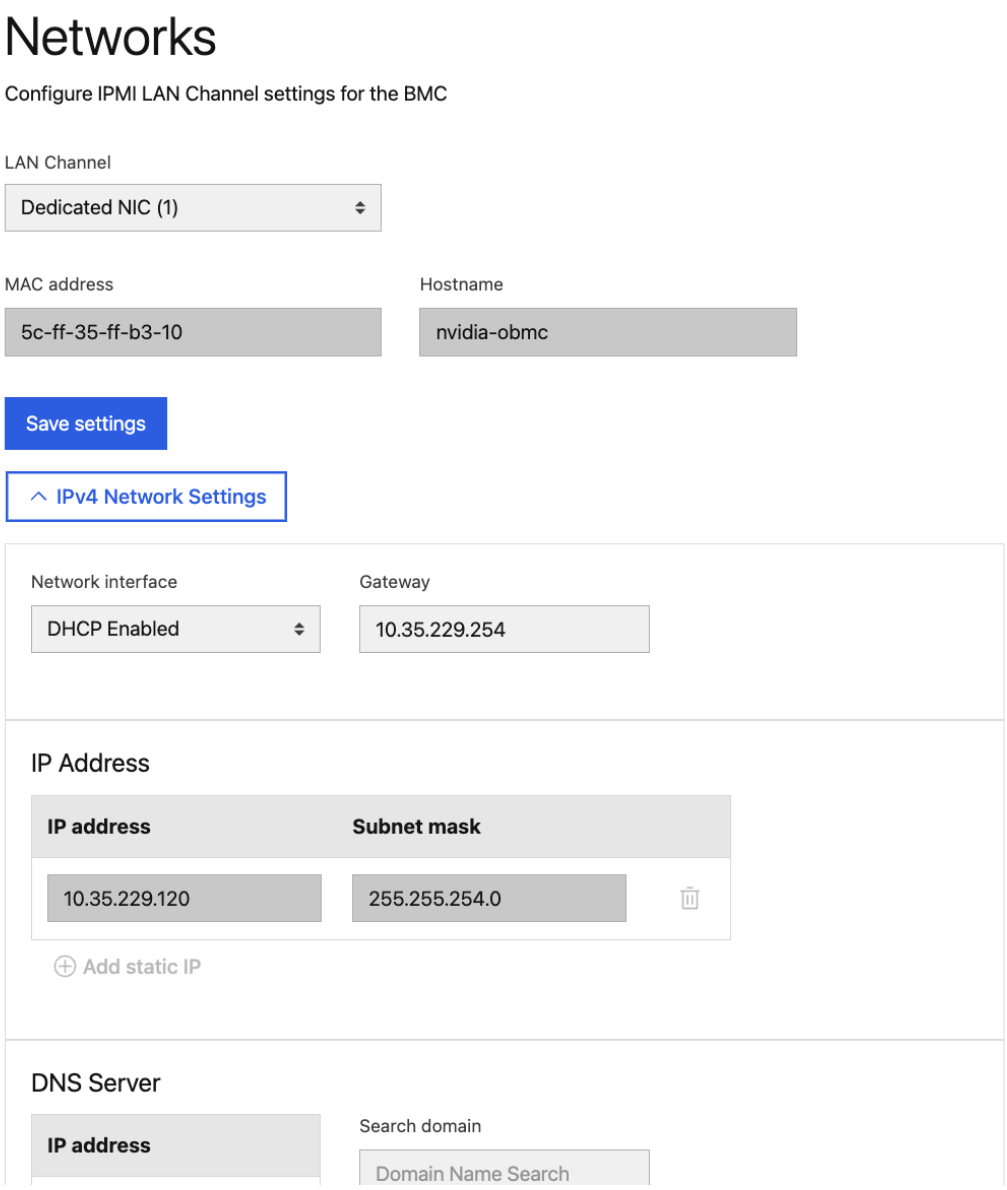
Notice: *The date and time cannot be set more than* ***Jan 19 03:14:07 2038****. After this point, systems relying on a signed 32-bit integer to track time will experience an* ***integer overflow****, causing the time to be misrepresented as* ***Dec 13 20:45:52 1901 (UTC)****.*

Enable/disable NTP service.

- If NTP is enabled, you have to set the Use NTP servers (DHCP)、Primary NTP Server、Secondary NTP Server setting fields related to NTP.
- If NTP is disabled, you must manually set the date and time in the Date YYYYMM-DD、24-hour time (UTC) HH:MM fields or Sync from RTC.

Networks

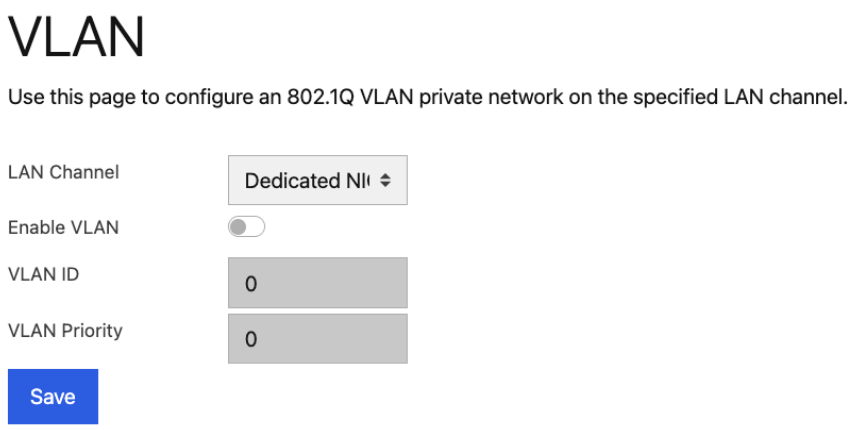
To go to **Networks** page. Click **Settings -> Networks** from the main menu. This page allows you to configure the BMC network settings, including LAN channels, IPv4 and IPv6 configurations, as well as DNS server settings.



VLAN

To go to **VLAN** page. Click **Settings -> VLAN** from the main menu. This page allows you to configure an 802.1Q VLAN private network for a specified LAN channel. This setup is essential for creating isolated virtual networks for better traffic management and security.

Notice: *802.1Q is a standard protocol for implementing VLANs in Ethernet networks.*



VLAN ID: Enter the VLAN ID (identifier) for the VLAN network. VLAN ID are used to uniquely identify. each VLAN on the network. Values are from **1** to **4094**.

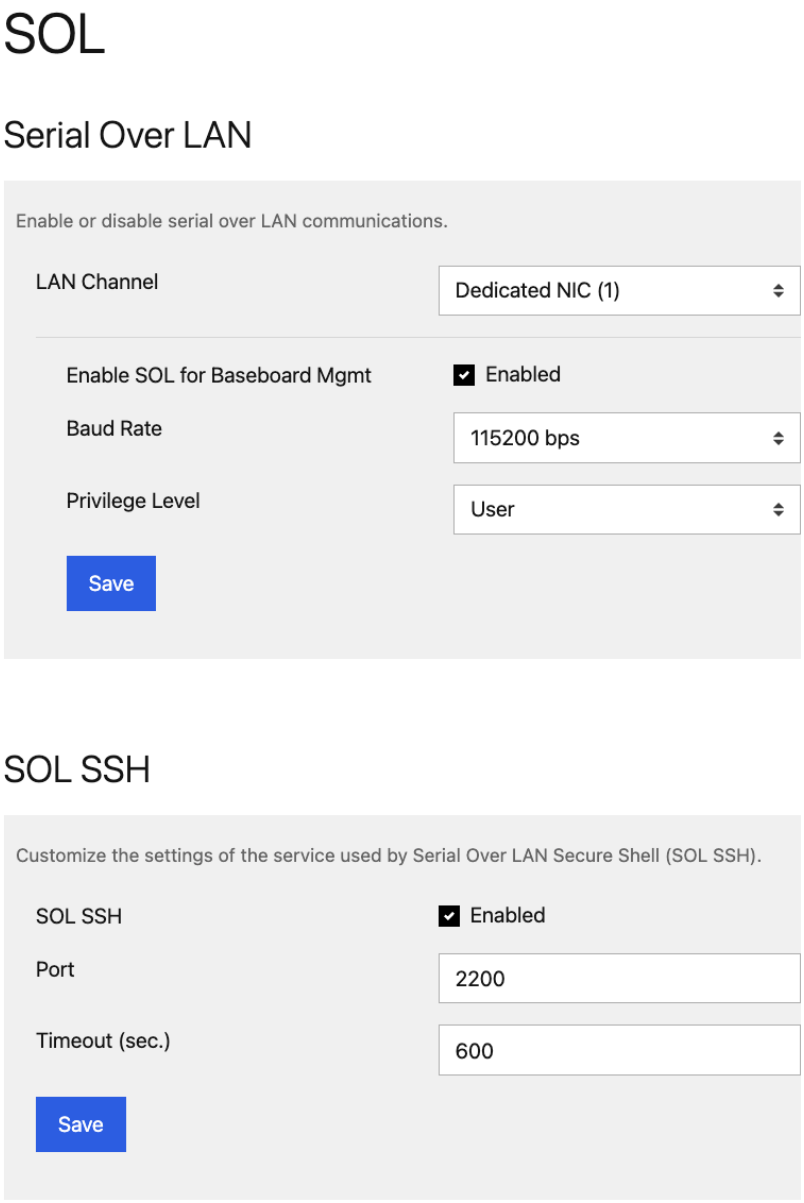
VLAN Priority: Set the VLAN Priority to define the traffic class for the VLAN. This value determines the priority level of packets sent through the VLAN.

Valid Range: **0–7**, where **0** is the lowest priority and **7** is the highest priority.

SOL

To go to **SOL** page. Click **Settings -> SOL** from the main menu.

This page allows you to configure the Serial Over LAN (SOL) settings for the BMC. SOL allows you to redirect serial traffic from the baseboard over an IPMI session, enabling communication with the host system during both OS and pre-OS stages. These settings provide the ability to manage and diagnose the host remotely over the network, regardless of the operating system state.



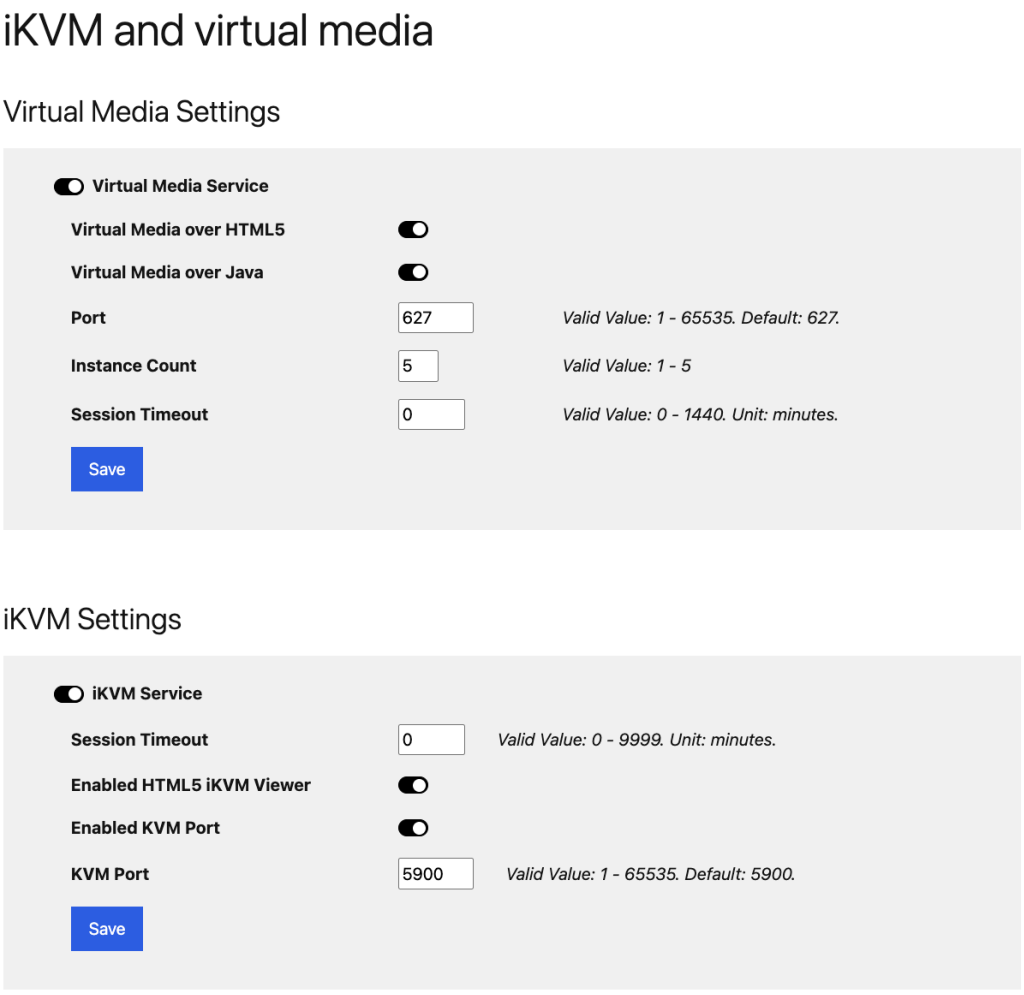
Serial Over LAN: Configure the Serial Over LAN (SOL) settings for remote management of the host's serial console over the network, specific to the selected channel.

SOL SSH: Customize the settings of the service used by Serial Over LAN Secure Shell (SOL SSH). Changing this setting will immediately terminate all the sessions which are using SOL SSH service.

iKVM and virtual media

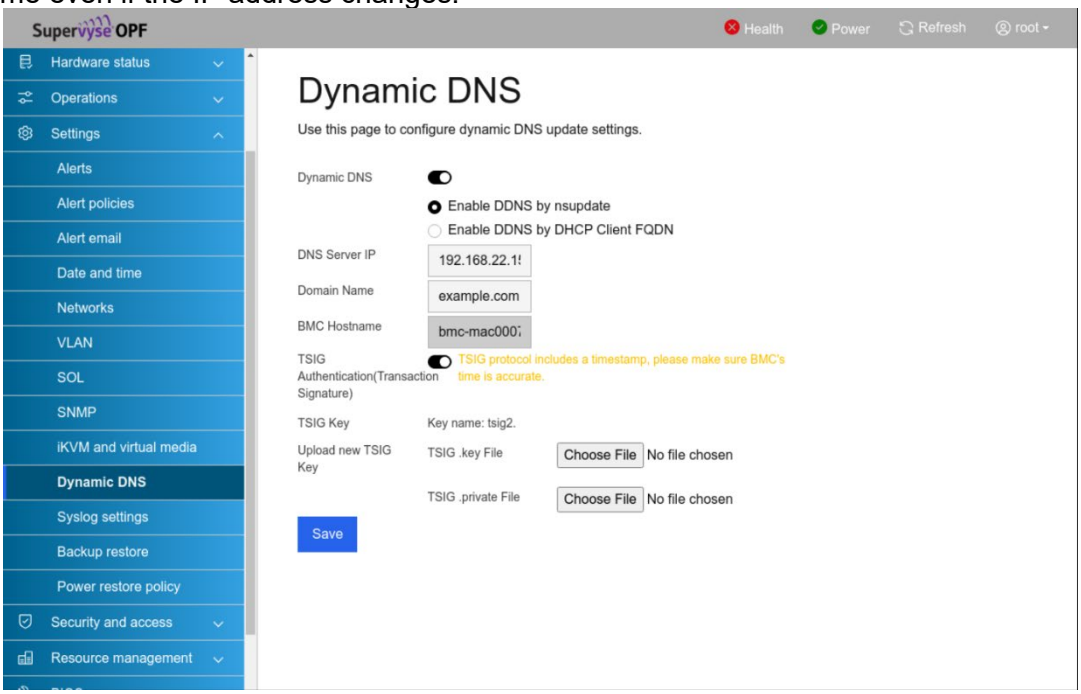
To go to **iKVM & virtual media**. Click **Settings -> iKVM & virtual media** from the main menu.

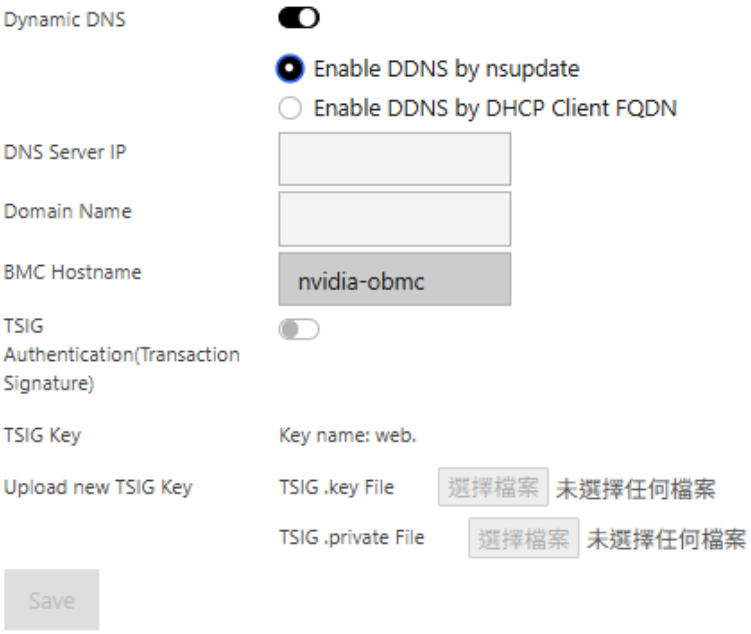
This page allows you to configure iKVM and Virtual Media settings. iKVM (Integrated Keyboard, Video, and Mouse) enables remote control of the host's keyboard, display, and mouse. The Virtual Media feature allows you to remotely mount media (such as ISO files), facilitating OS installation, recovery, or updates. These settings enable flexible host management and support remote maintenance and troubleshooting.



Dynamic DNS

To go to **Dynamic DNS** page. Click **Settings -> Dynamic DNS** from the main menu. This page allows you to configure settings for Dynamic DNS updates. Dynamic DNS is a service that automatically updates changing IP addresses to a DNS server so that users can access the device through a fixed domain name even if the IP address changes.





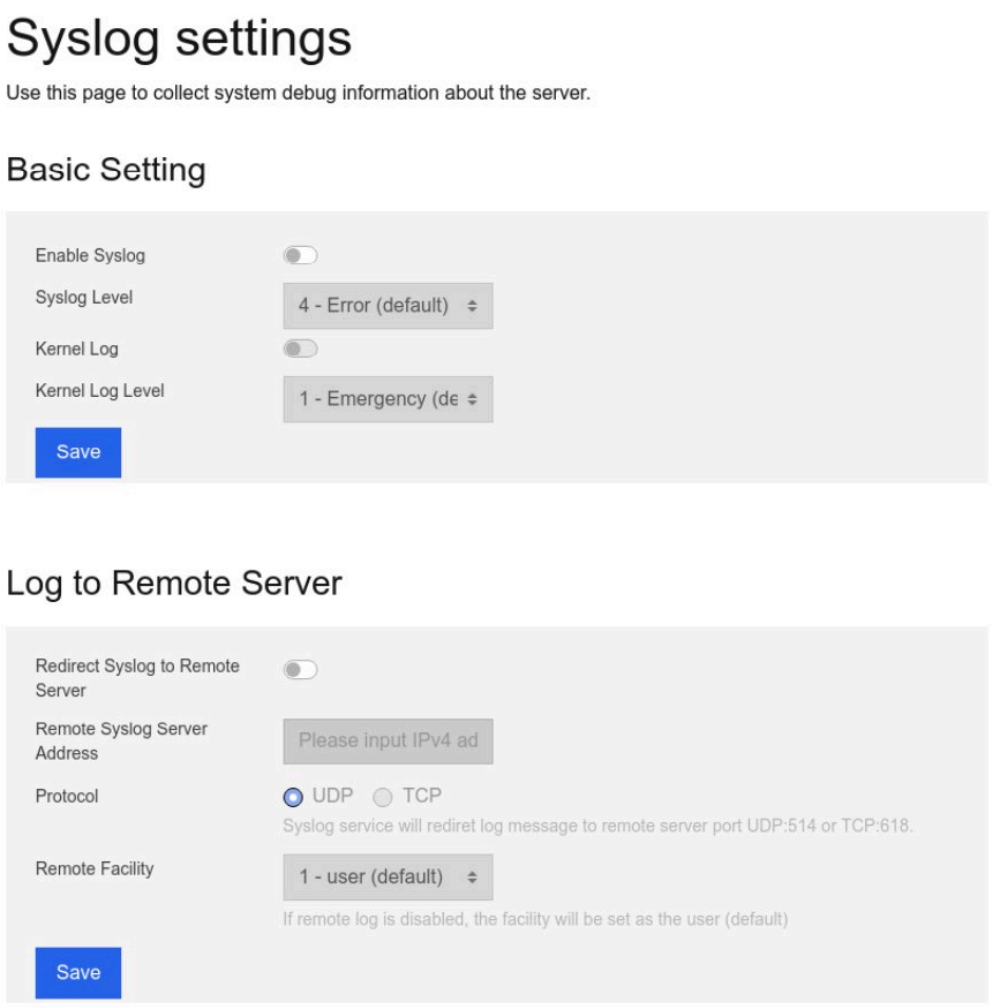
Option	Task

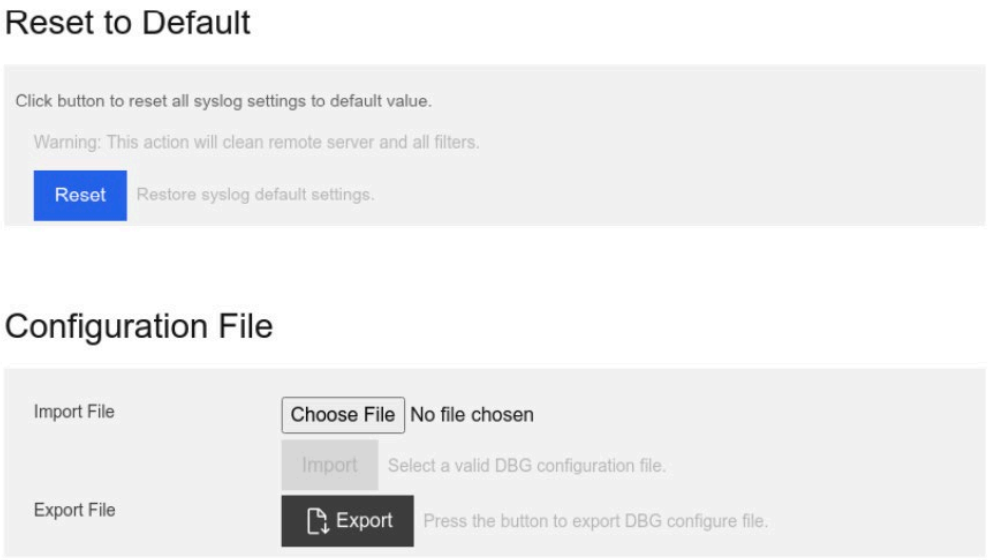
Dynamic DNS	Enables or disables the DDNS feature.
	• **On**: DDNS is active, allowing automatic DNS updates. When enabled, you can choose between:
	  ○ **Enable DDNS by nsupdate** - Use the nsupdate method to update DNS records dynamically.
	  ○ **Enable DDNS by DHCP Client FQDN** - Update DNS records using the Fully Qualified Domain Name (FQDN) provided by the DHCP client.
	• **Off**: DDNS is inactive.

Enable DDNS by nsupdate	The nsupdate option uses a dynamic DNS update utility to send DNS update packets directly to the DNS server.
Enable DDNS by DHCP Client FQDN	This option allows dynamic DNS updates by utilizing the **DHCP Client's Fully Qualified Domain Name (FQDN)**, simplifying DNS record management by automating updates through the DHCP server. It allows devices to automatically update their DNS records, ensuring accurate mappings between IP addresses and hostnames. When enabled, the DHCP client sends its full hostname (FQDN) to the DHCP server, which updates the DNS server with the client's IP and FQDN, removing the need for manual DNS record updates.
TSIG Authentication	This setting enables secure communication between the BMC and the DNS server using Transaction Signature (TSIG). **Notice:** **TSIG protocol includes a timestamp, please make sure BMC's time is accurate**: Ensure the BMC's system time is accurate, as TSIG uses a timestamp to prevent replay attacks. Incorrect BMC time may cause TSIG authentication to fail. **TSIG** (transaction signature): is a protocol extension used in DNS to provide secure authentication and integrity for DNS transactions. It achieves this by attaching a cryptographic signature to each DNS message. This signature is computed using a shared secret key and a hashing algorithm, such as HMAC-MD5 or HMAC-SHA256.

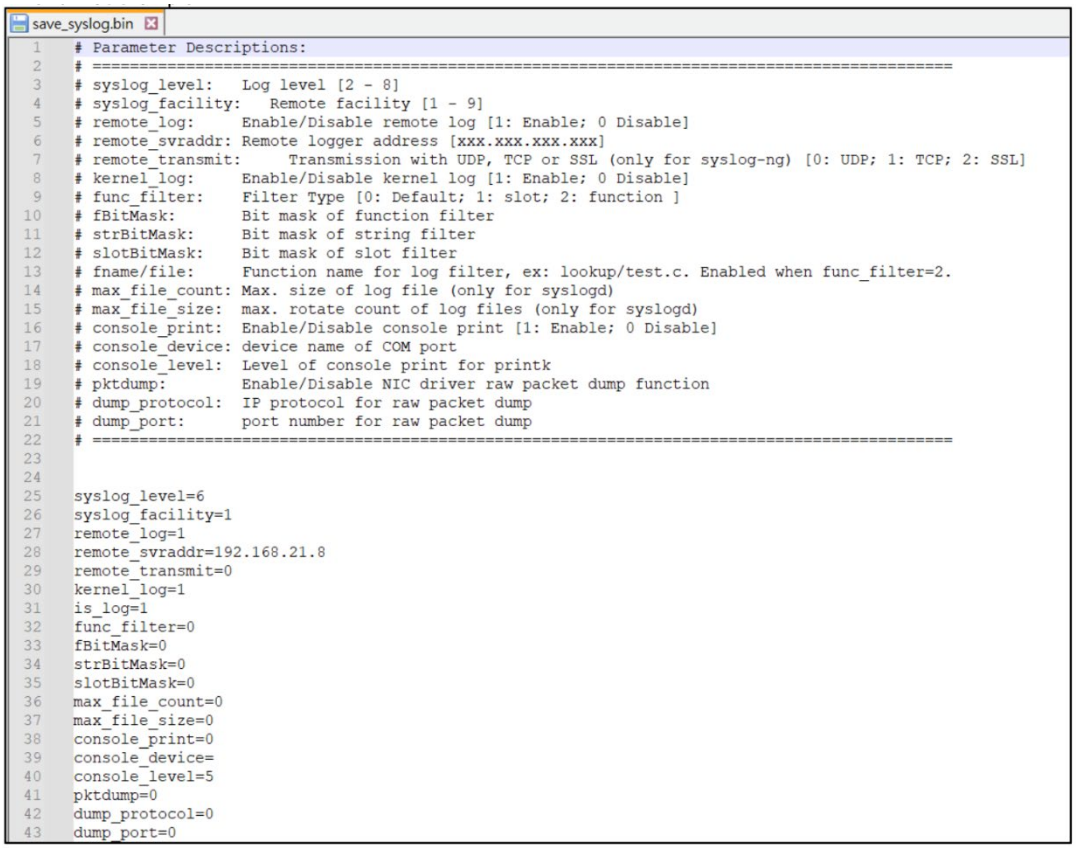
Syslog settings

After enabled Syslog option, you can modify the Syslog Level, Kernel Log, Kernel Log Level settings.





The exported configuration file could be opened via text editor.



Backup restore

To go to **Backup restore** page. Click **Settings -> Backup restore** from the main menu. This page is used to display Backup restore related information.

BMC offers backup and restore functionality for both the BMC/BIOS configuration file. This feature allows users to back up current configurations, ensuring that system settings can be restored in the event of a failure or for recovery purposes. By securely storing backups, BMC provides a reliable method to maintain system stability and quickly recover from potential issues.

Backup restore

Use this page to backup the current BIOS/BMC configuration and restore it.

Backup BMC settings

Backup the current BMC configuration.

Backup

Restore BMC settings

After upload the BMC config file and Press 'Restore' button to restore BMC settings.

Restore File Choose File No file chosen

Upload Restore

Backup BIOS settings

Backup the current BIOS configuration.

Backup

Restore BIOS settings

Press 'Restore' button to restore BIOS settings.

Restore File Choose File No file chosen

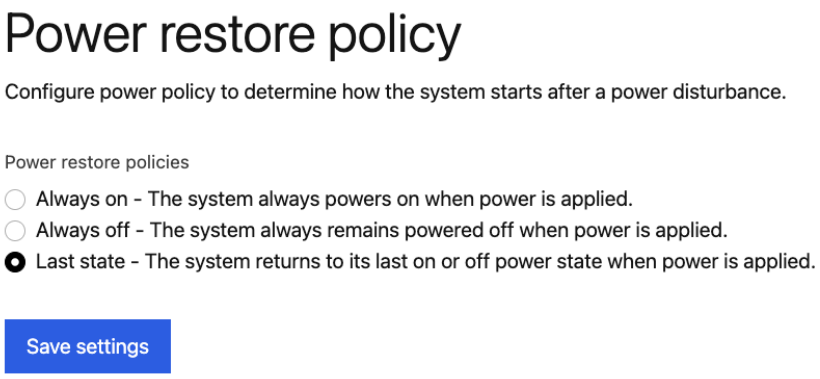
Restore

Option	Task
Backup	Click this button to download the current BMC/BIOS configuration to a file. BMC backup file name: backup256.bin ('256' that means sha256 checksum.) BIOS backup file name: bios.cfg ***Notice**: If the **BIOS Backup** button grays out, it means that the BIOS is not uploading data to the bmc. Please try to reboot host*.
Restore (BMC)	Restores the BMC configuration from a previously saved file. When clicked, a confirmation box will appear, prompting the user to confirm the action for BMC restoration. **Once confirmed, the BMC will immediately restart, and this action cannot be undone**, ensuring the user intentionally restores the previous BMC state.
Restore (BIOS)	For the BIOS configuration restoration, no confirmation box will appear. The BIOS configuration will be immediately restored without additional prompts, and this action is also irreversible, ensuring the user intentionally restores the previous BIOS state.

Power restore policy

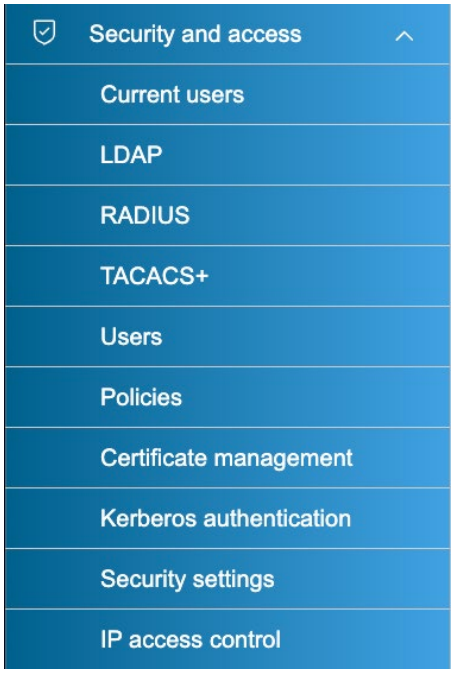
To go to **Power restore policy**. Click **Settings -> Power restore policy** from the main menu.

This page allows you to configure the power restore policy settings, which determine how the system behaves when power is restored after a disturbance or outage. You can choose the desired power recovery behavior. The available options enable you to specify whether the system should always power on, remain off, or return to its last known power state when power is re-applied. These settings provide flexibility for managing the system's response to power interruptions.



Security and access

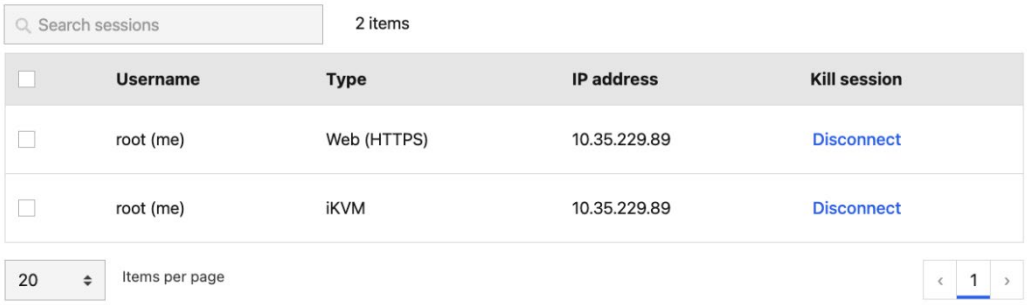
Security and access refers to the measures and configurations used to protect systems, networks, and data from unauthorized access, while ensuring that legitimate users can access resources when needed. These settings are crucial for maintaining confidentiality, integrity, and availability of information and services.



Current users

To go to **Current Users** page. Click **Security and access -> Current Users** from the main menu. This page is used to display current users.

Current users



Web Session Timeout

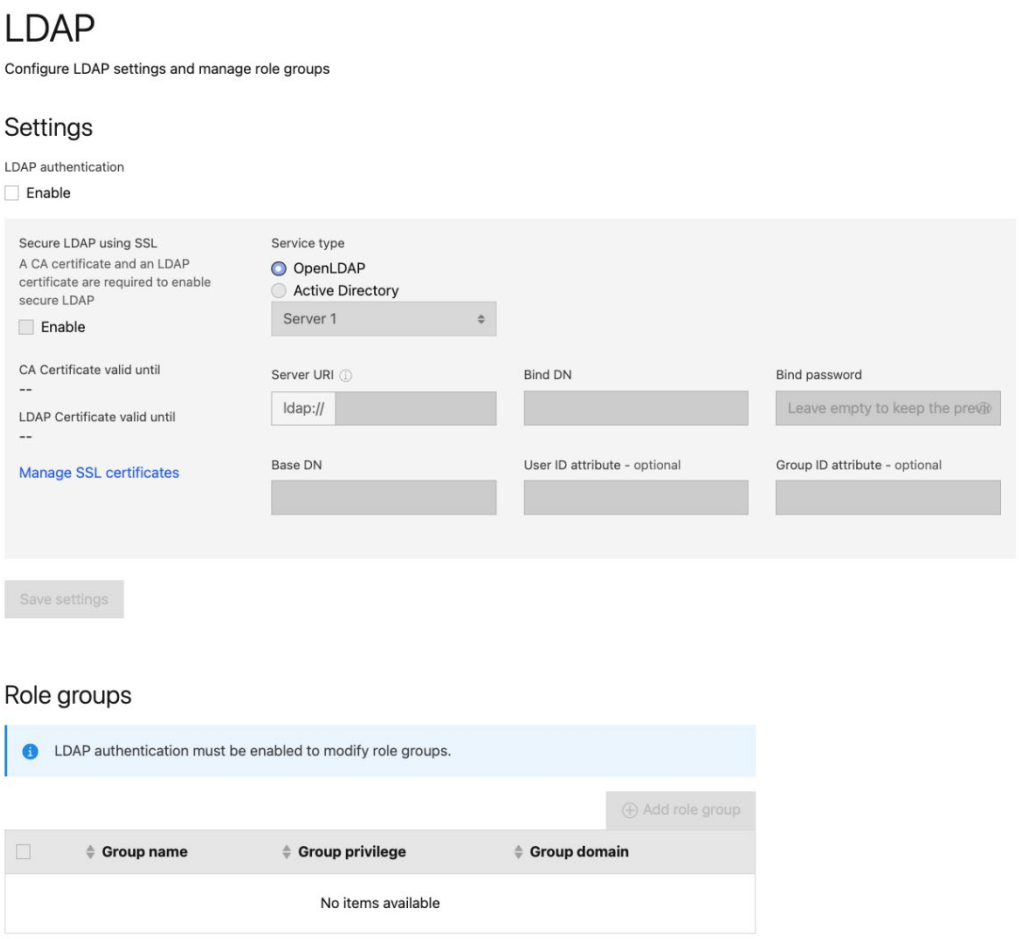
LDAP

To go to the **LDAP** page. Click **Security and access -> LDAP** from the main menu. This page provides options to configure server settings for OpenLDAP or Active Directory.

LDAP (Lightweight Directory Access Protocol) is an open protocol used to access and manage directory information services. It is commonly used for authentication and user management in systems like OpenLDAP, Active Directory, and similar directory-based services.

OpenLDAP is an open-source implementation of the LDAP, a protocol used for accessing and managing directory information services over a network.

Active Directory (AD) is a directory service developed by Microsoft for Windows domain networks. Active Directory uses LDAP as its primary protocol for directory services and supports authentication mechanisms like Kerberos and NTLM. It is widely used for managing enterprise networks and enabling single sign-on (SSO) capabilities.



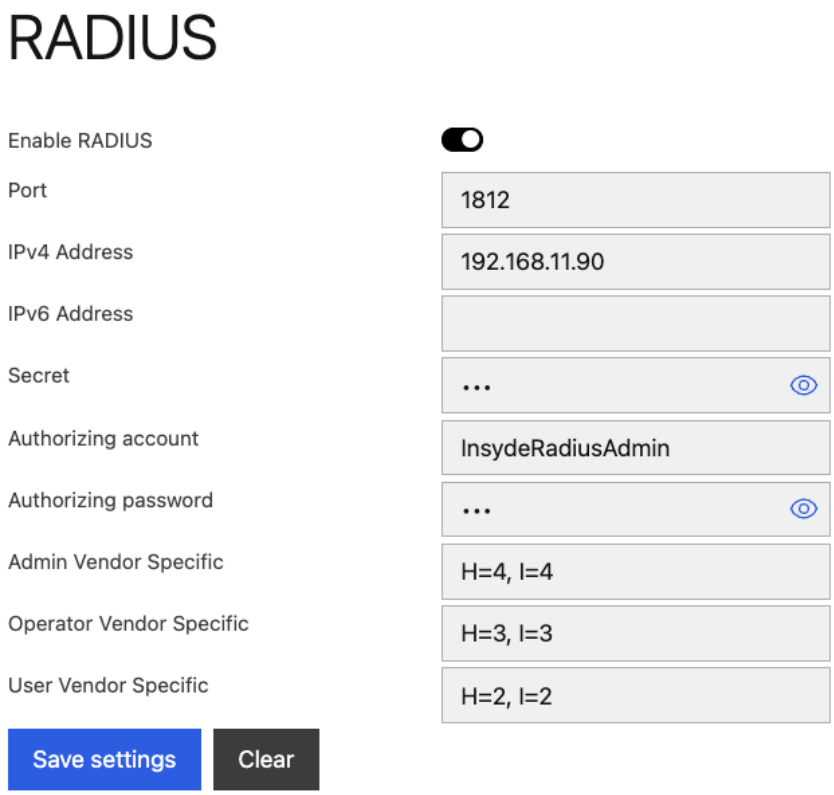
Sample settings

Item	Description	
Service type	OpenLDAP	
Server URI	ldap://192.168.22.156	
Bind DN	cn=admin,dc=bmc,dc=com	
Bind password	admin	
Base DN	ou=insyde,dc=bmc,dc=com	
User ID attribute	cn	
Group ID attribute	gidNumber	
Group Name	**Group privilege**	**Group domain**
admin	Administrator	dc=bmc,dc=com
operator	Operator	dc=bmc,dc=com
user	ReadOnly	dc=bmc,dc=com

RADIUS

To go to the **RADIUS** page. Click **Security and access -> RADIUS** from the main menu.

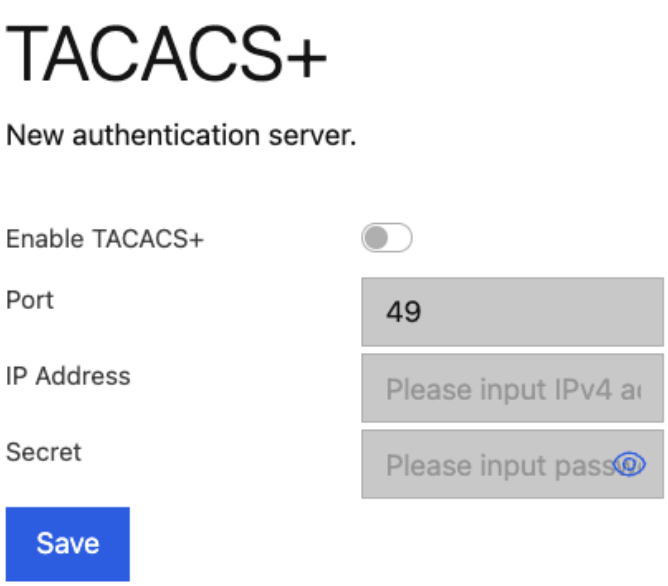
RADIUS (Remote Authentication Dial-In User Service) is a protocol used to manage authentication, authorization, and accounting (AAA) for users who access network services. By configuring RADIUS settings, you can integrate your system with an external RADIUS server for centralized user authentication, ensuring that only authorized users can access the system.



TACACS+

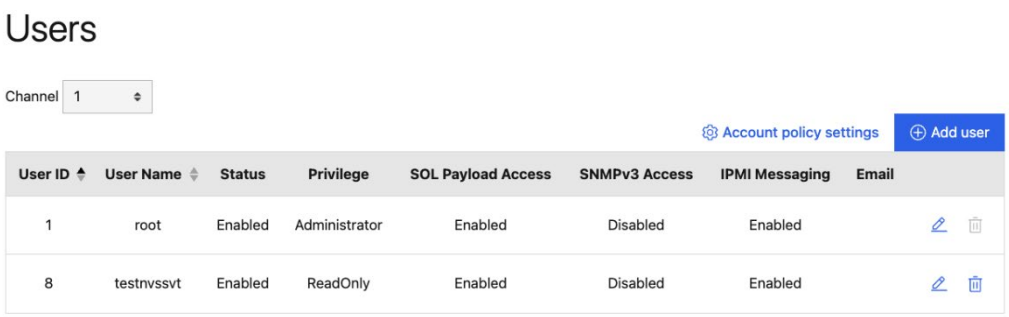
To go to **TACACS+** page. Click **Security and access -> TACACS+** from the main menu. This page is used to configure TACACS+ related information.

TACACS+ (Terminal Access Controller Access-Control System Plus) is a protocol used for network device authentication, authorization, and accounting. It is an enhanced version of the original TACACS (Terminal Access Controller Access-Control System) protocol, developed by Cisco, and is primarily used for centralized management and control of network devices such as routers, switches, wireless access points, and others.

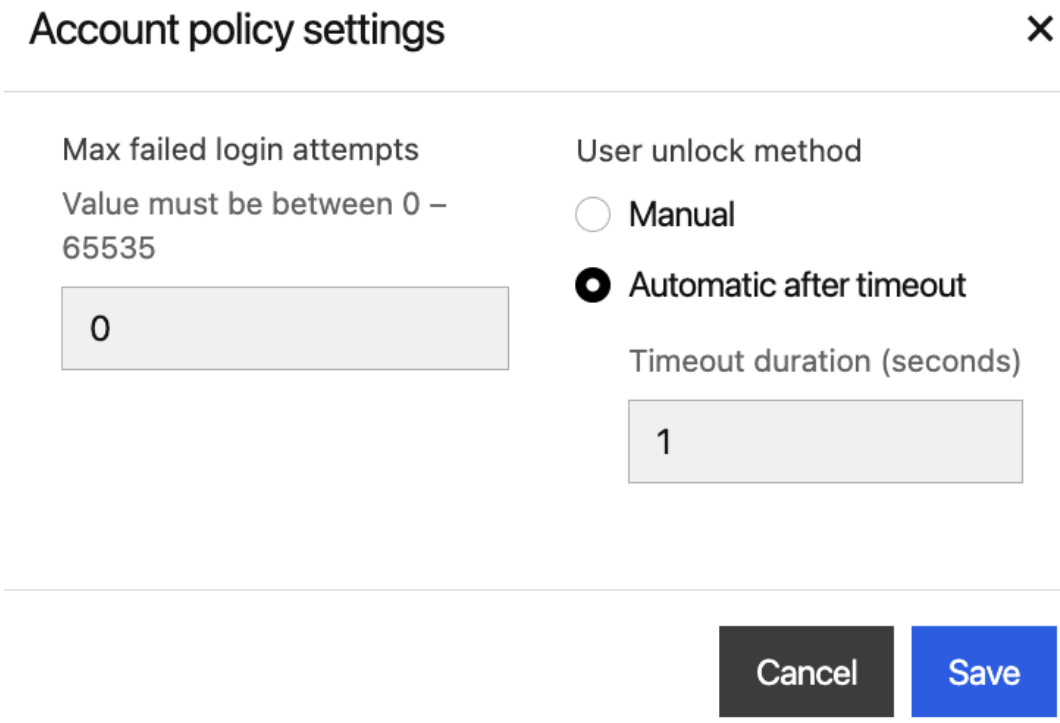


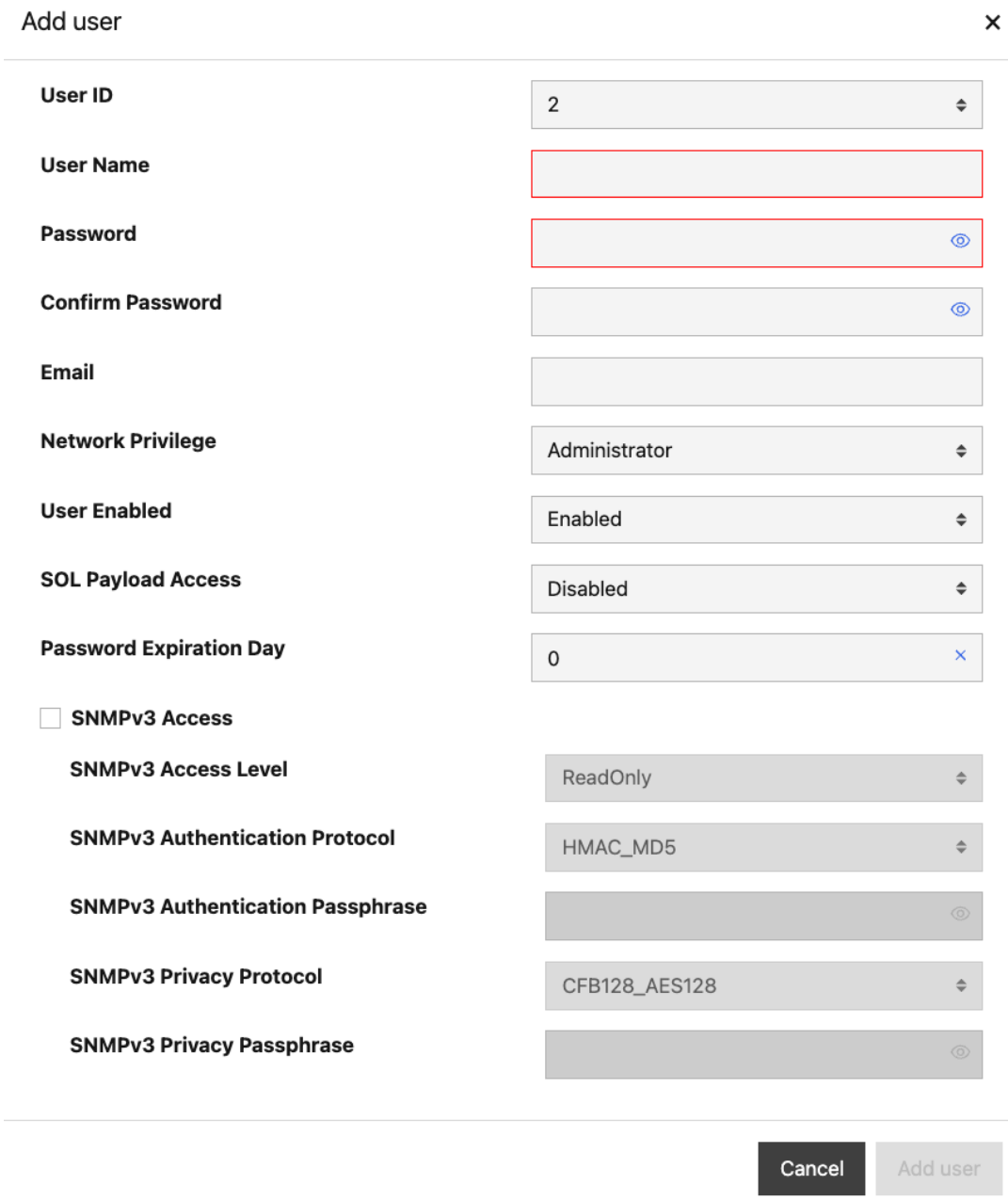
Users

This page is used to display user information and can modify user settings.



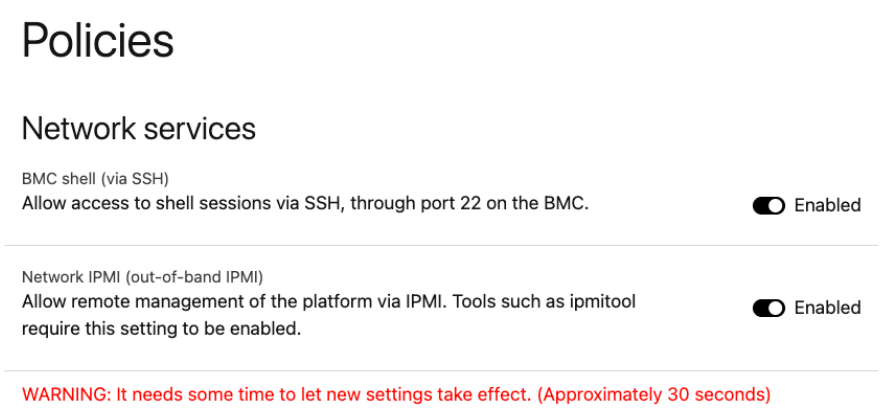
Field Name	Description
Status	Indicates the current state of a user account, enabled or disabled.
Privilege	The level of access or permissions assigned to a user, determining what actions they can perform in the system. • Administrator • Operator • ReadOnly • NoAccess


Account policy settings
Max failed login attempts
Value must be between 0 – 65535
0
User unlock method
Manual
Automatic after timeout
Timeout duration (seconds)
1
Cancel
Save


Add user
User ID
2
User Name
Password
Confirm Password
Email
Network Privilege
Administrator
User Enabled
Enabled
SOL Payload Access
Disabled
Password Expiration Day
0
SNMPv3 Access
SNMPv3 Access Level
ReadOnly
SNMPv3 Authentication Protocol
HMAC_MD5
SNMPv3 Authentication Passphrase
SNMPv3 Privacy Protocol
CFB128_AES128
SNMPv3 Privacy Passphrase
Cancel
Add user

Policies

To go to **Policies** page. Click **Security and access -> Policies** from the main menu. This page is used to configure the ways to access BMC.



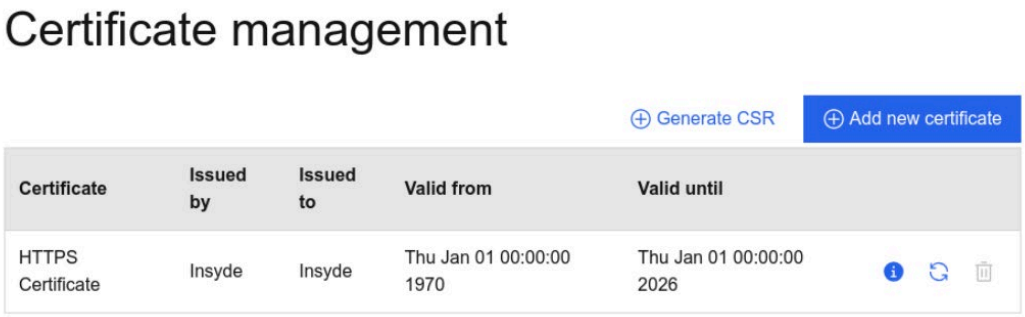
***Notice**: It needs some time to let new settings take effect (Approximately 30 seconds, sometimes 2-3 minutes).*

Sometimes when switching, the error "failed" appears, and you can switch again after waiting for about 2-3 minutes.

Certificate management

This page is used to display Certificate management related information.

Certificate management is a security feature within the BMC system, designed to ensure encrypted and secure communication between the server hardware and the BMC. By managing and handling certificates, BMC provides robust authentication and encryption mechanisms to protect the system from unauthorized access and ensure that data is not tampered with during transmission. Certificate management is particularly important in data centers and high-security environments, ensuring the security and integrity of remote management operations.

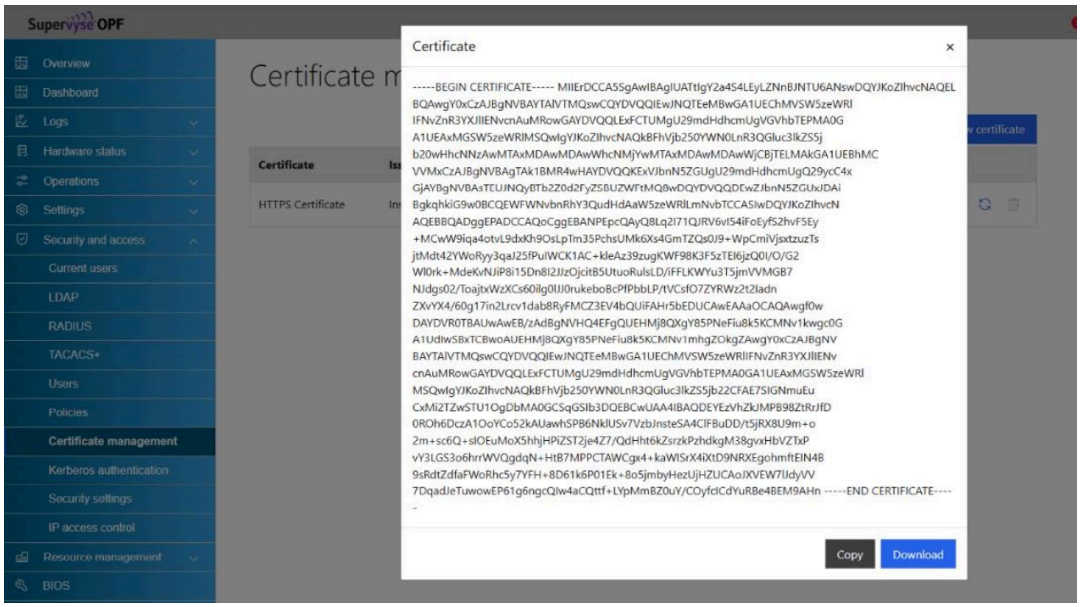


Certificate:

Displays the SSL/TLS certificate used for which secure communication.

- HTTPS Certificate
- LDAP Certificate
- CA Certificate
- VM Certificate

Check details of Certificate

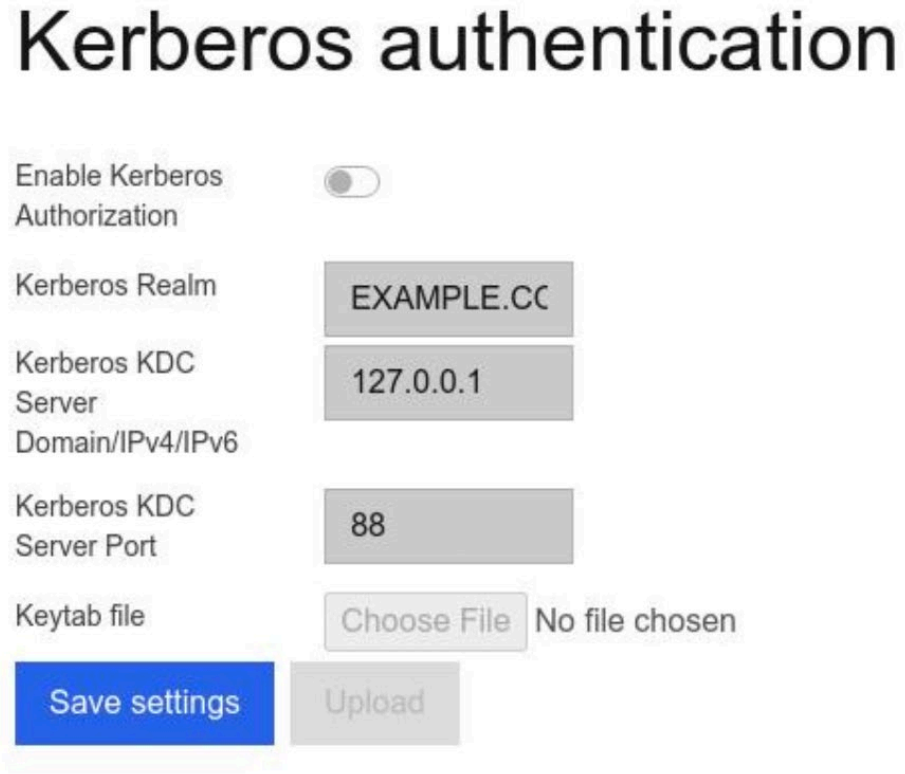


Kerberos authentication

To go to **Kerberos authentication** page. Click **Security and access** -> **Kerberos authentication** from the main menu. This page is used to configure Kerberos certification related information.

Kerberos is a secure authentication protocol that protects communication between users and services through encryption and a ticketing mechanism. Users only need to login once to securely access multiple services, while preventing replay attacks and ensuring the confidentiality and integrity of data.

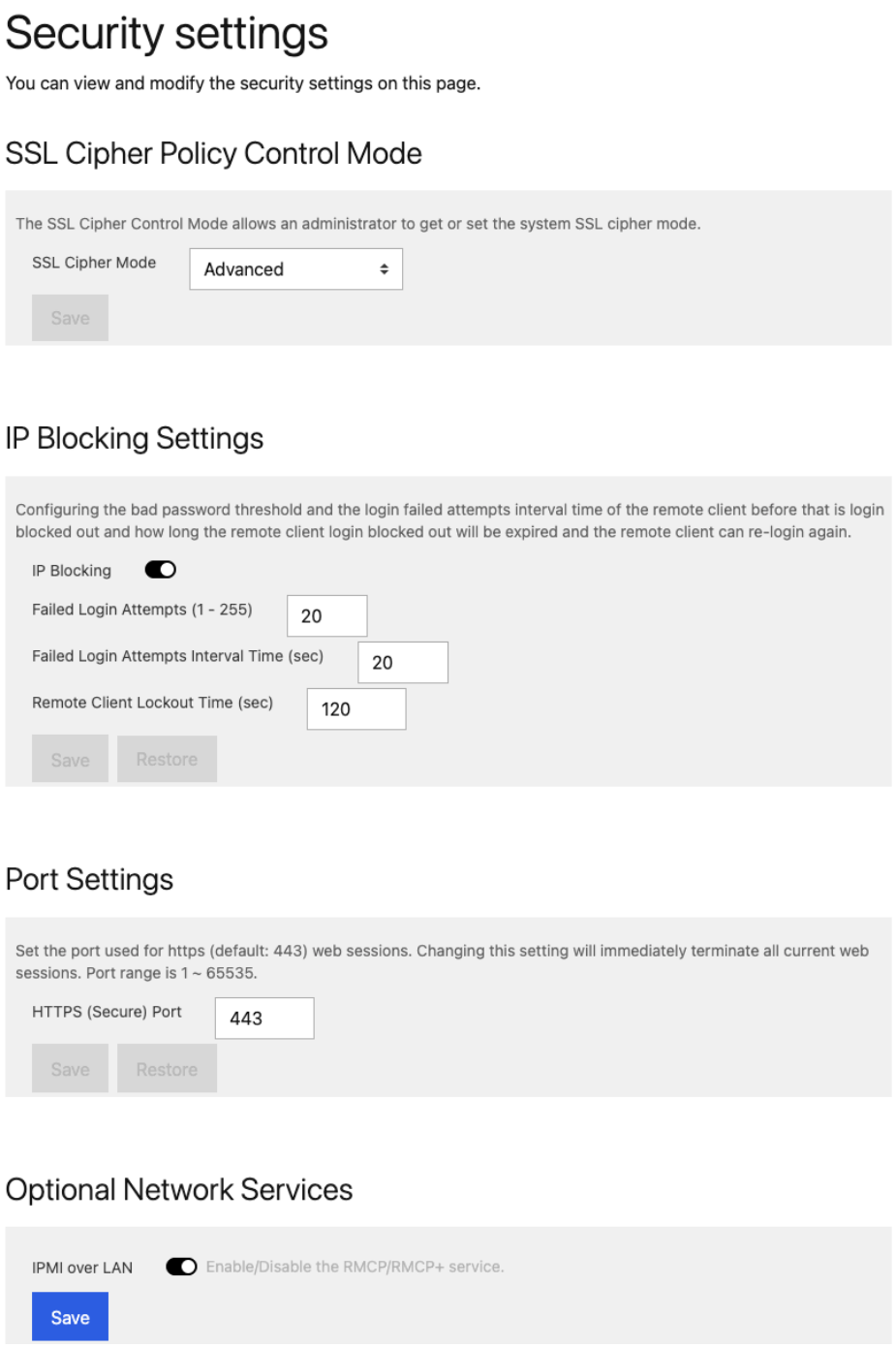
Notice: *The login privilege depends on configurations of* ***Role groups of Security and access - LDAP****.*



Security settings

To go to **Security settings** page. Click **Security and access -> Security settings** from the main menu. This page is used to configure security settings related information.

In the security settings of the BMC, four components are provided, primarily used to protect the BMC from unauthorized access and attacks.



SSL Cipher Mode:

When the system starts for the first time, "Advanced" is the default mode.

Available options:

- **Advanced** – wide browser compatibility, like most newer browser versions.
- **Broad Compatibility** – check the compatibility to other protocols before using it, like IMAPS.
- **Widest Compatibility** – compatibility to most legacy browsers, legacy libraries, and other application protocols besides HTTPS, like IMAPS.
- **Legacy** – widest compatibility

SSL Cipher Policy Control Mode

The SSL Cipher Control Mode in BMC systems allows administrators to configure SSL/TLS encryption settings for secure communication between the BMC and remote systems. This feature ensures that all data exchanged is encrypted, preventing eavesdropping, tampering, and unauthorized access. By selecting specific encryption protocols and cipher suites, administrators can enforce strong security standards, protecting sensitive information and maintaining the integrity of communication channels across the network.

IP Blocking Settings

By configuring the bad password threshold, login failed attempts interval time, and login locked out duration, administrators can effectively mitigate brute force attacks while ensuring that legitimate users aren’t unfairly locked out. The settings provide a balance between security and usability, preventing unauthorized access while allowing users a chance to re-authenticate after a brief locked out.

Port Settings

BMC system typically provides management functions through multiple network ports. By configuring the port settings, you can control which port number is used, effectively restricting unauthorized access and enhancing system security.

Optional Network Services

This setting configures additional network service that the BMC can use. The service typically has extra features or protocols that enhance the flexibility of management functions, but they may also introduce potential security risks.

IP access control

To go to the **IP access control** page. Click **Security and access -> IP access control** from the main menu.

IP access control is a security feature that allows administrators to manage and restrict access to a system based on IP addresses, MAC addresses, and network ports. This provides more granular control over which devices can connect to the system, adding extra layers to prevent unauthorized access.

IP access control

IPv4

Enable IP Access Control:

Number Of Access Rules: 4

Rule No	Rule Type	Rule	Policy
1	IP/Mask	192.168.2.0/24	Accept
2	IP Range	192.168.3.1 - 192.168.3.255	Accept
3	MAC	00-00-00-00-00-00	Drop
4	Port	TCP: 1 - 65535	Accept

Add

IPv6

Enable IP Access Control:

Number Of Access Rules: 4

Rule No	Rule Type	Rule	Policy
1	IP/Mask	::192.168.2.0	Accept
2	IP Range	::192.168.3.1 - ::192.168.3.255	Accept
3	MAC	00-00-00-00-00-00	Drop
4	Port	TCP: 1 - 65535	Accept

Add

Field Name	Description
Rule No	A unique identifier for each access rule. Rules are processed in ascending order, and the rule number determines the priority.
Rule Type	Specifies the type of rule being created. Possible values include: • **IP/Mask:** Defines a single IP address or a subnet range using CIDR notation (e.g., 192.168.1.0/24 or 10.0.0.1/32). • **IP Range**: Defines a range of IP addresses, for example, 192.168.1.1-192.168.1.100. • **MAC**: Matches devices based on their Media Access Control (MAC) address, for example, 00:1A:2B:3C:4D:5E. • **Port**: Filters network traffic based on **TCP** or **UDP** protocols and specific port numbers or ranges (e.g., TCP:443 for HTTPS or TCP:22 for SSH).
Rule	The specific IP, subnet, MAC address, or port value to which the rule applies. Examples: • For **IP/Mask**: 192.168.1.0/24 • For **IP Range**: 192.168.1.1-192.168.1.100 • For **MAC**: 00:1A:2B:3C:4D:5E • For **Port**: TCP: 22-80
Policy	Defines the action to take when traffic matches the rule. Possible values include: • **Accept**: Allow the traffic to pass. • **Drop**: Silently discard the traffic without notifying the sender (common for blocking).
Number Of Access Rules	Indicates the total number of access rules currently configured or allowed. The system has a maximum limit of 10 rules.

Resource management

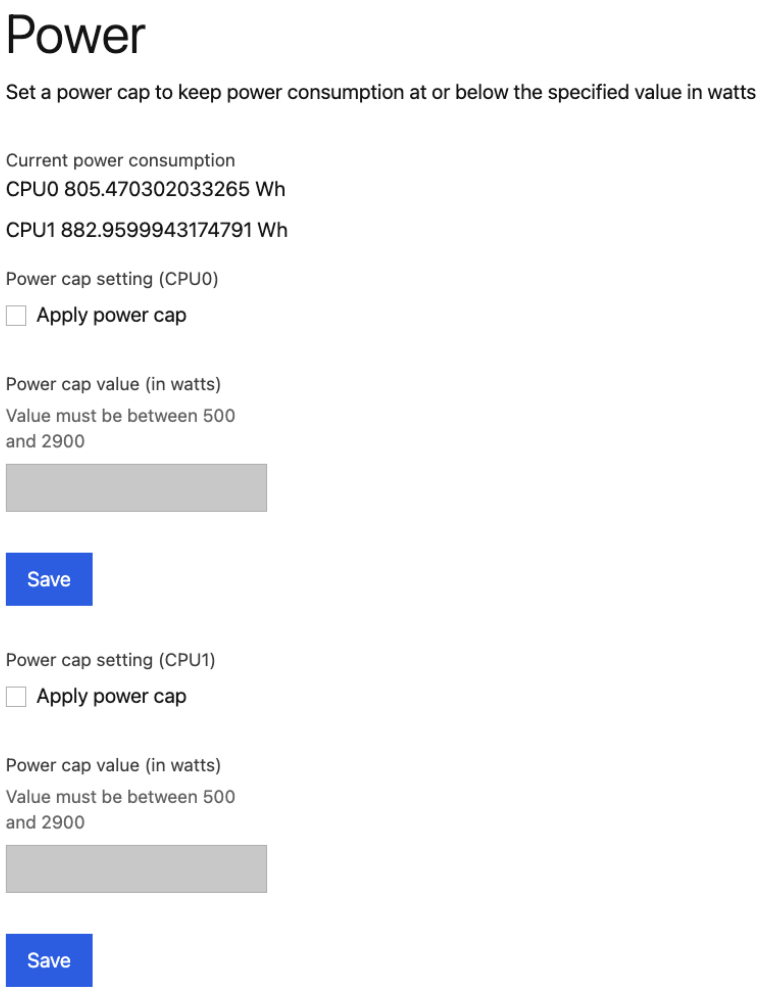
The **Resource Management** section focuses primarily on monitoring and managing power, aiming to help administrators optimize the system's energy usage. Through these settings, you can adjust power policies, view power consumption data, set automatic power on/off schedules, and more, thereby balancing performance requirements with energy efficiency needs to enhance system efficiency and reliability. These features are especially important in resource-intensive environments in business operations, helping to reduce energy costs and improve system stability.

Power

To go to **Power** page: Click **Resource management -> Power** from the main menu. This page is used to manage or configure Power related information.

BMC provides a feature that allows administrators to set a power limit for the CPU. This setting is especially important when the server is under heavy load, as it ensures the system consistently stays within the predefined power limit.

Even under high-performance demands, the server will not exceed the set power threshold, effectively preventing excessive power consumption, system overheating, performance degradation, and potential hardware damage.



Power cap value (in watts):

This option can only be set when the **Apply power cap** is enabled.

Input the maximum allowable power consumption for the CPU, set in watts. This value helps limit the CPU's energy usage to a predefined threshold, ensuring it doesn't exceed the set power cap for efficiency and safety.

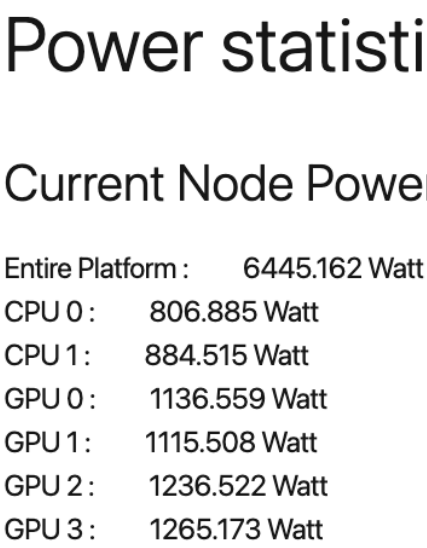
Value must be between xxx and xxx.

xxx: The values will vary depending on the platform.

If this is set to the maximum limit, it means disable power cap.

Power statistics

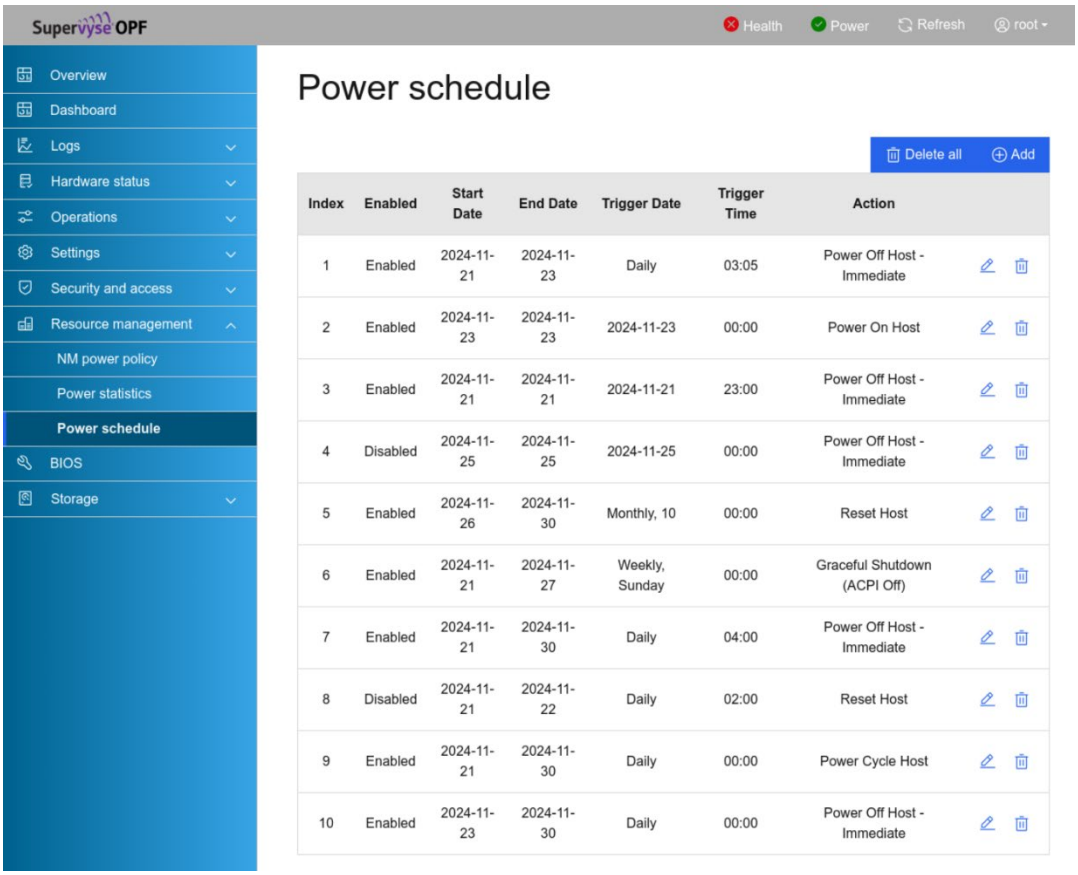
NVIDIA platform only has Entire Platform and CPU/GPU info. This page displays the current power consumption of the node, providing a detailed breakdown of CPU and GPU power usage, along with the total power consumption for the entire platform.



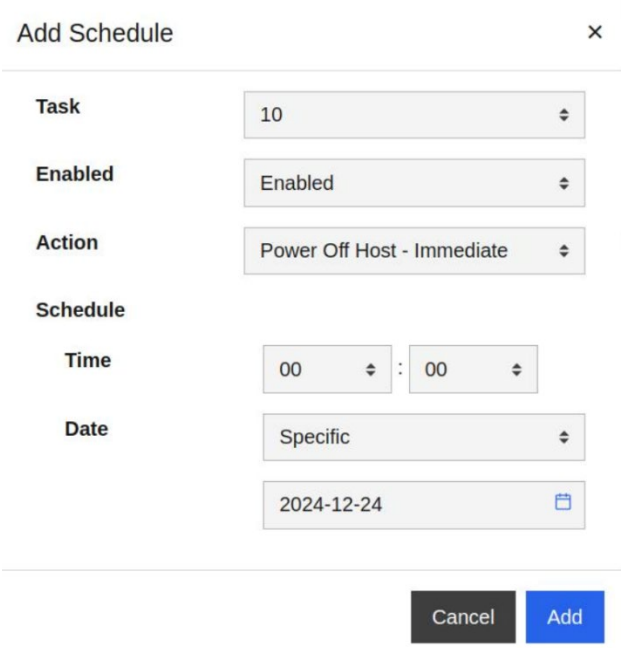
The Entire Platform power consumption is the sum of all CPU and GPU consumptions.

Power schedule

To go to **Power schedule** page. Click **Resource management** -> **Power schedule** from the main menu. This page allows users to manage automated power control tasks for the server. This feature enables you to schedule actions such as **powerng** on or off the host at specified times and dates. Below is a detailed operation for using the power schedule interface and its features.



Index	Enabled	Start Date	End Date	Trigger Date	Trigger Time	Action
1	Enabled	2024-11-21	2024-11-23	Daily	03:05	Power Off Host - Immediate
2	Enabled	2024-11-23	2024-11-23	2024-11-23	00:00	Power On Host
3	Enabled	2024-11-21	2024-11-21	2024-11-21	23:00	Power Off Host - Immediate
4	Disabled	2024-11-25	2024-11-25	2024-11-25	00:00	Power Off Host - Immediate
5	Enabled	2024-11-26	2024-11-30	Monthly, 10	00:00	Reset Host
6	Enabled	2024-11-21	2024-11-27	Weekly, Sunday	00:00	Graceful Shutdown (ACPI Off)
7	Enabled	2024-11-21	2024-11-30	Daily	04:00	Power Off Host - Immediate
8	Disabled	2024-11-21	2024-11-22	Daily	02:00	Reset Host
9	Enabled	2024-11-21	2024-11-30	Daily	00:00	Power Cycle Host
10	Enabled	2024-11-23	2024-11-30	Daily	00:00	Power Off Host - Immediate



BIOS

BIOS (Basic Input/Output System) is firmware located on the computer's motherboard, responsible for initializing hardware during startup and loading the operating system. BIOS is the first program that runs when the computer is powered on, ensuring that hardware and software work together correctly.

These pages allow you to view and configure settings that will be applied to the BIOS during the next boot.

Leak Detection

Leak detection will be performed by leak sensors inside the trays and leak sensors around the rack. The sensors are wired to a Sensor IC (or CPLD in the switch tray), which connects to the BMC (baseboard management controller) over I2C and through the interrupt line. The BMC will be responsible for:

Handling the interrupt by the sensor and reading the liquid amount (or fault condition), if applicable.

If an anomaly is detected:

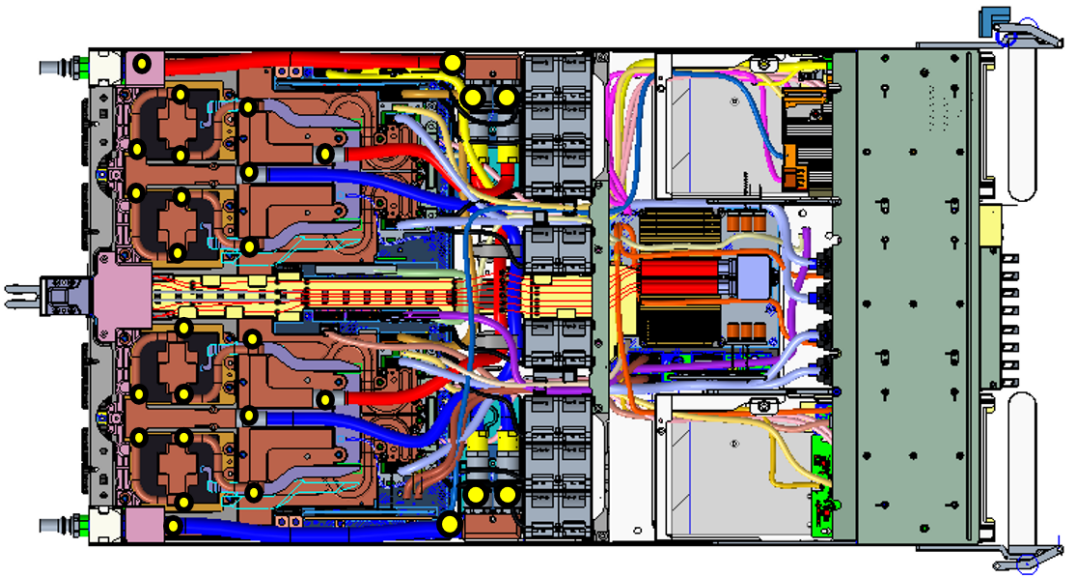
- Send a notification event (Redfish or gNMI, if applicable).
- Blink the amber fault LED in the front panel at 4 Hz.
- Taking emergency action if programmed (e.g. power down the tray)

Leak Sensors

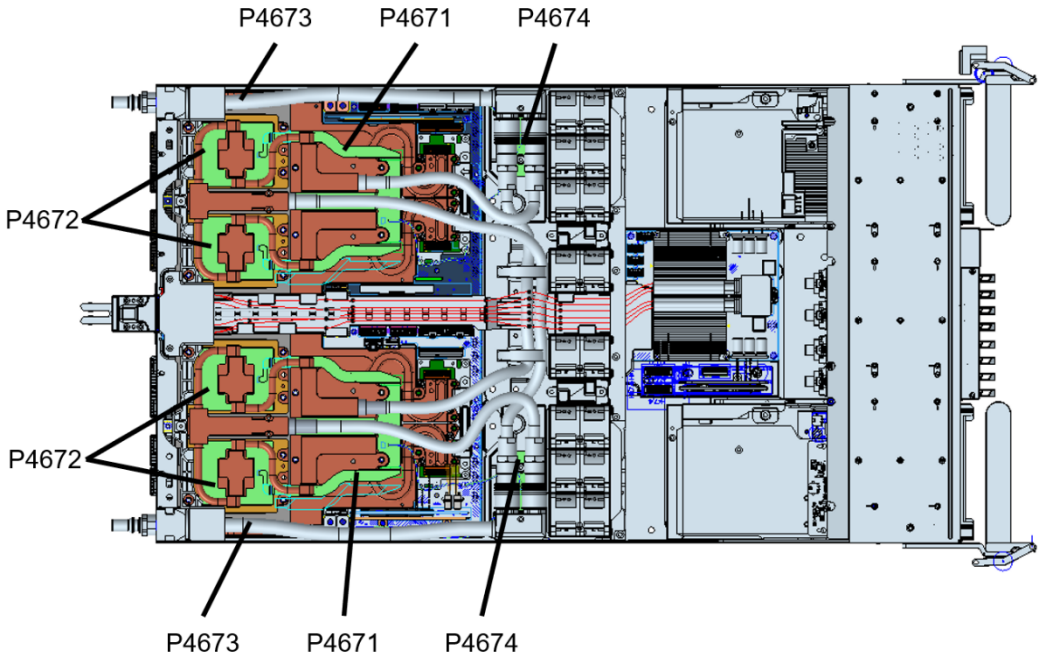
The GB300 NVL 72 trays incorporate custom shaped flex PCB sensors place on the top surface of the cold plates and under or near all O-ring seals, hoses, manifolds, and fluid couplings to be as close as possible to all potential leak locations.

High risk Leak Points

The GB300 NVL 72 tray included 28 locations identified, that would benefit from using leak sensors to reduce this risk.



NVIDIA MGX NVL Leak Sensor Installation Location



The list of leak sensors and their quantity used on the MGX compute tray as follows:

- P4671 – CPU sensor
- P4672 – GPU sensor
- P4673 – Tray QD sensor
- P4674 – Manifold Sensor

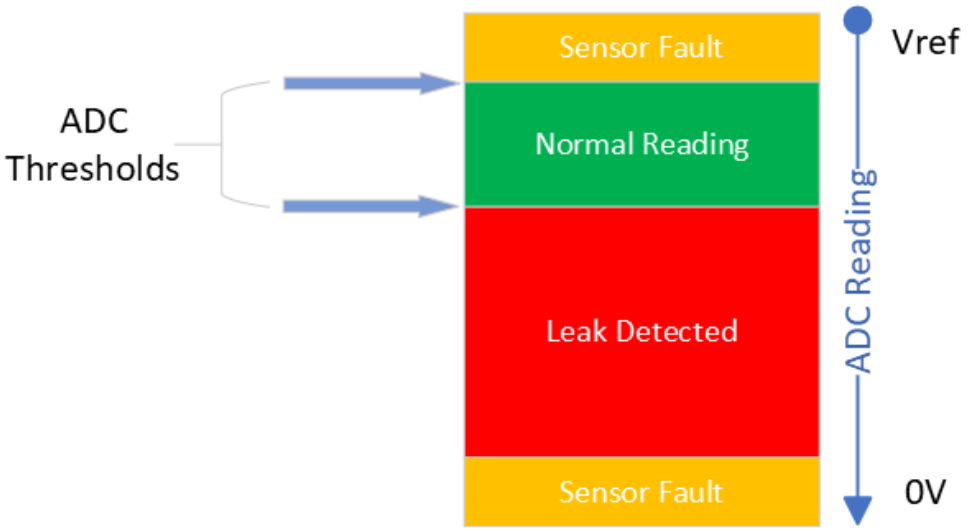
GB300 Leak Sensor Part Details

Chip	Use Case	Primary Board Addr.	Secondary Board Addr.
MAX1363	Primary	0x34h	0x35h
ADS7142	Alternate	0x18h	0x1Eh

As the leak detector sensor encounter liquid, the resistance across the sensor will drop, resulting in lower voltage input to the ADC. The BMC will need to determine if the ADC reading is abnormal or not. ADC output values can indicate the following conditions:

- Sensor resistance above normal range: leak detect sensor may have been disconnected (sensor fault).
- Sensor resistance decreased below normal range: indicates a potential leak

- Sensor resistance at or near zero: sensor may have been shorted, such as cases where it has come into contact with metal (sensor fault)



Check Leakage methods

Leak Self-Test

The leak detection and response can be tested by the FPGA I/O expander, TCA9555. Setting the output of IO1_7 high will pull the sensor input low to simulate a leak, for testing purpose.

Redfish Telemetry

The BMC will support the DMTF Redfish LeakDetection and LeakDetector schemas. The LeakDetection schema will provide information on the LeakDetectors available on the system, and the LeakDetector schema will provide information on the state of the particular LeakDetector.

Example telemetry output:


```
{
    "@odata.id": "/redfish/v1/Chassis/Chassis_0/ThermalSubsystem/LeakDetection/LeakDetectors/
        Chassis_0_LeakDetector_1_ColdPlate",
    "@odata.type": "#LeakDetector.v1_3_0.LeakDetector",
    "DetectorState": "OK",
    "Id": "Chassis_0_LeakDetector_1_ColdPlate",
    "LeakDetectorType": "Moisture",
    "Name": "Chassis 0 LeakDetector 1 ColdPlate",
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    }
}
```

```
{
    "@odata.id": "/redfish/v1/Chassis/Chassis_0/ThermalSubsystem/LeakDetection/LeakDetectors/
        Chassis_0_LeakDetector_0_ColdPlate",
    "@odata.type": "#LeakDetector.v1_3_0.LeakDetector",
    "DetectorState": "Critical",
    "Id": "Chassis_0_LeakDetector_0_ColdPlate",
    "LeakDetectorType": "Moisture",
    "Name": "Chassis 0 LeakDetector 0 ColdPlate",
    "Status": {
        "Health": "Critical",
        "State": "Degraded"
    }
}
```


Back-Up Shut Down Timer Configuration

The “Back-Up Shutdown Timer” feature allows the user to configure a timeout value, where upon timer expiration after a leak has been detected, the BMC will shut down the compute tray. The feature shall default to a disabled state, with the configuration accessible through Redfish properties:

/redfish/v1/Chassis/Chassis_0/Oem/Nvidia/Policies/LeakDetectionPolicy

```
{
    "@odata.id": "/redfish/v1/Chassis/Chassis_0/Oem/Nvidia/Policies/LeakDetectionPolicy",
    "@odata.type": "#NvidiaPolicy.v1_0_0.NvidiaPolicy",
    "Id": "LeakDetectionPolicy",
    "Name": "Policy for Leak Detection",
    "PolicyConditionLogic": "AnyOf",
    "PolicyConditions": [
        {
            "Property": "/redfish/v1/Chassis/Chassis_0/ThermalSubsystem/LeakDetection/LeakDetectors/
               Chassis_0_LeakDetector_0_ColdPlate/#DetectorState",
            "PropertyStringValue": "Critical"
        },
        {
            "Property": "/redfish/v1/Chassis/Chassis_0/ThermalSubsystem/LeakDetection/LeakDetectors/
               Chassis_0_LeakDetector_0_Manifold/#DetectorState",
            "PropertyStringValue": "Critical"
        },
        {
            "Property": "/redfish/v1/Chassis/Chassis_0/ThermalSubsystem/LeakDetection/LeakDetectors/
               Chassis_0_LeakDetector_1_ColdPlate/#DetectorState",
            "PropertyStringValue": "Critical"
        },
        {
            "Property": "/redfish/v1/Chassis/Chassis_0/ThermalSubsystem/LeakDetection/LeakDetectors/
               Chassis_0_LeakDetector_1_Manifold/#DetectorState",
            "PropertyStringValue": "Critical"
        }
    ],
    "PolicyEnabled": false,
    "PolicyReactions": [
        {
            "CommonReaction": "HardPowerOff",
            "ReactionDelaySeconds": 0.0
        }
    ],
    "Status": {
        "Health": "OK",
        "State": "Enabled"
    }
}
```

The user can PATCH the following properties to update Policy settings related to shutdown.

- PolicyEnabled
    - “true” - Shutdown enabled on leak detection
    - “false” - Shutdown disabled on leak detection
- PolicyReactions: ReactionDelaySeconds
    - Sets the delay in seconds after a leak is detected before BMC executes a system shutdown

The BMC shall persist such settings through resets and power cycles. Please note the final property naming and URI path may change as design is updated and feedback received.

BMC Firmware Secure

External Root of Trust (ERoT) hardware is part of the BMC module, which is intended for production. ERoT hardware provides a secure flash and boot mechanism to validate the BMC firmware is sourced from reliable organization.

(ERoT is currently not supported on BMC module card)

Secure Boot

- Meets NIST 800-193 PFR Guidelines
- **Detection and Recovery are currently not supported**
- Authenticates SP| Flash image before loading
- Support AES-256/384/512 Encrypted SPI Flash images

SPI Monitor

- Allows 50 MHz operation of SPI Flash (TBD)
- Real Time load module verification and execution path matching during Host boot
- Prevents unauthorized Read/Write/Erase during Host runtime

Redfish Update

- Support on-line redfish update with Insyde BMC

  curl -k -u root:0penBmc -H "Content-Type: application/octet-stream" -X POST -T <TARBALL> https://<BMC_IP>/redfish/v1/UpdateService/update'

Redfish

Redfish is a management standard which uses data model representation inside of a hypermedia RESTful interface. It is based on REST, that's how Redfish is easier to use and implement than many other solutions. Since its model oriented, it is capable of expressing the relationships between components in modern systems as well as the semantics of the services and components within them. It is also easily extensible. By using a hypermedia approach to REST, Redfish can express a large variety of systems from multiple vendors. Utilizing JSON (JavaScript Object Notation) data format which is in plain text, allows many types of parameters to be available such that it enables scalability, human readability, and flexibility for most programming environments by easily interpreting payload.

HTTP Methods

The following HTTP methods are used to implement different actions, as described below:

HTTP Method	Description
POST	The POST method is used to create a new resource. The POST request is submitted to the resource collection in which the new resource is to belong. Submitting a POST request to a resource representing a collection is equivalent to submitting the same request to the Members property of that resource. The POST method is used to initiate operations on the object (such as Actions). Services shall support the POST method for sending actions. The POST operation may not be idempotent.
GET	The GET method is used to retrieve a representation of a resource. That representation can either be a single resource or a collection.
PATCH	The PATCH method is the preferred method used to perform updates on pre-existing resources. Changes to the resource are sent in the request body. Properties not specified in the request body are not directly changed by the PATCH request. The response is either empty or a representation of the resource after the update was done. The implementation may reject the update operation on certain fields based on its own policies and, if so, shall not apply any of the update requested.
DELETE	The DELETE method is used to remove a resource. Services shall support the DELETE method for resources that can be deleted.

PUT	The PUT method is used to completely replace a resource. Properties omitted from the request body are reset to their default value.

Status Code

HTTP defines status codes that can be returned in response messages.

Status Code	Status Name	Description
200	OK	The request was successfully completed and includes a representation in its body.
201	Created	A request that created a new resource completed successfully. The Location header shall be set to the canonical URI for the newly created resource. A representation of the newly created resource may be included in the response body.
202	Accepted	The request has been accepted for processing, but the processing has not been completed. The Location header shall be set to the URI of a Task resource that can later be queried to determine the status of the operation. A representation of the Task resource may be included in the response body.
204	No Content	The request succeeded, but no content is being returned in the body of the response.
301	Moved Permanently	The requested resource resides under a different URI
302	Found	The requested resource resides temporarily under a different URI.
304	Not Modified	The service has performed a conditional GET request where access is allowed, but the resource content has not changed. Conditional requests are initiated using the headers If-Modified-Since and/or If-None-Match (see HTTP 1.1, sections 14.25 and 14.26) to save network bandwidth if there is no change.
401	Unauthorized	The authentication credentials included with this request are missing or invalid.

403	Forbidden	The server recognized the credentials in the request, but those credentials do not possess authorization to perform this request.
404	Not Found	The request specified a URI of a resource that does not exist.
405	Method Not Allowed	The HTTP verb specified in the request (e.g., DELETE, GET, HEAD, POST, PUT, PATCH) is not supported for this request URI. The response shall include an Allow header which provides a list of methods that are supported by the resource identified by the Request-URI.
406	Not Acceptable	The Accept header was specified in the request and the resource identified by this request is not capable of generating a representation corresponding to one of the media types in the Accept header.
409	Conflict	A creation or update request could not be completed, because it would cause a conflict in the current state of the resources supported by the platform (for example, an attempt to set multiple attributes that work in a linked manner using incompatible values).
410	Gone	The requested resource is no longer available at the server and no forwarding address is known. This condition is expected to be considered permanent. Clients with link editing capabilities SHOULD delete references to the Request-URI after user approval. If the server does not know, or has no facility to determine, whether or not the condition is permanent, the status code 404 (Not Found) SHOULD be used instead. This response is cacheable unless indicated otherwise.
411	Length Required	The request did not specify the length of its content using the Content-Length header (perhaps Transfer-Encoding: chunked was used instead). The addressed resource requires the Content-Length header.
412	Precondition Failed	Precondition (such as OData-Version, If Match or If Not Modified headers) check failed.

415	Unsupported Media Type	The request specifies a Content-Type for the body that is not supported.
500	Internal Server Error	The server encountered an unexpected condition that prevented it from fulfilling the request.
501	Not Implemented	The server does not (currently) support the functionality required to fulfill the request. This is the appropriate response when the server does not recognize the request method and is not capable of supporting the method for any resource.
503	Service Unavailable	The server is currently unable to handle the request due to temporary overloading or maintenance of the server.

Available APIs

Username: root Password: 0penBmc

Resource	Resource URI	Redfish Schema
ServiceRoot	/redfish/v1/	ServiceRoot.v1_17_0.ServiceRoot
ComputerSystemCollection	/redfish/v1/Systems	ComputerSystemCollection.ComputerSystemCollection
ComputerSystem	/redfish/v1/Systems/<SystemID>	ComputerSystem.v1_23_1.ComputerSystem
BootOptionCollection	/redfish/v1/Systems/<SystemID>/BootOptions	BootOptionCollection.BootOptionCollection
BootOption	/redfish/v1/Systems/<SystemID>/BootOptions/<BootOptionId>	BootOption.v1_0_6.BootOption
MemoryCollection	/redfish/v1/Systems/<SystemID>/Memory	MemoryCollection.MemoryCollection
Memory	/redfish/v1/Systems/<SystemID>/Memory/<MemoryID>	Memory.v1_20_0.Memory
ProcessorCollection	/redfish/v1/Systems/<SystemID>/Processors	ProcessorCollection.ProcessorCollection
Processor	/redfish/v1/Systems/<SystemID>/Processors/<ProcessorId>	Processor.v1_20_0.Processor
EthernetInterfaceCollection	/redfish/v1/Managers/<ManagerId/EthernetInterfaces	EthernetInterfaceCollection.EthernetInterfaceCollection
EthernetInterface	/redfish/v1/Managers/<ManagerId/EthernetInterfaces/<InterfaceId>	EthernetInterface.v1_12_3.EthernetInterface
Bios	/redfish/v1/Systems/<SystemID>/Bios /redfish/v1/Systems/<SystemID>/Bios/Settings	Bios.v1_2_3.Bios Bios.v1_2_3.Bios
LogServiceCollection	/redfish/v1/Systems/<SystemID>/LogServices	LogServiceCollection.LogServiceCollection
LogService	/redfish/v1/Systems/<SystemID>/LogServices/<LogType>	LogService.v1_7_0.LogService
LogEntryCollection	/redfish/v1/Systems/<SystemID>/LogServices/<LogType>/Entries	LogEntryCollection.LogEntryCollection
LogEntry	/redfish/v1/Systems/<SystemID>/LogServices/<LogType>/Entries/<EntryId>	LogEntry.v1_17_0.LogEntry
Chassis		
ChassisCollection	/redfish/v1/Chassis	ChassisCollection.ChassisCollection

Chassis	/redfish/v1/Chassis/<ChassisID>	Chassis.v1_26_0.Chassis
Power	/redfish/v1/Chassis/Self/Power	Power.v1_5_4.Power (TBD, Intel/AMD)
Thermal	/redfish/v1/Chassis/Self/Thermal	Thermal.v1_5_3.Thermal (TBD, Intel/AMD)
PowerSubsystem	/redfish/v1/Chassis/<ChassisID>/PowerSubsystem	PowerSubsystem.v1_1_3.PowerSubsystem
PowerSupplyCollection	/redfish/v1/Chassis/<ChassisID>/PowerSubsystem/PowerSupplies	PowerSupplyCollection.PowerSupplyCollection
PowerSupply	/redfish/v1/Chassis/<ChassisID>/PowerSubsystem/PowerSupplies/<PowerSupplyId>	PowerSupply.v1_4_0.PowerSupply
ThermalSubSystem	/redfish/v1/Chassis/<ChassisID>/ThermalSubsystem	ThermalSubsystem.v1_3_3.ThermalSubsystem
ThermalMetrics	/redfish/v1/Chassis/<ChassisID>/ThermalSubsystem/ThermalMetrics	ThermalMetrics.v1_3_2.ThermalMetrics
FanCollection	/redfish/v1/Chassis/<ChassisID>/ThermalSubsystem/Fans	FanCollection.FanCollection
Fan	/redfish/v1/Chassis/<ChassisID>/ThermalSubsystem/Fans/<FanId>	Fan.v1_5_2.Fan
Managers		
ManagerCollection	/redfish/v1/Managers	ManagerCollection.ManagerCollection
Manager	/redfish/v1/Managers/<ManagerID>	Manager.v1_20_0.Manager
ManagerNetworkProtocol	/redfish/v1/Managers/<ManagerID>/NetworkProtocol	ManagerNetworkProtocol.v1_10_1.ManagerNetworkProtocol
SerialInterfaceCollection	/redfish/v1/Managers/<ManagerID>/SerialInterfaces	SerialInterfaceCollection.SerialInterfaceCollection
SerialInterface	/redfish/v1/Managers/<ManagerID>/SerialInterfaces/<SerialInterfaceId>	SerialInterface.v1_2_1.SerialInterface
General		
AccountService	/redfish/v1/AccountService	AccountService.v1_17_0.AccountService
Manager Account Collection	/redfish/v1/AccountService/Accounts	ManagerAccountCollection.ManagerAccountCollection
Manager Account	/redfish/v1/AccountService/Accounts/<AccountId>	ManagerAccount.v1_13_0.ManagerAccount
Role Collection	/redfish/v1/AccountService/Roles	RoleCollection.RoleCollection
Role	/redfish/v1/AccountService/Roles/<RoleId>	Role.v1_3_3.Role

EventService	/redfish/v1/EventService	EventService.v1_10_3.EventService
Event Destination Collection	/redfish/v1/EventService/Subscriptions	EventDestinationCollection.EventDestinationCollection
EventDestination	/redfish/v1/EventService/Subscriptions/<Subscriptions_ID>	EventDestination.v1_13_0.EventDestination (TBD)
TaskService	/redfish/v1/TaskService	TaskService.v1_2_1.TaskService
TaskCollection	/redfish/v1/TaskService/Tasks	TaskCollection.TaskCollection
Task	/redfish/v1/TaskService/Tasks/{{Task_instance}}	Task.v1_7_4.Task
JSON Schema file collection	/redfish/v1/JsonSchemas	JsonSchemaFileCollection.JsonSchemaFileCollection
JSON Schema file	/redfish/v1/JsonSchemas/<json_schema_name>	JsonSchemaFile.v1_1_5.JsonSchemaFile
Session Service	/redfish/v1/SessionService	SessionService.v1_2_0.SessionService
Session Collection	/redfish/v1/SessionService/Sessions	SessionCollection.SessionCollection
Session	/redfish/v1/SessionService/Sessions/<SessionId>	Session.v1_8_0.Session
MessageRegistryFileCollection	/redfish/v1/Registries	MessageRegistryFileCollection.MessageRegistryFileCollection
MessageRegistryFile	/redfish/v1/Registries/Base|TaskEvent|ResourceEvent|OpenBMC	MessageRegistryFile.v1_1_5.MessageRegistryFile
Storage Collection	/redfish/v1/Systems/<SystemID>/Storage	StorageCollection.StorageCollection
Storage	/redfish/v1/Systems/<SystemID>/Storage/<StorageId>	Storage.v1_18_0.Storage
UpdateService	/redfish/v1/UpdateService	UpdateService.v1_15_0.UpdateService
SecureBoot	/redfish/v1/Systems/<SystemID>/SecureBoot	SecureBoot.v1_1_2.SecureBoot
DrivesCollection	/redfish/v1/Systems/<SystemID>/Storage/<StorageId>/Drives	DriveCollection.DriveCollection
Drive for NVME	/redfish/v1/Systems/<SystemID>/Storage/SystemDisk1/Drives/<DriveId>	Drive.v1_21_0.Drive
Drive for SATA	/redfish/v1/Systems/<SystemID>/Storage/SystemDisk1/Drives/<DriveId>	Drive.v1_21_0.Drive
Drive for RAID	/redfish/v1/Systems/<SystemID>/Storage/SystemDisk1/Drives/<DriveId>	Drive.v1_21_0.Drive

SensorCollection	/redfish/v1/Chassis/<ChassisID>/Sensors	SensorCollection.SensorCollection
Sensor	/redfish/v1/Chassis/<ChassisID>/Sensors/<SensorId>	Sensor.v1_10_1.Sensor
SecureBootDatabasesCollection	/redfish/v1/Systems/system/SecureBoot/SecureBootDatabases	SecureBootDatabaseCollection.SecureBootDatabaseCollection
SecureBootDatabase	/redfish/v1/Systems/system/SecureBoot/SecureBootDatabases/<SecureBootDatabaseID>	SecureBootDatabase.v1_0_3.SecureBootDatabase
Certificate		
CertificateService	/redfish/v1/CertificateService	CertificateService.v1_0_6.CertificateService
CertificateLocations	/redfish/v1/CertificateService/CertificateLocations	CertificateLocations.v1_0_4.CertificateLocations
CertificateCollection	/redfish/v1/Managers/<ManagerID>/NetworkProtocol/HTTPS/Certificates /redfish/v1/AccountService/LDAP/Certificates /redfish/v1/Managers/<ManagerID>/Truststore/Certificates /redfish/v1/Managers/<ManagerID>/VirtualMedia/Oem/Insyde/Certificates /redfish/v1/Systems/<SystemID>/Boot/Certificates /redfish/v1/Chassis/<ERoT Chassis ID>/Certificates	CertificateCollection.CertificateCollection
Certificate	Reference above.	Certificate.v1_9_0.Certificate
FirmwareInventory		
SoftwareInventoryCollection	/redfish/v1/UpdateService/FirmwareInventory	SoftwareInventoryCollection.SoftwareInventoryCollection
SoftwareInventory	/redfish/v1/UpdateService/FirmwareInventory/<SoftwareInventoryId>	SoftwareInventory.v1_10_2.SoftwareInventory
HostInterfaceCollection	/redfish/v1/Managers/<ManagerID>/HostInterfaces	HostInterfaceCollection.HostInterfaceCollection
HostInterface	/redfish/v1/Managers/<ManagerID>/HostInterfaces/<HostInterfaceId>	HostInterface.v1_3_3.HostInterface
Telemetry		
TelemetryService	/redfish/v1/TelemetryService	TelemetryService.v1_3_4.TelemetryService
MetricDefinitionCollection	/redfish/v1/TelemetryService/MetricDefinitions	MetricDefinitionCollection.MetricDefinitionCollection
MetricDefinition	/redfish/v1/TelemetryService/MetricDefinitions/<MetricDefinitionID>	MetricDefinition.v1_3_4.MetricDefinition

MetricReportDefinitionCollection	/redfish/v1/TelemetryService/MetricReportDefinitions	MetricReportDefinitionCollection.MetricReportDefinitionCollection
MetricReportDefinitions	/redfish/v1/TelemetryService/MetricReportDefinitions/<MetricReportDefinitionId>	MetricReportDefinition.v1_4_1.MetricReportDefinition
MetricReportCollection	/redfish/v1/TelemetryService/MetricReports	MetricReportCollection.MetricReportCollection
MetricReport	/redfish/v1/TelemetryService/MetricReports/<MetricReportId>	MetricReport.v1_4_2.MetricReport
TriggersCollection	/redfish/v1/TelemetryService/Triggers	TriggersCollection.TriggersCollection
Triggers	/redfish/v1/TelemetryService/Triggers/<TriggersID>	Triggers.v1_4_0.Triggers

Common Gateway Interface

The Common Gateway Interface (CGI) is a standard method that defines how web servers interact with external programs to generate dynamic content. Essentially, it acts as an interface between a web server (like Apache) and an executable program (often called a CGI program or script), enabling the server to pass user requests and data to the program and receive dynamic content back, typically in the form of HTML

Beyond Redfish API operations, our BMC still maintan mutiple CGI interfaces for debug and deep operation usage.

Session & Cookies

To ensure CGI functions properly, a cookie mechanism is required to maintain the on-going session. Below is example command for start session and obtain cookie.

bmc=*192.168.100.1*

user=*root*

pass=*0penBmc*

```
cookie=$(mktemp /tmp/cookie-XXXXXXX)


##Login
curl -s -k -c "$cookie" -X POST -H 'Content-Type: application/json' -d "{"data":["$user","$pass"]}" https://${bmc}/login
## Get CSRF
csrf=$(cat $cookie | sed -nre 's/.XSRF-TOKEN\s(.*)$/\1/p')
## Request Simple GET
curl -k -c "$cookie" -b "$cookie" -X GET -H 'QUERY: DATETIME' https://${bmc}/cgi/config_datetime.cgi


##Logout
curl -k -c "$cookie" -b "$cookie" -X POST -H "X-XSRF-TOKEN: $csrf" https://${bmc}/logout
```

For POST, PUT, and DELETE requests, an additional CSRF token check is required.

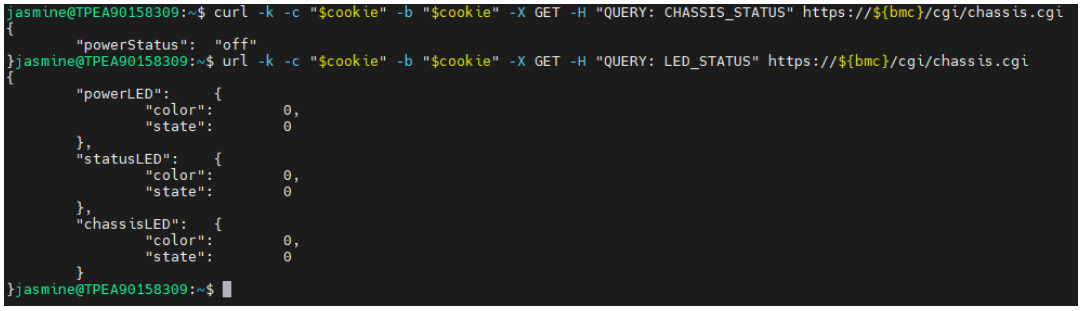
Please make sure to include the CSRF token in the request header using the key X-XSRF-TOKEN.

In addition, please ensure that the request method and corresponding data are properly specified.

Here's an example of how to add it:

```
curl -k -c "$cookie" -b "$cookie" -X POST -H "X-XSRF-TOKEN: $csrf" -H
'QUERY: DATETIME2' -H 'Content-Type: application/json' -d
'{"ntp":{"primaryNTPServer":"time.google.com",
"secondaryNTPServer":"ntp.ubuntu.com"}}'
https://${bmc}/cgi/config_datetime.cgi
```

Note: Do not forget to log out to drop session.



Compliance Information

限用物質含有情況標示聲明書

設備名稱: 伺服器 Equipment name :						，型號（型式）： GS-31B00 Type designation (Type):
單元Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛Lead (Pb)	汞Mercury (Hg)	鎘Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr^{+6})	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
機箱/擋板 Chassis/Enclosure	—	○	○	○	○	○
金屬機械部件(支架) Metallic Mech parts,(Bracket)	○	○	○	○	○	○
電路板組件 PCBA	—	○	○	○	○	○
機構零件 Metallic Accessories	○	○	○	○	○	○
散熱片 Heatsink	○	○	○	○	○	○
連接線 Cable	—	○	○	○	○	○
配件 Accessories	○	○	○	○	○	○

備考1. 〝超出0.1 wt %〞及〝超出0.01 wt %〞係指限用物質之百分比含量超出百分比含量基準值。
Note 1：“Exceeding 0.1 wt %” and “exceeding 0.01 wt %” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.

備考2. 〝○〞係指該項限用物質之百分比含量未超出百分比含量基準值。
Note 2：“○” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.

備考3. 〝—〞係指該項限用物質為排除項目。
Note 3：The “–” indicates that the restricted substance corresponds to the exemption.

FCC, Class A - USA

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) This device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

ICES-003 Class A Notice - Avis NMB-003, Class A - Canada

This Class A digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe A est conforme à la norme NMB-003 du Canada.

CISPR 32 / EN 55032, Class A - International, European Union

Warning: Operation of this equipment in a residential environment could cause radio interference.

VCCI, Class A – Japan

この装置は、クラスA機器です。この装置を住宅環境で使用すると電波妨害を引き起こすことがあります。この場合には使用者が適切な対策を講ずるよう要求されることがあります。

VCCI ー A