Intel® Server System R2600SR

System Management Module (SMM) User Guide

An overview of system configuration procedures and settings.

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Intel® Server Products and Solutions

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Document Revision History

Date	Revision	Changes
February 2018	1.0	Initial release.

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1. Introduction

1.1 The Intel® Server System R2600SR Product Family

The Intel® Server System R2600SR product family features density-optimized, rack-mount, 2U, 4-node server systems designed to support a variety of workloads, from high-performance computing (HPC) environments to hyper-converged infrastructure to software-defined infrastructure. Each system within the Intel® Server System R2600SR product family includes four independent and preconfigured compute nodes, allowing for a power-on ready installation for any supported operating environment.

1.2 About This Document

This Intel® Server System R2600SR Product Family System Management Module (SMM) User Guide is written for system integrators and service technicians responsible for system setup, server and system upgrades, and repair.

This document provides the process of operating the SMM and detailed SMM Web GUI. The descriptions include how to check the status and component information and show how to modify the configuration. It offers a detailed explanation and definition for each function tab of the SMM web pages.

For the latest revision of this document, go to http://www.intel.com/support.

1.3 About the System Management Module (SMM)

The SMM performs the following tasks:

1. Node status reporting
2. Enclosure power and fan status reporting
3. Enclosure power and fan configuration management
4. Enclosure Vital Product Data (VPD) information reporting
5. Enclosure event log display, save, and clear
6. SMM management and settings backup/restore

The System Management Module (SMM) firmware utilizes built-in web pages for system management. It supports Transport Layer Security 1.2 for data encryption over the network and certificate management.

1.3.1 Supported Web Browsers

Browsers supported by the SMM web interface include:

- Internet Explorer 11
- Microsoft Edge 25.10586 or later
- Mozilla Firefox 48.0 or later
- Google Chrome 52.0 or later

1.4 Document Organization

Chapter 1. Introduction

This chapter provides a high-level overview of the Intel® Server System R2600SR Product Family and the System Management Module (SMM) User Guide structure, contents, and organization.

Chapter 2. System Management Module (SMM) Web Interface Access

This chapter gives information on how to access the System Management Module (SMM) Web GUI.

Chapter 3. System Management Module (SMM) Web Interface Function Tabs

The chapter describes the detailed functions of the System Management Module (SMM) web interface and the six function tabs.

Chapter 4. IPMI Command and SMTP and LAN Configuration Parameter Tables

The chapter focuses on tables of the IPMI Commands, SMTP Configuration Parameters, and LAN Configuration Parameters.

Appendix A – Glossary

1.5 Resource Information and Software

For additional information about this family of products or any of their supported accessories, refer to the following resources available at: http://www.intel.com/support

Table 1. Server system references

For this Information or Software	Use this Document or Software
In-depth technical information about this product family	• Intel® Server System R2600SR Product Family Technical Product Specification • Product Safety and Regulatory Compliance - Intel® Xeon® processor Scalable Family
System integration instructions and service guidance	• Intel® Server System R2600SR Product Family System Setup and Service Guide • Intel® Server System R2600SR Product Family Message and Code Reference Guide • Intel® Server System R2600SR Product Family System Management Module User Guide
Server configuration guidance and compatibility	• Intel® S2600SR Product Family Configuration Guide
System firmware updates, onboard device drivers, and software to manage the Intel® Server System	http://downloadcenter.intel.com/

2. System Management Module (SMM) Web Interface Access

The SMM web interface is accessed via Ethernet connection (10/100/1000 Mbit) through an established SMM session. Connecting to the SMM for the first time may require a change of the Internet protocol properties on the client computer. See the Network Configuration (Section 3.6.3) for more information.

To log into the SMM web interface, complete the following steps:

1. By default, the SMM network is disabled. Enable the SMM network. To enable the SMM network, issue the enable IPMI command below to the BMC Controller. The <XCC IP> is the XCC IP address:

   Enable:
   ```
   ipmitool -I lanplus -H <XCC's IP> -U USERID -P PASSW0RD raw 0x3A 0xF1 0x01
   ```

2. The following two commands can also be used to either query or disable the SMM network.

   Query:
   ```
   ipmitool -I lanplus -H <XCC's IP> -U USERID -P PASSW0RD raw 0x3A 0xF1 0x00
   ```

   Disable:
   ```
   ipmitool -I lanplus -H <XCC's IP> -U USERID -P PASSW0RD raw 0x3A 0xF1 0x02
   ```

The table below shows details of the individual codes within the IPMI commands listed above.

Table 2. Individual IPMI command code details

Net Function = 0x3A			
Code	**Command**	**Request, Response Data**	**Description**
0xF1	**SMM network control**	Request: • Byte 1: Request type – 0x00 = Query SMM network status – 0x01 = Enable – 0x02 = Disable Response: • Byte 1 – Completion Code • Byte 2 – SMM network status (for Query request only)	This setting is used to set SMM network status which value is disabled as default. The BMC Controller command supports the system chassis and compute node only.

3. Point the browser to the SMM web interface URL defined during initial system configuration.
4. Apply the out-of-factory default network settings at the first use of the SMM (in this order):
   a. The SMM should use DHCP first. If the SMM cannot acquire an IP address from a DHCP server in 2 minutes, it uses a static IP address. The default static IP address is: 192.168.70.100.
   b. Using Hyper Text Transfer Protocol Secure (HTTPS). (For example, https://192.168.70.100)
   c. IPv4 enabled with static IP = 192.168.70.100
   d. IPv6 enabled with local link address (LLA) IP. To calculate LLA IP, do the following:
      1) Split the MAC address of the SMM (39-A7-94-07-CB-D0) into two parts. Insert FF-FE in the middle (i.e., 39-A7-94-FF-FE-07-CB-D0).
      2) Convert the two hexadecimal digits at the left end of the string to binary (i.e., 00111001-A7-94-FF-FE-07-CB-D0).
      3) Invert the value for bit 1 of the first byte (i.e., 00111011-A7-94-FF-FE-07-CB-D0).
      4) Convert the binary digits at the left end of the string back to hexadecimal.
      5) Combine the hexadecimal digit pairs into 4-digit groups (i.e., 3BA7-94FF-FE07-CBD0).
      6) Replace dash (-) separators with colon (:) separators (i. e., 3BA7:94FF:FE07:CBD0).
      7) Add FE80:: to the left of the string (i.e., FE80::3BA7:94FF:FE07:CBD0).

5. Type user ID and password assigned by a system administrator.
   Default ID: USERID
   Password: PASSW0RD (**Note:** The sixth character of PASSW0RD is the number zero).
6. Click **Log in**.
7. Change the password for the first login default
   a. The password complexity rules are:
      - Must be at least 10 characters in length
      - Must contain at least one number (0 through 9)
      - Must contain at least two of the following three categories:
      - An uppercase letter (A through Z)
      - A lowercase letter (a through z)
      - A non-alphabetic characters such as !@#$%^*-_+=().:`|?"\

3. System Management Module (SMM) Web Interface Function Tabs

The section describes the detailed functions of the System Management Module (SMM) web interface. Within this interface are six function tabs:

- **Summary**
- **Power**
- **Cooling**
- **System Information**
- **Event Log**
- **Configuration**

Move the cursor over a function tab button in the web interface to view the subcategories of that function. Click on the tab or subcategory to go directly to the function.

Notes:

Each SMM web page has a **Refresh** button. Use this button to refresh the page as needed and get the latest readings and status.

The voltage and cooling overview pages refresh periodically (the auto-refresh interval is every 30 seconds).

When an SMM web page is inactive beyond a preset timeframe (the default is 20 minutes), the session times out and expires. Sessions on the voltage and cooling overview pages do not expire as these pages auto-refresh.

Whether F5 from the keyboard or **Refresh** on a browser is used, the web page will redirect to the login page for security reasons.

3.1 Summary

The Summary tab displays overall chassis (enclosure) status and information, which can be shown within two different views: Enclosure Front and Enclosure Rear.

Click on the icon in Figure 1 to access each of these.

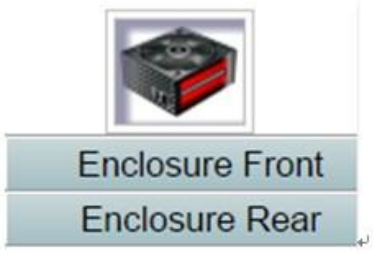


Figure 1. Web enclosure views

3.1.1 Enclosure Front

The **Enclosure Front** section shows the status of the compute node as indicated. The following figure shows how compute node status is displayed.

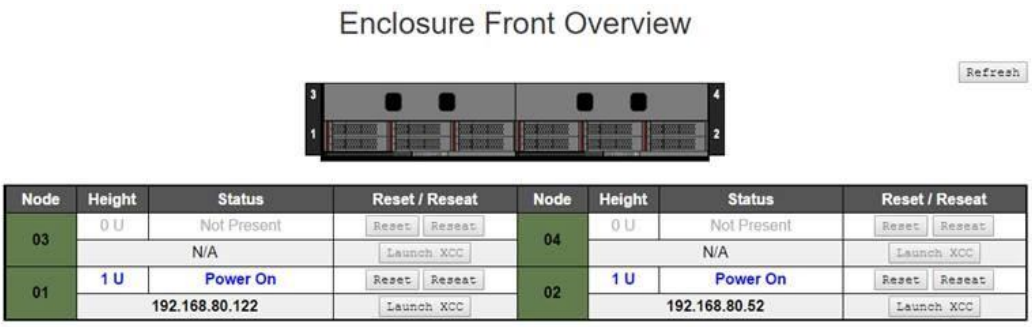


Figure 2. Enclosure Front overview

The following are definitions for the title and status indicators of the Enclosure Front web interface:

- **Node:** The node number.
- **Height:** The node height. (This can range from 1 to 2U).
- **Status:**
  - **Not Present**: No node is installed.
  - **No Permission**: The node has not granted power permission and cannot be powered on.
  - **Fault**: The node has a power fault and cannot be powered on.
  - **Power On**: The node is powered on.
  - **Power Off**: The node is powered off.
- **Reset/Reseat**: Used to perform virtual reset/virtual reseat.
  - **Reset**: Remotely reset node BMC Controller through the SMM.
  - **Reseat**: Remotely power cycle the entire node.
    - After virtual **Reset/Reseat**, the node takes at least two minutes to be fully functional.
    - Launch BMC Controller: Use the specified IP address to access the BMC Controller from the web.

Note: Five minutes after the SMM has been updated, the **Enclosure Front Overview** must be manually updated to update all node status. If the Enclosure Front Overview is not manually updated the BMC Controller will reset to update to the latest node status.

3.1.2 Enclosure Rear

The **Enclosure Rear** section shows the status for three separate system components:

- (System) Management Module (SMM)
- Current PSU
- Fan

3.1.2.1 (System) Management Module (SMM)

The Management Module section indicates the status of the SMM. The following figure is an example of how SMM status is displayed.

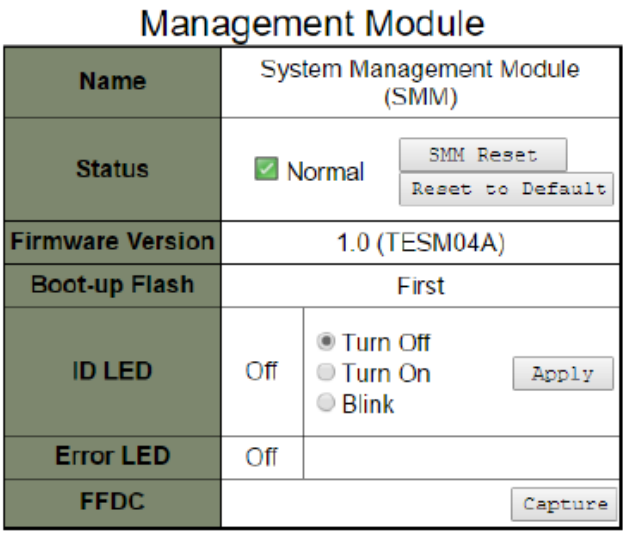


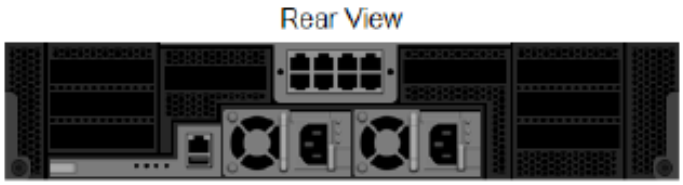
Figure 3. System Management Module (SMM) status

The following definitions are for title and status indicators in the Management Module (SMM) web interface:

- **Status**: SMM operating status.
  - **SMM Reset**: Warm reboot the SMM.
  - **Reset to Default**: Restore the SMM settings to factory default.
- **Firmware Version**: The current firmware revision.
- **Boot-up Flash**: SMM current boot up bank. In normal operation, **Boot-up Flash** should always be first. Only when the first flash has a hardware or firmware failure will the SMM switch to second flash.
- **ID LED**: The Identification LED (ID LED). This blue light LED assists a user in locating an enclosure in a rack. Options are to turn the blue LED on as solid or make the LED blink once every second. Click **Apply** to activate the option.
- **Error LED**: The Error LED is on after a critical event occurs and turns off after it is de-asserted.
- **FFDC**: The Fast Failure Data Collection (FFDC). Instantly collects information about events and conditions that might lead up to a failure. Click **Capture** to download the file used to analyze the problem from the web.

3.1.2.2 Current PSU

The Current PSU section indicates the status of system power supplies. The following figure shows how Current PSU status is displayed.



Current PSU - ZeroOutput Enabled, Total power bank = 2000W

PSU	Status	Ratings	AC-IN	Capability	Zero-Out	EPOW	Throttle	DC-PG
PSU1	Present	2000 W	212 V	2000 W	Wake Up	Normal	Normal	Yes
PSU2	Present	2000 W	0 V	0 W	Disabled	Assert	Normal	No

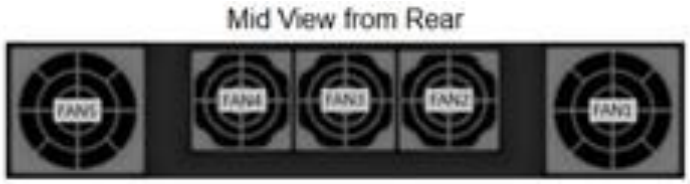
Figure 4. Current PSU status

The following definitions are for title and status indicators in the Current PSU web interface:

- **Status**
  - **Present**: The power supply is installed.
  - **Not Present**: No power supply is installed.
  - **Fault**: The power supply is in a fault condition.
- **Ratings**: Displays the power rating. The Ratings column should always show a 2000W PSU.
- **AC-IN**: Displays the AC input power presented to the PSU.
- **Capability**: The maximum DC output power that the power supply can provide to the entire system.
  - If DC-PG of the PSU is **No**, capability will be 0 W (Zero Watts).
  - If DC-PG of the PSU is **Yes**, capability is usually equal to its rating.
- **Zero-output**: Redundancy mode.
  - **Disabled**: Zero-output is disabled.
  - **Wake-Up**: Zero-output is enabled. The power supply is in working state.
  - **Sleep**: Zero-output is enabled. The power supply is in hibernate state and no DC output.
- **EPOW (Early Power-Off Warning)**
  - **Assert**: The power supply is in an "AC lost" condition.
  - **Normal**: The power supply AC is in normal operating condition.
- **DC-PG (Direct Current - Power Good)**: The DC power status of the power supply.
  - **No**: The power supply is not providing the required DC power.
  - **Yes**: The power supply is providing required DC power.

3.1.2.3 Fan

The Fan section indicates the status of system cooling fans. This figure shows how Fan status is displayed.



Fan

Bay	Status	Type	Bay	Status	Type
2	Present	60mm	1	Present	80mm
3	Present	60mm	5	Present	80mm
4	Present	60mm			

Figure 5. System Fan status

The following are definitions for title and status indicators for the Fan web interface:

- **Status**
  - **Present**: The fan is in normal operating condition.
  - **Not present**: No fan is installed.
  - **Fault**: The fan is in a fault condition.
- **Type:** There are two fan sizes, 60mm and 80mm. This column indicates which size of fan is installed.

3.2 Power

The **Power** section provides status for five power-related conditions/functions:

- **Power Overview**
- **Power Supply Unit (PSU) Configuration**
- **Power Cap**
- **Voltage Overview**
- **Power Restore Policy**

This figure shows how the Power tab is displayed.

Figure 6. Power tab

To access information on the power section desired, click on the function tab associated with that section.

3.2.1 Power Overview

The **Power Overview** displays information relative to enclosure/chassis level power consumption, node-level power consumption, and subsystem power consumption, which includes the power supply units (PSUs) and thermal subsystem (system fans).

The following figure shows how the Power tab is displayed.

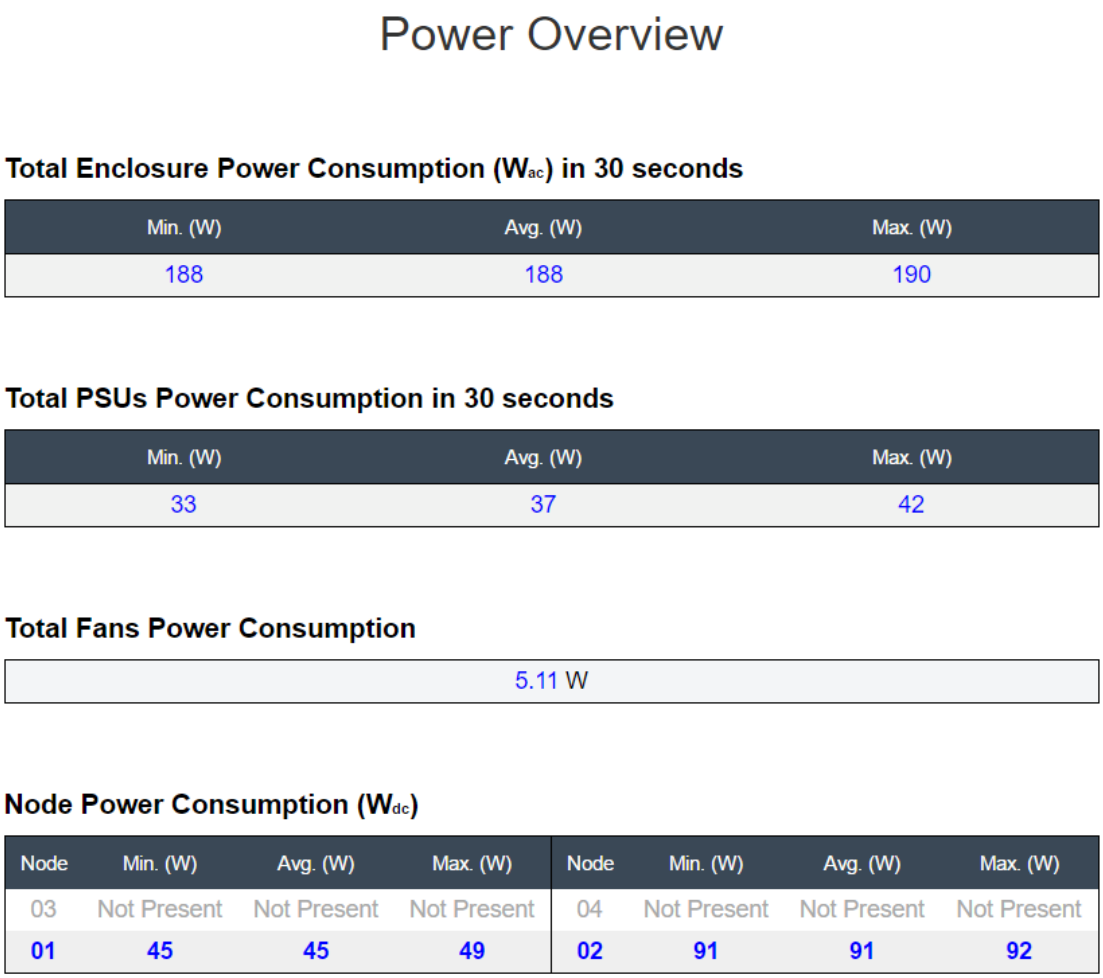


Figure 7. Power overview

Note: Enclosure/chassis and PSU power consumption is sampled at one-second intervals.

3.2.2 Power Supply Unit (PSU) Configuration

With the **Power Supply Unit (PSU) Configuration** tab a user can set the redundancy mode for PSUs. The following figure shows how the **Power Supply Unit (PSU) Configuration** tab is displayed.

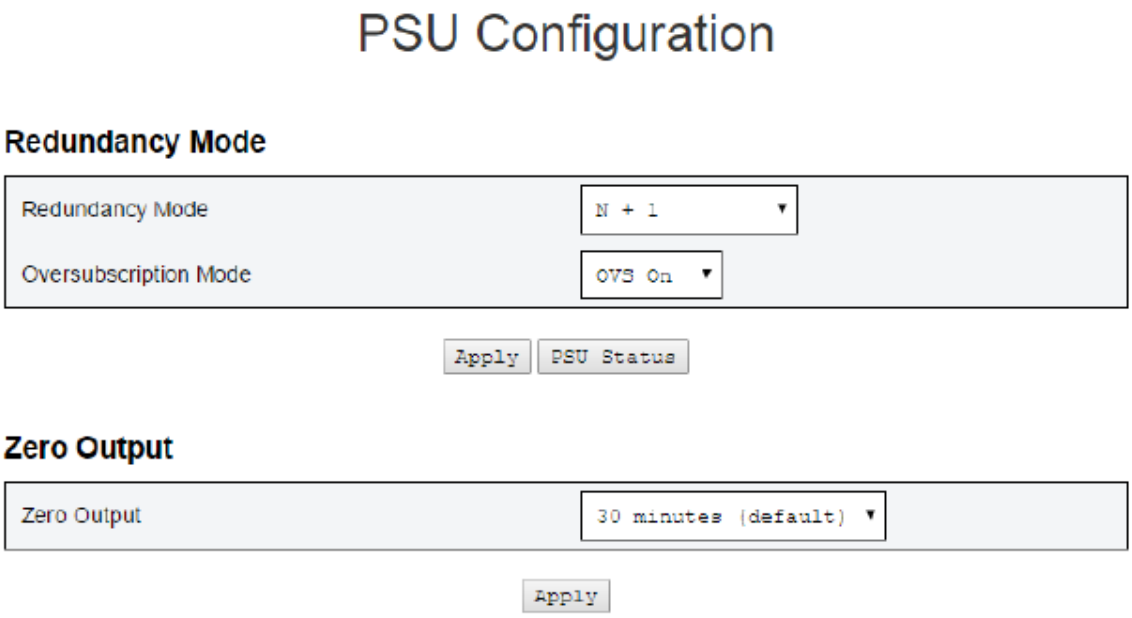


Figure 8. PSU configuration

The following are title and status indicator definitions for the PSU Configuration interface:

- **Redundancy Mode:** Two configurable modes.
  - **No Redundancy**: System can be throttled or shut down if one or more power supplies is in a fault condition.
  - **N+1**: There is one properly installed PSU as a redundant power supply, so, if any one of the PSUs is in a fault condition, there is no impact to system operation or performance, given that Oversubscription mode is not enabled.
- **Oversubscription Mode**: This mode allows the system to take advantage of extra power from the redundant power supply when power supplies are in a healthy condition. When the redundancy fails, the PSU shuts down within 1 second if system power loading is not corrected after the time limit. The SMM takes the action of node throttling in a power emergency situation. Enclosure performance could be impacted even in redundancy mode if oversubscription is also enabled.
  - Oversubscription is applied only with N+1 redundancy modes.
  - When enabled with N+1, the total power available is equivalent to 1.2 single PSU capability.
  - After selecting the PSU Redundancy Mode from the drop-down menus, click **Apply** to activate.
- **Zero Output**: Three scanning periods are available: 10/30/60 minutes. The shorter the scanning period, the faster the SMM adjusts the number of hibernating PSUs to optimize PSU efficiency when the system load changes. With shorter scanning periods, PSUs are also turned on and off more frequently as system loading fluctuates, which can reduce PSU life. Disable zero output to keep all PSUs always active. After selecting Zero Output Mode from the drop-down menus, click **Apply** to activate.

3.2.3 Power Cap

The **Power Cap** enables a wattage limit to be placed on power consumption at the enclosure/chassis or compute node level. Within the **Power Cap** tab the following two options are presented:

- Enclosure Power Cap
- Node Power Cap

Enclosure Power Cap

When applied to the enclosure/chassis, power consumption for the entire enclosure is capped.

Node Power Cap

When applied on an individual compute node, node power consumption is capped at an assigned level.

Power Saving

Power Saving is a third option which can run with the first two options. When enabled by an individual or all compute nodes on the enclosure level, the system runs in throttling mode.

The following figures show how the Enclosure Power Cap and the Node Power Cap/Power Save tabs are displayed.

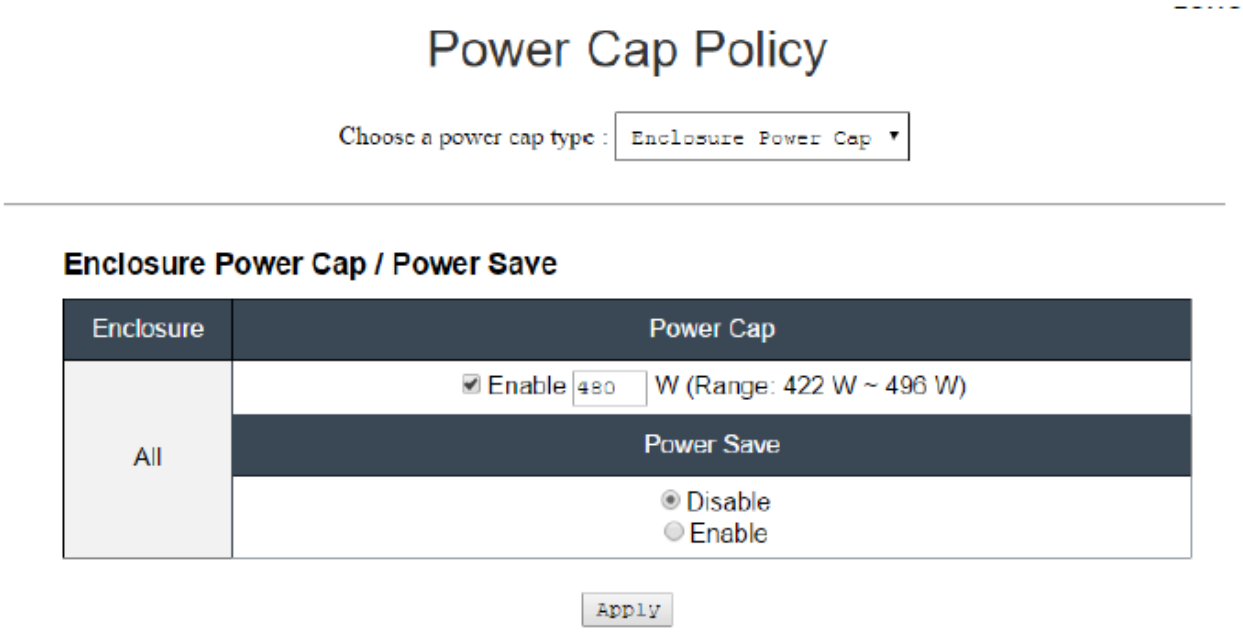


Figure 9. Enclosure Power Cap

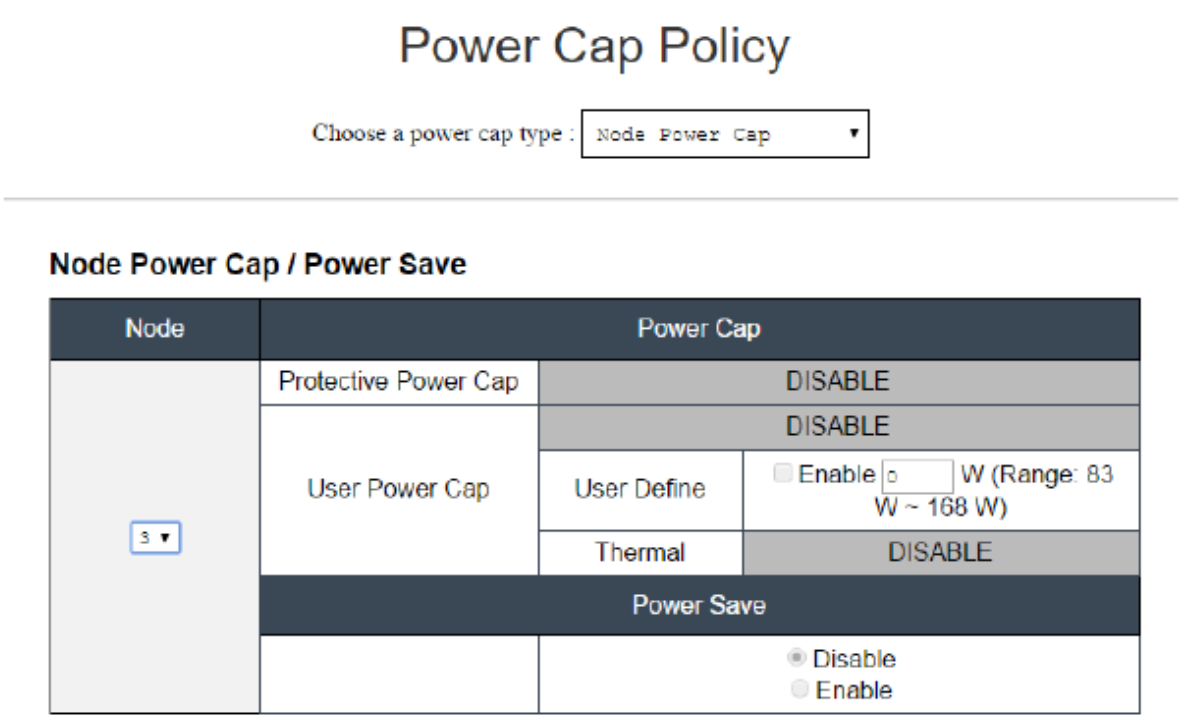


Figure 10. Node Power Cap/Power Save

Follow the instructions below to set and enable Enclosure and Node power caps.

1. Select **Enclosure Power Cap** or **Node Power Cap** from the drop-down menu.
2. Power cap value is limited within the range from minimum to maximum possible power consumption of the specific node/enclosure. To enable the power cap, enter a power cap value for the option selected, check the box, and click **Apply**.
3. Although a power cap enabled (checked) or disabled (unchecked) can be applied independently of a power cap value, a power cap value must be enabled and **Enable** selected.
   a. If a power cap is enabled without an input value, the text box is left empty to represent that no user power cap value is specified and no power cap is enforced.
   b. If an input value is entered and applied for the power cap without checking **Enable**, the input value is saved but not enforced.
4. There are three types of power cap for Node domain. User can set **User Power Capping** value for each node.
5. Select **Enable** in the **Power Save** section and click on **Apply** to activate Power Save. Power Save can be applied simultaneously with both Power Cap options.

The following table provides details about power saving modes.

Table 3. Power saving modes

Mode	Title	Description
Disable	Static maximum performance	The system runs at full speed (no throttling) regardless of the workload.
Enable	Static minimum power	The system runs in a throttled state (defined by the implementation) regardless of the workload.

3.2.4 Voltage Overview

The **Voltage Overview** table provides the status of the SMM module board (12V, 5V, 3.3V, 2.5V, 1.2V, 1.15V) and battery voltage. The error log is asserted if a critical threshold is reached.

Note: The table auto refreshes every 30 seconds.

Table 4. Voltage overview table of the SMM

Probe List

Status	Probe Name	Reading	Lower Non-Critical	Upper Non-Critical	Lower Critical	Upper Critical	Lower Non-Recoverable	Upper Non-Recoverable
	12V_SENSE	12.155 V	11.700 V	12.675 V	10.595 V	13.195 V	N/A	N/A
	5V_SENSE	4.9256 V	4.5028 V	5.4088 V	4.0196 V	5.4994 V	N/A	N/A
	3V3_SENSE	3.3582 V	2.9754 V	3.5670 V	2.6448 V	3.6366 V	N/A	N/A
	2V5_SENSE	2.5155 V	2.2446 V	2.6961 V	1.9995 V	2.7477 V	N/A	N/A
	1V2_SENSE	1.2040 V	1.0850 V	1.2950 V	0.9590 V	1.3230 V	N/A	N/A
	1V15_SENSE	1.1550 V	1.0360 V	1.2390 V	0.9170 V	1.2740 V	N/A	N/A
	VBAT_SENSE	3.1376 V	N/A	N/A	2.2472 V	N/A	N/A	N/A

3.2.5 Power Restore Policy

The **Power Restore Policy** determines the mode of compute node operation after a loss of power. Two policy options are available:

- **Always OFF**: Node remains off upon restoration of power.
- **Restore**: Node restores to the power state enabled before the power failure.

The following figure shows how the Power Restore Policy tab is displayed.

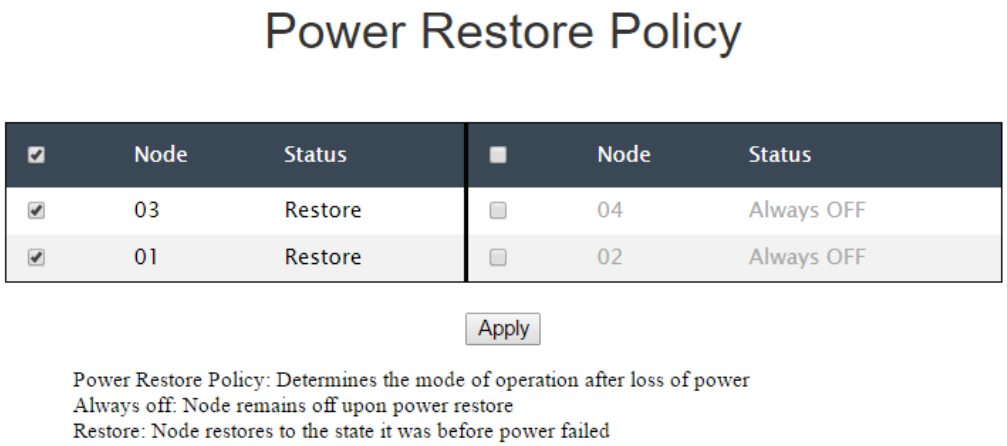


Figure 11. Power Restore policy

Follow the instructions below to enable and set a power restore policy.

1. Check the boxes of the nodes to enable a power restore policy.
2. Click **Apply** to activate the setting.

Note: The change of setting and node status for a power restore policy takes effect 1 minute after selecting and clicking **Apply**. During this application time, the node state may not be recovered upon AC loss.

3.3 Cooling

The Cooling tab contains three sections for the monitoring and management of system cooling:

- **Cooling Overview**
- **PSU Fan Speed**
- **Acoustic Mode**

3.3.1 Cooling Overview

The Cooling Overview section monitors system fan speed and displays it in RPM. An error is asserted in the error log when fan speed is below lower critical threshold.

The following figure shows how the Cooling Overview tab is displayed.

Probe List

Status	Probe Name	Reading	Lower Non-Critical	Upper Non-Critical	Lower Critical	Upper Critical	Lower Non-Recoverable	Upper Non-Recoverable
	FAN_TACH_1A	2304 RPM	1024 RPM	N/A	768 RPM	N/A	N/A	N/A
	FAN_TACH_1B	2304 RPM	1024 RPM	N/A	768 RPM	N/A	N/A	N/A
	FAN_TACH_2A	2816 RPM	1024 RPM	N/A	768 RPM	N/A	N/A	N/A
	FAN_TACH_2B	2944 RPM	1024 RPM	N/A	768 RPM	N/A	N/A	N/A
	FAN_TACH_3A	2816 RPM	1024 RPM	N/A	768 RPM	N/A	N/A	N/A
	FAN_TACH_3B	2944 RPM	1024 RPM	N/A	768 RPM	N/A	N/A	N/A
	FAN_TACH_4A	2816 RPM	1024 RPM	N/A	768 RPM	N/A	N/A	N/A
	FAN_TACH_4B	2944 RPM	1024 RPM	N/A	768 RPM	N/A	N/A	N/A
	FAN_TACH_5A	2304 RPM	1024 RPM	N/A	768 RPM	N/A	N/A	N/A
	FAN_TACH_5B	2304 RPM	1024 RPM	N/A	768 RPM	N/A	N/A	N/A

Figure 12. Cooling overview

Note: This page refreshes automatically every 30 seconds.

The following title and status indicator definitions for the Cooling Overview web interface:

- **Status** (two status types):
  -  : Indicates **Healthy** (no fault) status
  -  : Indicates **Fault** status.
- **Fan_Tach_#A (#B):**
  - When the fan number (#) equals to 2, 3 or 4, system fan speed normally operates at 2000 - 18500rpm.
  - When the fan number (#) equals to 1 or 5, system fan speed normally operates at 2000 - 13000rpm.

System fans are equipped with dual motors. Tach A displays the primary fan motor speed and Tach B displays the secondary/redundant fan motor speed.

- **Lower Critical**: 768 rpm is set to be the lower critical fan speed threshold.

3.3.2 PSU Fan Speed

The PSU Fan Speed function monitors power supply fan speed and displays it in RPM. The following figure shows how the PSU Fan Speed tab is displayed.

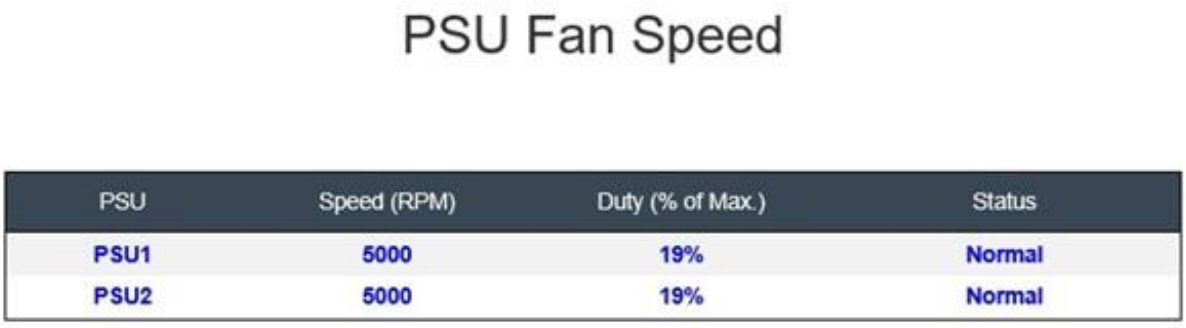


Figure 13. PSU fan speed

The following are title and status indicator definitions for the PSU Fan Speed web interface:

- **Speed**: PSU fan speed normally operates at 4000~23000 rpm. PSU fan speed is displayed in RPM.
- **Duty (% of Max.):** Out of 25300 rpm. (23000*(1+10%))
- **Status:**
  - **Normal**: PSU fan is running in healthy condition.
  - **Not Present**: No power supply is installed.
  - **Fault**: Fan speed is lower than the threshold (3000rpm).

3.3.3 Acoustic Mode

During normal system run time, the acoustic attenuation can be adjusted to one of five different acoustic modes. If selected, an acoustic mode can apply only to the entire enclosure. The following figure shows how the Acoustic Mode tab is displayed.

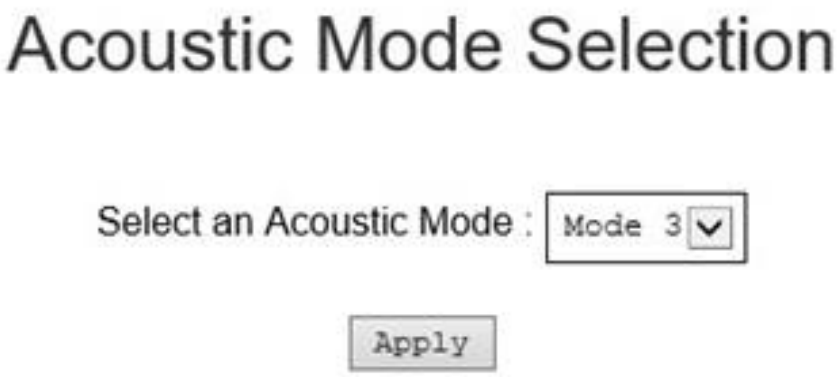


Figure 14. Acoustic mode selection

Adjust the acoustic attenuation through the steps that follow.

1. Select the desired mode from the drop-down menu.
   - **None**: Fan speeds change as required for optimal cooling
   - **Mode 1**: Highest acoustics attenuation (lowest cooling)
   - **Mode 2**: Higher acoustics attenuation
   - **Mode 3**: Intermediate acoustics attenuation
   - **Mode 4**: Low acoustics attenuation (higher cooling)
   - **Mode 5**: Aggressive cooling mode
2. Click on **Apply** to activate the setting.

Notes:

When acoustic modes are applied, nodes workload is also capped to avoid over-heating.

If a PCI card is installed in the enclosure that requires more power or cooling, the acoustic mode is automatically disabled.

3.4 System Information

Six categories of fixed Vital Product Data (VPD) are listed under the **System Information** tab. Those categories are:

- **Enclosure VPD**
- **Power Distribution Module (PDM) VPD**
- **SMM VPD**
- **PSU VPD**
- **EIOM VPD**
- **PIOR Right/Left VPD**

Note: Information displayed with IPMI standard FRU command is limited to SMM Board VPD data only.

3.4.1 Enclosure VPD

The **Enclosure VPD** tab displays system/chassis level information. The following figure shows how the **Enclosure VPD** tab is displayed.

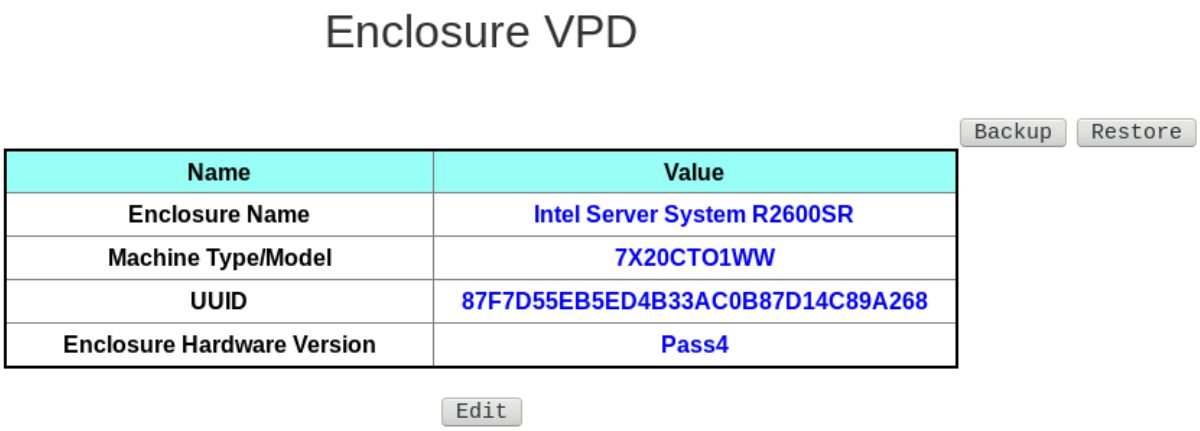


Figure 15. Enclosure VPD

Note: The storage device can be a USB device or microSD card depending on machine type.

The following are title definitions or functions for the **Enclosure VPD** web interface:

- **Backup**: Save current enclosure name onto USB storage device for future migration
- **Restore**: Load the enclosure name from previously saved data on the USB storage device
- **Edit**: Modify the enclosure name based on the following rule
  - Enclosure Name can be up to 64 characters using alphanumeric characters a-z, A-Z and 0-9, - (hyphen), _ (underscore), and space
- **Enclosure Name**: For example, “Intel Server System R2600SR”
- **Machine Type**: For example, “7X125AJCCN”
- **UUID**: Randomly generated ID number of the enclosure
- **Enclosure Hardware Version**: Hardware version

3.4.2 Power Distribution Module (PDM) VPD

The **Power Distribution Module (PDM) VPD** provides data for the Power Distribution Module installed in the system shuttle. This figure shows how the **Power Distribution Module (PDM) VPD** tab is displayed.

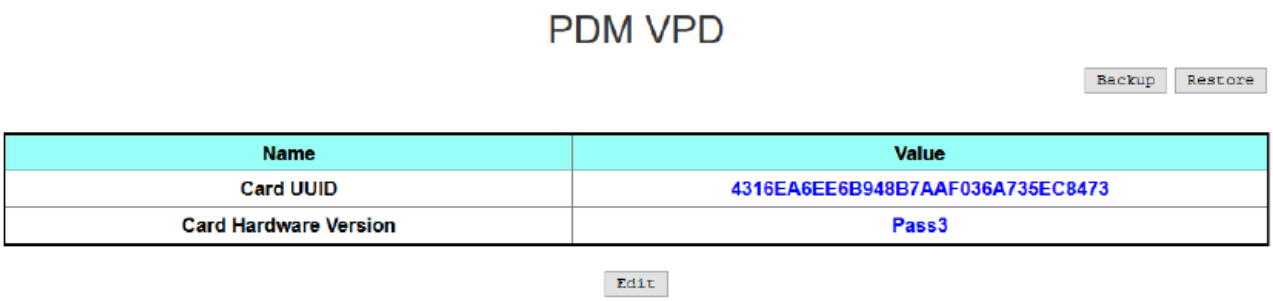


Figure 16. PDM VPD

Note: The storage device can be a USB device or microSD card depending on machine type.

The following are title definitions or functions for the **Power Distribution Module (PDM) VPD** web interface:

- **Backup**: Save the current card serial number, card UUID, hardware version, and FRU part number onto the USB storage device for future migration.
- **Restore**: Load the previously saved card serial number, card UUID, hardware version, and FRU part number data from the USB storage device.
- **Edit**: Modify the card UUID as user preference based on this rule:
  - UUID: Card UUID must be filled in with all 32 alphanumeric characters (A-Z, 0-9). No space and no other characters are allowed.
- **Card UUID**: Randomly generated ID number of the enclosure.
- **Card Hardware Version**: Hardware version.

3.4.3 SMM VPD

The **SMM VPD** tab displays System Management Module (SMM)-related information. The following figure shows how the **SMM VPD** tab is displayed.

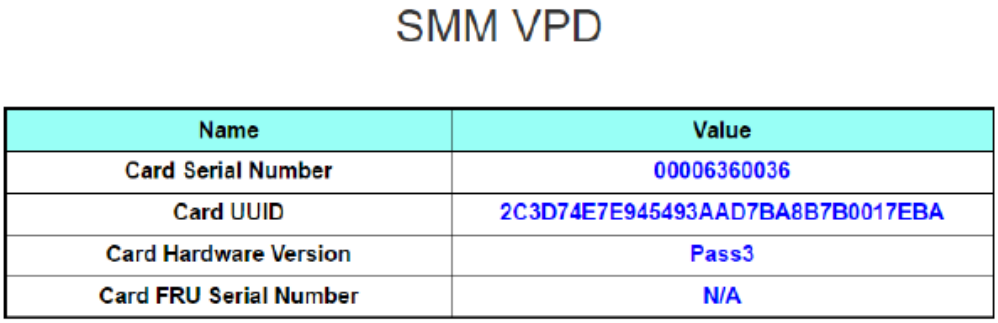


Figure 19. SMM VPD

The following are title definitions for the **SMM VPD** web interface:

- **Card Serial Number**: The last 11 digits of an 8S bar code label on SMM (For example, 8SXXXXXXXXX**AAAABBBCCCC**).
- **Card UUID**: Randomly generated ID number of the enclosure
- **Card Hardware Version**: Hardware version
- **Card FRU Serial Number**: The first 10 digits after "8S" of an 8S bar code label on SMM. (For example, 8S**XXXXXXXXXX**AAAABBBCCCC).

3.4.4 PSU VPD

The **PSU VPD** tab displays power supply related information. The following figure shows how the **PSU VPD** tab is displayed.

PSU1 VPD

Name	Value
MFR Revision	0B
Type	CFFv3 1100W PT
Part Number	SP50L09207
FRU Number	01GV270
Serial Number	A1DB7111004
Header Code	A1DB
Vendor Name	ACBE
MFR Date	01(week)/17(year)
Primary FW Revision	4.51
Seconday FW Revision	84.51
MFR Model	FSF056
MFR Location	DB
Barcode	8SSP50L09207A1DB7111004

Figure 20. PSU VPD

The following are title definitions for the **PSU VPD** web interface:

- **MFR Revision:** Assembly revision
- **Type:** CFFv3 PSU type
- **Part Number:** Intel part number
- **FRU Number:** Intel FRU number for a field-replaceable unit
- **Serial Number:** The last 11 digits of an 8S bar code label on PSU. (For example, 8SXXXXXXXXXXAAAABBBCCCC").
- **Header Code:** Intel header code
- **Vendor Name:** Vendorname
- **MFR Date:** Manufacturing date code (week/year)
- **Primary FW Revision:** Primary firmware revision
- **Secondary FW Revision:** Secondary firmware revision
- **MFR Model:** Vendor part number
- **MFR Location:** Manufacturer location
- **PSU FRU Number:** For example,"01GV270"
- **Barcode:** Intel barcode

3.4.5 EIOM VPD

The **EIOM VPD** tab displays Ethernet I/O Module-related information. The following figure shows how the **EIOM VPD** tab is displayed.

EIOM VPD

Name	Value
Card Serial Number	00006360036
Card UUID	688471A276B311E68186AD3D4359E997
Card Hardware Version	Pass3
Card FRU Serial Number	N/A

Figure 21. EIOM VPD

The following are title definitions for the **EIOM VPD** web interface:

- **Card Serial Number**: The last 11 digits of an 8S bar code label on EIOM. (For example, 8SXXXXXXXXXX**AAAABBBCCCC**).
- **Card UUID**: Randomly generated ID number of the enclosure
- **Card Hardware Version**: Hardware version
- **Card FRU Serial Number**: The first 10 digits after "8S" of a 8S bar code label on EIOM. (For example, 8S**XXXXXXXXXX**AAAABBBCCCC).

3.4.6 PIOR Right/Left VPD

The **PIOR Right/Left VPD** tab displays PCIe I/O Riser-related information for either the left or right side riser card. The following figure shows how the **PIOR Right/Left VPD** tab is displayed.

PIOR Right VPD

Name	Value
Card Serial Number	00006360040
Card UUID	44FF6A1378EB11E687B4D1612BBB26D6
Card Hardware Version	Pass3
Card FRU Serial Number	N/A

PIOR Left VPD

Name	Value
Card Serial Number	00006360041
Card UUID	F31E17B57A6A11E6B3FF9E2FA5353282
Card Hardware Version	Pass3
Card FRU Serial Number	N/A

Figure 22. PIOR Right/Left VPD

The following are title definitions for the **PIOR Right/Left VPD** web interface:

- **Card Serial Number**: The last 11 digits of an 8S bar code label on PIOR. For example, 8SXXXXXXXXXX**AAAABBBCCCC**
- **Card UUID**: Randomly generated ID number of the enclosure
- **Card Hardware Version**: Hardware version
- **Card FRU Serial Number**: The first 10 digits after "8S" of an 8S bar code label on PIOR. For example, 8S**XXXXXXXXXX**AAAABBBCCCC

3.5 Event Log

The **Event Log** tab displays System Event Log (SEL) information. This information results as the SEL records enclosure/chassis level information, warning, and critical events. The SEL information can assist in resolving system issues. The SEL logs a maximum of 4090 event entries.

Note: At this time, the SEL cannot log more than 4090 event entries. The user must manually clear the log before the SEL can log more events.

By default, events are sorted by occurring order from earliest in time to the latest; therefore, the latest entry is on the last page. Click on **Date/Time** to reorder the sorting in the opposite order, from the latest event to the earliest.

The following figure shows how the **Event Log** tab is displayed.

Figure 17. Event Log

The following are title and status indicator definitions for the **Event Log** web interface:

- **Refresh**: SEL does not automatic refresh. Click **Refresh** to get the latest entries.
- **Save Log**: Exports SEL data and saves it as a .csv file.
- **Clear Log**: Clears SEL data.
- **Severity**: From low severity to high severity.

  – : Indicates **Information** events

  – : Indicates **Warning** events

  – : Indicates **Critical** events. Critical event lights the Error LED.

For detailed SEL messages, refer to the Intel® Server System R2600SR Product Family Message and Code Reference Guide.

3.6 Configuration

Twelve **Configuration** tabs are used to configure and manage the system and SMM module. The following figure is an example of how the **Configuration** tabs are displayed.

Figure 18. Configuration tabs

Twelve categories are listed under the **Configuration** tabs:

- **Firmware Update**
- **SMTP**
- **SNMP**
- **PEF**
- **Network Configuration**
- **Time Settings**
- **User Account**
- **Account Security**
- **Services**
- **Web Certificate**
- **NTP (Network Time Protocol)**
- **Backup and Restore**

Note: Press the Hardware Reset button for more than 4 seconds to restore all settings (except Time Setting) to factory default settings.

3.6.1 Firmware Update

There are two phases to the **Firmware Update** process. During the Firmware Upload stage, a path to fetch the firmware image can be selected. The SMM checks the image header information for validation.

The following figure is an example of how the **Firmware Update** tab is displayed.

Figure 19. Firmware Update page

Follow this procedure to complete a firmware update.

Upload

Select an image file and click **Upload**. The Upload process terminates all other sessions. After the Upload process begins, any attempt to refresh, log out, or navigate away from the Update page restarts the system.

Once a valid firmware image is uploaded, a Firmware Image Confirmation Table appears with the **Preserve Settings** check box. If **Preserve Settings** is checked, SMM configurations are kept and applied after the firmware update. The preserved settings include:

- **SMTP**
- **SNMP**
- **PEF**
- **Network Configuration**
- **Time Setting** (Time is always kept no matter whether **Preserve Settings** is checked or not)
- **User Account**
- **Account Security**
- **Services**
- **Web Certificate**
- **NTP**

Notes: A **Recover Primary Bank Firmware** check box present in the Firmware Update page functions only when the SMM starts on the secondary bank, indicating the primary bank image might be corrupted and need recovery. In this case, the check box is open for selection. The check box does not function when the SMM is booted up from the primary bank.

Check **Recover Primary Bank Firmware** check box to perform the recovery measure and update the image onto the primary bank. Uncheck it to upgrade firmware onto the secondary bank.

If the Firmware Update process is cancelled after the firmware image is uploaded, the SMM automatically restarts.

The following figure shows how the Firmware Update with Firmware Image web image is displayed.

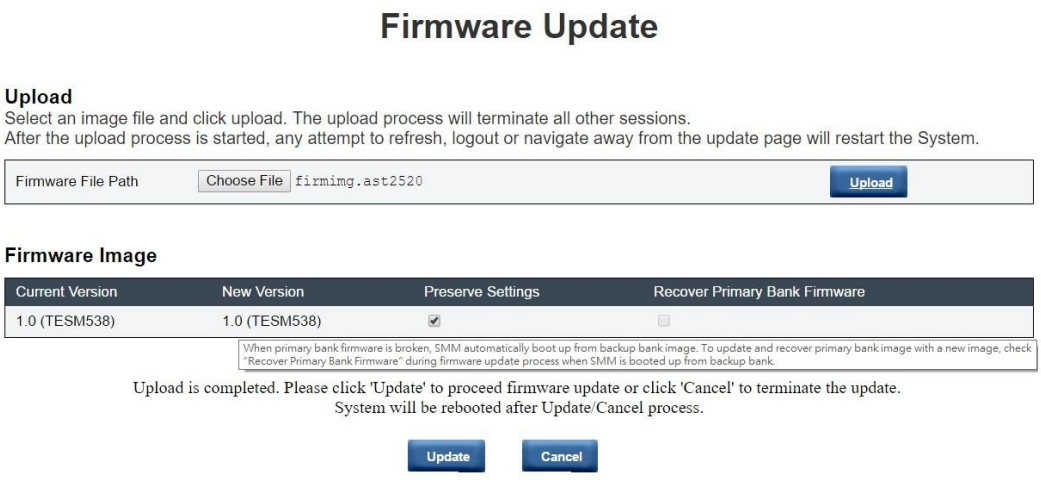


Figure 20. Firmware Update/Firmware Image

During updating, the system displays a loading page where all SMM functions are locked.

Once the progress reaches 100%, the SMM automatically restarts and log in is required again to access the SMM Web interface.

3.6.2 SMTP/SNMP/PEF

Configured SMTP and SNMP traps allow the enclosure/chassis to be monitored for selected events. SMTP/SNMP trap event types are set in the Platform Event Filter (PEF) page.

3.6.2.1 Simple Mail Transfer Protocol (SMTP)

The following figure shows how the SMTP tab is displayed.

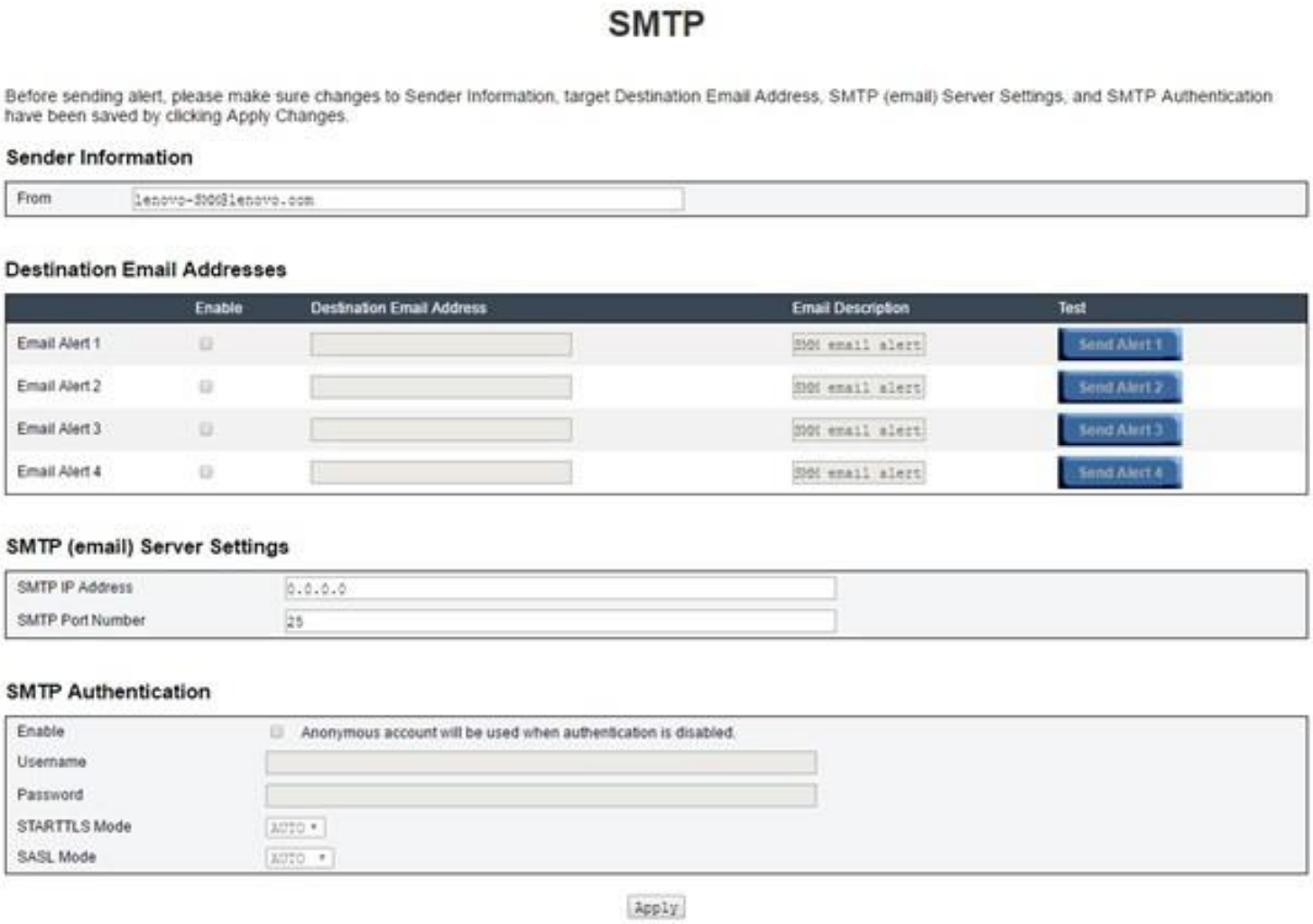


Figure 21. SMTP interface

The following procedure tests the SMTP email alert:

- **SMTP**: Enable, configure and test SMTP email alert at this page.
  - Click **Send Alert #** to test the emailalert
  - Check **Global Alerting Enable** in PEF page to enable email alerts

The following information provides the default values:

- All email alerts disabled
- Email server address = 0.0.0.0
- Authentication disabled

Notes:
Before sending an alert, make sure changes to **Sender Information**, **Destination Email Address**, **SMTP (email) Server Setting**, and **SMTP Authentication** are saved by clicking **Apply**.

When the SMM SEL is full, no new event entry can be added. However, further SMTP event emails are generated until the log is cleared.

3.6.2.2 Simple Network Management Protocol (SNMP)

The following figure shows how the SNMP tab is displayed.

Figure 22. SNMP interface

The following procedure should be used to test the SNMP email alert.

- **SNMP**: Enable, configure and test the SNMP trap at on the SNMP Interface page.
- Click **Send Test Trap** to test the event trap.
- **Community Name** displays/configures the SNMP community name using only alphabet and numerical values. The value must not be empty.
- All the events are sent to the destination IP address when **Global Alerting Enable** in the PEF page is checked.
- For SNMP trap type, check the **Generate PEF** box for targeted type of events.

Default values are:

- All traps disabled
- Community Name = public

Notes:

Before sending a test trap, save changes to the target **Destination** and **Community String** by clicking **Apply**.

When the SMM SEL is full, some PEF alerts may be missing or sent repeatedly.

3.6.2.3 Platform Event Filter (PEF) Interface

The following figure is an example of how the PEF tab is displayed.

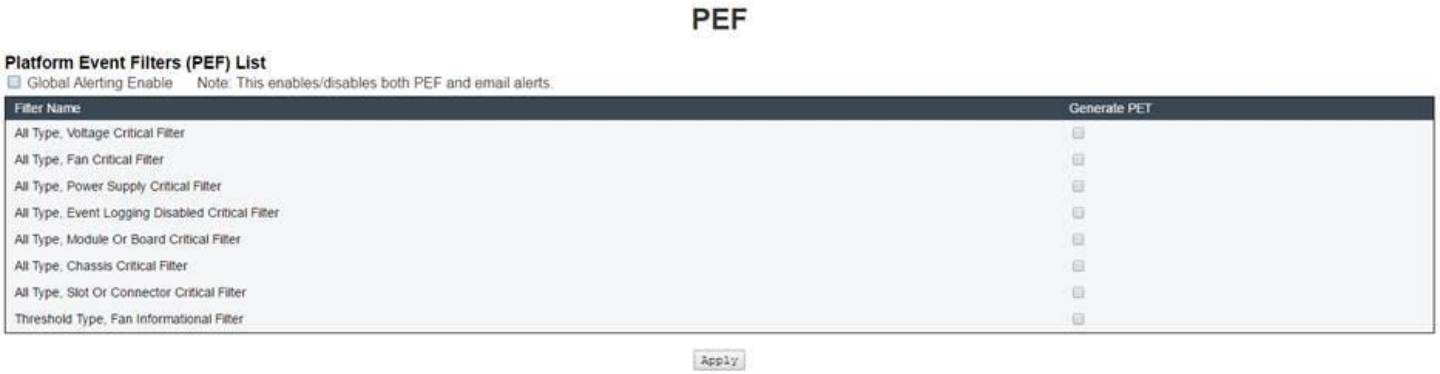


Figure 23. PEF interface

The following are the PEF filter options for email alerts.

- **PEF**: Set SMTP/SNMP trap event types at this page.

Default values are:

- None of the filters is selected
- Global Alerting is unchecked

3.6.3 Network Configuration

Networking parameters are changed in the **Network Configuration** tab. The following parameters can be modified.

- **Host Name**
- **DNS Domain Name**
- **Auto Negotiation Mode**
- **Network Speed**
- **Duplex Mode**
- **IP Version (IPv4, IPv6) Enable/Disable**
- **IP Address**
- **IP Source (Static, DHCP first then Static)**
- **Gateway**
- **Subnet Mask**
- **DNS Server**
- **VLAN**

The following figure shows how the **Network Configuration** tab is displayed.

Figure 24. Network configuration

The following are general network configuration settings.

General Settings

A change to the network settings may require a change to IP address settings. Each change to settings may cause a loss in connectivity and the termination of all sessions. Changes may not take effect immediately.

Default settings for **Network Configuration** are:

- Host Name: SMM-$MAC_ADDR
- DNS Domain Name: Intel.com

The following figure shows how the **Network Interface Configuration tab** is displayed.

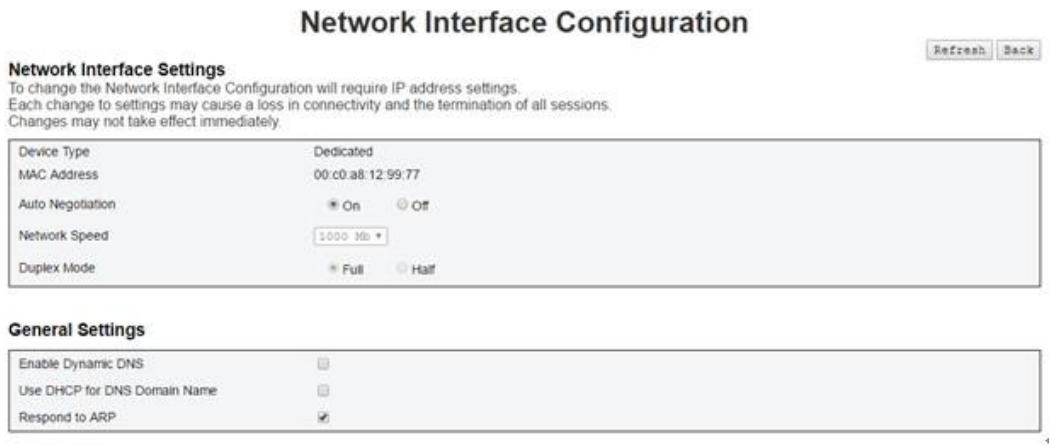


Figure 25. Network Interface configuration

Clicking on an item within **Network Interface Configuration** displays detailed network settings.

Default settings for **Network Interface Configuration** are:

- **Auto Negotiation:** On
- **Dynamic DNS:** Unchecked
- **Use DHCP for DNS Domain Name:** Unchecked
- **Respond to ARP:** Checked

The following figures show how the IP Version tabs are displayed.

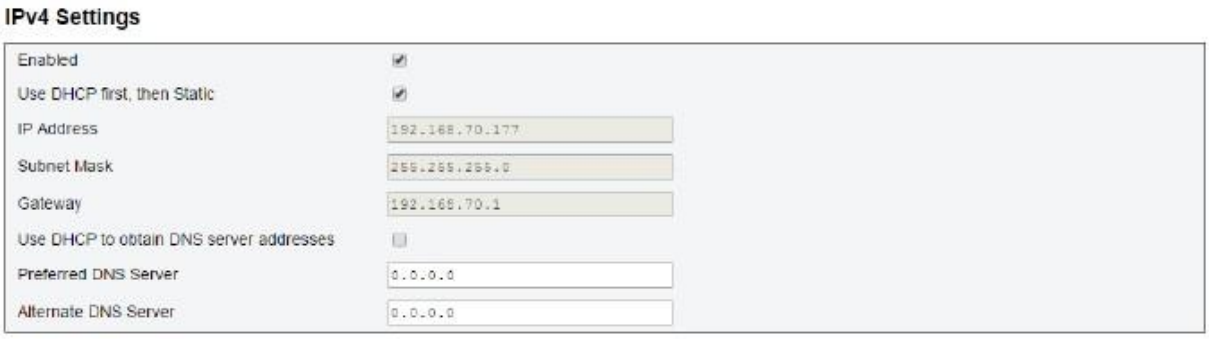


Figure 26. IPv4 settings

Default values for **IPv4 Settings** are:

- **IPv4:** Enabled
  - Use DHCP first, then Static: Checked
- **IP Address**: 192.168.70.100
- **Subnet Mask:** 255.255.255.0
- **Gateway:** 192.168.70.1
- **Preferred/Alternate DNS Server:** Blank

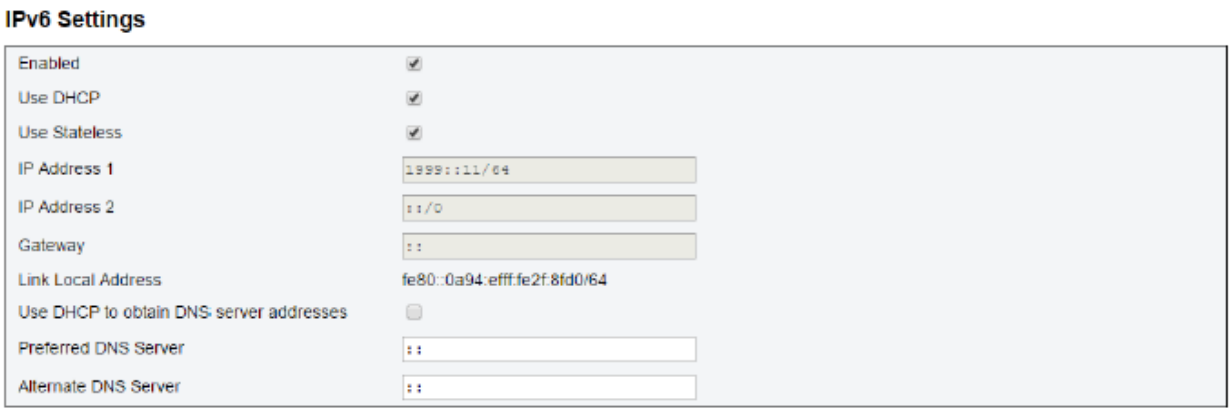


Figure 27. IPv6 settings

Default values for **IPv6 Settings** are:

- **IPv6:** Enabled
  - Use DHCP: Checked
  - Use Stateless Address Auto-configuration: Checked
- **IP Address 1:** Blank (configured by user)
- **IP Address 2:** Blank (configured by user)
- **Gateway:** Blank (configured by user)
- **Link Local Address:** Converted from MAC address automatically
  - Use DHCP to obtain DNS Server address: Unchecked
- **Preferred/Alternate DNS Server:** Blank (configured by user)

The following figure shows how the **VLAN Settings** tab is displayed.

Figure 28. VLAN settings

Default value for **VLAN Settings** is:

- VLAN: Disabled

3.6.4 Time Settings

The **Time Settings** tab is used to configure system time and date. This figure shows how the **Time Settings** tab is displayed.

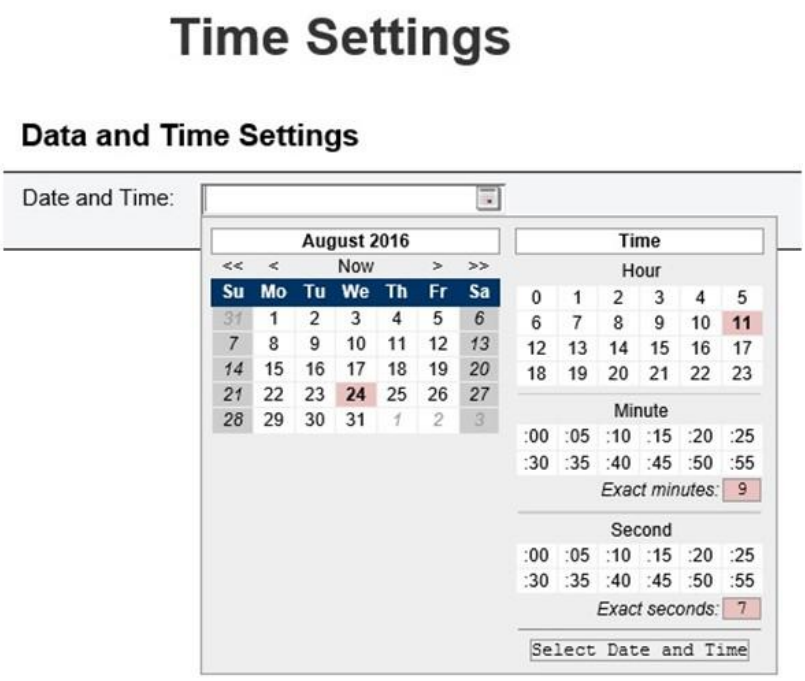


Figure 29. Time and Date settings

The procedure to configure system time and date is:

1. Select date and time.
2. Click **Apply**.

Once set, time is always maintained even if default settings are restored or **Preserve Setting** is unchecked during a firmware update.

3.6.5 User Account

The **User Account** tab allows management of user roles. There are three types of user roles:

- **Administrator:** Has full access to all the web pages and can modify all the settings and configurations.
- **Operator:** Has full access to all the web pages except the User Account page. Can only see own account at the User Account page. No modification allowed at the account page.
- **User:** Has full access and modification rights to all the pages except these pages in the Configuration tab: SMTP/SNMP/PEF/Network Configuration/User Account/Web Service. Only viewing is allowed on these pages. No modification is allowed.

The following figures show how the User Account tabs are displayed.

Figure 30. User Account tab--User and Operator

User Account

To configure an account for a particular user, click **User ID**. If the State (Password Policy Check) is enabled, password strength checking is enabled while updating the user configuration.

Note: Password policy check enabled by default. User name= USERID, Password = PASSW0RD

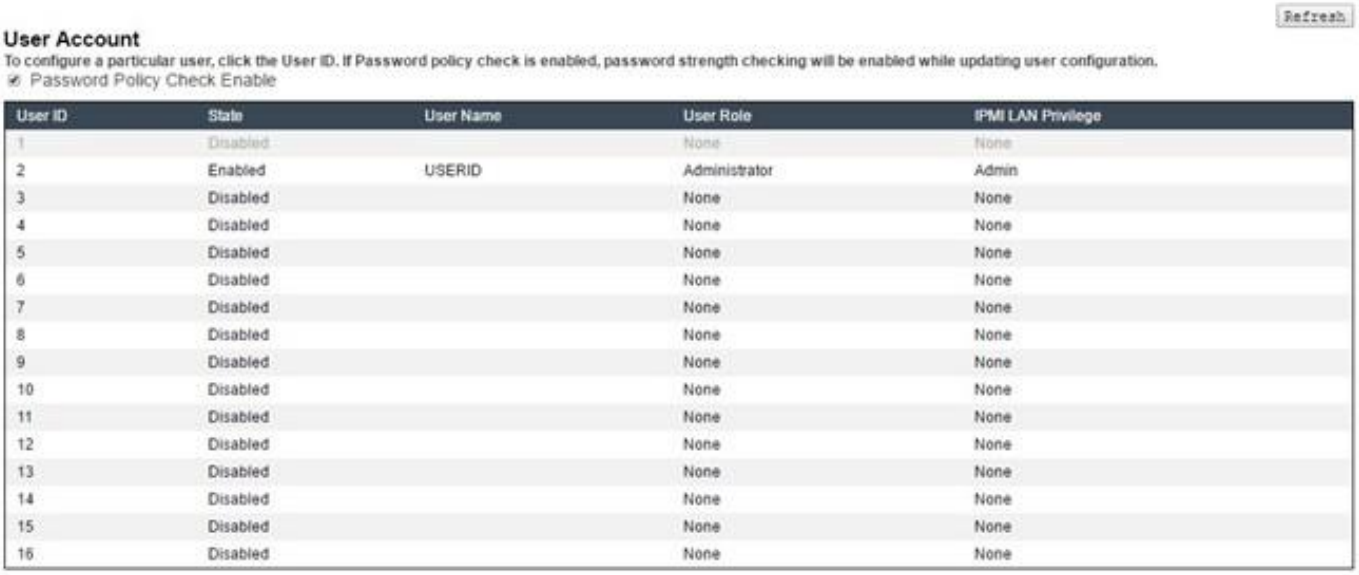


Figure 31. User Account - Administrator

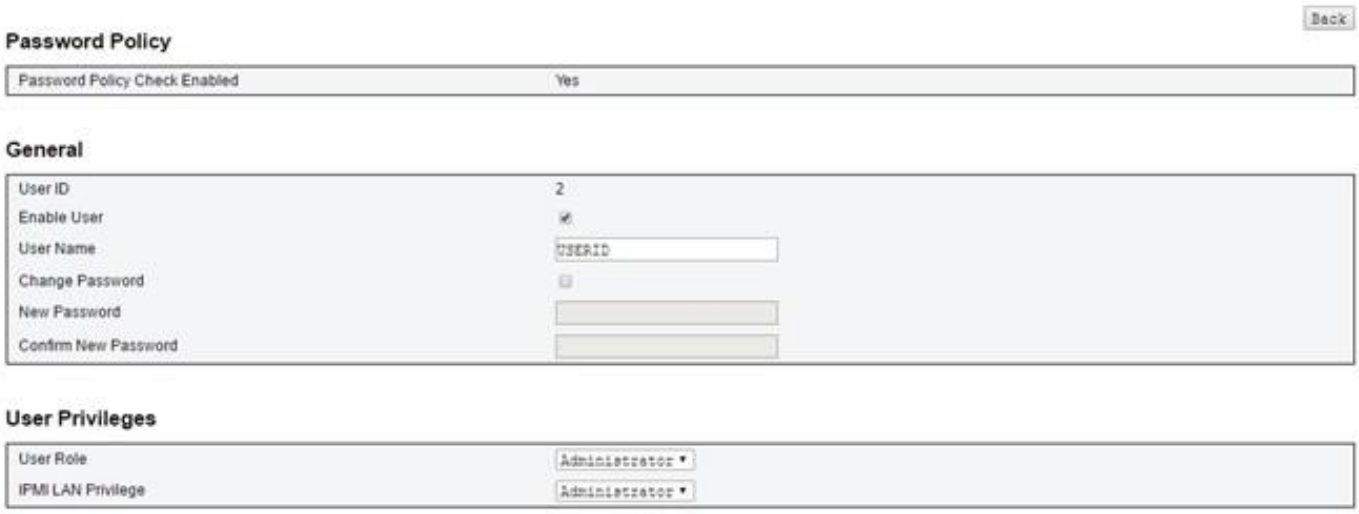


Figure 32. Password policy

Clicking on one of the listed account leads to User Configuration. Here, enable/disable/delete account, set user name, set/change password, and select user privileges. When the **Password Policy Check Enable** box is checked, the account password must follow the password policy rule (at least 8 characters with numbers, letters, and a character).

Creating User Account Names and Passwords

1. Assign a user account name in the **User Name** field of up to 16 characters using alphanumeric characters a-z, A-Z, and 0-9, - (hyphen) and _ (underscore). Click the **Apply Changes** button. If validation fails, the GUI displays an error message.
2. Set/change a password in the **New Password** field using up to 20 printable US-ASCII (Code: 33-126) characters. The password must contains characters from three of the following four categories:
   - English uppercase characters (A through Z)
   - English lowercase characters (a through z)
   - Base 10 digits (0 through 9)
   - Non-alphabetic characters (such as !, $, #, %)

If validation fails, the GUI displays an error message.

Note: Creating a new user account with an existing user name is not allowed.

3.6.6 Account Security

Advanced account security setting allows different values for the following rules.

Table 5. Account security settings

Items	Default settings
Minimum password length	**10**
Force user to change password on first access	**Yes**
Password expiration period (in days)	**90**
Password expiration warning period (in days)	**5**
Minimum password change interval (in hours)	**24**
Minimum password reuse cycle (0-10)	**5**
Maximum number of login failures	**5**
Lockout period after maximum login failures (in minutes)	**60**
Web inactivity session timeout (in minutes)	**20**

3.6.7 Services

The **Services** tab allows configuration of HTTPS ports for connection and enabling/disabling the IPMI service state. The following figure shows how the Services tab is displayed.

Figure 33. Services tab

The default value for the **Services** tab is:

- HTTPS Port Number = 443.

Note: No default HTTP port number = 80

3.6.8 Web Certificate

The **Web Certificate** tab displays current certificate information. There are three **Web Certificate** options for selection: Generate Certificate Signing Request (CSR), Import a Signed Certificate, and Generate Self-Signed Certificate. The following figures are examples of how the **Web Certificate** tabs are displayed.

Figure 34. Web Certificate tab

The following information is contained in the **Web Certificate** tab.

Subject Information:

- Country Code (CC) = US
- State (S) = NC
- Locality (L) = RTP
- Organization (O) = Server
- Common Name (CN) = management.module

Issuer Information:

- Country Code (CC) = US
- State (S) = NC
- Locality (L) = RTP
- Organization (O) = Server
- Common Name (CN) = management.module

Figure 35. Generate a Certificate Signing Request (CSR)

3.6.8.1 Generate a Certificate Signing Request (CSR)

To generate a Certificate Signing Request (CSR), do the following:

Press the **Generate a Certificate Signing Request (CSR)** button to fill in the certification request information and download the CSR. Once completed, the CSR can be submitted to a third-party certificate authority to apply for a digital identity certificate.

Figure 36. Import a signed certificate

3.6.8.2 Import a Signed Certificate

Note: Uploading a signed certificate restarts the web service, causing the termination of the current GUI session and temporary unavailability of the web server.

Press the **Import Certificate** button to import the certificate when the CA responds with a signed certificate. This supports a certificate in PEM format.

Convert a DER certificate to PEM format by using the following: "`openssl x509 -inform der -in certificate.cer -out certificate.pem`."

After importing the certificate, reconnect to the SMM.

Figure 37. Generate a Self-signed Certificate

3.6.8.3 Generate a Self-signed Certificate

Press the **Generate** button to generate a self-signed certificate. Generating a self-signed certificate restarts the web service, causing the current GUI session and the web server to become temporarily unavailable.

A self-signed certificate can also be generated by populating the spaces on this page and pressing the **Generate** button.

3.6.9 Network Time Protocol (NTP)

Network time protocol and time zone settings are configured in the **NTP** (Network Time Protocol) tab. The following figure is an example of how the **NTP** tab is displayed.

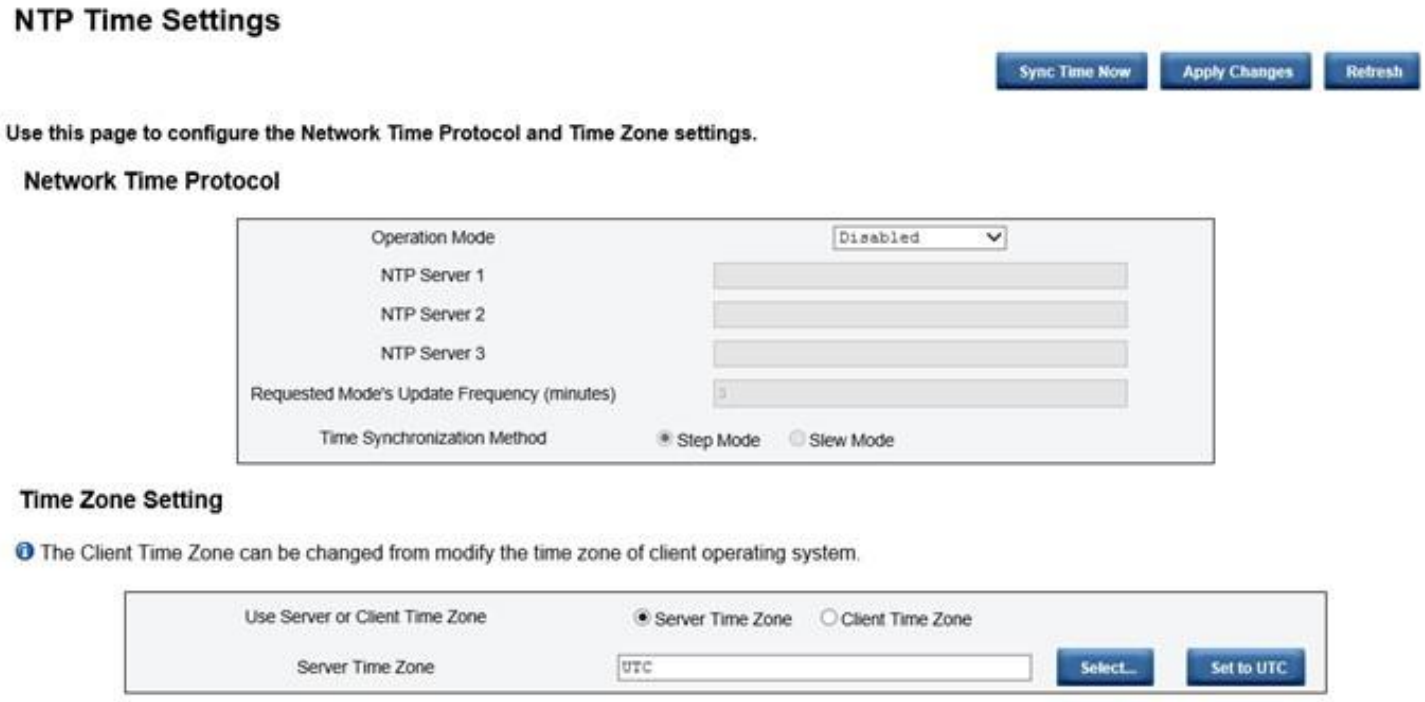


Figure 38. NTP Time Settings

In the NTP time settings, the drop-down menu can be used to change the operation mode and enter the NTP server address into the text boxes. In addition, the update frequency and time synchronization method can be selected. After changing the settings, click on **Apply Changes** to save the configuration. Clicking on the **Sync Time Now** button synchronizes with the server. For the time zone setting, select the server or the client time zone. The client time zone can be changed by modifying the time zone of the client operating system.

Default values for the **NTP Time Settings** are:

- Operation Mode: Disable
- Server Time Zone: UTC

3.6.10 Backup and Restore

The **Backup and Restore** tab allows for the backup and restoration of configuration data. The following figure is an example of how the **Backup and Restore** tab is displayed.

Figure 39. SMM Backup and Restore

User configurations are automatically saved when they are set or modified. Users can back up the configuration from a remote to a local device or restore the configuration to a remote from a local device over the network. If a storage device is inserted and detected, it can be used by the SMM to preserve and migrate SEL and user configurations. The SMM only keeps the latest configuration file in a storage device for backup and restore.

Note: The storage device can be a USB device or microSD card depending on machine type. The size of the USB/microSD storage device should be larger than 1GB. The support file system is FAT32.

The following are details on configurations that can be backed up and restored.

- **Backup**: Backup SEL and below enclosure configurations to local device or USB/microSD storage.
  - Power Supply Redundancy Policy
  - Oversubscription Mode
  - Zero Output
  - Enclosure capping/saving or node capping/saving
  - Acoustic Mode setting
  - Power Restore Policy
  - The settings in the configuration tabs
- **Restore**: Restore and apply the configurations stored in local device or USB/microSD to SMM.

4. IPMI Command and SMTP and LAN Configuration Parameter Tables

4.1 IPMI Detailed Commands

Table 6. Detailed IPMI commands

Name	NetFn	CMD	Request Data / Response Data	Comments
OEMCMD_GET_PSU_COLLECTED_DATA	0x32	0x90	**Request:** Byte 1: Input type 1: AC-IN 2: PSU consumption 3: System fan power **Response:** • When AC-IN, PSU consumption – Byte 1: Completion code 0x00: successful – Byte 2: Sum of MIN AC- IN / (PSU consumption) LSB – Byte 3: Sum of MIN AC- IN / (PSU consumption) MSB – Byte 4: Sum of AVG AC- IN / (PSU consumption) LSB – Byte 5: Sum of AVG AC- IN / (PSU consumption) MSB – Byte 6: Sum of MAX AC- IN / (PSU consumption) LSB – Byte 7: Sum of MAX AC- IN / (PSU consumption) MSB • When FAN power – Byte 1: Completion code 0x00: successful – Byte 2: Sum of FAN Power (LSB) – Byte 3: Sum of FAN Power – Byte 4: Sum of FAN Power (MSB)	This command is used to show regularly collected Data from all PSU and system FANs. 1 Unit = 1 W **Note:** Only FAN power unit using 10 mW = 0.01 W FAN total power = ((MSB * 256* 256) + (Byte2 *256) + LSB) * (10 mW) AVG: average

OEMCMD_GET_PSU_STATUS	0x32	0x91	**Request:** None **Response:** • Byte 1: Completion code – 0x00: Successful • Byte 2: PSU EPOW – Bit: 0-1 = PSU1-2 – 0: Not trigger – 1: Trigger • Byte 3: PSU THROTTLE – Bit: 0-1 = PSU1-2 – 0: Not trigger – 1: Trigger • Byte 4: PSU PRESENT – Bit: 0-1 = PSU1-2 – 0: Not present – 1: Present • Byte 5: PSU PWR GOOD – Bit: 0-1 = PSU1-2 – 0: Not power good – 1: Power good • Byte 6: EPOW OUT • Byte 7: THROTTLE OUT	This command is used to show the PSU related register or Status (From PSOC) ZERO_ WAKE_UP#
OEMCMD_GET_FAN_ GPIO	0x32	0x94	**Request:** None **Response:** • Byte 1: completion code – 0x00: Successful – 0xC9: Parameter out of range • Byte 2: FAN Present – One bit per FAN – LSB: FAN1 • Byte 3: FAN Error LED – One bit per FAN – LSB: FAN1	
OEMCMD_SET_FAN_GPIO	0x32	0x95	**Request:** • Byte 1: FAN Error LED number (1-5) • Byte 2: Fan Error Led Function – 0: Led off – 1: Led on **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range	

OEMCMD_GET_SYS_LED	0x32	0x96	**Request:** None **Response:** • Byte 1: Completion code – 0x00: Successful • Byte 2: System Locater LED – 0: Off – 1: On – 2: Blink • Byte 3: Check Log LED – 0: Off – 1: On	This command is used to get the SMM LED status. 0: Off 1: On 2: Blink (Locater only)
OEMCMD_SET_SYS_LED	0x32	0x97	**Request:** • Byte 1: LED type – 1: System Locater LED – 2: Check Log LED • Byte 2: Function – 0: Disable – 1: Enable – 2: Blink (System Locater only) **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range	This command is used to get the SMM LED status. 0: Off 1: On 2: Blink (Locater only)

OEMCMD_GET_NODE_POWER_ READING	0x32	0x98	**Request:** • Byte 1: Node number – 1: Node 1 – 2: Node 2 – 3: Node 3 – 4: Node 4 – 5: Enclosure **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range – 0xD5: Current not support (Node absent) • Byte 2: Power minimum (LSB) • Byte 3: Power minimum (MSB) • Byte 4: Power average (LSB) • Byte 5: Power average (MSB) • Byte 6: Power maximum (LSB) • Byte 7: Power maximum (MSB)	Display the node power consumptions update by XCC.(Unit: Watt)
OEMCMD_GET_NODE_SIZE	0x32	0x99	**Request:** • Byte 1: Node 1 - 4 – 1: Node 1 – 2: Node 2 – 3: Node 3 – 4: Node 4 **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range – 0xD5: Current not support (Node absent) • Byte 2: Node Physical Width • Byte 3: Node Physical Height • Byte 4: Add-on Valid • Byte 5: Add-on Width	Displays dimensions of node
			• Byte 6: Add-on Height	

OEMCMD_SET_ACOUSTIC_MODE	0x32	0x9B	**Request:** • Byte 1: Acoustic mode – 0: Disable – 1: Mode 1 Enable – 2: Mode 2 Enable – 3: Mode 3 Enable – 4: Mode 4 Enable – 5: Mode 5 Enable **Response:** • Byte 1: Completion code – 0x00: Successful – 0x01: PCIe priority high – 0xC9: Out of range	• 0x0 = Disable • 0x1 = Mode 1 Enable – System FAN duty range 5% - 20%. • 0x2 = Mode 2 Enable – System FAN duty range 5% - 25%. • 0x3 = Mode 3 Enable – System FAN duty range 5% - 30%. • 0x4 = Mode 4 Enable – System FAN duty range 5% - 45%. • 0x5 = Mode 5 Enable – System FAN duty range 30% - 100%. Add 20% more duty to normal duty.

OEMCMD_GET_CAP_BOUNDARY	0x32	0x9D	**Request:** • Byte 1: Node number – 1: Node 1 – 2: Node 2 – 3: Node 3 – 4: Node 4 – 5: Enclosure **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range – 0xD5: Current not support (Node absent) • Byte 2: Capping Min LSB • Byte 3: Capping Min MSB • Byte 4: Capping Max LSB • Byte 5: Capping Max MSB • Byte 6: Protective Capping LSB • Byte 7: Protective Capping MSB • Byte 8: User Capping LSB • Byte 9: User Capping MSB • Byte 10: Thermal Capping LSB • Byte 11: Thermal Capping MSB	**Node Capping Range:** (Node minimum power capacity) < Cap < (Node max power capacity) **Enclosure Capping Range:** (Sum of Node minimum power capacity) < Cap) The minimum power should consider the permission pass nodes. **Note:** Capping will only be applied in OS-runtime. The configuration of enclosure level current capping is not the same behavior with sum of node level
OEMCMD_SET_CAP_VALUE	0x32	0x9E	**Request:** • Byte 1: Node number – 1: Node 1 – 2: Node 2 – 3: Node 3 – 4: Node 4 – 5: Enclosure • Byte 2: Capping Value (LSB) • Byte 3: Capping Value (MSB) **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range	**Note:** Capping / Saving not support when node with no permission Capping value range: 1 - 32767
			– 0xD5: Current not support (Node absent)	

OEMCMD_SET_CAP_STATE	0x32	0x9F	**Request:** • Byte 1: Node number – 1: Node 1 – 2: Node 2 – 3: Node 3 – 4: Node 4 – 5: Enclosure • Byte 2: Capping mode – 0: Disable – 1: Enable • Byte 3: Saving mode – 0: Disable – 1: Saving mode 1 **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range – 0xD5: Current not support (Node absent)	**Note:** Capping / Saving not supported when node with no permission.
OEMCMD_GET_CAP_STATE	0x32	0xA0	**Request:** • Byte 1: Node number – 1: Node 1 – 2: Node 2 – 3: Node 3 – 4: Node 4 – 5: Enclosure **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range – 0xD5: Current not support (Node absent) • Byte 2: Capping mode – 0: Disable – 1: Enable • Byte 3: Capping Value LSB • Byte 4: Capping Value MSB • Byte 5: Saving mode – 0: Disable – 1: Saving mode 1	Saving mode does not support 2, 3
OEMCMD_SET_DATE_TIME	0x32	0xA1	**Request:** • Byte 1: Year MSB(2000 ~2037) • Byte 2: Year LSB (2000 ~2037)	**Note:** Year is from 2000~20xx for user input convenient, the input data is decimal format. Example: Year 2010

			• Byte 3: Month (0x01~0x12) • Byte 4: Date (0x01~0x31) • Byte 5: Hour (0x00~0x23) • Byte 6: Minute (0x00~0x59) • Byte 7: Second (0x00~0x59) **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Out of range	Byte 1 : 0x20 Byte 2: 0x10
OEMCMD_GET_PSU_POLICY_OVS	0x32	0xA2	**Request:** None **Response:** • Byte 1: Completion code – 0x00: Successful • Byte 2: PSU Policy – 0: No Redundant – 1: N+1 Policy • Byte 3: Oversubscription Mode – 0: Disable – 1: Enable	This command is used to get PSU policy and total power bank. (Unit :1W) **AC high line or 240VDC:** • 1320W for 1100W PSU • 1920W for 1600W PSU • 2400W for 2000W PSU **AC low line:** • 1080W for 1100W PSU (<100VDC) • 1260W for 1100W PSU (<170VDC) • NA for 1600W PSU • NA for 2000W PSU
OEMCMD_SET_PSU_POLICY_OVS	0x32	0xA3	**Request:** • Byte 1: PSU Policy – 0: No Redundant – 1: N+1 Policy • Byte 2: OVS	This command is used for set PSU policy. We may not set the PSU policy successful due to

			– 0: Disable – 1: Enable **Response:** • Byte 1: Completion code – 0x00: Successful – 0xD5: PSU configure not allow – 0xC9: Out of range • Byte 2: Completion code – 0x00: REDUNDANT_OK – 0x01:REDUNDANT_ PRESENT_ERR – 0x02:REDUNDANT_ BANK_LACK	configuration invalid.
OEMCMD_SET_NODE_RESET	0x32	0xA4	**Request:** • Byte 1: Node number – 0x1: Node 1 – 0x2: Node 2 – 0x3: Node 3 – 0x4: Node 4 • Byte 2: Reset mode – 1: reset (XCC reset) – 2: reseat (AC cycling) **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range – 0xD5: Current not support (Node absent)	This command is used for Reset/ Reseat node by user. If node not present, it would response 0xD5
OEMCMD_GET_PSU_FAN_STATUS	0x32	0xA5	**Request:** • Byte 1: PSU FAN number – 1: PSU1 FAN – 2: PSU2 FAN **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Out of range • Byte 2: FAN Speed LSB (rpm) • Byte 3: FAN Speed MSB (rpm) • Byte 4: FAN duty (0~100%) • Byte 5: FAN status – 0 : Not Present – 1 : Abnormal – 2 : Normal	This command is used to get PSU FAN status **Note:** Ab-Normal means PSU rpm is lower than 3000 rpms.

OEMCMD_BACKUP_RESTORE	0x32	0xA6	**Request:** • Byte 1: Actions – 0 : Get Backup or Restore Status – 1 : Backup to storage device – 2 : Restore from storage device **Response:** • Byte 1: – 0x00 : BACKUP RESTORE OK – 0x01: BACKUP RESTORE RUNNING – 0x30: SD DEVICE NOT EXIST – 0x31: SD BACKUP FINISHED – 0x32: SD BACKUP FAIL – 0x41: SD RESTORE FINISHED – 0x42: SD RESTORE FAIL – 0xC9: Out of range – 0xCC: Invalid data field in request	This command is used to backup/ restore configuration to/from external storage device such as USB or SD. If the storage device is not inserted, it will return fail.
OEMCMD_GET_NODE_STATUS	0x32	0xA7	**Request:** • Byte 1: Node number – 0x1: Node 1 – 0x2: Node 2 – 0x3: Node 3 – 0x4: Node 4 **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range – 0xD5: Current not support (Node absent) • Byte 2: Node power state – 0x00: Power OFF – 0x20: No Permission – 0x40: Power Fault – 0x80: Power ON • Byte 3: Width	Report current node status.

			• Byte 3: Width • Byte 5: Permission state – 0x00: First permission fail – 0x01: Permission to standby – 0x02: Second permission fail – 0x03: Permission pass (Secondary boot pass) – 0xFF: Permission not decide	
OEMCMD_GET_SMM_STATUS	0x32	0xA8	**Request:** None **Response:** • Byte 1: Completion code – 0x00: Successful • Byte 2: SMM version • Byte 3: SMM minor version • Byte 4: PSOC major version • Byte 5: PSOC minor version • Byte 6: Boot Flash number – 0x1: flash 1 – 0x2: flash 2 (fail over) • Byte 7: 13: SMM build ID	The build ID is using ASCII value. For example, 0x41 = 'A'
OEMCMD_SET_NODE_RESTORE_ POLICY	0x32	0xA9	**Request:** • Byte 1: Node policy – Bit [7:6]: Node 4 (1: Last state, 0: Off) – Bit [5:4]: Node 3 – Bit [3:2]:: Node 2 – Bit [1:0]:: Node 1 **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range	

OEMCMD_GET_NODE_RESTORE_ POLICY	0x32	0xAA	**Request:** None **Response:** • Byte 1: Completion code – 0x00: Successful • Byte 2: Node policy – Bit [7:6]: node 4 (1:last state, 0:off) – Bit [5:4]: node 3 – Bit [3:2]: node 2 – Bit [1:0]: node 1	
OEMCMD_SET_PSU_SMART_ REDUNDANT	0x32	0xAB	**Request:** • Byte 1: Mode – 0 : disable – 1: per 10 minutes update – 2: per 30 minutes update – 3: per 60 minutes update **Response:** • Byte 1: Completion code – 0x00: Successful – 0x01: Not Support – 0xC9: Out of range	If PSU in “not support” or “mismatch “stage, the PSU smart redundant also not support.
OEMCMD_GET_PSU_SMART_ REDUNDANT	0x32	0xAC	**Request:** None **Response:** • Byte 1: Completion code – 0x00: Successful • Byte 2: status – 0x00: Normal – 0x01: Not support • Byte 3: mode (When status is normal) – 0 : disable – 1: per 10 minutes update – 2: per 30 minutes update – 3: per 60 minutes update	Status: • 0x00: Normal • 0x01: Not support
OEMCMD_SMM_RESET_TO_ DEFAULT	0x32	0xAD	**Request:** None **Response:** • Byte 1: Completion code – 0x00: Successful	This command is used to reset SMM to default value.

OEMCMD_GET_VPD	0x32	0xB0	**Request:** • Byte 1: VPD type – 0: SMM – 1: PDM – 2: RH Riser – 3: LH Riser – 4: EIOM – 5: Enclosure • Byte 2: Device ID – 0: MTM – 1: Machine serial number – 2: Component part number Level – 3: Component FRU number – 4: Component serial number – 5: Manufacture ID – 6: Hardware revision – 7: Manufacture date – 8: UUID – 9: IANA enterprise number – A: Product ID – B: Component name – C: GLID – D: EC level **Response:** • Byte 1: Completion code – 0x00: Successful • Byte 2: N VPD Data	Read Only Device ID: • 0x0: MTM (Enclosure), 10 Bytes • 0x1: Machine serial number (Enclosure), 10 Bytes. • 0x2: Component part number (SMM, PDM, PIOR, EIOM), 12 Bytes. • 0x3: Component FRU number (SMM, PDM, PIOR, EIOM), 12 Bytes. • 0x4: Component serial number (SMM, PDM, PIOR, EIOM), 12 Bytes. • 0x5: Manufacture ID (Enclosure, SMM), 4 Bytes. • 0x6: Hardware revision level (SMM, PDM, PIOR, EIOM, Enclosure), 1 Byte. • 0x7: Manufacture date (SMM, PDM, PIOR, EIOM, Enclosure), 4 Bytes. • 0x8: Universal Unique ID (UUID) (SMM, PDM, PIOR, EIOM, Enclosure), 16 Bytes. • 0x9: IANA enterprise number (Enclosure), 4 Bytes. • 0xA: Product ID (Enclosure), 2 Bytes. • 0xB: Component name (SMM, PDM, PIOR, EIOM, Enclosure), 64 Bytes.

				• 0xC: Global Identifier (GLID) (Enclosure), 8 Bytes. • 0xD: EC level (SMM, PDM, PIOR, EIOM, Enclosure), 10 Bytes.
OEMCMD_GET_PSU_DATA	0x32	0xC3	**Request:** • Byte 1: PSU number – 1: PSU 1 – 2: PSU 2 **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Out of range • Byte 2: LSB of fan speed (rpm) • Byte 3: MSB of fan speed (rpm) • Byte 4: LSB of VIN (v) • Byte 5: MSB of VIN (v) • Byte 6: LSB of PSU type (w) • Byte 7: MSB of PSU type (w)	This command is used to get PSU data.
	0x32	0xC4	**Request:** • Byte 1: Duty (%) – 0 ~ 100 **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range	Should disable automatic system FAN control first by OEMCMD_SET_SYSTEM_FAN_CONTROL (0x32, 0xC6)
OEMCMD_SET_SYSTEM_FAN_ CONTRO	0x32	0xC6	**Request:** • Byte 1: mode – 0: Disable automatic FAN control – 1: Enable automatic FAN control – 2: Put FAN in silent mode and disable automatic FAN control **Response:** • Byte 1: Completion code – 0x00: Successful	

OEMCMD_GET_NODE_COOLING_ VALUE	0x32	0xC7	**Request:** • Byte 1: Node number – 1: Node 1 – 2: Node 2 – 3: Node 3 – 4: Node 4 **Response:** • Byte 1: Completion code – 0x00: Successful – 0xC9: Parameter out of range – 0xD5: Current not support (Node absent) • Byte 2: Cooling value – 0 - 100	
OEMCMD_GET_WEB_STATE	0x32	0XF0	**Request:** None **Response:** • Byte 1: Completion code – 0x00: Successful • Byte 2: State – 0x00: Disabled – 0x01: Enabled	
OEMCMD_SET_WEB_STATE	0x32	0XF1	**Request:** • Byte 1: State – 0x00: Disabled – 0x01: Enabled **Response:** • Byte 1: Completion code – 0x00: Successful	

OEMCMD_GET_SECURITY_OPTION	0x32	0xFA	**Request:** • Byte 1: Configuration type – 0x00: Minimum password length – 0x01: Force user to change password on first access – 0x02: Password expiration period (in days) – 0x03: Password expiration warning period (in days) – 0x04: Minimum password change interval (in hours) – 0x05: Minimum password reuse cycle – 0x06: Maximum number of login failures – 0x07: Lockout period after maximum login failures (in minutes) – 0x08: Web inactivity session time-out (in minutes) **Response:** • Byte 1: Completion code – 0x00: Successful • Byte 2: Configuration setting (LSB) • Byte 3: Configuration setting (MSB)	
OEMCMD_SET_SECURITY_OPTION	0x32	0xFB	**Request:** • Byte 1: Configuration type – 0x00: Minimum password length – 0x01: Force user to change password on first access – 0x02: Password expiration period (in days) – 0x03: Password expiration warning period (in days) – 0x04: Minimum password change interval (in hours)	

			– 0x05: Minimum password reuse cycle – 0x06: Maximum number of login failures – 0x07: Lockout period after maximum login failures(in minutes) – 0x08: Web inactivity session time-out (in minutes) • Byte 2: Configuration value (LSB) • Byte 3: Configuration value (MSB / Optional) **Response:** • Byte 1: Completion code – 0x00: Successful – 0xc9: Parameter out of range	
OEMCMD_SET_SMTP_CONFIG_ PARAMETERS	0x32	0xB2	**Request:** • Byte 1: Parameter selector • Byte 2: N - Configuration parameter data. Per “SMTP Configuration Parameters ” on page 58. **Response:** • Byte 1: Generic codes plus – 0xC7: Request data length invalid – 0xC9: Parameter out of range – 0xCC: Invalid data field in request	See “SMTP Configuration Parameters ” on page 58 for parameter selector and data.

OEMCMD_GET_SMTP_CONFIG_PARAMETERS	0x32	0xB3	**Request:** • Byte 1: Parameter selector • Byte 2: Set selector. (Selects a given set of parameters under a given Parameter selector value.) – 0x00: Parameter does not use a set selector. • Byte 3: Block selector – 0x00: Parameter does not require a block selector. **Response:** • Byte 1: Generic codes plus – 0xC7: Request data length invalid – 0xC9: Parameter out of range – 0xCC: Invalid data field in request • Byte 2: N - Configuration parameter data. See "SMTP Configuration Parameters" on page 58.	
IPMICMD_SET_LAN_CONFIG_PARAM	0x0C	0x01	**Request:** • Byte 1: Channel number • Byte 2: Parameter selector • Byte 3: Configuration parameter data. See "LAN Configuration Parameters" on page 61 **Response:** • Byte 1: Completion code – 80h: Parameter not supported – 81h: Attempt to set the 'set in progress' value when not in the 'set complete' state. – 82h: Attempt to write read-only parameter – 83h: Attempt to read write-only parameter	The OEM parameters are added into parameter selector and data. **(Byte 2: N)** See "LAN Configuration Parameters" on page 61 for more details.
IPMICMD_SET_LAN_CONFIG_PARAM	0x0C	0x02	**Request:** • Byte 1: Channel number • Byte 2: Parameter selector • Byte 3: Set Selector	The OEM parameters are added into parameter selector and data. **(Byte 2: N)**

			– 00h: If parameter does not use a Set Selector • Byte 4: Block Selector – 00h: If parameter does not require a block number **Response:** • Byte 1: Completion code – 80h: Parameter not supported. • Byte 2: Parameter revision • Byte 3: N Configuration parameter data, see “LAN Configuration Parameters” on page 61	See “LAN Configuration Parameters” on page 61 for more details.

4.2 SMTP Configuration Parameters

The following table contains detailed parameters for OEMCMD_SET_SMTP_CONFIG_PARAMETERS and OEMCMD_ GET_SMTP_CONFIG_PARAMETERS.

Table 7. SMTP configuration parameters

Parameter Selector	Number	Parameter Data (non-volatile)
Sender Information	**0**	Assigns the send from. The field is default filled with <host name>@<domain name> automatically. If the field is OEM-set, it must follow these rules: 1. Do not consist of only space characters. 2. It must be the combination of alphanumeric characters a-z, A- Z and 0-9, space characters, non-alphabetic characters. 3. The maximum length of the field is 254 characters. • Data 1: String length • Data 2: N – the sting of <host name>@<domain name>

Destination Email Addresses	1	Data 1: Set selector = Field selector, 0 based. • [7:2] - Reserved • [1:0] - Field selector – 00b: Field 1 - Enable/Disable – 01b: Field 2 - Destination Email Address – 10b: Field 3 - Email Description – 11b: Field 4 - Send Alert (Set only) Data 2: Block selector = Target of Email Alert selector, 0 based. • [7:2] - Reserved • [1:0] - – 00b: Email Alert 1 – 01b: Email Alert 2 – 10b: Email Alert 3 – 11b: Email Alert 4 For Set selector = 0 Data 3: • [7:1] - reserved • [0] - – 0b: Disable – 1b: Enable For Set selector = 1 Data 3: String length, Max = 64. Data 4: N – the sting of Destination Email Address For Set selector = 2 Data 3: String length, Max = 254. Data 4: N – the sting of Email Description
SMTP (email) Server Settings	2	Data 1: Set selector = Field selector, 0 based. • [7:1] - reserved • [0] - Field selector – 0b: Field 1 - SMTP IP Address – 1b: Field 2 - SMTP Port Number For Set selector = 0 Data 2: String length, Max = 254. Data 3: N – the sting of IPV4, IPV6 or FQDN For Set selector = 1 Data2:3: Port number. LS-byte first.

SMTP Authentication	**3**	Data 1: Set selector = Field selector, 0 based. • [7:3] - reserved • [2:0] - Field selector – 000b: Field 1 - Enable/Disable – 001b: Field 2 - Username – 010b: Field 3 - Password (Set only) – 011b: Field 4 - STARTTLS Mode – 100b: Field 5 - SASL Mode – 101b:111b: Reserved For Set selector = 0 Data 2: • [7:1] - Reserved • [0] – 0b: Disable – 1b: Enable For Set selector = 1 Data 2: String length, Max = 254. Data 3: N – the sting of user name For Set selector = 2 Data 2: String length, Max = 254 Data 3: N – the sting of password For Set selector = 3 Data 2: • [7:2] - Reserved • [1:0] – 00b: AUTO – 01b: OFF – 10b: ON – 11b: Reserved For Set selector = 4 Data 2: • 000b: AUTO • 001b: PLAIN • 010b: LOGIN • 011b: NTLM • 100b: MD5 • 101b:111b: Reserved

4.3 LAN Configuration Parameters

The following table contains detailed parameters for LAN configuration.

Table 8. LAN configuration parameters

Parameter Selector	Number	Parameter Data (non-volatile)
Host Name	0xC3	BMC Host Name • Data 1: String length, Max = 63 • Data 2: N – the sting of BMC hostname
DNS Domain Name	0xC4	DNS Domain Name Set operation implicates using static for DNS Domain Name. **Note:** The setting of Use DHCP for DNS Domain Name will be disabled. • Data 1: String length, Max = 237 • Data 2: N – the sting of DNS Domain name

Appendix A. Glossary

Term	Definition
AC	Alternating Current (current repeatedly changes direction)
AC-IN	AC Input Power. See also AC.
AP	Application Processor
ARP	Address Resolution Protocol
ASM	Abstract State Machine
ASU	Advanced Settings Utility
ATA	Advanced Technology Attachment
BEL	Named after Alexander Graham Bell, a logarithmic unit expressing magnitude of change in level of power, voltage, current, or sound intensity. A decibel (dB), 1/10 bel (B), measures relative power.
BMC	Baseboard Management Controller
BIK	Baseboard In Knock-Down-Kit – Integrated System
BIOS	Basic Input/Output System
BSP	Boot Strap Processor. (The processor selected at boot time to be the primary processor in a multi-processor system.)
CA	Certificate Authority
CIM	Common Information Model
CLI	Command Line Interface
CPU	Central Processing Unit
CSR	Certificate Signing Request
DC	Direct Current (current flows in one direction)
DDR	Double-Data Rate
DDR4	Double-Data Rate 4. See also DDR.
DER	Distinguished Encoding Rules (This method for encoding a data object includes public key infrastructure certificates and keys).
DHCP	Dynamic Host Configuration Protocol
DIMM	Dual In-line Memory Module (This plug-in memory module has signal and power pins on both sides of the internal printed circuit board (front and back)).
DMI	Desktop Management Interface
DNS	Domain Name Server
DOM	Disk on Module
DOS	Disk Operating System
EAN	European Article Number, also known as International Article Number (Barcode)
EDS	External Design Specification
EFI	Extensible Firmware Interface
EI	Enhanced Intel
EIOM	Ethernet I/O Module
EMI	Electromagnetic Interference
EPOW	Early Power-off Warning
FFDC	Fast Failure Data Collection
FP	Front Panel
FRU	Field-Replaceable Unit
FW	Firmware
GB	Gigabyte
GLID	Global Identification

GUI	Graphical User Interface
HCI	Host Controller Interface Specification.
HTTPS	Hyper Text Transfer Protocol Service
IANA	Internet Assigned Numbers Authority
ID LED	Identification LED
IMM	Integrated Management Module
IOM	I/O Module
IP	Internet Protocol
IPL	Initial Program Load
IPMI	Intelligent Platform Management Interface. A set of computer interface specifications for an autonomous computer subsystem that provides management and monitoring capabilities independently of the host system's CPU, firmware (BIOS or UEFI) and operating system.
IPIF	Intel® Platform Innovation Framework for EFI architecture
ISA	Instruction Set Architecture
LAN	Local Area Network
LCP	Intel® Local Control Panel
LED	Light-Emitting Diode
LER	Live Error Recovery
LLA	Local Link Address (i.e. IPv6 Link)
LSB	Least Significant Bit
MAC	Media Access Control
MB	Megabyte
Mbit	Megabit
MFR	Manufacturer
MM	Millimeter
MSB	Most Significant Bit
MTM	Mobile Trusted Module
MT/s	Mega Transfers per second
NIC	Network Interface Card
NM	Node Manager
NTLM	NT LAN Manager. A suite of Microsoft security protocols that provides authentication, integrity, and confidentiality to users. Replaces the Microsoft LAN Manager (LANMAN) product. See also LAN.
NTP	Network Time Protocol
OS	Operating System
PCI	Peripheral Component Interconnect (or PCI Local Bus Standard – also called “Conventional PCI”).
PDM	Power Distribution Module.
PDU	Protocol Data Unit
PEF	Platform Event Filter
PEI	Pre-EFI Initialization. Component of Intel® Platform Innovation Framework.
PEIM	PEI Module. See also PEI.
PIOR	(card)
PSU	Power Supply Unit
PTU	Power Thermal Utility
PXE	Preboot Execution Environment. Specification which describes a standardized client-server environment that boots a software assembly, retrieved from a network, on PXE-enabled clients.

RAM	Random Access Memory
RAS	Reliability, Availability, and Serviceability
ROM	Read-Only Memory
RPM	Revolutions Per Minute
RT	Runtime. Component of Intel® Platform Innovation Framework for EFI architecture. See also IPIF.
RTP	Real-Time Transport Protocol
SAS	Serial Attached SCSI (High-speed serial data version of SCSI). See also SCSI.
SBSP	System Boot-Strap Processor
SCA	Single Connector Attachment
SCSI	Small Computer System Interface (Connection usually used for disks of various types).
SEC	Security (Component of Intel® Platform Innovation Framework for EFI architecture).
SEL	System Event Log
SIO	Super I/O
SMM	System Management Module
SMTP	Simple Mail Transfer Protocol
SOL	Serial-over-LAN
SNMP	Simple Network Management Protocol
SUP	System Update Package
TLS	Transport Layer Security
TPS	Technical Product Specification
UEFI	Unified Extensible Firmware Interface
URL	Uniform Resource Locator
USB	Universal Serial Bus (standard serial expansion bus meant for connecting peripherals)
UTC	Coordinated Universal Time and Date (World Time Server). A 24-hour time standard used to synchronize world clocks as well as the base point for all other time zones in the world. Each time zone is determined by its difference to the UTC. UTC is represented as UTC +0.
UUID	Unique Universal Identifier
VID	Voltage Identification
VLAN	Virtual LAN. A physical object recreated and altered by additional logic. See also LAN.-
VPD	Vital Product Data
XCC	BMC Controller