Integrated Baseboard Management Controller Web Console (Integrated BMC Web Console)

User Guide

Guide to the Integrated BMC Web Console (previously known as embedded web server) for Intel® server boards and systems based on the 1st and 2nd Gen Intel® Xeon® Scalable processor family.

Rev. 2.0

March 2022

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Document Revision History

Date	Revision	Changes
December 2017	1.0	Initial release.
January 2018	1.1	Public release.
May 2018	1.2	Update EWS certificate statement. Update usage for SOL log dump, alerts, alert email settings, and security settings page.
September 2018	1.3	Add LDAP and OOB firmware update page.
January 2019	1.4	Add iKVM over HTML5 page, LDAP settings page, BIOS/ME firmware update page, Syslog server configuration page, Virtual Media, and BIOS configurations tab.
March 2019	1.5	Add caution for switch setting to avoid network duplex mismatch. Update SDR Configuration page to add option for SDR auto configuration enabling and disabling.
May 2020	1.6	Added KCS Policy control. Added Cipher suite. Added figure of S9200WK RMM4 pin and BMC Nic location. Updated Figure 73. HTML5 Keyboard Macro menu page.
July 2020	1.7	Update KCS Policy control
December 2020	1.8	Update Figure picture for Sections 5, 6, 7. Update some table content for Sections 5, 6, 7. Minor changes throughout for clarity.
August 2021	1.9	Add Host Interface information in chapter 4.1. Add Host Interface information and setting in Table 13 and Table 14. Update Virtual Media information for Section 7.5. Minor language and format edits throughout the document.
March 2022	2.0	Updated the document title, replacing “embedded web server” with “Integrated BMC Web Console”. Updated descriptions for KCS policy control modes Deny All and Restrict in Table 19. Edits throughout the document to improve style and formats.

Disclaimers

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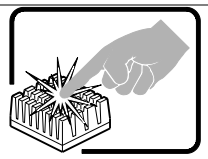
Safety Information

Important Safety Instructions

Read all caution and safety statements in this document before performing any of the instructions. See also Intel® Server Boards and Server Chassis Safety Information at https://www.intel.com/content/dam/support/us/en/documents/server-products/g23122-004_safetyregulatory.pdf.

SAFETY STEPS: When removing the chassis cover to access the inside of the system, follow these steps:

1. Turn off all peripheral devices connected to the system.
2. Turn off the system by pressing the power button.
3. Unplug all AC power cords from the system or from wall outlets.
4. Label and disconnect all cables connected to I/O connectors or ports on the back of the system.
5. Provide some electrostatic discharge (ESD) protection by wearing an antistatic wrist strap attached to chassis ground of the system—any unpainted metal surface—when handling components.
6. Do not operate the system with the chassis covers removed.



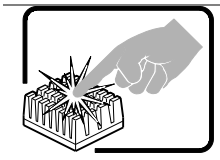
A microprocessor and heat sink may be hot if the system has been running. Also, there may be sharp pins and edges on some board and chassis parts. Contact should be made with care. Consider wearing protective gloves.

Wichtige Sicherheitshinweise

Lesen Sie zunächst sämtliche Warnund Sicherheitshinweise in diesem Dokument, bevor Sie eine der Anweisungen ausführen. Beachten Sie hierzu auch die Sicherheitshinweise zu Intel-Serverplatinen und Servergehäusen unter https://www.intel.com/content/dam/support/us/en/documents/server-products/g23122-004_safetyregulatory.pdf.

SICHERHEISMASSNAHMEN: Immer wenn Sie die Gehäuseabdeckung abnehmen um an das Systeminnere zu gelangen, sollten Sie folgende Schritte beachten:

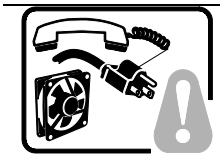
1. Schalten Sie alle an Ihr System angeschlossenen Peripheriegeräte aus.
2. Schalten Sie das System mit dem Hauptschalter aus.
3. Ziehen Sie den Stromanschlußstecker Ihres Systems aus der Steckdose.
4. Auf der Rückseite des Systems beschriften und ziehen Sie alle Anschlußkabel von den I/O Anschlüssen oder Ports ab.
5. Tragen Sie ein geerdetes Antistatik Gelenkband, um elektrostatische Ladungen (ESD) über blanke Metallstellen bei der Handhabung der Komponenten zu vermeiden.
6. Schalten Sie das System niemals ohne ordnungsgemäß montiertes Gehäuse ein.



Der Mikroprozessor und der Kühler sind möglicherweise erhitzt, wenn das System in Betrieb ist. Außerdem können einige Platinen und Gehäuseteile scharfe Spitzen und Kanten aufweisen. Arbeiten an Platinen und Gehäuse sollten vorsichtig ausgeführt werden. Sie sollten Schutzhandschuhe tragen.

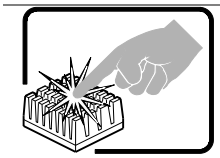
Consignes de sécurité

Lisez attention toutes les consignes de sécurité et les mises en garde indiquées dans ce document avant de suivre toute instruction. Consultez Intel® Server Boards and Server Chassis Safety Information sur le site https://www.intel.com/content/dam/support/us/en/documents/server-products/g23122-004_safetyregulatory.pdf



CONSIGNES DE SÉCURITÉ -Lorsque vous ouvrez le boîtier pour accéder à l'intérieur du système, suivez les consignes suivantes:

1. Mettez hors tension tous les périphériques connectés au système.
2. Mettez le système hors tension en mettant l'interrupteur général en position OFF (bouton-poussoir).
3. Débranchez tous les cordons d'alimentation c.a. du système et des prises murales.
4. Identifiez et débranchez tous les câbles reliés aux connecteurs d'E-S ou aux accès derrière le système.
5. Pour prévenir les décharges électrostatiques lorsque vous touchez aux composants, portez une bande antistatique pour poignet et reliez-la à la masse du système (toute surface métallique non peinte du boîtier).
6. Ne faites pas fonctionner le système tandis que le boîtier est ouvert.



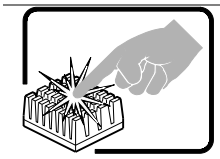
Le microprocesseur et le dissipateur de chaleur peuvent être chauds si le système a été sous tension. Faites également attention aux broches aiguës des cartes et aux bords tranchants du capot. Nous vous recommandons l'usage de gants de protection.

Instrucciones de seguridad importantes

Lea todas las declaraciones de seguridad y precaución de este documento antes de realizar cualquiera de las instrucciones. Vea Intel® Server Boards and Server Chassis Safety Information en https://www.intel.com/content/dam/support/us/en/documents/server-products/g23122-004_safetyregulatory.pdf

INSTRUCCIONES DE SEGURIDAD: Cuando extraiga la tapa del chasis para acceder al interior del sistema, siga las siguientes instrucciones:

1. Apague todos los dispositivos periféricos conectados al sistema.
2. Apague el sistema presionando el interruptor encendido/apagado.
3. Desconecte todos los cables de alimentación CA del sistema o de las tomas de corriente alterna.
4. Identifique y desconecte todos los cables enchufados a los conectores E/S o a los puertos situados en la parte posterior del sistema.
5. Cuando manipule los componentes, es importante protegerse contra la descarga electrostática (ESD). Puede hacerlo si utiliza una muñequera antiestática sujetada a la toma de tierra del chasis — o a cualquier tipo de superficie de metal sin pintar.
6. No ponga en marcha el sistema si se han extraído las tapas del chasis.



Si el sistema ha estado en funcionamiento, el microprocesador y el disipador de calor pueden estar aún calientes. También conviene tener en cuenta que en el chasis o en el tablero puede haber piezas cortantes o punzantes. Por ello, se recomienda precaución y el uso de guantes protectores.

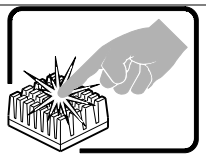
重要安全指导

在执行任何指令前，请阅读本文档中所有的注意事项及安全声明。或 https://www.intel.com/content/dam/support/us/en/documents/server-products/g23122-004_safetyregulatory.pdf 上的 *Intel® Server Boards and Server Chassis Safety Information*（《Intel 服务器主板与服务器机箱安全信息》）

Importanti istruzioni di sicurezza

PASSI DI SICUREZZA: Qualora si rimuovano le coperture del telaio per accedere all'interno del sistema, seguire i seguenti passi:

1. Spegnere tutti i dispositivi periferici collegati al sistema.
2. Spegnere il sistema, usando il pulsante spento/acceso dell'interruttore del sistema.
3. Togliere tutte le spine dei cavi del sistema dalle prese elettriche.
4. Identificare e sconnettere tutti i cavi attaccati ai collegamenti I/O od alle prese installate sul retro del sistema.
5. Qualora si tocchino i componenti, proteggersi dallo scarico elettrostatico (SES), portando un cinghia anti-statica da polso che è attaccata alla presa a terra del telaio del sistema – qualsiasi superficie non dipinta – .
6. Non far operare il sistema quando il telaio è senza le coperture.



Se il sistema è stato a lungo in funzione, il microprocessore e il dissipatore di calore potrebbero essere surriscaldati. Fare attenzione alla presenza di piedini appuntiti e parti taglienti sulle schede e sul telaio. È consigliabile l'uso di guanti di protezione.

Warnings

Heed safety instructions: Before working with your server product, whether you are using this guide or any other resource as a reference, pay close attention to the safety instructions. You must adhere to the assembly instructions in this guide to ensure and maintain compliance with existing product certifications and approvals. Use only the described, regulated components specified in this guide. Use of other products / components will void the UL listing and other regulatory approvals of the product and will most likely result in noncompliance with product regulations in the region(s) in which the product is sold.

System power on/off: The power button DOES NOT turn off the system AC power. To remove power from system, you must unplug the AC power cord from the wall outlet. Make sure the AC power cord is unplugged before you open the chassis, add, or remove any components.

Hazardous conditions, devices, and cables: Hazardous electrical conditions may be present on power, telephone, and communication cables. Turn off the server and disconnect the power cord, telecommunications systems, networks, and modems attached to the server before opening it. Otherwise, personal injury or equipment damage can result.

Electrostatic discharge (ESD) and ESD protection: ESD can damage disk drives, boards, and other parts. We recommend that you perform all procedures in this chapter only at an ESD workstation. If one is not available, provide some ESD protection by wearing an anti-static wrist strap attached to chassis ground, any unpainted metal surface on your server when handling parts.

ESD and handling boards: Always handle boards carefully. They can be extremely sensitive to ESD. Hold boards only by their edges. After removing a board from its protective wrapper or from the server, place the board component side up on a grounded, static free surface. Use a conductive foam pad if available but not the board wrapper. Do not slide board over any surface.

Installing or removing jumpers: A jumper is a small plastic encased conductor that slips over two jumper pins. Some jumpers have a small tab on top that you can grip with your fingertips or with a pair of fine needle-nosed pliers. If your jumpers do not have such a tab, take care when using needle nosed pliers to remove or install a jumper; grip the narrow sides of the jumper with the pliers, never the wide sides. Gripping the wide sides can damage the contacts inside the jumper, causing intermittent problems with the function controlled by that jumper. Take care to grip with, but not squeeze, the pliers or other tool you use to remove a jumper, or you may bend or break the pins on the board.

Caution: Slide/rail mounted equipment is not to be used as a shelf or a work space.

Intel warranties that this product will perform to its published specifications. However, all computer systems are inherently subject to unpredictable system behavior under various environmental and other conditions.

This product is not intended to be the sole source for any critical data and the user must maintain a verified backup. Failure to do so or to comply with other user notices in the product user guide and specification documents may result in loss of or access to data.

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1. Introduction

This user guide describes how to use the Intel® Remote Management Module 4 (Intel® RMM4) and the Integrated Baseboard Management Controller (Integrated BMC) web console. It provides an overview of the features of the web console and the Intel RMM4 module along with instructions on how to set up and operate the Intel RMM4 module.

The Integrated BMC Web Console provides both exceptional stability and permanent availability independent of the present state of the server's operating system. As a system administrator, use the Integrated BMC Web Console to gain location-independent remote access to respond to critical incidents and to undertake necessary maintenance.

Designed to work with the BMC, the Intel RMM4 Lite is a small form-factor mezzanine card that enables remote keyboard, video, and mouse (KVM) and media redirection on the server system through the built-in web console, from anywhere, at any time. Use the Intel RMM4 to install, update, and monitor the operating system.

1.1 Support Information

For support on the Integrated BMC Web Console and the Intel RMM4, visit https://www.intel.com/content/www/us/en/support.html. This support page provides the following:

- Latest BIOS, firmware, drivers, and utilities.
- Product documentation, installation guides, and quick start guides.
- Full product specifications, technical advisories, and errata.
- Compatibility documentation for memory, hardware add-in cards, chassis support matrices, and operating systems.
- Server and chassis accessory parts list for ordering upgrades and spare parts.
- Searchable knowledge base of product information.

For further assistance, contact Intel customer support at http://www.intel.com/support/feedback.htm.

1.2 Warranty Information

To obtain warranty information, visit https://www.intel.com/content/www/us/en/support/articles/000006361/services.html.

2. Intel® Remote Management Module 4 (Intel® RMM4)

This section provides an overview of the Intel RMM4 and highlights significance benefits of its features.

2.1 Intel® RMM4 Lite Overview

The Intel RMM4 comes in one package – the Intel RMM4 Lite. The Intel® Dedicated Server Management NIC is an onboard dedicated management port.

The Intel RMM4 Lite is a small board that unlocks advanced management features on the RGMII interface when installed on Intel® server boards. It provides an increased level of manageability over the basic server management available to the server board. It works as an integrated solution on the server system.

After the Intel RMM4 Lite has been installed, the advanced management features are available through both the onboard Intel Dedicated Server Management NIC and all onboard Integrated BMC-shared NIC ports.

Figure 1. Intel® RMM4 Lite

2.2 Intel® RMM4 Lite Features

The Intel RMM4 add-on offers convenient, remote KVM access and control through LAN or Internet. It captures, digitizes, and compresses video and transmits it with keyboard and mouse signals to and from a remote computer. Remote access and control software runs in the Integrated Baseboard Management Controller, utilizing expanded capabilities enabled by the Intel RMM4 hardware.

Key features of the Intel RMM4 add-on card include:

- KVM redirection – Allows up to four simultaneous KVM sessions (one full session and video-only for subsequent sessions) from either the RMM4 NIC or the baseboard NIC used for management traffic.
- Media redirection – Allows system administrators or users to mount a remote IDE or USB CD-ROM, floppy, or a USB flash disk as a remote device to the server. In addition to physical devices, disk images in IMA, IMG, and ISO formats can be virtually mounted. After being mounted, the remote device appears just like a local USB device to the server, allowing system administrators to boot from the device, install software (including operating systems), copy files, update BIOS, and so on.
- KVM – Automatically senses video resolution for best possible screenshot, high-performance mouse tracking, and synchronization. It allows remote viewing and configuration in pre-boot POST and BIOS setup.

2.3 Supported Operating Systems and Browsers

The Intel RMM4 enabled features run independently of the host operating system on the server where it is installed except during remote console (KVM) connections. During remote console connections, the keyboard, video, and mouse of the console system operate just as if they were physically at the server where the Intel RMM4 is connected. During remote console connections, the interaction with the host operating system limits the support to operating systems that have been validated. Those operating systems are listed in the following sub sections.

2.3.1 Server System

The following operating systems are supported on the managed server:

- Microsoft Windows Server* 2012 R2
- Microsoft Windows Server* 2016
- Microsoft Windows* 10 (Redstone 2)
- Red Hat* Enterprise Linux* 6.9 x64
- Red Hat* Enterprise Linux* 7.3 x64
- SUSE* Enterprise Linux* 11 SP4 x64
- SUSE* Enterprise Linux* 12 SP2 x64
- VMware* ESXi 6.5U1
- CentOS* 7.3
- Ubuntu* 17.04

2.3.2 Client System

The following client browsers have been tested:

- Microsoft Internet Explorer* –versions 10 and 11
- Mozilla Firefox* – versions 53 and 54
- Google Chrome* – versions 59 and 60
- Apple Safari* – version 10

3. Installing the Hardware

Before beginning, carefully read the safety information provided in the front matter of this manual.

3.1 Intel® RMM4 Lite Installation

3.1.1 Required Tools

The following tools and supplies are required for installation:

- Phillips* (cross-head) screwdriver (#1 bit and #2 bit)
- Needle-nose pliers
- Antistatic wrist strap and conductive foam pad (recommended)

3.1.2 Installation Procedure

Caution: Intel RMM4 Lite devices are not hot-swappable. Before removing or replacing them, do the following:

1. Take the server out of service.
2. Power off the system.
3. Unplug the AC power cord from the system or wall outlet.
4. Wait for the power supply LEDs to turn off.

To install the Intel RMM4 Lite in Intel® Server Boards S2600WF, S2600BP, and S2600ST product families, follow the steps below:

1. Ensure that the AC power is removed from the system and that the power supply LEDs are off.
2. Find the Intel RMM4 Lite connector as specified in Table 1 for each server board product family.

Table 1. Intel® RMM4 Lite Connector Locations on Intel® Server Boards

Intel® Server Board	Intel® RMM4 Lite Connector	Refer to
Intel® Server Board S2600WF	J1D2	Figure 3
Intel® Server Board S2600BP	J2A1	Figure 4
Intel® Server Board S2600ST	J1D1	Figure 5
Intel® Server Board S9200WK	J46X1	Figure 6

3. Carefully pick up the Intel RMM4 Lite module. Verify the location of the Intel RMM4 Lite connector key pin 1 location and insert the Intel RMM4 Lite into the mating connector on the Intel server board (Figure 2).

Note: For more details, refer to the specific Intel® server system technical product specification (TPS) *and* service guide.

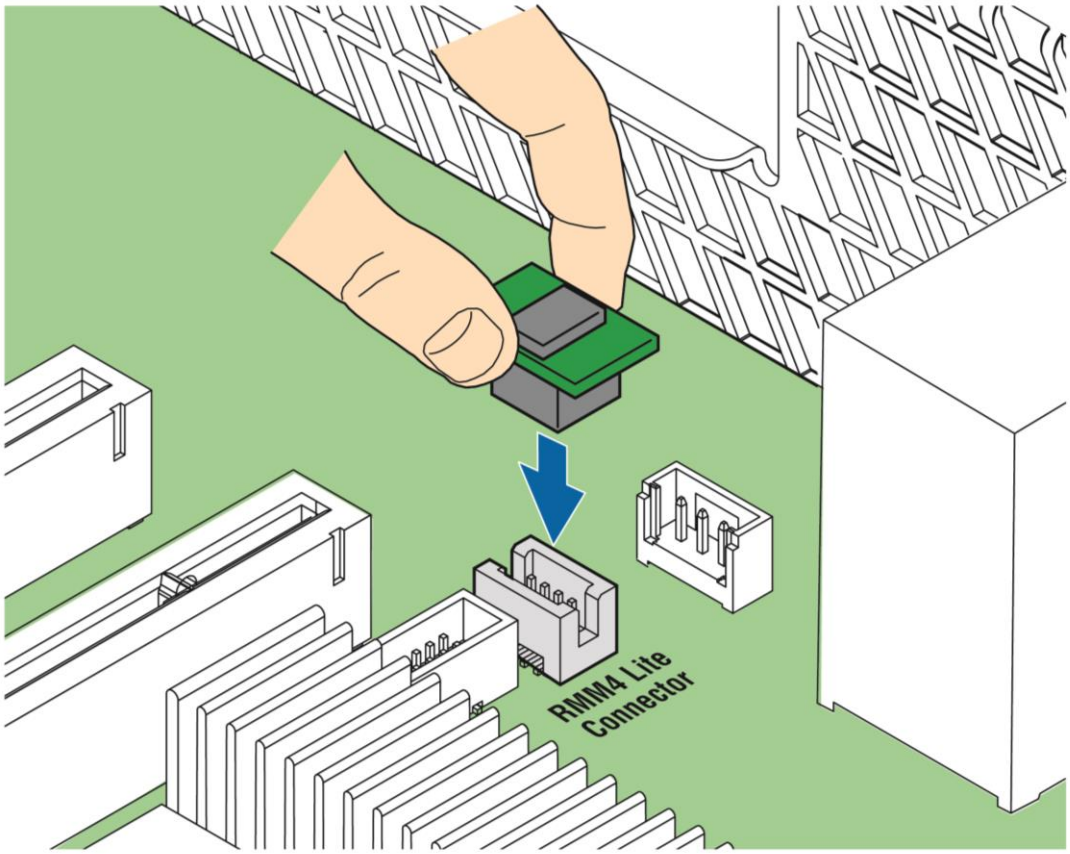

Figure 2. Installing Intel® RMM4 Lite Module on Intel® Server Board

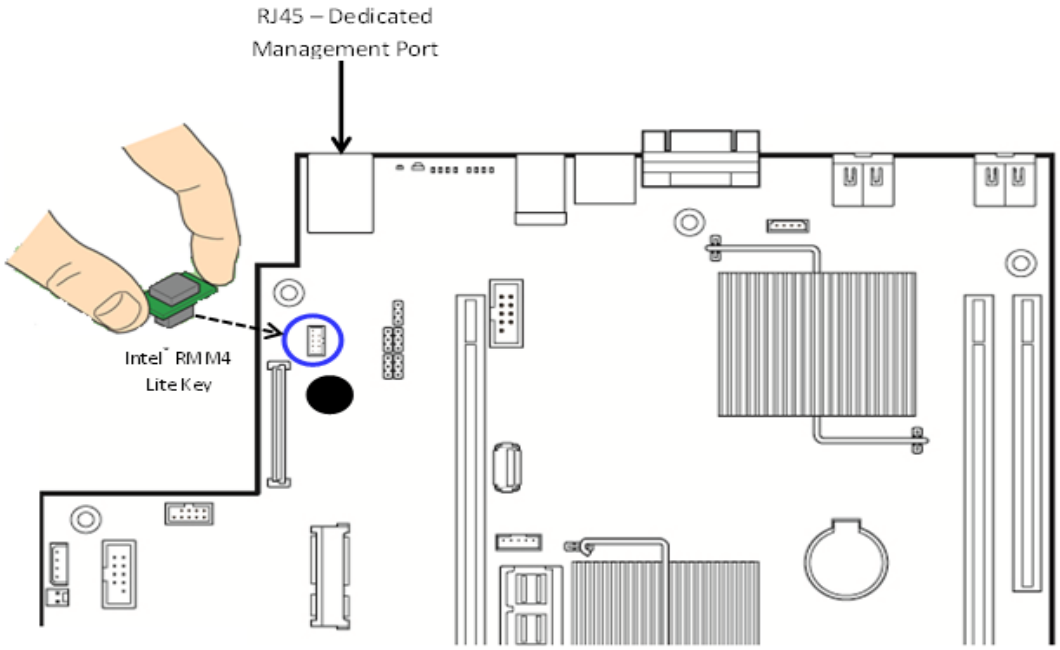

Figure 3. Intel® Server Board S2600WF – Intel® RMM4 Lite Connector and Intel® Dedicated Server Management NIC Location

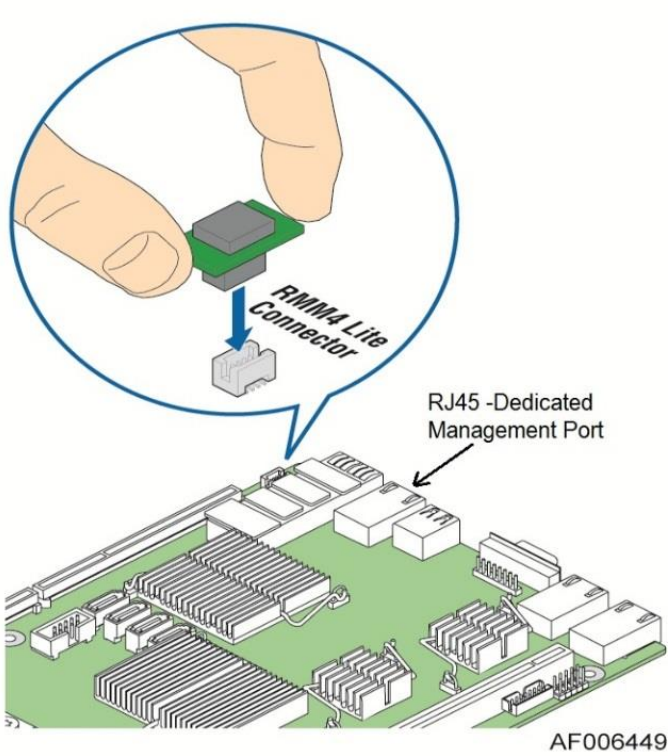

Figure 4. Intel® Server Board S2600BP – Intel® RMM4 Lite Connector and Intel® Dedicated Server Management NIC Location

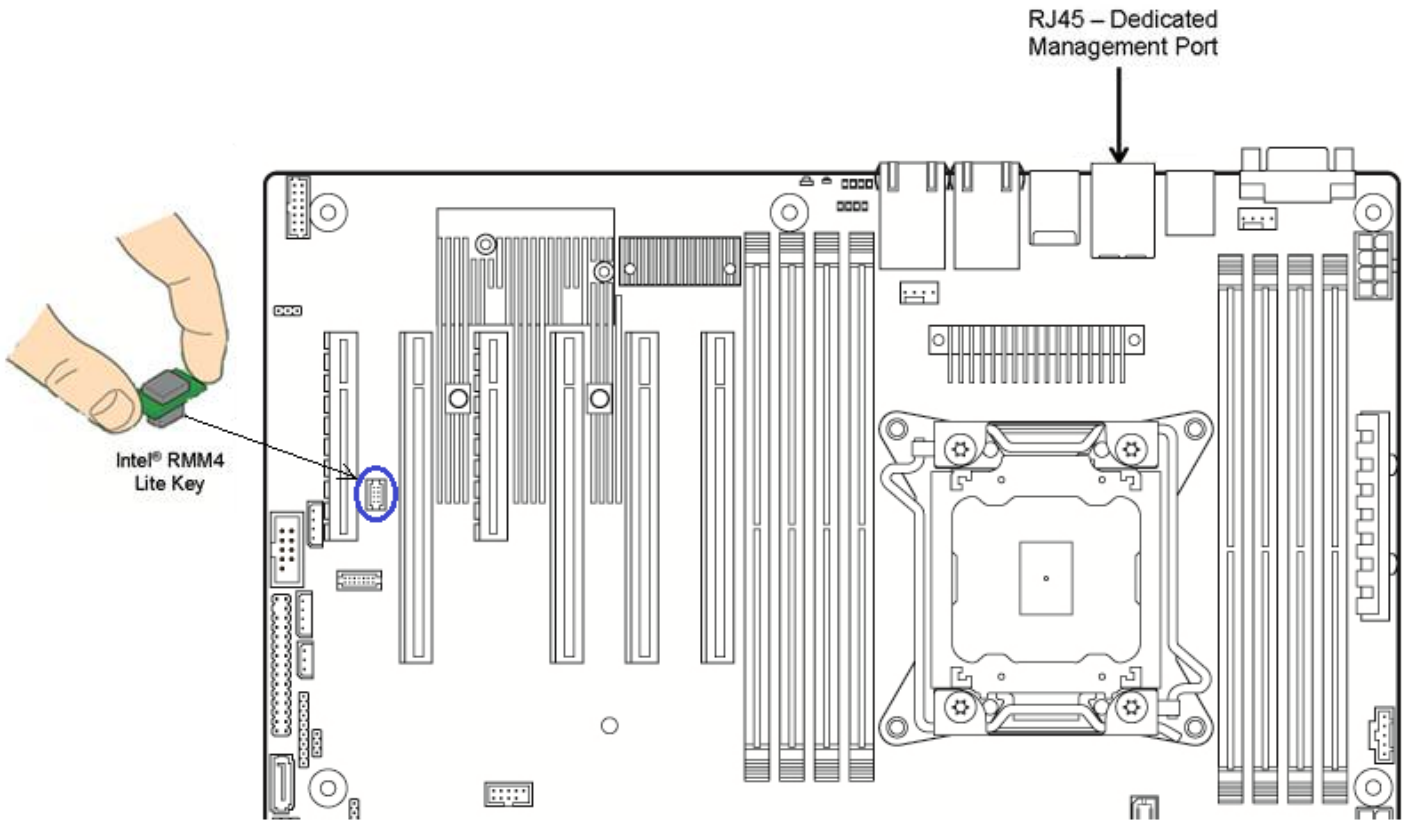

Figure 5. Intel® Server Board S2600ST – Intel® RMM4 Lite Connector and Intel® Dedicated Server Management NIC Location

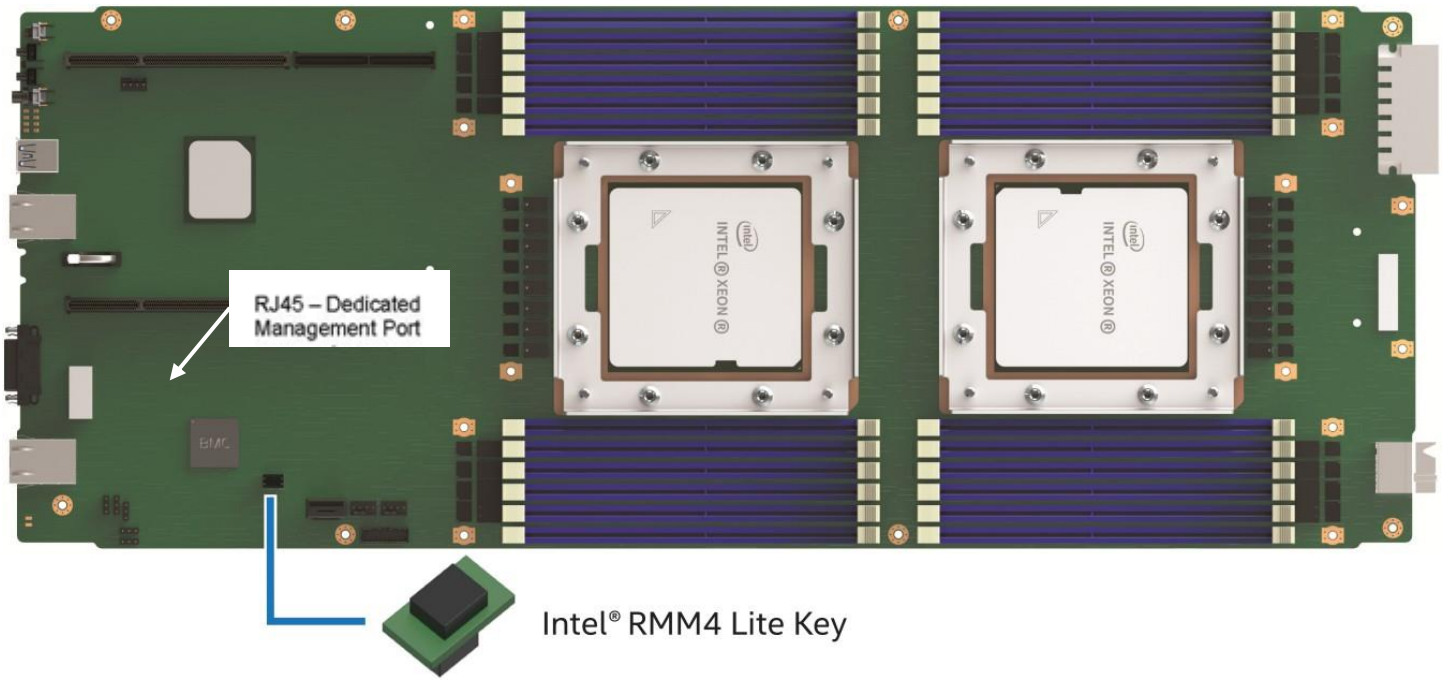

Figure 6. Intel® Server Board S9200WK – Intel® RMM4 Lite Connector

3.2 Intel® Dedicated Server Management NIC

For Intel® Server Boards S2600WF, S2600BP, S2600ST, and S9200WK product families, the Intel® Dedicated Server Management NIC is included onboard and does not need to be manually installed. The Intel® Dedicated Server Management NIC has its own, single and separate, dedicated management port. The port location varies by platform as shown in Figure 3, Figure 4, Figure 5, and Figure 6.

Caution: Because the BMC does not allow for manual configuration of speed and duplex, any switch port to which the BMC is connected must be configured to auto negotiation, which follows industry best practices for 1GbE devices.

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4. Configuring Server Management Hardware

This section discusses using the server utilities to enable a system to use the Integrated BMC Web Console or the Intel RMM4 from a new, unset state to an operational one.

When first powered on, by default, the server management BMC LAN and the Intel® RMM4 have a static IP address of 172.16.10.10.

Two steps are necessary before server management BMC LAN or the Intel RMM4 can be used:

1. One or both LAN channels must be configured as either DHCP or static addresses.
2. At least one user must be enabled to use the LAN channels.

The server management BMC LAN and the Intel RMM4 can be configured in multiple ways:

- Using BIOS setup
- Using Save and Restore System Configuration Utility (SYSCFG) (available at http://downloadcenter.intel.com/default.aspx)
- Using IPMI commands

4.1 Configuring Server Management Hardware Using BIOS Setup

1. During POST, press **<F2>** to go to the BIOS setup main page.
2. Navigate to the **Server Management** tab and select **BMC LAN Configuration** to enter the BMC LAN Configuration screen (Figure 7).
3. For a Host Interface (HI) network:
    - Scroll to **HI BMC LAN configuration** > **IP source**, and then select **Static**. Configure the **IP address**, **Subnet Mask**, and **Gateway IP** as needed.
4. For an IPv4 network:
    - If configuring the server management BMC LAN, scroll to **Baseboard LAN configuration** > **IP source** and then select either **Static** or **Dynamic**. If **Static** is selected, configure the **IP address**, **Subnet mask**, and **Gateway IP** as needed.
    - If configuring the Intel RMM4, scroll down to **Dedicated Management LAN Configuration**> **IP source** and then select either **Static** or **Dynamic**. If **Static** is selected, configure the **IP address**, **Subnet mask**, and **Gateway IP** as needed.
5. For an IPv6 network:
    - If configuring the server management BMC LAN, scroll to **Baseboard LAN IPv6 configuration** > **IP source** and then select **Enabled**. Then scroll to **IPV6 source** and select either **Static** or **Dynamic**. If **Static** is selected, configure the **IPV6 address**, **Gateway IPV6**, and **IPV6 Prefix Length** as needed.
    - If configuring the Intel RMM4, scroll down to **Dedicated Management LAN IPv6 Configuration** > **IP source** and then select either **Static** or **Dynamic**. If **Static** is selected, configure the **IPV6 address**, **Gateway IPV6**, and **IPV6 Prefix Length** as needed.
6. Select **User Configuration** to enter the User Configuration screen (Figure 8).
7. Under **User ID**, set the following settings as desired:
    - **Privilege** – Select the privilege to be used. (Administrator privilege is required to use KVM or media redirection enabled by the Intel RMM4 Lite.)
    - **User status** – Select **Enabled**.
    - **User name** – Enter the desired name. Note that the anonymous user cannot be changed.
    - **User password** – Enter the desired password twice.

8. Press **<F10>** to save the configured settings and exit BIOS setup. The server reboots with the new LAN settings.

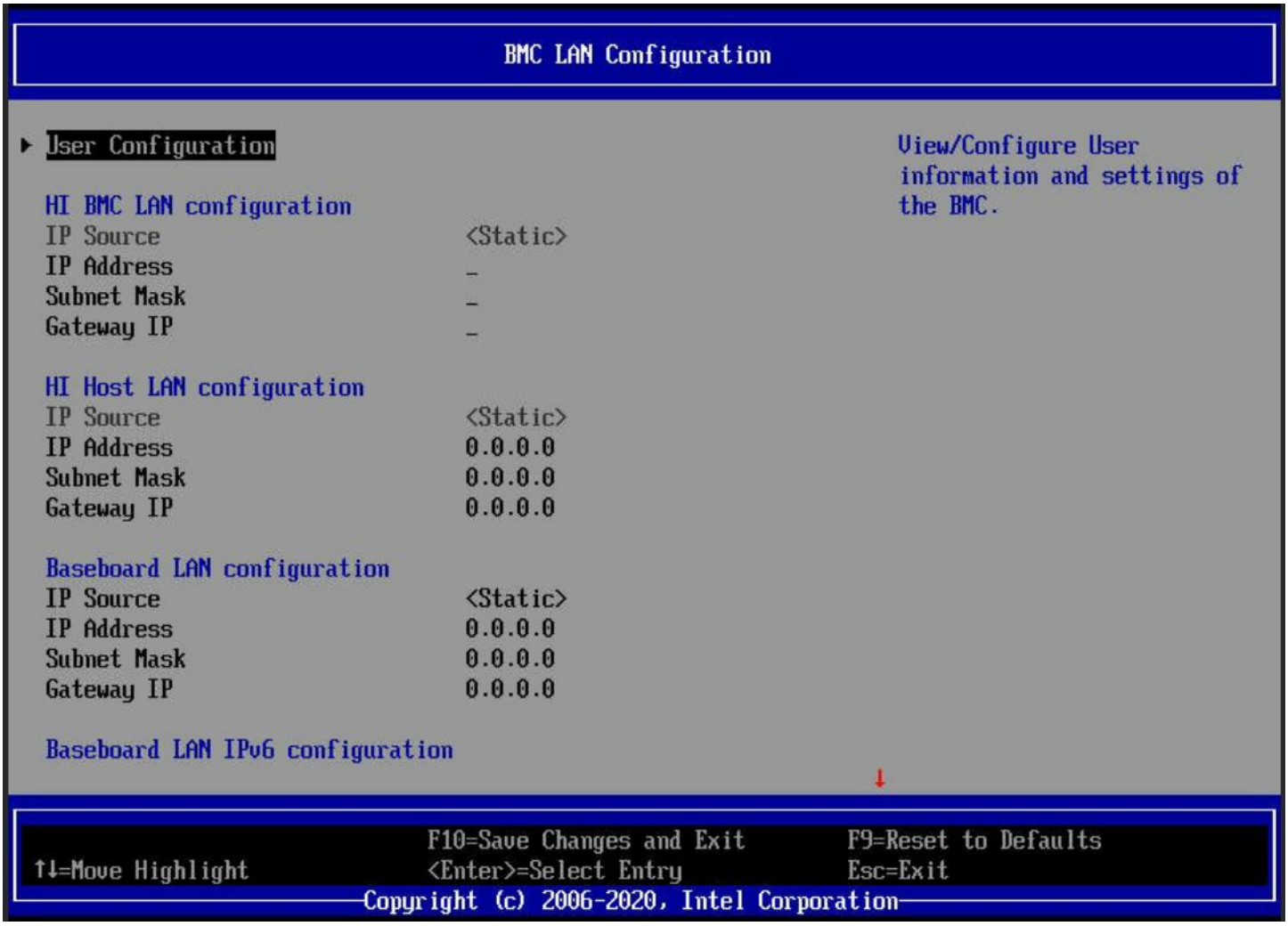

Figure 7. BIOS Setup BMC LAN Configuration Screen

Figure 8. BIOS Setup User Configuration Screen

4.2 Configuring Server Management Hardware Using SYSCFG

This section describes the basic commands needed to configure the Intel RMM4 using SYSCFG commands. This utility is supported in EFI, Linux*, and Microsoft Windows* operating systems. The commands are the same for all versions. At a minimum, configure the settings outlined in the following sections.

Note: The examples in the following sections use the Intel® Dedicated Server Management NIC LAN channel 3. If using a different NIC, substitute the appropriate channel number; for NIC1 use channel 1 and for NIC 2 use channel 2.

4.2.1 Configuring the User

1. Set the password for BMC user 2. This example sets the password to `superuser`.

   ```
   syscfg /u 2 "root" "superuser"
   ```

2. Enable BMC user 2 on LAN channel 3.

   ```
   syscfg /ue 2 enable 3
   ```

3. Enable the admin privilege and set the payload type to SOL+KVM for BMC user 2 on LAN channel 3.

   ```
   syscfg /up 2 3 admin sol+kvm
   ```

4.2.2 Configuring the IP Address

1. Set a static IP address and subnet mask on LAN channel 3.

   ```
   syscfg /le 3 static <STATIC_IP> <SUBNET_MASK>
   ```

2. If needed, set the default gateway on LAN channel 3.

   ```
   syscfg /lc 3 12 <DEFAULT_GATEWAY_IP>
   ```

3. Set the DHCP IP address source on LAN channel 3.

   ```
   syscfg /le 3 dhcp
   ```

4.2.3 Configuring Serial-over LAN (SOL)

If needed, enable serial-over-LAN (SOL) on LAN channel 3.

```
syscfg /sole 3 Enable Admin <BAUD_RATE> <RETRY_COUNT>
   <RETRY_INTERVAL_IN_MILLISECONDS>
```

5. Getting Started with Intel® RMM4 Operation

The Intel RMM4 module enables remote KVM access and control through LAN or Internet. The Integrated BMC Web Console is part of the standard BMC firmware/server management software and is used to access the remote KVM. This section provides basic information needed to access both interfaces. The Integrated BMC Web Console and remote console interfaces are described in detail in Section 6 and Section 7, respectively.

For initial setup information, including enabling the intended user, refer to Section 4. The examples in this chapter use user `root`, but other usernames and passwords could be used.

5.1 Client Browsers

The Intel RMM4 advanced features may be accessed using a standard Java*-enabled web browser. To access the web console using a securely encrypted connection, use a browser that supports the HTTPS protocol. Strong security is only assured by using a cipher strength (encryption) of 256-bit. Some older browsers may not have a strong 128-bit encryption algorithm.

To use the remote console (KVM) window of the managed server, Java Runtime Environment* (JRE*) version 6 update 22 or higher must be installed.

Note: The web console is designed for a screen size of 1280 pixels by 1024 pixels or larger. In smaller screens, use the browser slider controls to see the full content of each webpage.

5.2 Logging In

Enter the configured IP address of the Intel RMM4 or the configured BMC onboard NIC into the web browser to open the Integrated BMC Web Console module login page (Figure 9). To use a secure connection, type:

```
https://<IPaddress_or_Hostname>/
```

Enter the username and password and select a language option. For example:

- Username: `root`
- Password: `superuser`
- Language: **English**

Click the **Login** button to view the home page.

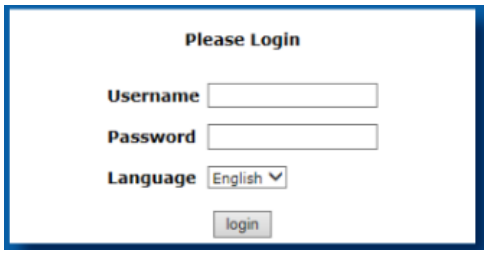

Figure 9. Integrated BMC Web Console Login Page

After the initial login, system administrators may change passwords and create new users and have full control over access to the Intel RMM4 enabled advanced features.

Note: The username and password are case sensitive. The printable set of ASCII characters can be used for username and password.

5.3 Navigation

The Integrated BMC Web Console home page contains eight tabs along the top for navigation within the web console (Figure 10). For details on each tabbed page, see Table 2. Each tab contains a secondary browser on the left edge of the window. For details on the specific functions of secondary menu items, see Section 7.

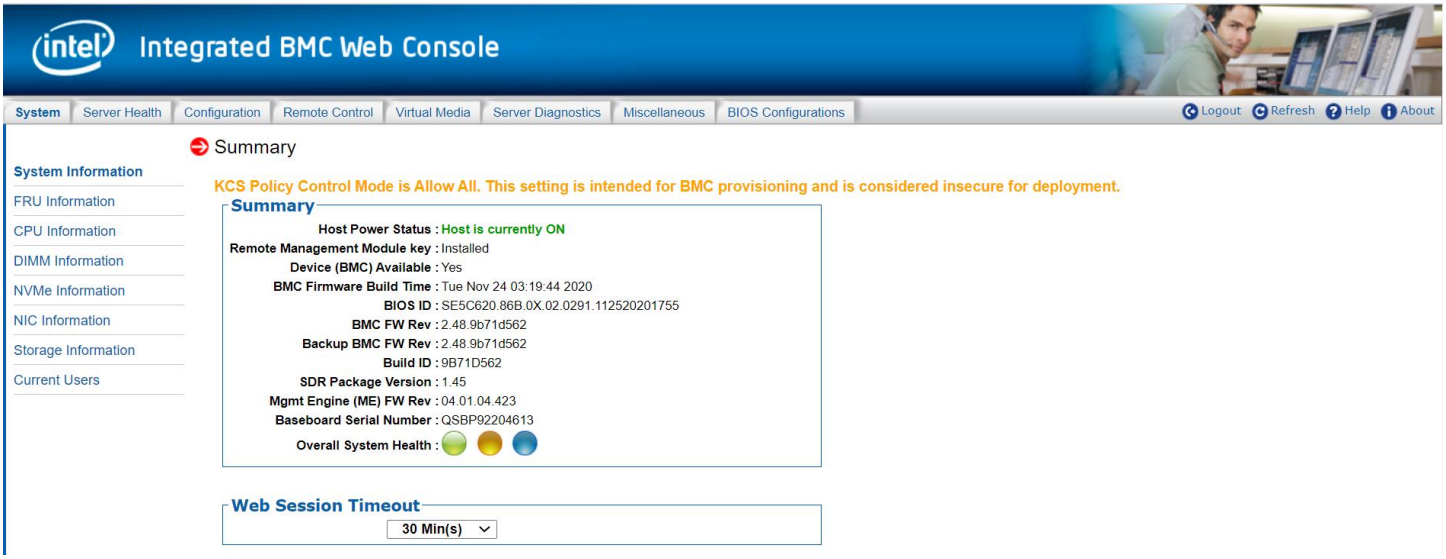

Figure 10. Integrated BMC Web Console Home Page

Table 2. Integrated BMC Web Console Tabs

Tab	Function	Secondary Menu
System	Provides access to general information about the server. The tab automatically opens the System Information page.	• System Information • FRU Information • CPU Information • DIMM Information • NVMe Information • NIC Information • Storage Information • Current Users
Server Health	Provides access to the sensors and event log. The tab automatically opens the Sensor Readings page.	• Sensor Readings • Event Log
Configuration	Provides access to configure various settings for the server. The tab automatically opens the Alerts page.	• Alerts • Alert Email • Date & Time • IPv4 Network • IPv6 Network • VLAN • LDAP • Active Directory • KVM & Media • SSL Certification • Users • Security Settings • SOL • SDR Configuration • BMC Firmware Update • BIOS/ME Firmware Update • Syslog Server Configuration

Tab	Function	Secondary Menu
Remote Control	Provides access to the remote console and control of the server power state. The tab automatically opens the KVM/Console Redirection page.	• KVM/Console Redirection • Server Power Control • Launch SOL • Virtual Front Panel • iKVM over HTML5
Virtual Media	Allows the user to share an ISO image or folder over HTML5. Maximum size of ISO image is 4.7GB, and folder is 2GB. Each image/folder will be emulated to the host as a USB device. The tab automatically opens the Virtual Media over HTML5 page.	• Virtual Media over HTML5 • Web ISO
Server Diagnostics	Provides access to server diagnostics information. The tab automatically opens the System Diagnostics page.	• System Diagnostics • POST Codes • System Defaults • SOL Log
Miscellaneous	Provides access to node manager configuration, power statistics, and power telemetry. The tab automatically opens the NM Configuration page.	• NM Configuration • Power Statistics • Power Telemetry
BIOS Configuration	Provides access to BIOS configuration. The tab automatically opens the NIC Configuration page.	• PCI Configuration • Serial Port Configuration • UPI Configuration • Integrated IO Configuration • Memory Configuration • Power n Performance • Processor Configuration • Mass Storage Controller Configuration • System Acoustic and Performance Configuration • System Event Log • Security • USB Configuration • Server Management • Advanced Boot Options • Main

In addition, the top of every page contains a toolbar with options explained in the following table.

Table 3. Integrated BMC Web Console Toolbar

Button	Function
Logout	End the current web console session. Click **OK** to confirm (Figure 11). After logging out, the web console returns to the login screen.
Refresh	Refresh the current webpage, including any data shown on the page. **Note:** Using the web browser's refresh/reload button or pressing the function key <F5> to do a refresh/reload is not supported for reloading the web console pages. Using either of them returns the web console to the home page.
Help	View a brief description of the current page in a frame at the right side of the browser window (Figure 12). Close the help frame by clicking the "X" in the upper right corner of the frame or by clicking the **Help** button again.
About	View the Intel copyright information and a statement about the use of open source code.

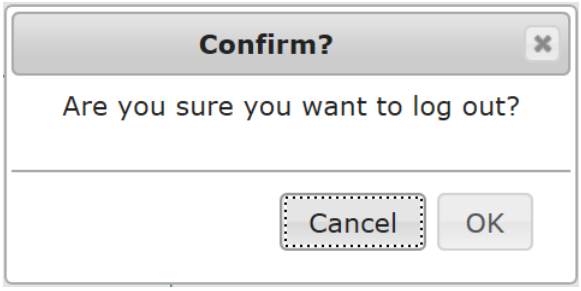

Figure 11. Logging Out of the Integrated BMC Web Console

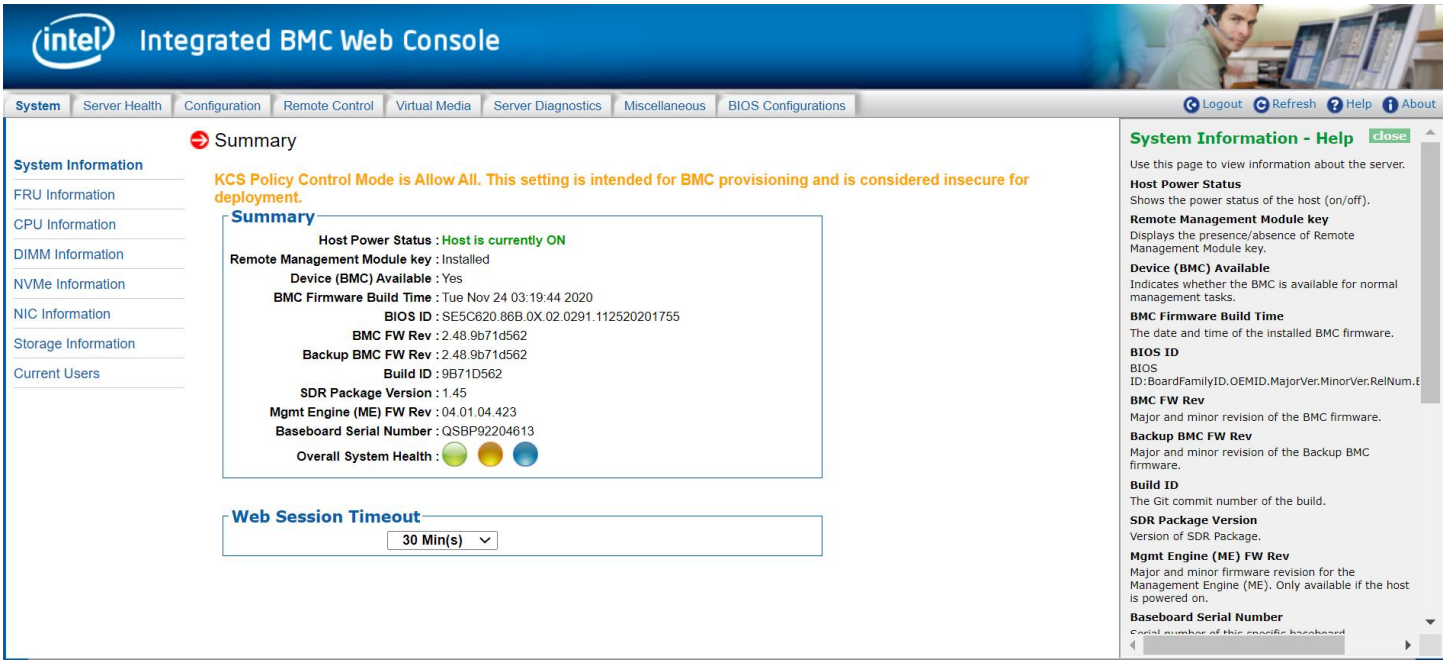

Figure 12. Integrated BMC Web Console Help

Note: If there is no user activity detected by the web console for 30 minutes, the current session is automatically terminated and the user must log in again for continued access to the web console. If a KVM remote console window is open, the web session does not automatically timeout.

6. Remote Console (KVM) Operation

The remote console is the redirected keyboard, video, and mouse of the remote host system where the Intel RMM4 module is installed. To use the remote console window of the managed host system, the browser must include a Java Runtime Environment* plug-in. If the browser has no Java* support, such as with a small handheld device, the user can maintain the remote host system using the administration forms displayed by the browser.

Starting the remote console opens a new window to display the screen content of the host system. The remote console acts as if the administrator were sitting directly in front of the screen of the remote system. This means the keyboard and mouse can be used as usual.

6.1 Launching the Redirection Console

Launch the remote console KVM redirection window by clicking **Launch Console** from the Remote Control tab of the Integrated BMC Web Console (Figure 13).

Note: If the user is using Microsoft Windows Internet Explorer*, Smart Screen is enabled, and the system is on a network with no direct connectivity to the internet, it may take an extremely long time to open a KVM window.

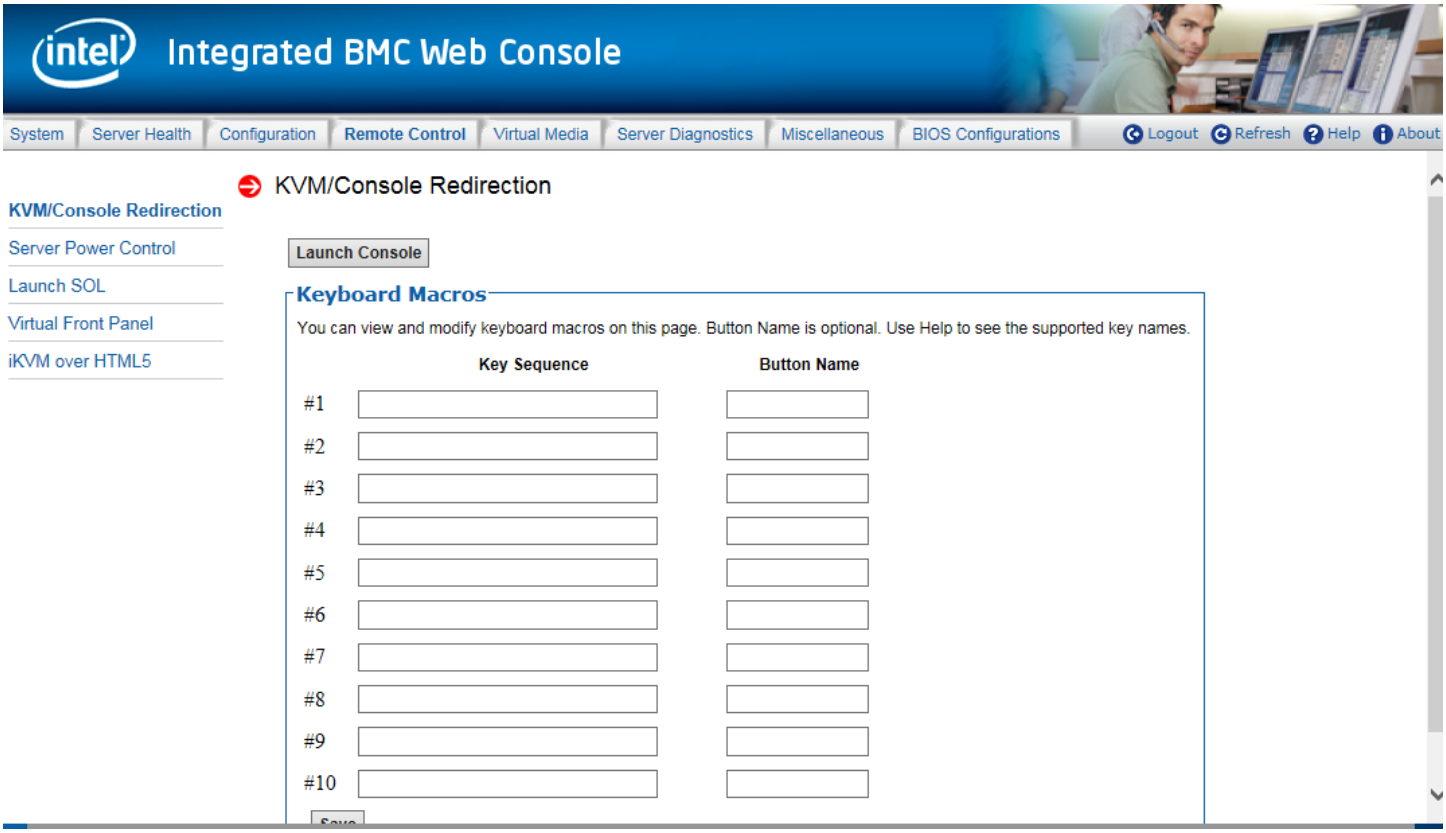

Figure 13. Remote Control Console Redirection Page

When the **Launch Console** button is clicked, a pop-up window is displayed to download the Java Network Launch Protocol `launch.jnlp` file. This in turn downloads the stand-alone Java application implementing the remote console.

Microsoft Internet Explorer*, Mozilla Firefox*, Google Chrome* and Apple Safari* browsers are supported.

Notes:

- Java Runtime Environment* (JRE*, Version 6 Update 22 or higher) must be installed on the client before the launch of a `JNLP` file.
- The client browser must allow pop-up windows from the Integrated BMC Web Console IP address.
- JCE Unlimited Strength Jurisdiction Policy Files required by AES-256 need be installed on the client side or the KVM automatically downgrades to AES-128. The additional strength is only required for users who need AES-256.

The remote console window is a Java Applet* that establishes TCP connections to the Integrated BMC Web Console. The protocol that is used to run these connections is a unique KVM protocol and not HTTP or HTTPS. This protocol uses ports #5900 for KVM and #623 for Floppy/USB media redirection. The local network environment must permit these connections to be made. That is, the firewall and, in case of a private internal network, the Network Address Translation (NAT) settings must be configured accordingly.

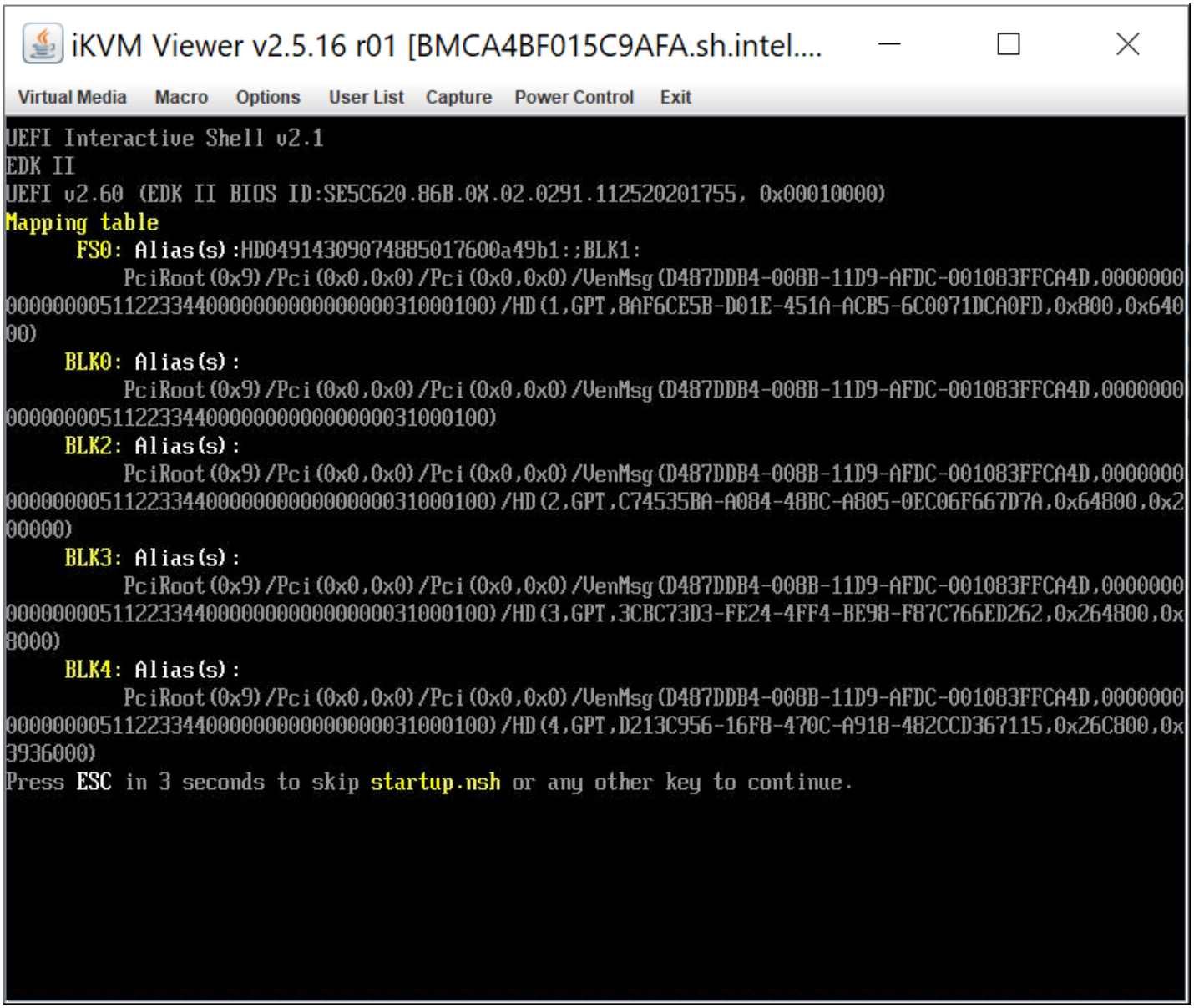

Figure 14. Remote Console Window

6.2 Main Window

Starting the remote console opens a host window (Linux* operating system window shown in Figure 15).

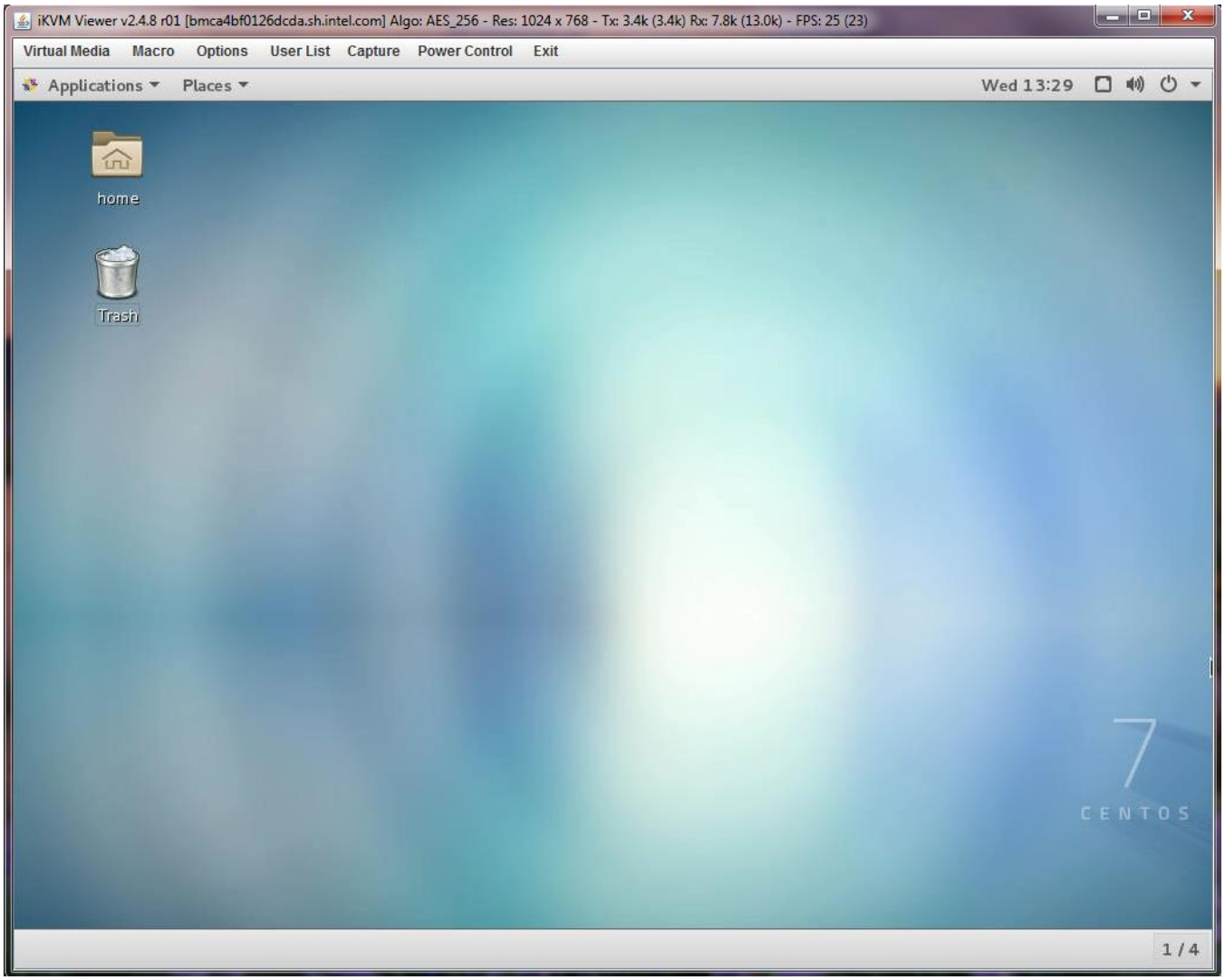

Figure 15. Remote Console Main Window

It displays the screen content of the remote server. The remote console responds as if it were located at the remote server. The responsiveness may be slightly delayed depending on the bandwidth and latency of the network between the Integrated BMC Web Console and the remote console. Enabling KVM and/or media encryption on the **Configuration** > **KVM & Media** page slightly degrades performance, as well.

The remote console window always shows the remote screen in its optimal size. This means it adapts its size to the size of the remote screen initially and after the screen resolution of the remote screen has been changed. However, the remote console window can be resized in the local window as usual.

6.3 Remote Console Control Bar

The top of the remote console window contains a control bar for viewing the status of the remote console and to configure remote console settings. The following sub sections describe each control task.

Figure 16. Remote Console Control Bar

6.3.1 Virtual Media Menu

Click **Virtual Media** in the remote console control bar to open the virtual storage and virtual keyboard menu as shown in Figure 17.

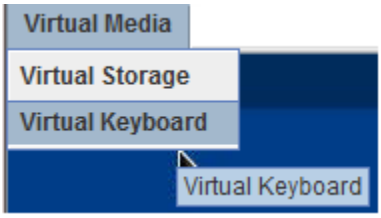

Figure 17. Remote Console Virtual Media Menu

Use the options in this menu to do the following:

- **Virtual Storage** – Allow starting/stopping remote media redirection as shown in Figure 18. Redirect up to four devices at the same time. Select a logical device from a local CD-ROM/DVD drive or an ISO image on the local client file system as a virtual CD-ROM device on the remote system; a local floppy drive; a USB key drive; or a floppy disk or USB key image (`.IMA`/`.IMG`) file on the local client file system as a virtual floppy device on the remote system.

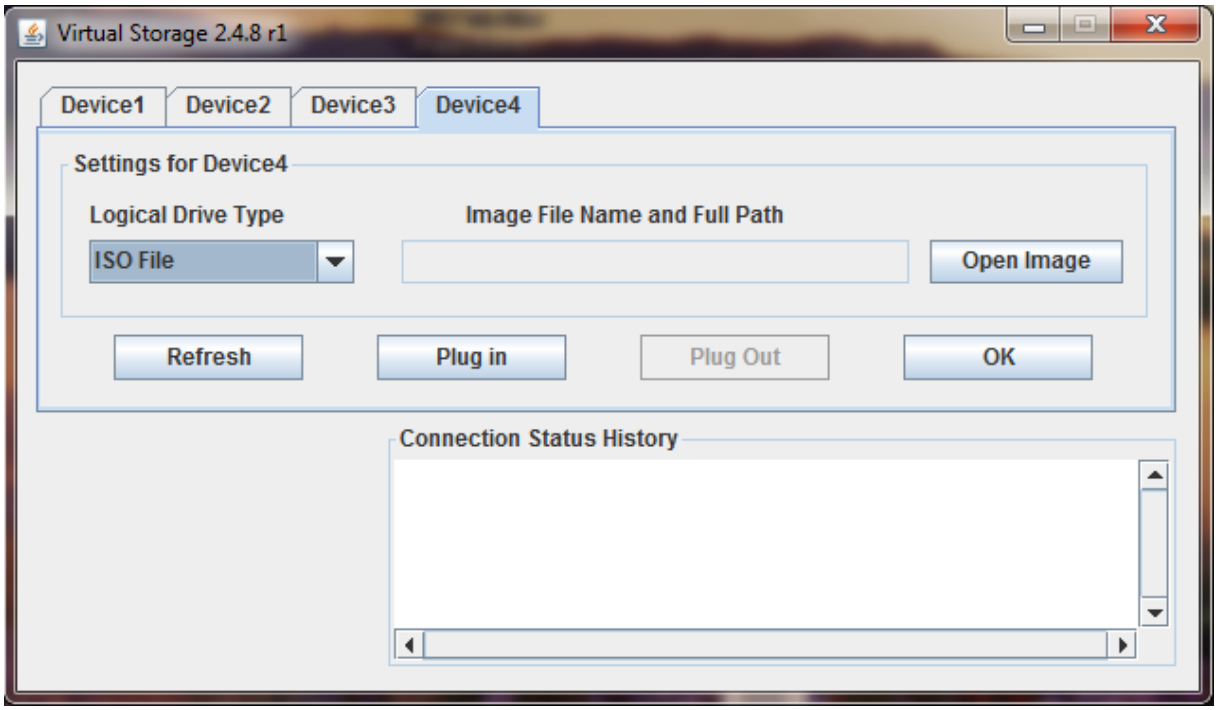

Figure 18. Remote Console Virtual Storage Menu

- **Virtual Keyboard –** Display a soft keyboard as shown in Figure 19.

Figure 19. Remote Console Virtual Keyboard Menu

6.3.2 Macro Menu

Click **Macro** to open the keyboard macro menu as shown in Figure 20.

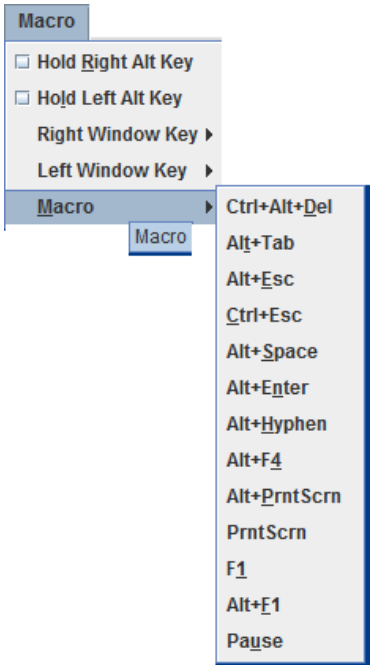

Figure 20. Remote Console Macro Menu

Using the options in this menu, to do the following:

- **Hold Right Alt Key** – Simulate holding down the right **<Alt>** key on the remote keyboard. On the local keyboard, right **<Alt>** key presses are processed by the local OS and not passed on to the remote OS.
- **Hold Left Alt Key** – Simulate holding down the left **< Alt>** key on the remote keyboard. On the local keyboard, left **<Alt>** key presses are processed by the local OS and not passed on to the remote OS.
- **Right Windows Key** – Simulate holding down the right **<Win>** key on the remote keyboard. On the local keyboard, right **<Win>** key presses are processed by the local OS and not passed on to the remote OS.
- **Left Windows Key** – Simulate holding down the left **<Win>** key on the remote keyboard. On the local keyboard, left **<Win>** key presses are processed by the local OS and not passed on to the remote OS.
- **Macro** – Simulate special key combinations to the remote OS, which include **<Ctrl+Alt+Del>**, **<Alt+Tab>**, **<Alt+Esc>**, **<Ctrl+Esc>**, **<Alt+Space>**, **<Alt+Enter>**, **<Alt+Hyphen>**, **<Alt+F4>**, **<Alt+Prntscrn>**, **<PrntScrn>**, **<F1>**, **<Alt+F1>**, **<Pause>**.

6.3.3 Options Menu

Click **Options** to open the options menu as shown in Figure 21.

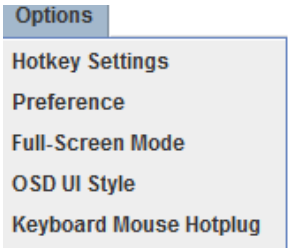

Figure 21. Remote Console Options Menu

Use the options in this menu, to do the following:

- **HotKey Settings –** Configure hotkeys as shown in Figure 22. Configure up to seven hotkeys to perform specific functions including adjust mouse, exit remote location, enter full-screen mode, refresh screen, send Ctrl+Alt+Del, toggle mouse display, and toggle UI display.

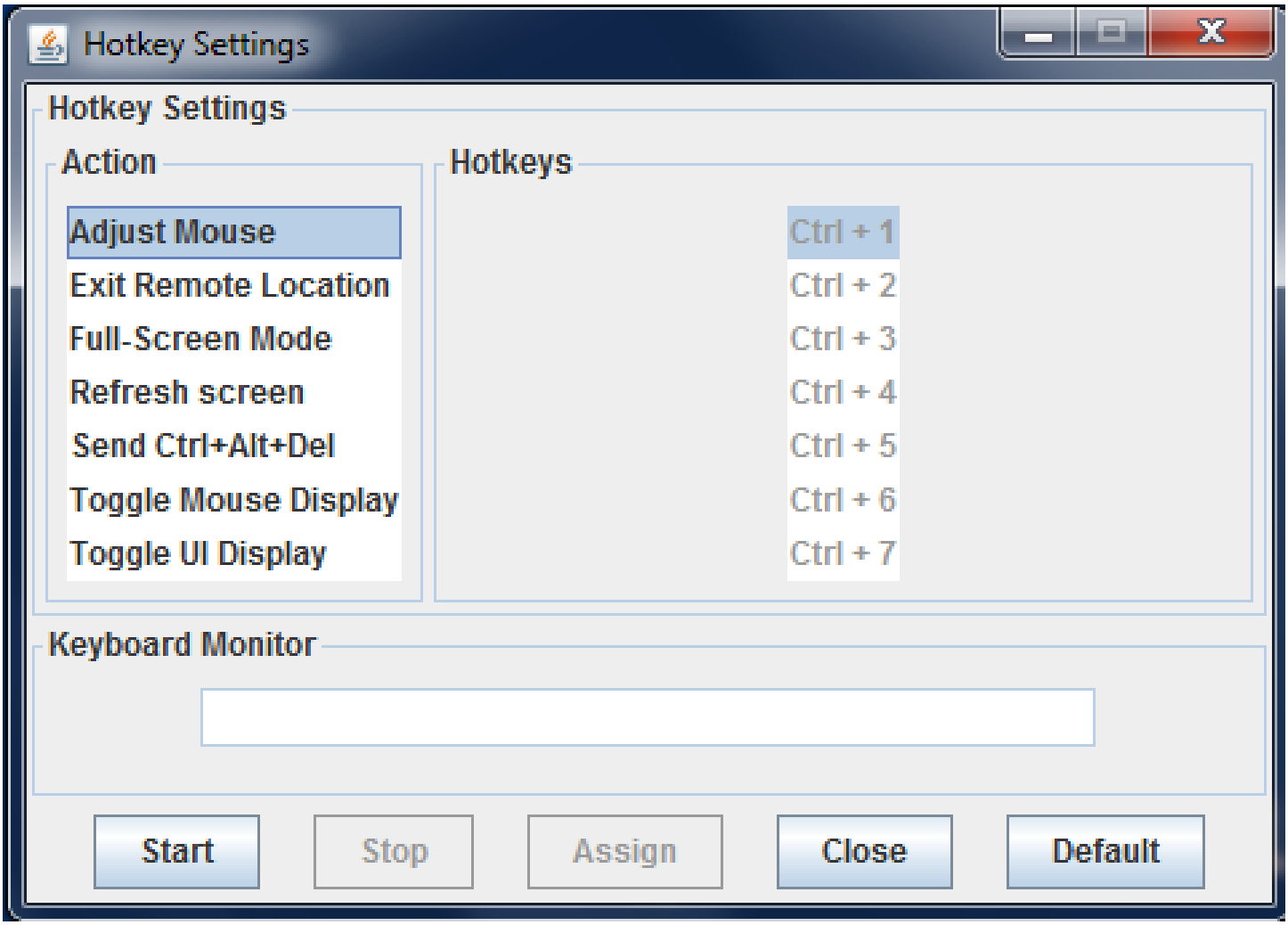

Figure 22. Remote Console HotKey Settings

- **Preference –** Configure the remote console display, mouse and keyboard settings, window, video stream, session timeout, and debug log level. The preference window toolbar has six tabs.
    - **Display** (Figure 23) – Adjust display brightness, image quality, display scale, and compression mode and enable FPS control by specifying frames per second.

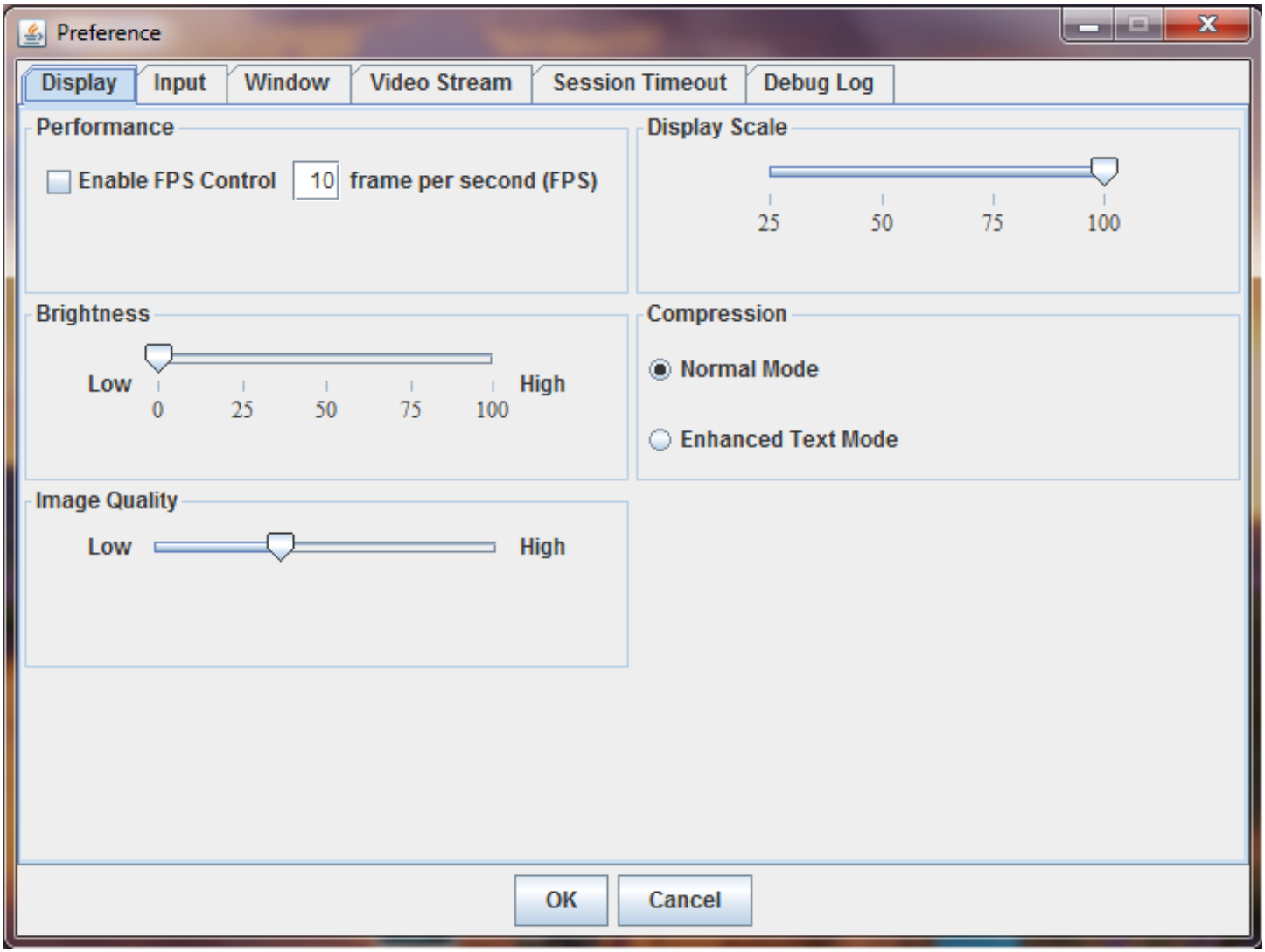

Figure 23. Remote Console Display Settings

- **Input** (Figure 24) – Enable/disable mouse/keyboard input, change the mouse mode, specify keyboard layout, and set repeat key timeout.

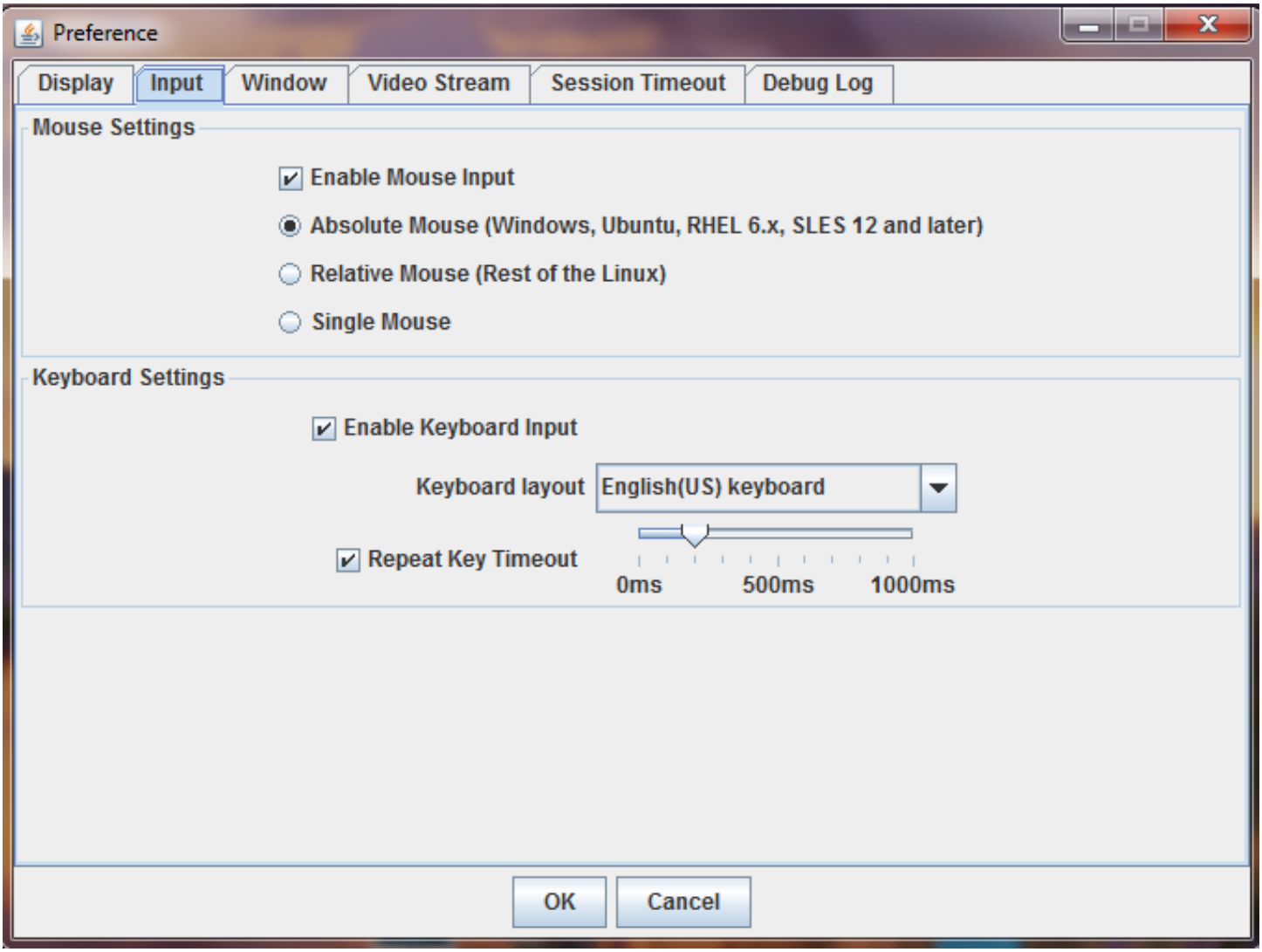

Figure 24. Remote Console Input Settings

- **Window** (Figure 25) – Enable or disable window auto-resize.

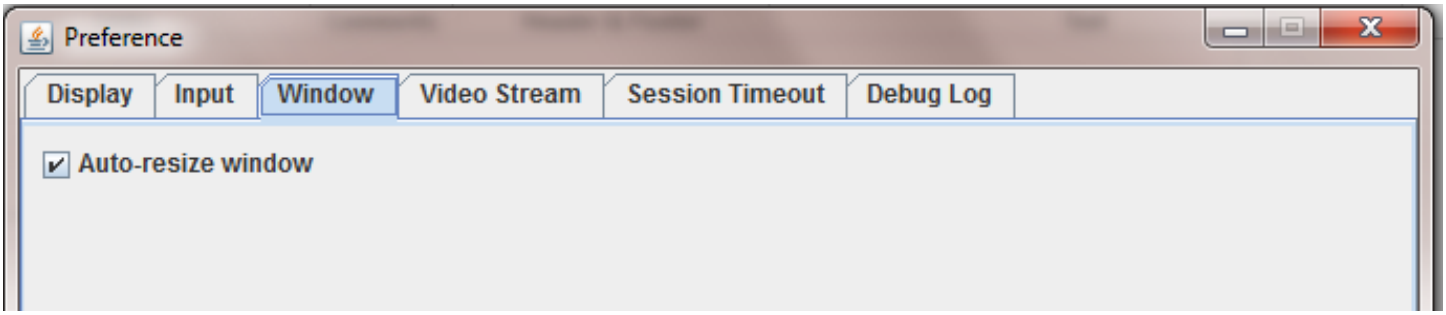

Figure 25. Remote Console Window Settings

- **Video Stream** (Figure 26) – Enable flow control by specifying a speed of T1, T2, or 256K Cable/DSL.

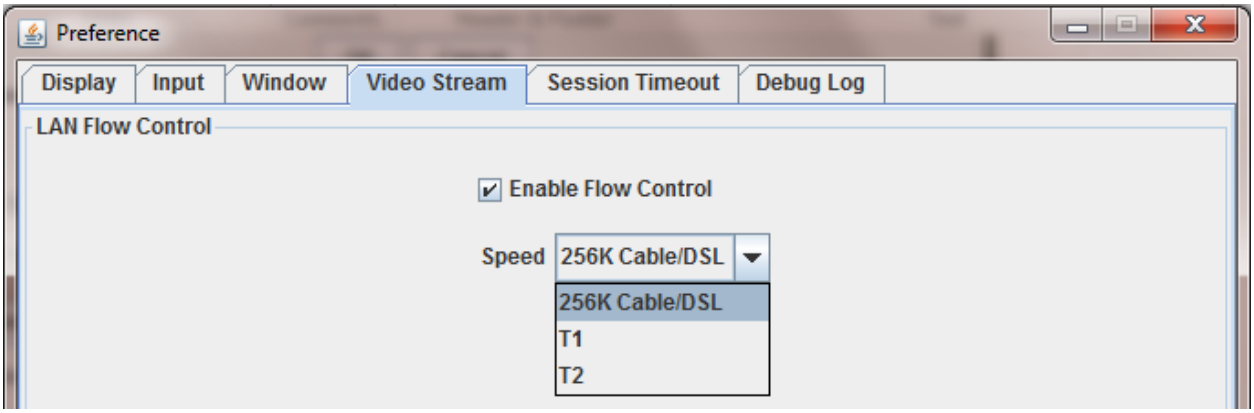

Figure 26. Remote Console Video Stream Settings

- **Session Timeout** (Figure 27) – Enable session timeout by specifying how many minutes for timeout.

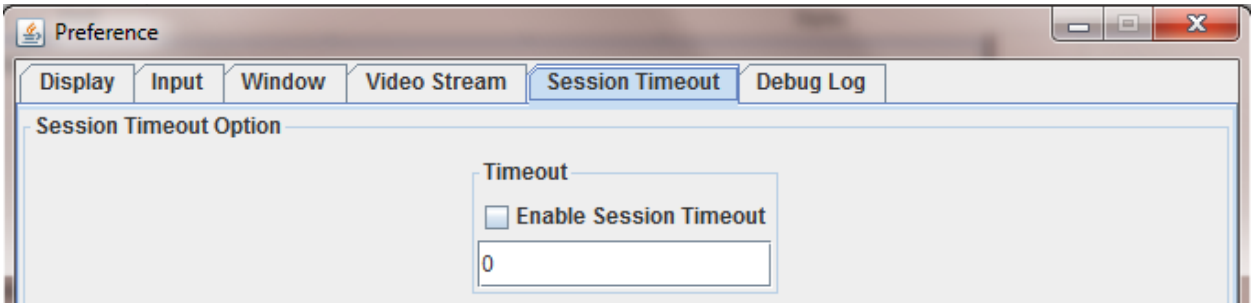

Figure 27. Remote Console Session Timeout Settings

- **Debug Log** (Figure 28) – Select a log level of Disabled, Emergency, Alert, Critical, Error, Warning, Notice, Info, or Debug. Table 4 defines each log level. The debug level is only for Java viewers and log messages will appear on the Java console, if enabled.

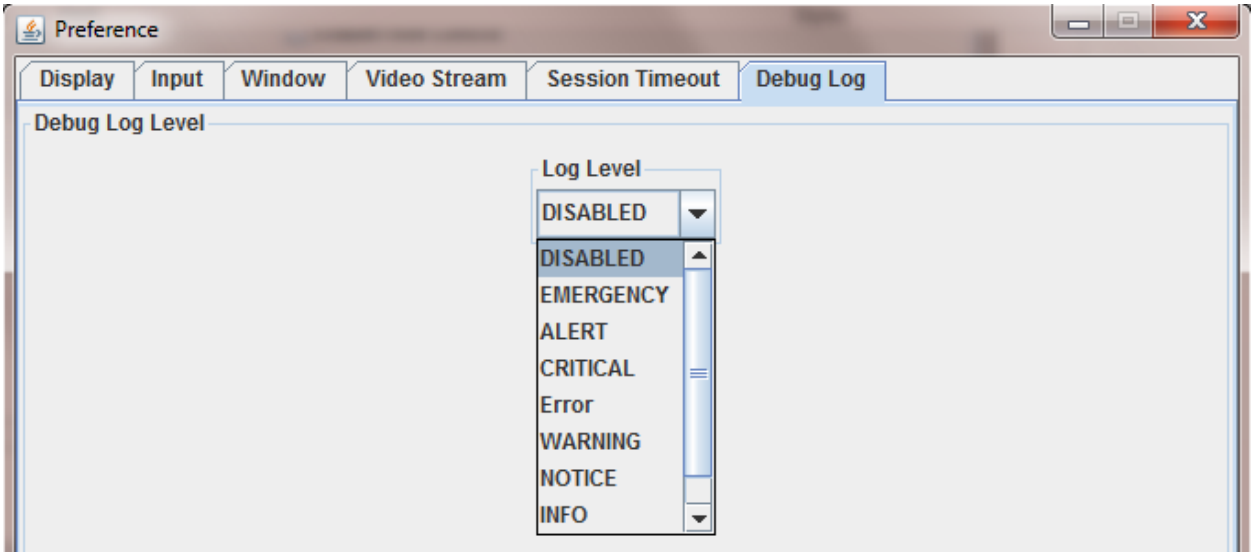

Figure 28. Remote Console Debug Log Settings

Table 4. Remote Console Log Level Definition

Log Level	Definition
Disabled	No debug log.
Emergency	Emergency conditions, such as system hangs, will save to the debug log.
Alert	Alert conditions such as system database corruption will save to debug log.
Critical	Critical conditions such as hard device errors.
Error	Error conditions.
Warning	Warning conditions.
Notice	Normal but significant conditions that are not error conditions.
Info	Informational messages.
Debug	Debug-level messages. Messages that contain information normally of use only when debugging a program.

- **Full-Screen Mode/Leave Full Screen Mode** – Enter or leave full screen mode (depending on the current state).
- **OSD UI Style –** Change the style of the remote console control bar as shown in Figure 29. Clicking the icons on this window performs tasks as shown in Table 5.

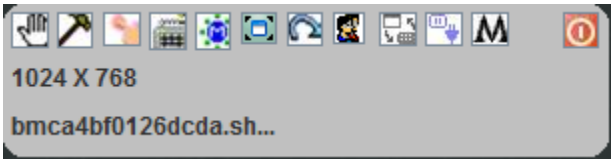

Figure 29. Remote Console Control Panel – OSD UI style

Table 5. Remote Console OSD UI Style Control Bar Options

Menu Icon	Function
	Move OSD UI menu
	Hotkey Settings
	Virtual Storage
	Virtual Keyboard
	Preference menu
	Full-screen mode
	Exit
	Show User List
	Switch back to menu UI mode
	Keyboard Mouse Hotplug
	Macro menu
	Power Control menu

- **Keyboard Mouse Hotplug** – Simulate remote console virtual USB keyboard/mouse unplug then plug.

6.3.4 User List Menu

Click **Show User List** to display information about connected users such as user name and client IP address (Figure 30).

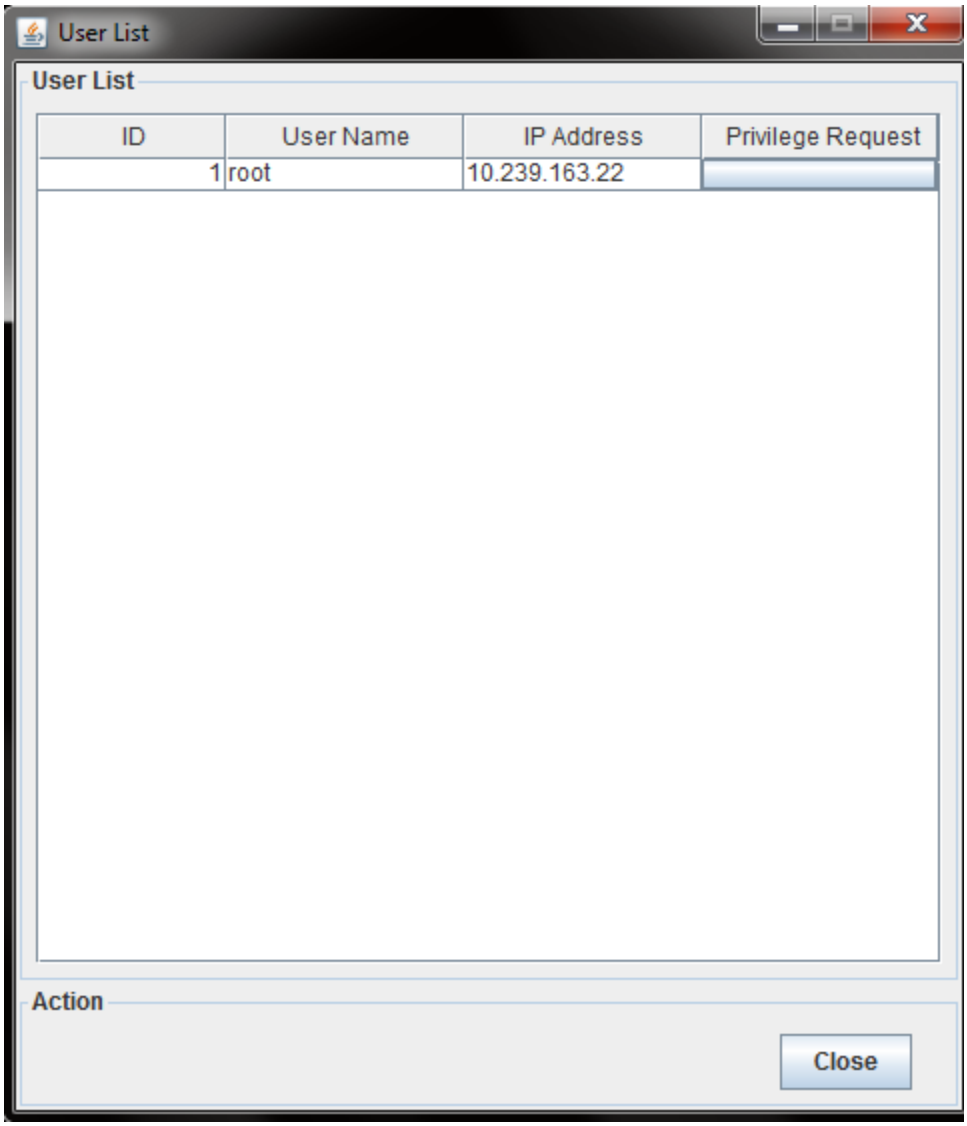

Figure 30. Remote Console User List

6.3.5 Capture Menu

Click **Capture** in the Remote Console control bar to capture a full screen view and save the image to the client. Click **Full screen view** to save the current full screen view of the remote console to the client.

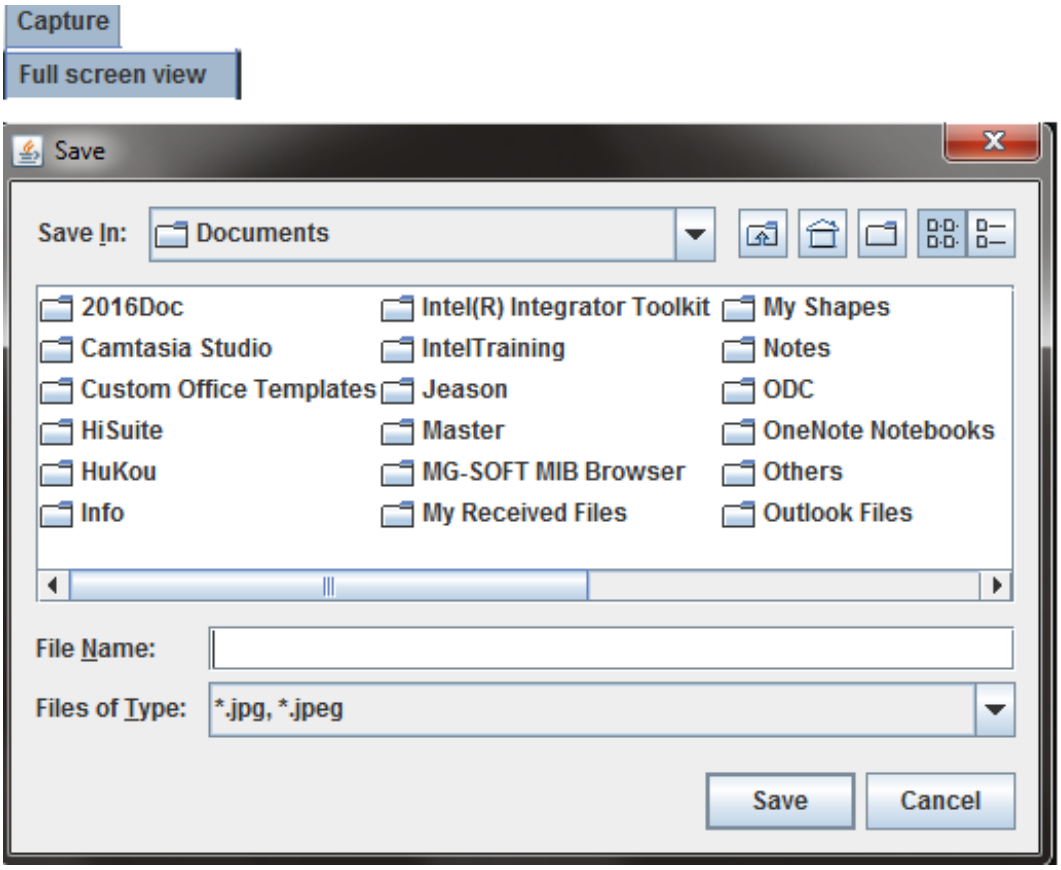

Figure 31. Remote Console Capture Menu

6.3.6 Power Control Menu

Click **Power Control** to open the power control menu as shown in Figure 32.

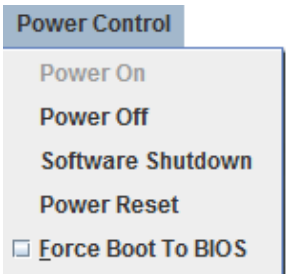

Figure 32. Remote Console Power Control Menu

Table 6 describes the power control operations that can be performed.

Note: All power control actions are done through the BMC and are immediate actions. It is suggested to gracefully shut down the operating system using the KVM interface or other interface before initiating power actions.

Table 6. Remote Console Power Control

Option	Task
Power ON	Power on the host.
Power OFF	Immediately power off the host.
Software Shutdown	Soft power off the host.
Power Reset	Hard reset the host without powering off.
Force Boot To BIOS	Enter BIOS setup after resetting the server.

6.3.7 Exit Menu

Click **Exit** and then click **Yes** (Figure 33) to exit the remote console.

Figure 33. Exit the Remote Console

6.4 Remote Console Status Line

The status line at the top of the Remote Console screen displays the console state as shown in figure below. status line provides BMC host name, Java encryption, resolution, transaction speed, and display frames per second.

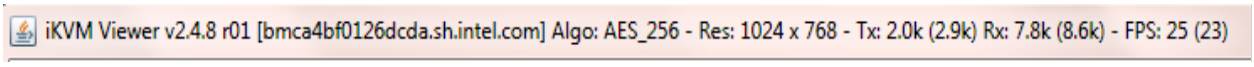

Figure 34. Remote Console Status Line

7. Integrated BMC Web Console Options

This chapter gives a detailed description of each Integrated BMC Web Console page. It is organized in sections corresponding to the six tabs in the horizontal menu. To access similar information about each page in the web console, click **Help** from the toolbar.

For information on navigating the web console interface, see Section 5.3. For a brief summary of the available pages and their secondary menus, see Table 2.The first secondary menu item for each tab is the default page that appears when the tab is selected.

When the web console is working on a user request, a busy indicator bar appears as shown in Figure 35.

Figure 35. Busy Indicator Bar

Note: Not all of the following sections are used by or directly related to Intel RMM4 enabled features but have been added here for completeness.

7.1 System Tab

The System tab contains general information about the system as explained in the following sub sections.

7.1.1 System Information

The System Information page displays a summary of the general system information. This includes the power status, Intel RMM4 key status, BMC firmware build time and version, BIOS ID, SDR package version, Intel® Management Engine (Intel® ME) firmware version, baseboard serial number, and overall system health status. For a complete description of the summary information, see Table 7.

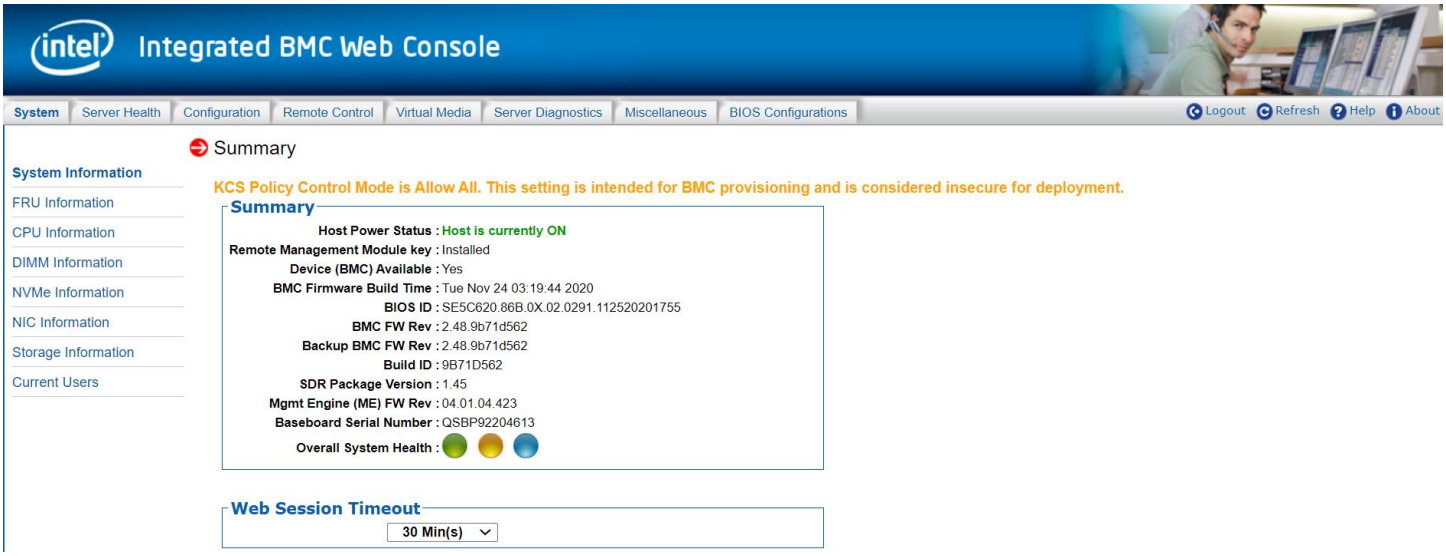

Figure 36. System Information Page

Table 7. System Information page details

Information	Details
Host Power Status	Power status of the host (on/off).
Remote Management Module Key	Indicates whether the Intel RMM4 card is present.
Device (BMC) Available	Indicates whether the BMC is available for normal management tasks.
BMC FW Build Time	The build date and time of the installed BMC firmware.
BIOS ID	Major and minor revision of the BIOS.
BMC FW Rev	Major and minor revision of the BMC firmware.
Backup BMC FW Rev	Major and minor revision of the backup BMC firmware.
SDR Package Version	Version of the Sensor Data Record.
Mgmt Engine (ME) FW Rev	Major and minor revision of the Management Engine firmware.
Baseboard Serial Number	Serial number of the baseboard in this system.
Overall System Health	A general indication of the system heath: • Left (Green) = System Ready LED • Center (Amber) = System Fault LED • Right (Blue) = Chassis ID LED

7.1.2 Field Replaceable Unit (FRU) Information

The Field Replaceable Unit (FRU) Information page displays information from the FRU repository of the baseboard, front panel, hot swap backplane, riser card, and power supply. Specify the FRU component by clicking the FRU Information pull-down box (Figure 37).

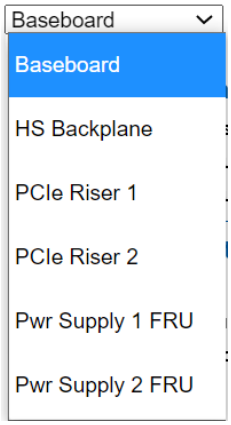

Figure 37. FRU Board Options

All data in the FRU information page is compliant with standard specifications (Platform Management FRU Information Storage Definition). See Figure 38 for details of the baseboard FRU.

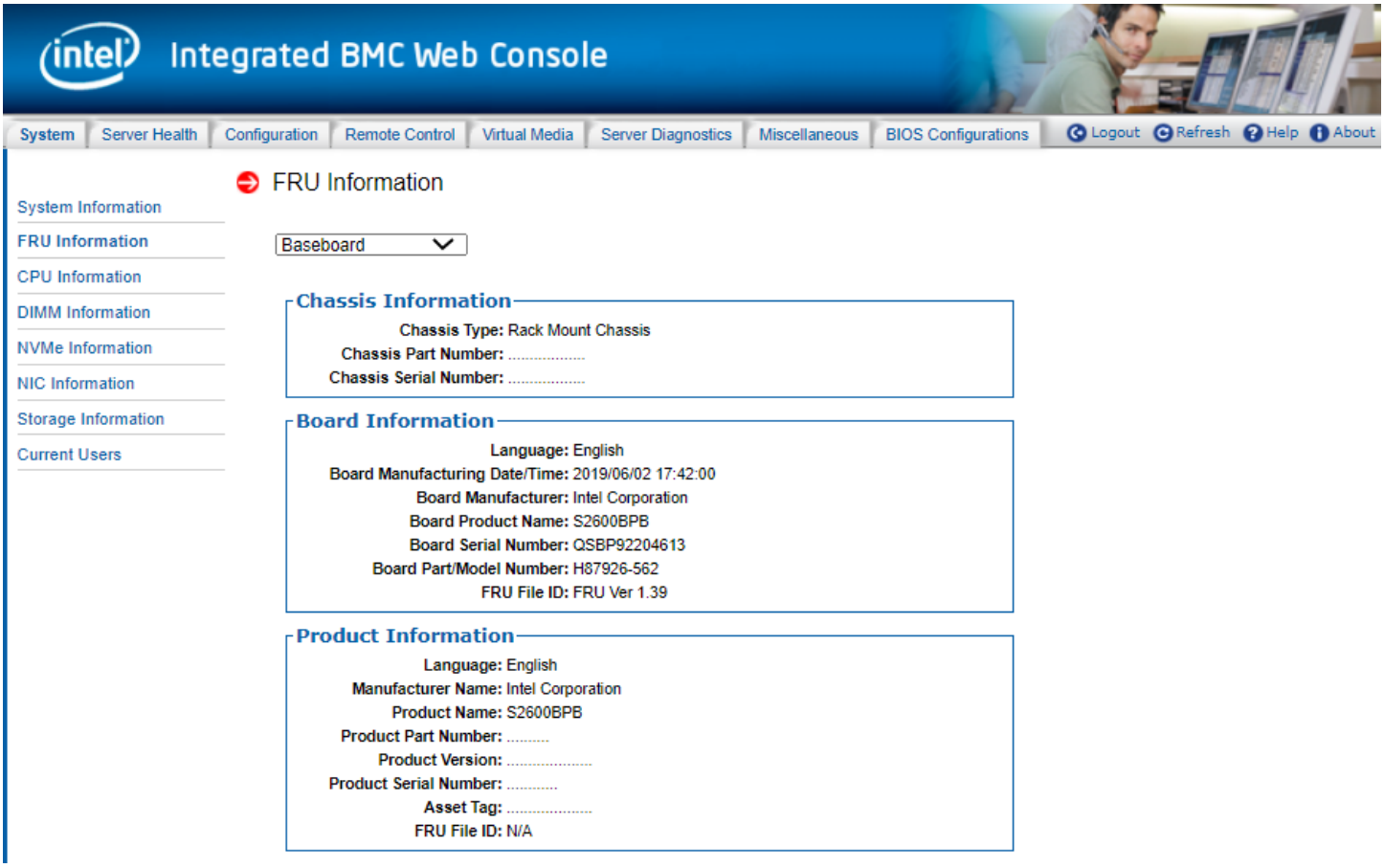

Figure 38. System FRU Information Page

7.1.3 CPU Information

The CPU Information page displays information on CPUs installed on the host system. The CPU information includes socket designation, manufacturer, version, processor signature, processor type, family, speed, number of cores, voltage, socket type, status, serial number, asset tag, and part number. See Figure 39 for details.

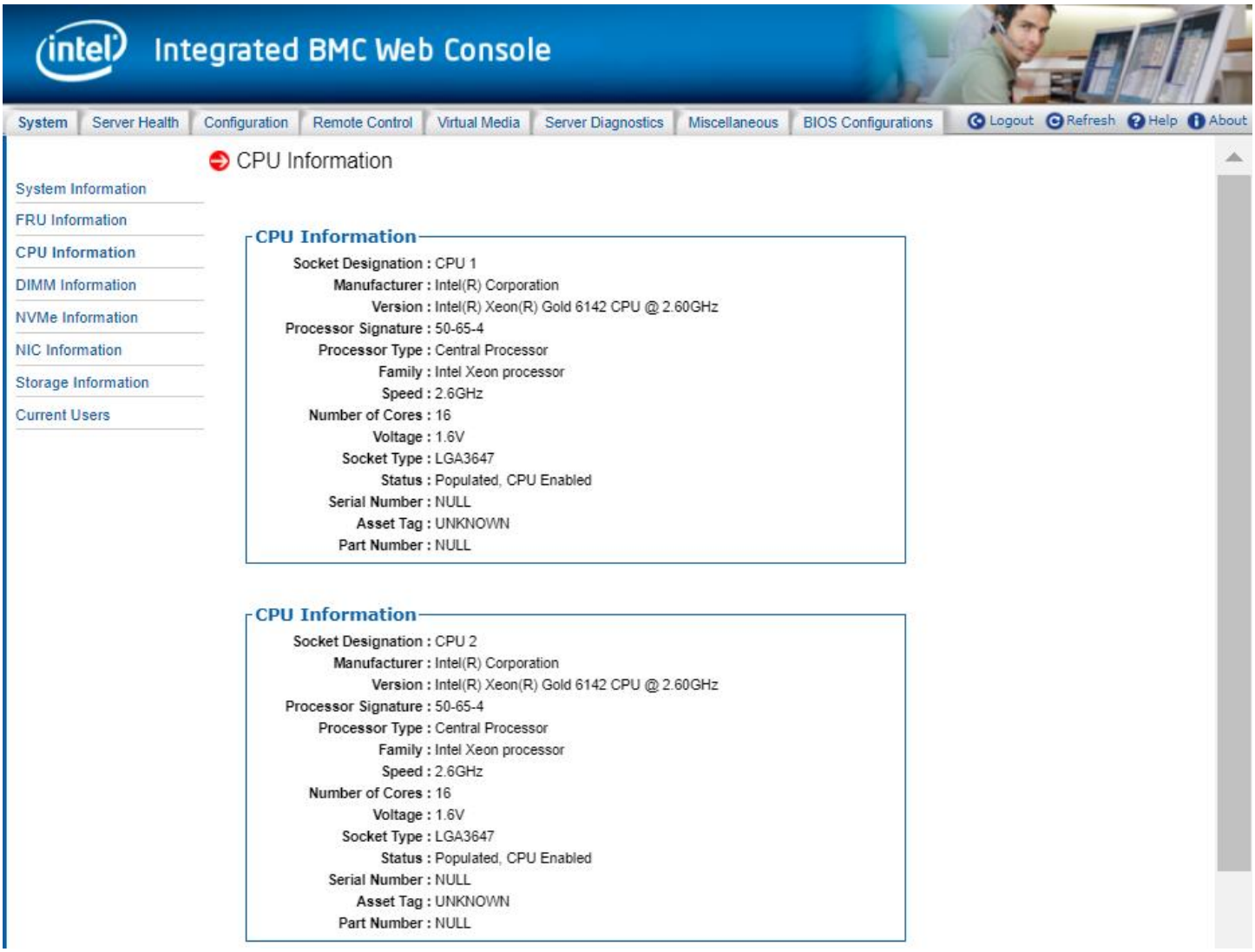

Figure 39. System CPU Information Page

7.1.4 DIMM Information

The DIMM Information page displays information on DIMMs installed in the host system. The DIMM information includes slot number, size, memory type, manufacturer, asset tag, memory serial/part number. See Figure 40 for details.

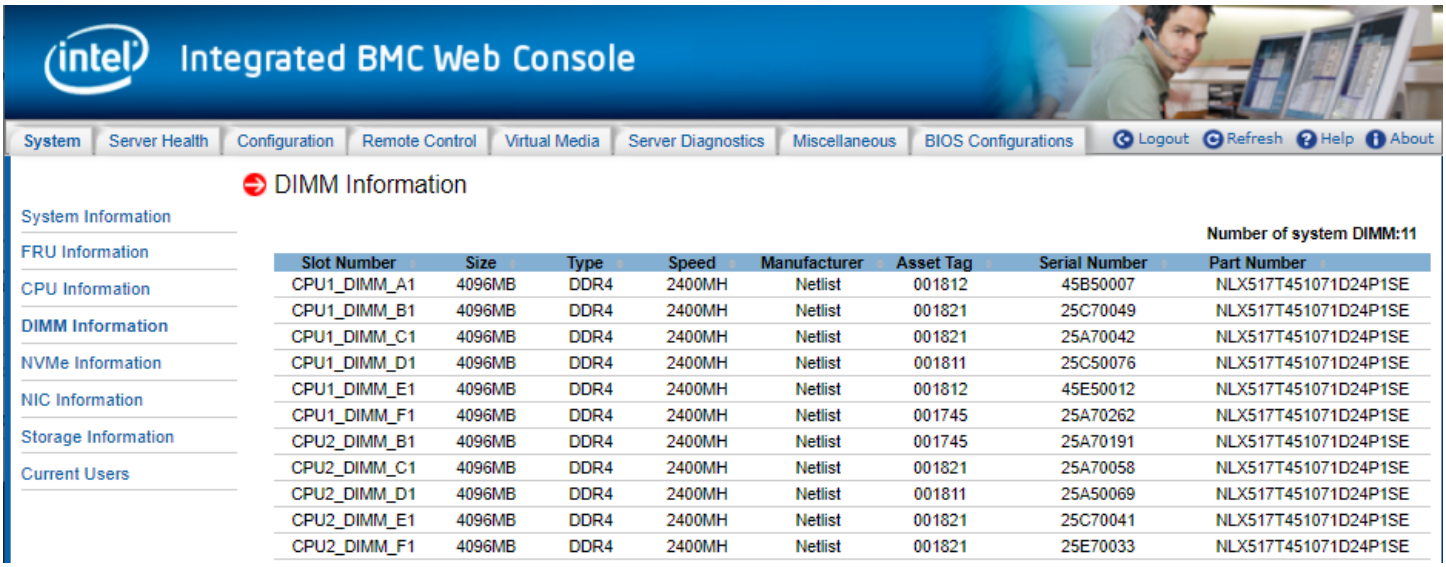

Figure 40. System DIMM Information Page

7.1.5 NVMe* Information

The NVMe* Information page displays information on supported NVMe drives installed on the host system. See Figure 41 for details. Note that the BMC only displays information about NVMe drives that meet all of the support requirements.

Figure 41. System NVMe* Information Page

7.1.6 NIC Information

The NIC Information page displays information for NIC modules installed in the host system. The NIC information includes PCI Class code, slot number, Vendor ID, Device ID, Current Speed(Mbps), Portidx, Media State, MAC Address, Firmware Version. See Figure 42 for details.

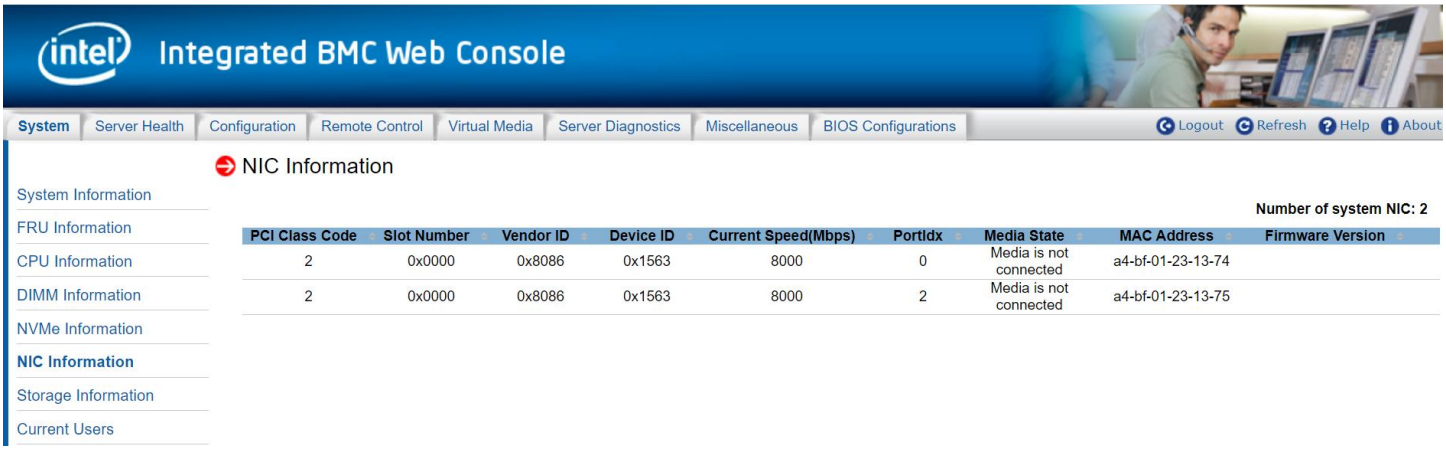

Figure 42. System NIC Information Page

7.1.7 Storage Information

The Storage Information page displays information of Storage devices installed in the host system. The Storage information includes Port Destination, Device Index, Connector Type, Protocol, Device Type, Capacity(GB), RPM, Model, Serial, PCI Class Code, Vendor ID, Device ID. See Figure 43 for details.

Figure 43. System Storage Information Page

7.1.8 Current Users

The Current Users page displays users currently logged in to the BMC via the embedded web server, IPMI 1.5 or IPMI 2.0 session, and EWS login type via HTTP or HTTPs. KVM session number, virtual media usage status, and client IP address are also listed in this table. See Figure 44 for details.

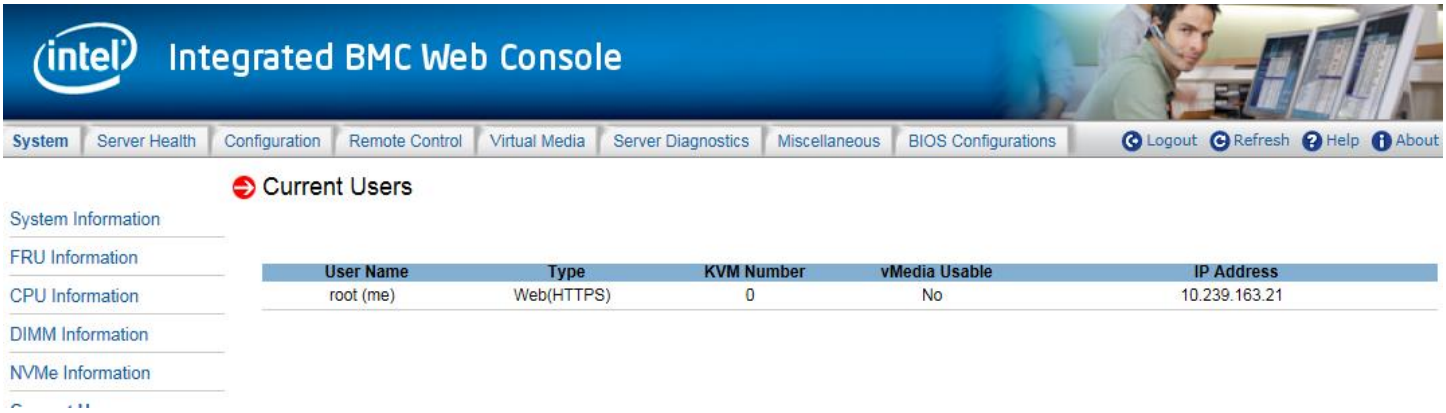

Figure 44. System Current Users Page

Notice: Intel added to the BMC a new KCS Policy Control Mode; when set to "Deny ALL" on the BMC EWS, both the BMC and FRUSDR cannot be upgraded/downgraded as expected behavior. Updates can still be performed via Redfish or BMC EWS. By default, the BMC KCS Policy is set to “Allow All”.

7.2 Server Health Tab

The Server Health tab shows data related to the server's health, such as sensor readings and the event log.

7.2.1 Sensor Readings

The Sensor Readings page displays system sensor information including status, health, and reading as shown in Figure 45 and Figure 46 (with threshold). Table 8 lists the options available in this page. By default, this page displays all sensors owned by the BMC and auto-refreshes every 60 seconds.

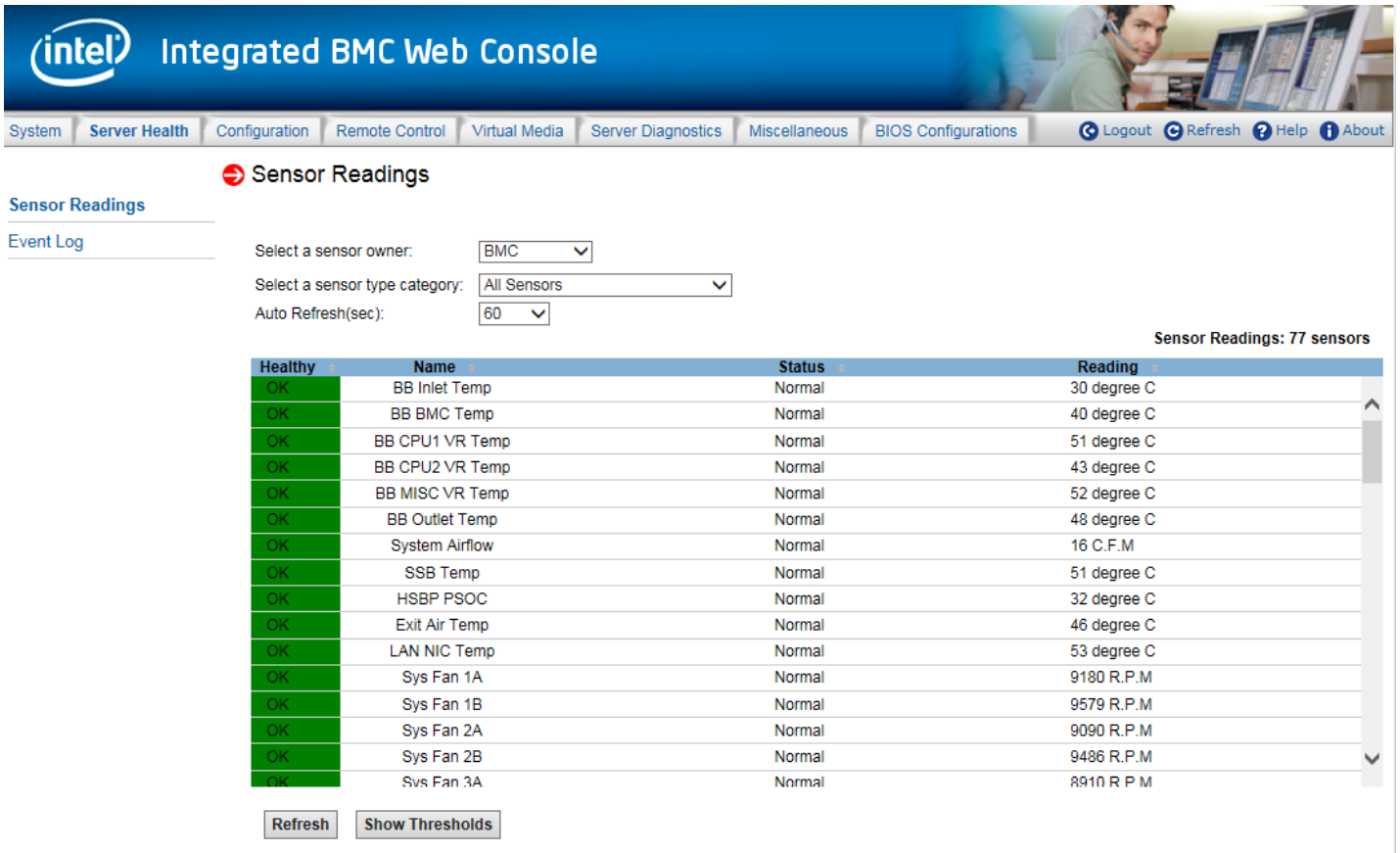

Figure 45. Server Health Sensor Readings Page (Thresholds Not Displayed)

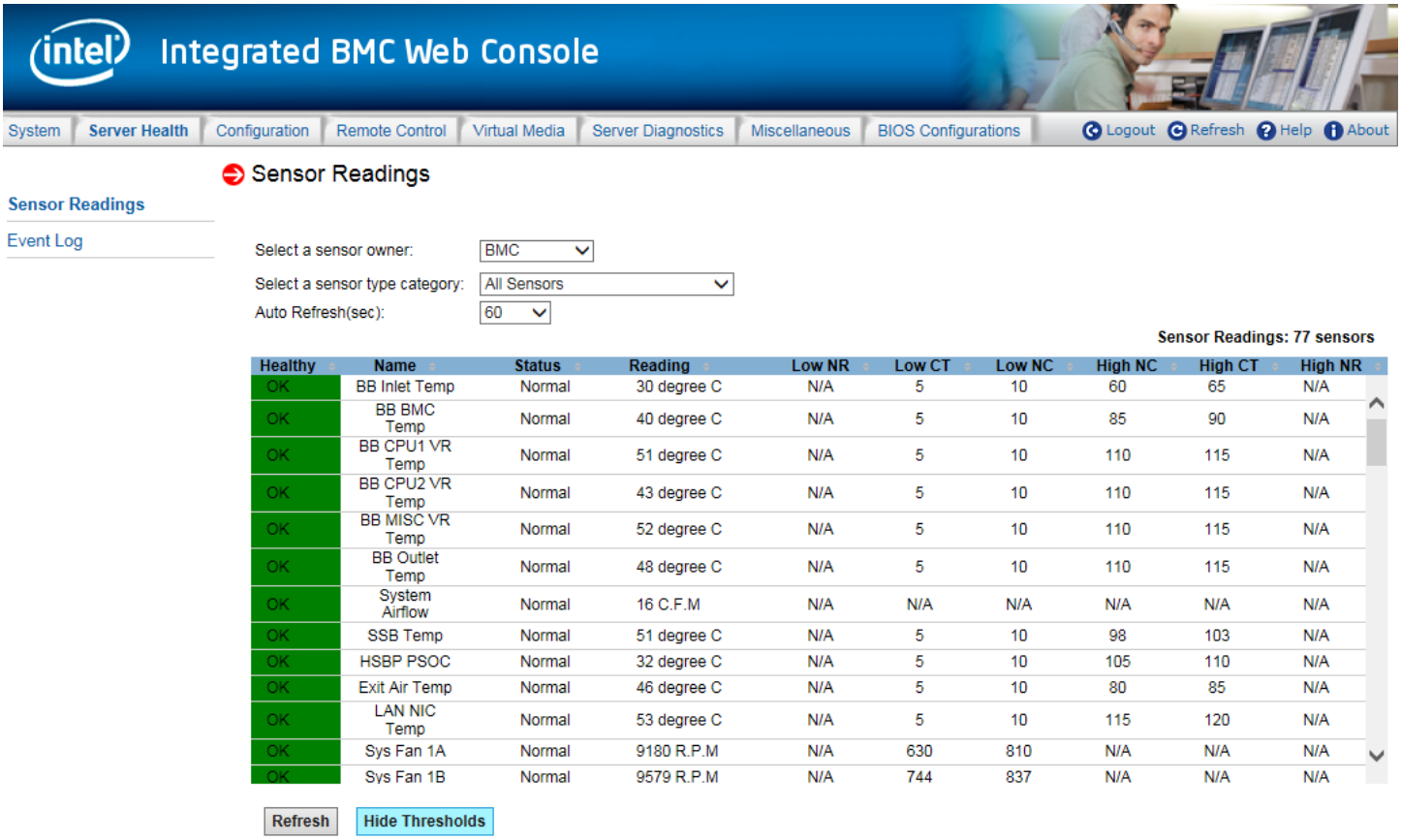

Figure 46. Server Health Sensor Readings Page (Thresholds Displayed)

Table 8. Server Health Sensor Readings Options

Option	Task
Select a sensor owner	Select the owner of sensor readings to display in the list. Choose BMC, ME, or SATELITE. The default owner is BMC.
Select a sensor type category	Select the sensor type category to display in the list. The default is to display all sensors.
Auto Refresh (sec)	Select the time (in seconds) to wait between sensor reading updates. Choose 0, 10, 15, 30, 60, 150, 300, or never. The default refresh time is 60 seconds.
Refresh	Click to refresh the selected sensor readings.
Show Thresholds	Click to show low and high, critical (CT) and non-critical (NC) threshold assignments. Use the scroll bar at the bottom to move the display left and right.
Hide Thresholds	Click to return to the original display, hiding the threshold values.

7.2.2 Event Log

The Event Log page displays the system server management event log (Figure 47). Table 9 lists the options available in this page.

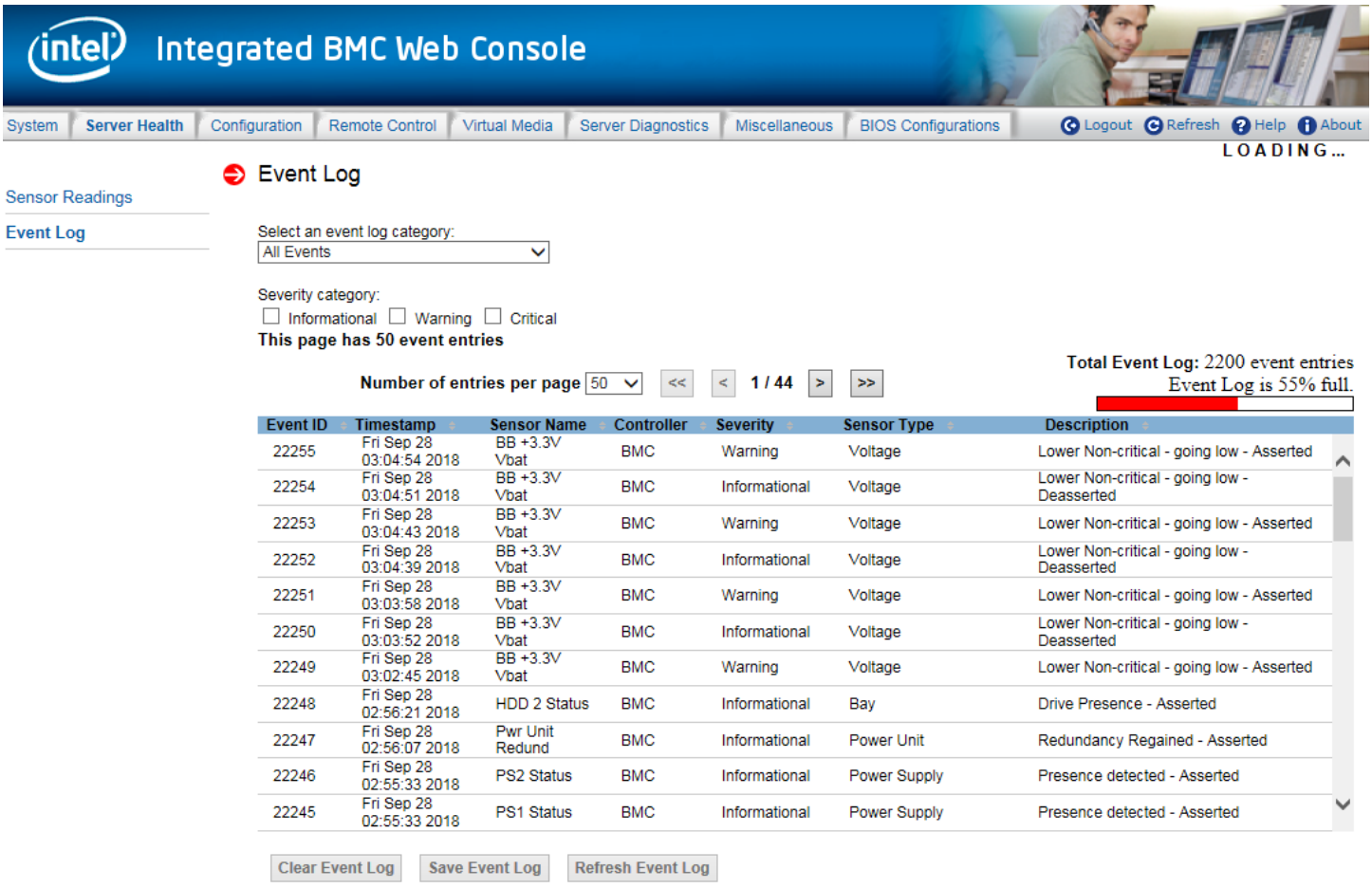

Figure 47. Server Health Event Log Page

Table 9. Server Health Event Log Options

Option	Task
Select an event log category	Select the type of events to display in the list.
Severity category	Select the severity of events to display in the list. Choose informational, warning, or critical.
Number of entries per page	Specify how many events are displayed per page.
Event full indicator	An estimate of how full the event log is.
Page selection	Navigate to other pages of recorded events. The selections are first page, previous page, next page, and last page.
Event log list	Selected sensors are shown with their name, status, and readings. This includes a list of the events with their ID, time stamp, sensor name, controller, severity, sensor type, and description.
Clear Event Log	Clear the event log.
Save Event Log	Save the event log to file.
Refresh Event Log	Refresh the event log.

7.3 Configuration Tab

The Configuration tab is used to configure various settings such as alerts, alert email, IPv4 and IPv6 networks, VLAN, KVM and media, SSL certification, users, security settings, SOL, SDR configuration, and firmware as discussed in the following subsections.

7.3.1 Alerts

Use this page to configure which system events should trigger alerts and the destination for those alerts. Up to two destinations can be selected for each LAN channel (Figure 48). Table 10 lists the options to select the events that should trigger alerts and where the alerts are to be sent.

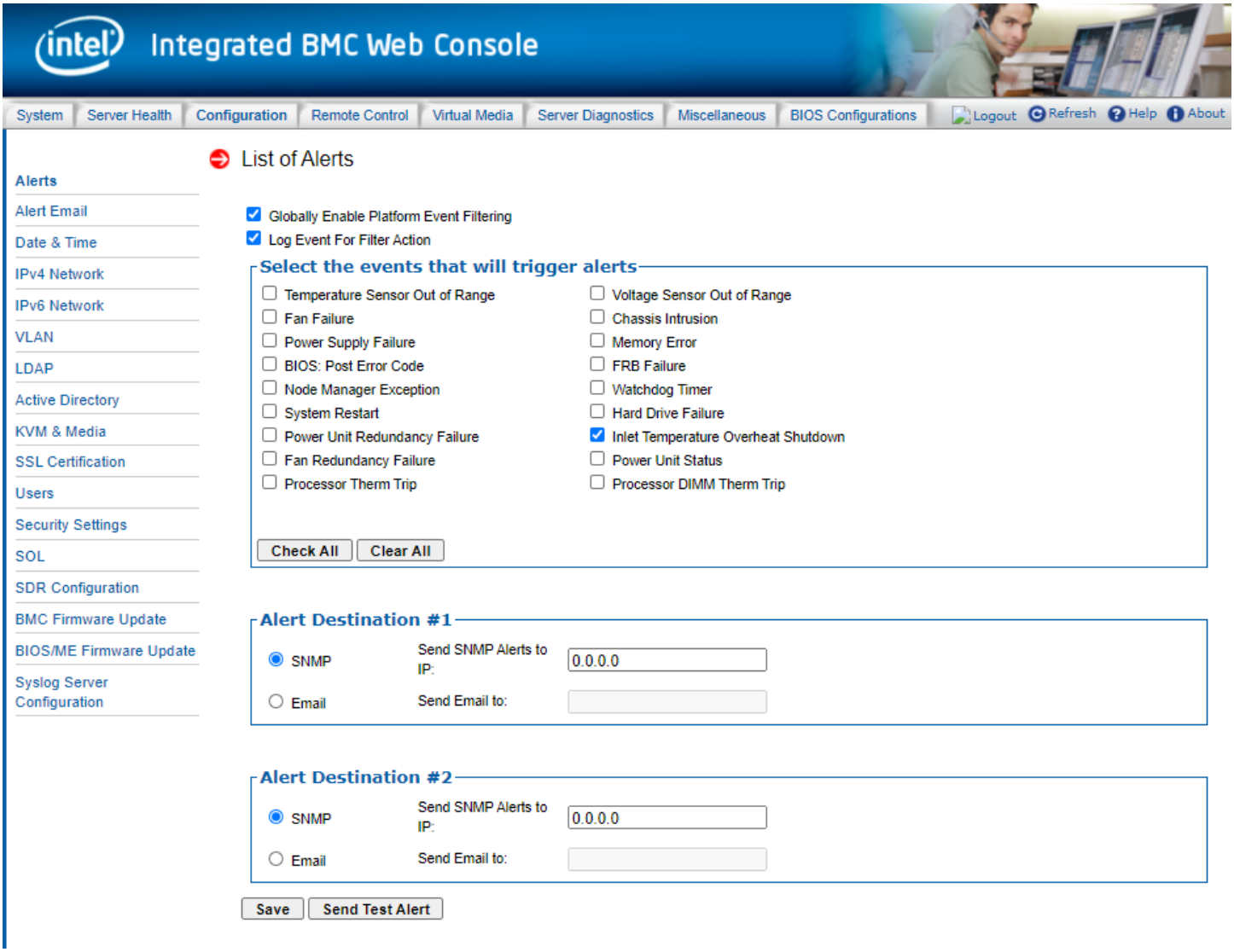

Figure 48. Alerts Page

Table 10. Alerts Options

Option	Task
Globally Enable Platform Event Filtering	This can be used to prevent sending alerts until the user has fully specified his/her desired alerting policies.
Log Event For Filter Action	This can be used to enable or disable the logging of an event into the System Event Log when a Filter Action is taken.
Select the events that will trigger alerts	Select one or more system events that will trigger an alert.
Check/Clear All	Click to select or clear all events.
Alert Destination #1/#2	Select either SNMP along with the IP address or email address that the alert will be sent to. Up to two destinations can be selected for each LAN channel.
Save	Click to use the selected setup.
Send Test Alerts	After configuring, select this to send a test alert.

7.3.2 Alert Email

Use this page to configure the parameters for alert emails. Table 11 lists the options to configure alert emails.

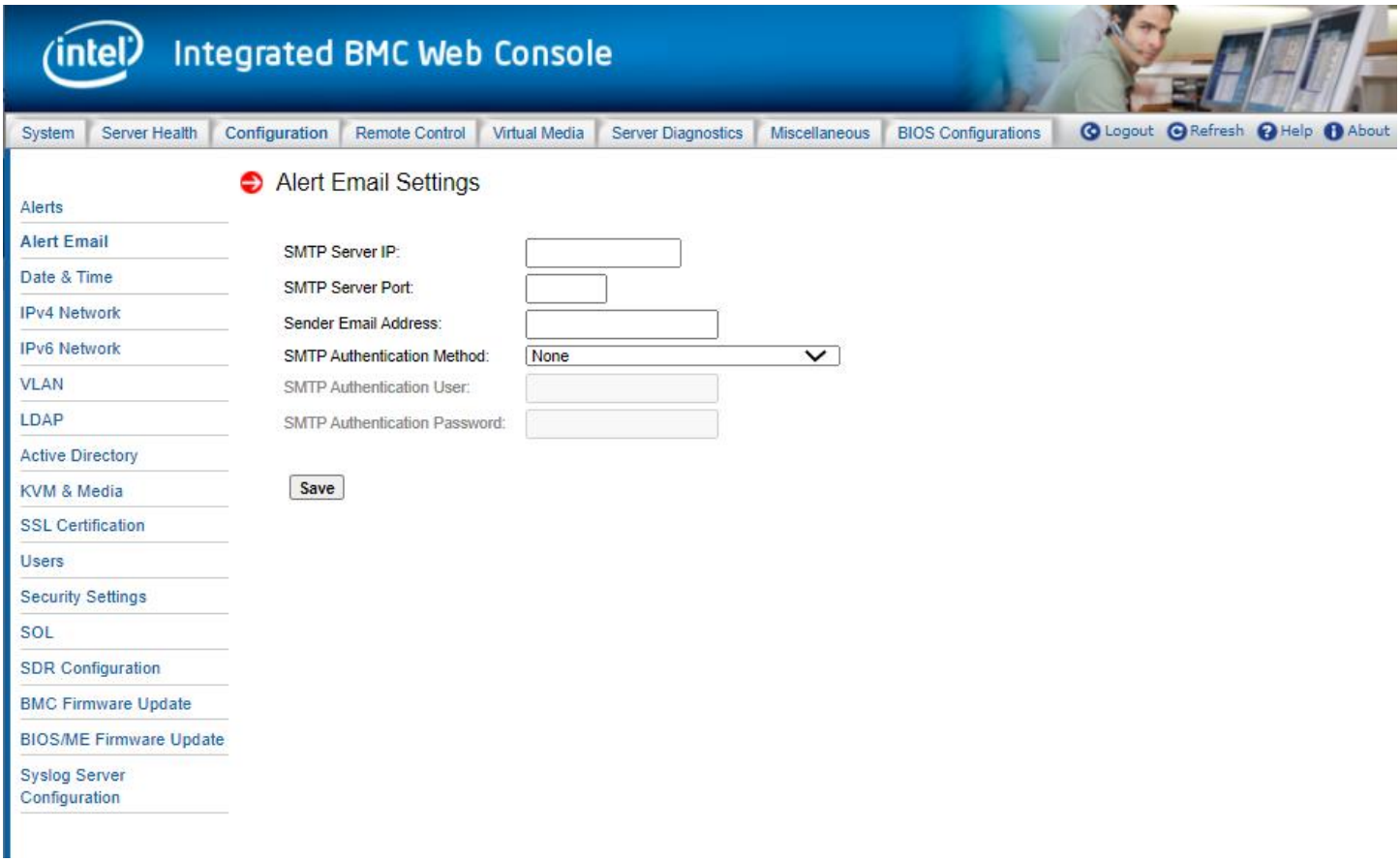

Figure 49. Alert Email Page

Table 11. Alert Email Options

Option	Task
SMTP Server IP	The IP address of the remote SMTP mail server that the alert emails will be sent to. The IP address is made of four numbers separated by dots as in "xxx.xxx.xxx.xxx". 'xxx' ranges from 0 to 255. The first 'xxx' must not be 0.
SMTP Server Port	The IP port number for which the remote SMTP Mailserver is listening. SMTP servers without encryption and servers supporting STARTTLS generally listen on TCP Port 25. SMTP servers supporting SSL/TLS (SMTPS) generally listen on TCP port 465.
Sender Email Address	The sender address string to be put in the "From:" field of outgoing alert emails.
SMTP Authentication Method	Select the SMTP authentication and encryption methods supported by the remote SMTP Mailserver. SMTP authentication without encryption is not supported. Options: • None - use this option if the remote SMTP Mailserver does not support authentication or does not support STARTTLS or SSL/TLS encryption methods. • Authentication after STARTTLS - Use this option if the remote SMTP Mailserver only supports STARTTLS encryption. • Authentication over TLS/SSL Session - Use this option if the remote SMTP Mailserver supports full SSL/TLS encrypted sessions (SMTPS).
SMTP Authentication User	User email account on the remote SMTP mail server used for SMTP authentication. This option is not available if SMTP Authentication Method is set to None.
SMTP Authentication Password	User password on the remote SMTP mail server used for SMTP authentication. This option is not available if SMTP Authentication Method is set to None.
Save button	Click to save any changes made.

7.3.3 Date & Time

Use this page to view and change the devices' date and time from NTP server or RTC. Table 12 lists the options to configure Date & Time.

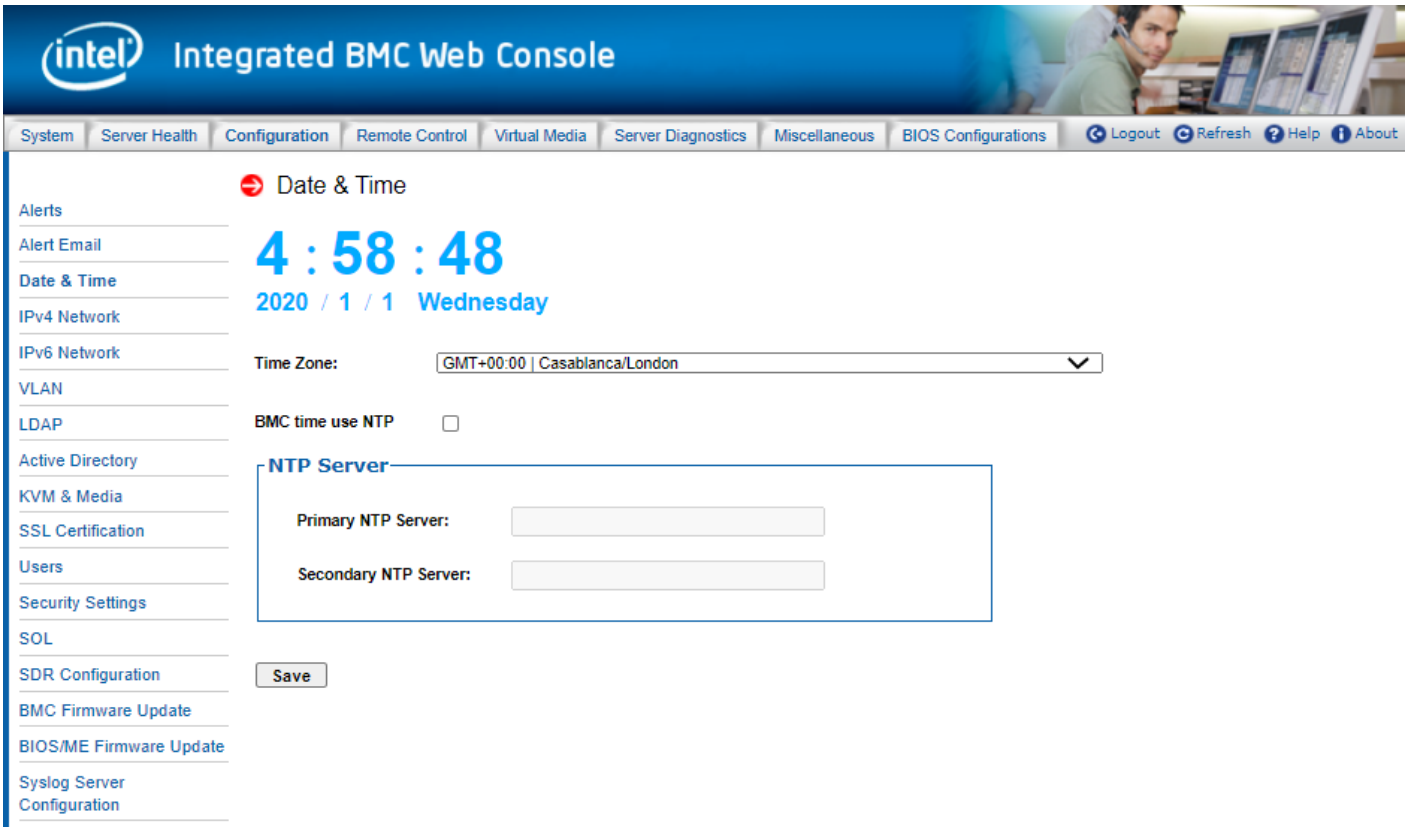

Figure 50. Date & Time Page

Table 12. Date & Time Options

Option	Task
Time Zone	Time zone setting.
BMC time use NTP	Enable/Disable NTP service.
Primary NTP Server	Primary NTB Server address.
Second NTP Server	Second NTB Server address.
Save button	Click to save any changes made.

7.3.4 IPv4 Network

The IPv4 settings page is used to configure the IPv4 network settings for the server management LAN interface to the BMC controller. See Figure 51 or Figure 52 for details. Table 13 lists the options available in this page.

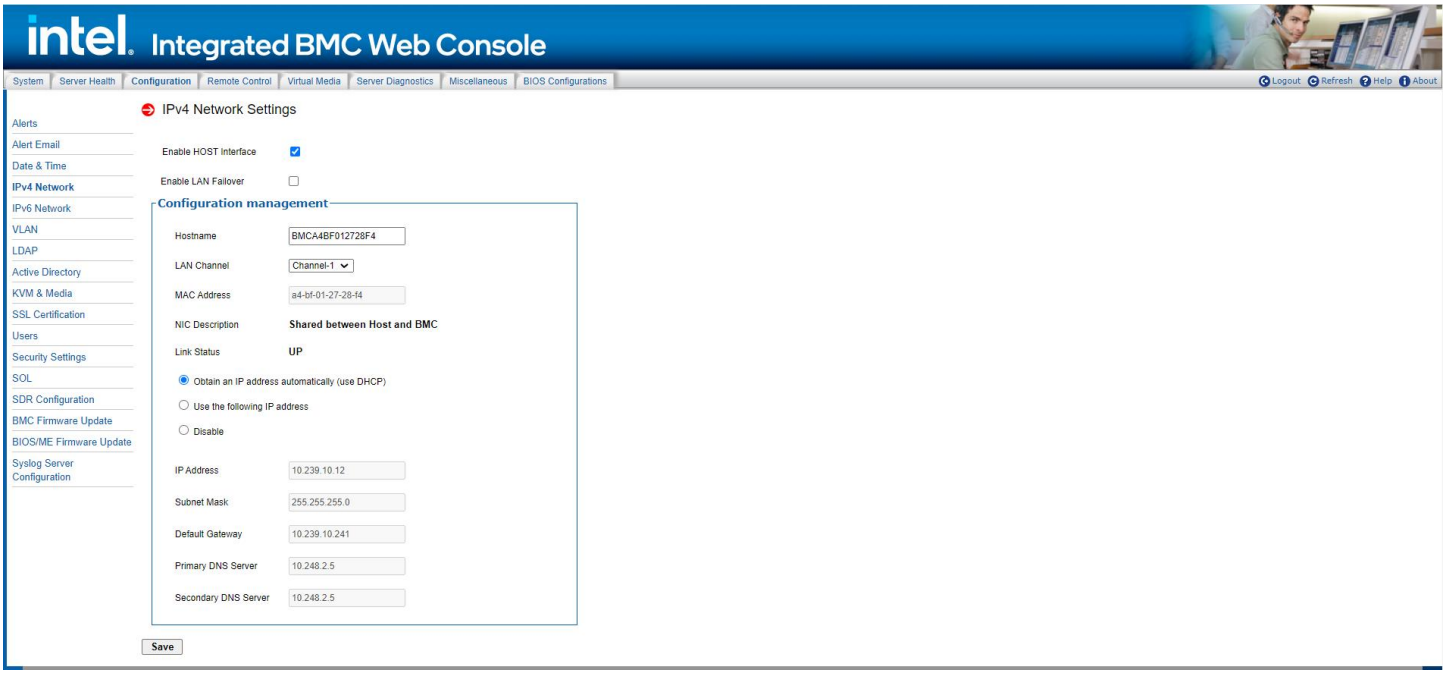

Figure 51. IPV4 Network DHCP Page

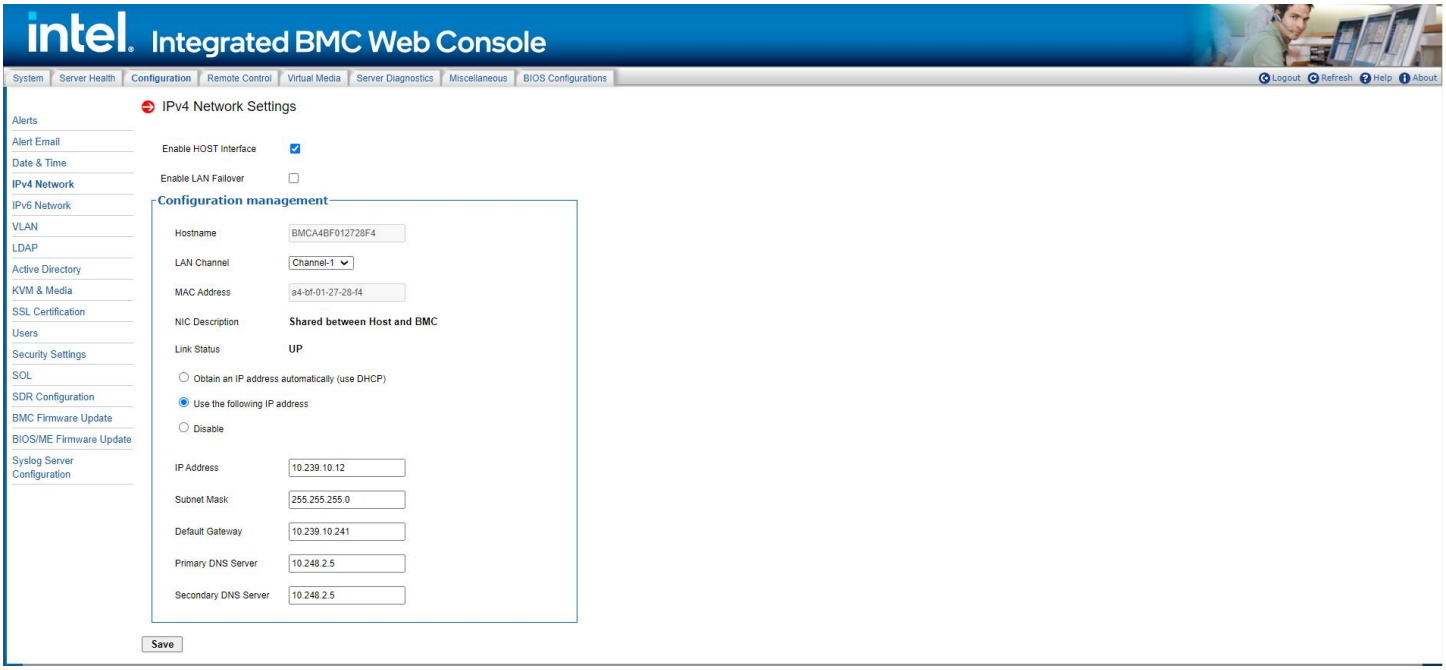

Figure 52. IPv4 Network Static Page

WARNING: Each network controller must be on a different subnet than all other controllers used for management traffic.

WARNING: When LAN failover is enabled, the system administrator must ensure that each network controller connection, which can be seen by the BMC, has connectivity to the same networks. If there is a loss of functionality on the primary network controller channel, it will randomly failover to any of the other network controller channels that are connected and seen by the BMC.

Table 13. IPv4 Network Settings Options

Option	Task
Host Name	The hostname is an RFC 1123 compliant string less than 64 alpha-numeric characters. Hyphen characters are allowed as long as the hyphen is not the first or final character in the hostname. The default value is "BMC" + MAC address.
Enable HOST Interface	Host Interface (HI) is based on Ethernet over USB. It provides an interface between the HOST and the BMC for communication. This allows applications to use the network socket to communicate with each other. If HI is not enabled yet, the user must enable it and save this configuration change. Then, continue to set the host interface configuration. HI only supports Static IP and can only modify IP address and netmask.
Enable LAN Failover	Enabling failover bonds Ethernet interfaces into the primary LAN Channel, the Bonding of LAN channel option can select Ethernet device to bond, the Primary LAN channel option can specify a LAN channel to primary LAN channel. When the primary interface's leash is lost, one of the secondary interfaces is activated automatically with the same IP address.
LAN Channel	Select the channel on which to configure the network settings. Lists the LAN Channels available for server management. The LAN channels describe the physical NIC connection on the server. • Intel® RMM (BMC LAN Channel 3) is the add-in RMM4 Dedicated Management NIC. • Baseboard Mgmt (BMC LAN Channel 1) is the onboard, shared NIC configured for management and shared with the operating system. • Baseboard Mgmt 2 (BMC LAN Channel 2) is the second onboard, shared NIC configured for management and shared with the operating system. • HOST Interface (BMC LAN Channel 4) is an internal channel between the HOST and the BMC.

Option	Task
MAC Address	The MAC address of the device (read only).
NIC Description	NIC dedicated to BMC / Host or shared between Host and BMC of LAN Channel(s) (read only).
Link Status	NIC Link status of LAN Channel(s) (read only).
IP address	Select one of the three options for configuring the IP address: • Obtain an IP address automatically (use DHCP) – Uses DHCP to obtain the IP address. • Use the following IP address – Manually configure the IP address. • Disable LAN Channel – Sets the IP address, Subnet Mask, and Default Gateway to 0.0.0.0.
IP Address **Subnet Mask** **Gateway**	If configuring a static IP, enter the requested address, subnet mask, and gateway in the given fields. The IP Address is made of four numbers separated by dots as in "xxx.xxx.xxx.xxx". 'xxx' ranges from 0 to 255. The first 'xxx' must not be 0.
Primary DNS Server **Secondary DNS Server**	If configuring a static IP, enter the Primary and Secondary DNS servers.
Save	Click to save any changes made.

7.3.5 IPv6 Network

The IPv6 settings page is used to enable and configure the IPv6 network settings and to enable and configure LAN failover (Figure 53) Table 14 lists the options available in this page.

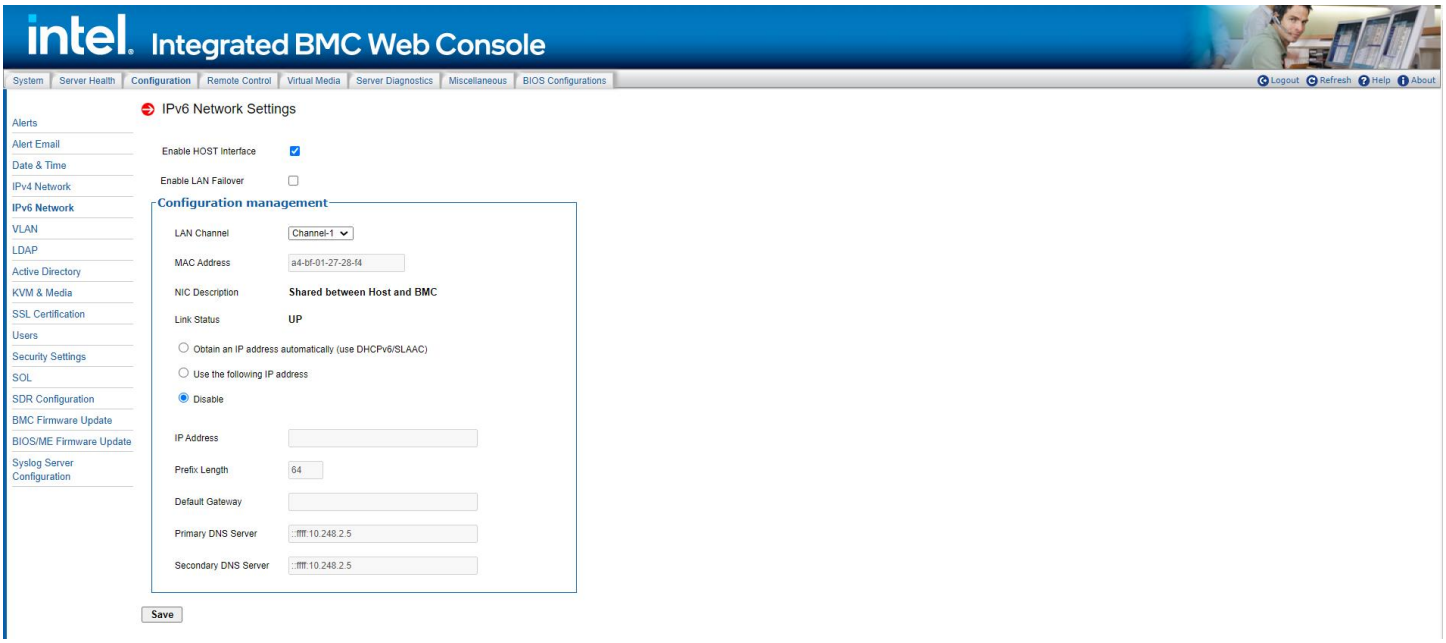

Figure 53. IPv6 Network Page

WARNING: Each network controller must be on a different subnet than all other controllers used for management traffic.

WARNING: When LAN failover is enabled, the system administrator must ensure that each network controller connection, which can be seen by the BMC, has connectivity to the same networks. If there is a loss of functionality on the primary network controller channel, it will randomly failover to any of the other network controller channels that are connected and seen by the BMC.

Table 14. IPv6 Network Settings Options

Option	Task
Enable LAN Failover	Enabling failover bonds Ethernet interfaces into the primary LAN Channel, the Bonding of LAN channel option can select Ethernet device to bond, the Primary LAN channel option can specify a LAN channel to primary LAN channel. When the primary interface's leash is lost, one of the secondary interfaces is activated automatically with the same IP address.
Enable HOST Interface	HI is based on Ethernet over USB. It provides an interface between the HOST and the BMC for communication. This allows applications to use the network socket to communicate with each other. If HI is not enabled yet, the user must enable it and save this configuration change. Then continue to set the host interface configuration. HI only supports Static IP and can only modify IP address and prefix length.
LAN Channel	Select the channel on which to configure the network settings. Lists the LAN Channels available for server management. The LAN channels describe the physical NIC connection on the server. • Intel® RMM (BMC LAN Channel 3) is the add-in RMM4 Dedicated Management NIC. • Baseboard Mgmt (BMC LAN Channel 1) is the onboard, shared NIC configured for management and shared with the operating system. • Baseboard Mgmt 2 (BMC LAN Channel 2) is the second onboard, shared NIC configured for management and shared with the operating system. • HOST Interface (BMC LAN Channel 4) is an internal channel between the HOST and the BMC.
MAC Address	The MAC address of the device (read only).
NIC Description	NIC dedicated to BMC / Host or shared between Host and BMC of LAN Channel(s) (read only).
Link Status	NIC link status of LAN Channel(s) (read only).
IP address	Select one of the three options for configuring the IP address: Use IPv6 auto-configuration (stateless ICMPv6 discovery) – Uses ICMPv6 to obtain the IP address. Obtain an IP address automatically (use DHCPv6) – Uses DHCPv6 to obtain the IP address. Use the following IP address – Manually configure the IP address.
IP Address **Gateway**	If configuring a static IP, enter the requested address and gateway in the given fields. The IP Address and Gateway are 128-bit fields made of eight hexadecimal numbers separated by colons as in "xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx:xxxx". 'xxxx' ranges from 0 to FFFF. First 'xxxx' must not be 0. One or more consecutive groups of zero value may be replaced with a single empty group using two consecutive colons (::).
Prefix Length	Select the routing prefix length.
Primary/Secondary DNS server	If configuring a static IP, enter the Primary and Secondary DNS servers.
Save	Click to save any changes made.

7.3.6 VLAN Settings

The VLAN settings page is used to enable and configure the VLAN private network settings on the selected server management LAN channels (Figure 54). Table 15 lists the options available in this page.

Figure 54. VLAN Settings Page

Table 15. VLAN Settings Options

Option	Task
LAN Channel	Select the channel on which to configure the network settings. Lists the LAN Channels available for VLAN. The LAN channel describes the physical NIC connection on the server. • Intel® RMM (BMC LAN Channel 3) is the add-in RMM4 NIC. • Baseboard Mgmt (BMC LAN Channel 1) is the onboard, shared NIC configured for management and shared with the operating system. • Baseboard Mgmt 2 (BMC LAN Channel 2) is the second onboard, shared NIC configured for management and shared with the operating system.
Enable VLAN	Enable VLAN for the LAN channel selected in the drop-down box.
VLAN ID	Specify the VLAN ID to use. Values are from 1 to 4094. Only one ID can be used at a time.
VLAN Priority	Specify the VLAN Priority field to place in outgoing packets. Priority code point (PCP) values in order of priority are: 1 (background), 0 (best effort), 2 (excellent effort), 3 (critical application), 4 (video), 5 (voice), 6 (internetwork control), 7 (network control). 0 (best effort) is the default.
Save	Click to save the current settings.

7.3.7 LDAP Settings

The LDAP settings page is used to enable/disable the LDAP settings on the selected server management LAN channels. See Figure 55 and Table 16 for available options on this page.

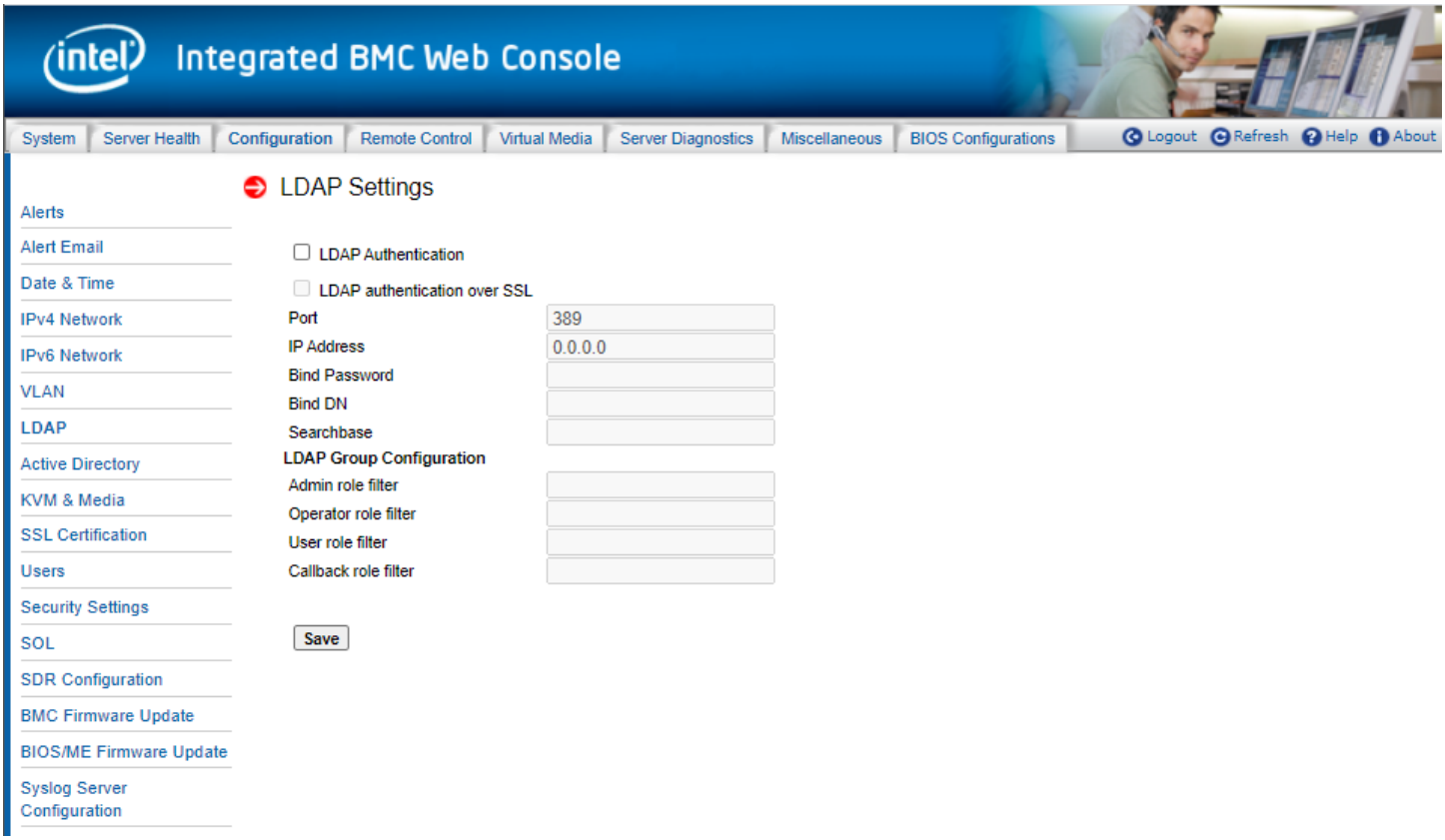

Figure 55. LDAP Settings Page

Table 16. LDAP Settings Options

Option	Task
LDAP Authentication	Check this box to enable LDAP authentication, then enter the required information to access the LDAP server.
LDAP authentication over SSL	Check this box to enable LDAP authentication over SSL.
Port	Specify the LDAP Port.
IP Address	The IP address of LDAP server. • IP Address made of 4 numbers separated by dots as in "xxx.xxx.xxx.xxx". • 'xxx' ranges from 0 to 255. • First 'xxx' must not be 0.
Bind Password	Authentication password for LDAP server; the password must be at least 4 characters long.
Bind DN	The Distinguished Name of the LDAP server, like "cn=Manager, dc=my-domain, dc=com".
Searchbase	The searchbase of the LDAP server, like "dc=my-domain, dc=com".
LDAP Group Configuration	Configure the LDAP search filters associated with BMC network privileges. like "(&(cn=BMCAdminGroup)(memberUid=%s))"
Admin role filter	LDAP query filter for Admin network privilege.
Operator role filter	LDAP query filter for Operator network privilege.
User role filter	LDAP query filter for User network privilege.
Callback role filter	LDAP query filter for callback network privilege.
Save	Click to save the current settings.

7.3.8 Active Directory Settings

The Active Directory Settings page used to config Active Directory Authentication and enable/disable Active Directory Authentication over SSL. See Figure 56 and Table 17 for available options on this page.

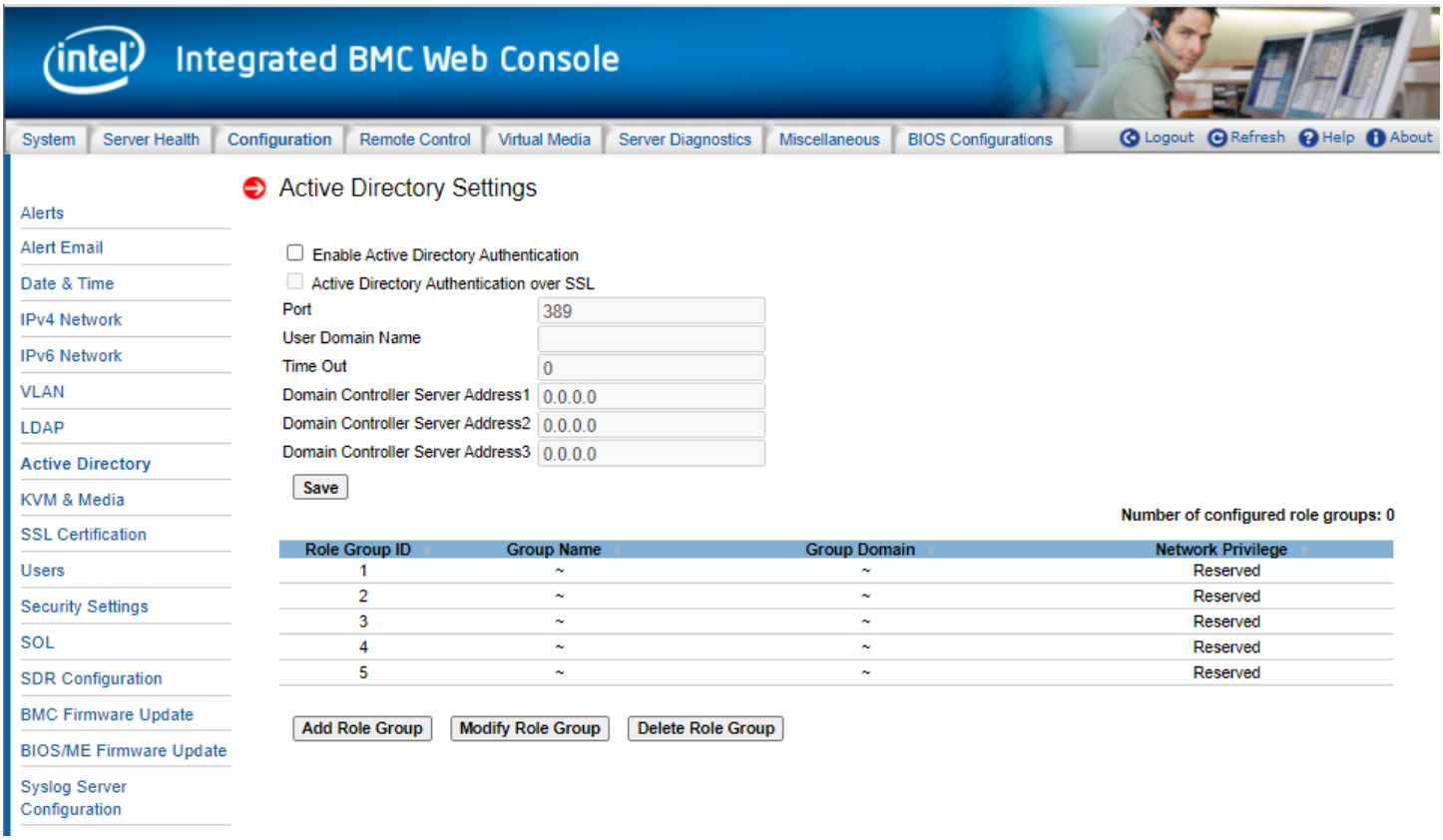

Figure 56. Active Directory Settings Page

Table 17. Active Directory Settings Options

Option	Task
Enable Active Directory Authentication	Click checkbox to enable.
Active Directory Authentication over SSL	Click checkbox to enable.
Port	Port 636 (the default LDAP port with SSL)
User Domain Name	User belongs to which domain in Active Directory server
Time Out	Timeout (sec) after request AD Server for authentication
Domain Controller Server Address1/2/3	IP address of a domain controller server. You can enter up to 3 sets of IP addresses.
Save (Remote Session)	Click to save any changes for Remote Session.
Add Role Group	Select an empty role group (Group Name : "~", Group Domain : "~" and Network Privilege : Reserved).
Modify Role Group	Modify Role Group Name, Domain and select Privilege.
Delete Role Group	Delete role group.
Save (Mouse Mode Setting)	Click to save any changes for Mouse Mode Setting.

7.3.9 KVM & Media

Use this page to enable/disable encryption on KVM or media during a redirection session (Figure 57). Table 18 lists the options for enabling or disabling encryption on KVM or media data and configuring the mouse mode setting during a redirection session.

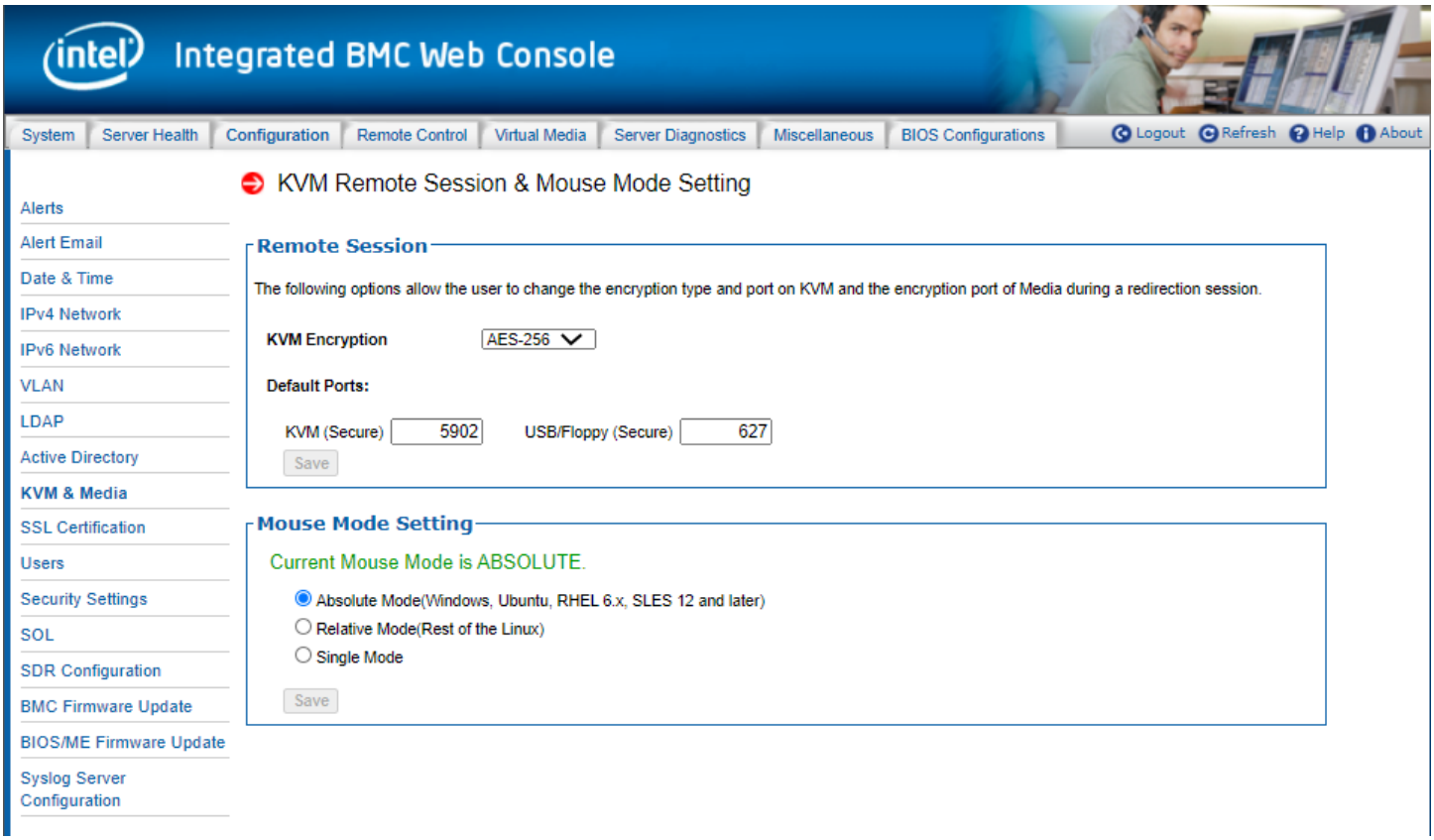

Figure 57. KVM & Media Page

Table 18. KVM & Media Options

Option	Task
KVM Encryption	Enable/disable encryption on KVM data during a redirection session. Choose any one from the supported encryption techniques.
Default Ports	Set the ports used by KVM and remote media (both standard and secure ports). Do not change these values unless knowing for certain that the new ports are unused.
Save (Remote Session)	Click to save any changes for Remote Session.
Mouse Mode Setting	Redirection Console handles mouse emulation from local window to remote screen in one of the following methods: • Absolute Mode - Select to have the absolute position of the local mouse sent to the server. Preferred method where supported. Use this mode for Windows* OS and newer versions of Linux* (Ubuntu*, RHEL, SLES). • Relative Mode - Select Relative Mode to have the calculated relative mouse position displacement sent to the server. Use this mode for older Linux* versions such as Red Hat (RHEL) 5.x. For best results, server and client OS mouse acceleration/threshold settings should match. Alternatively, use the mouse calibration option in JViewer*. • Single Mode - Select Single Mode to have the calculated displacement from the local mouse in the center position, sent to the server. Under this mode Ctrl+6 should be used to switch between Host and client mouse cursor. Use this mode in special situations such as the SLES 11 Linux* operating system installation.
Save (Mouse Mode Setting)	Click to save any changes for Mouse Mode Setting.

7.3.10 SSL Certification

The BMC generates a unique, self-signed SSL certificate when the server is first plugged into AC power. This default certificate is less secure than one signed by a Certificate Authority (CA). Uploading a CA signed certificate is recommended to allow client software to verify the authenticity of the BMC. Use this page to upload an SSL certificate and private key, which allows the device to be accessed in a secured mode. See Figure 58 for details.

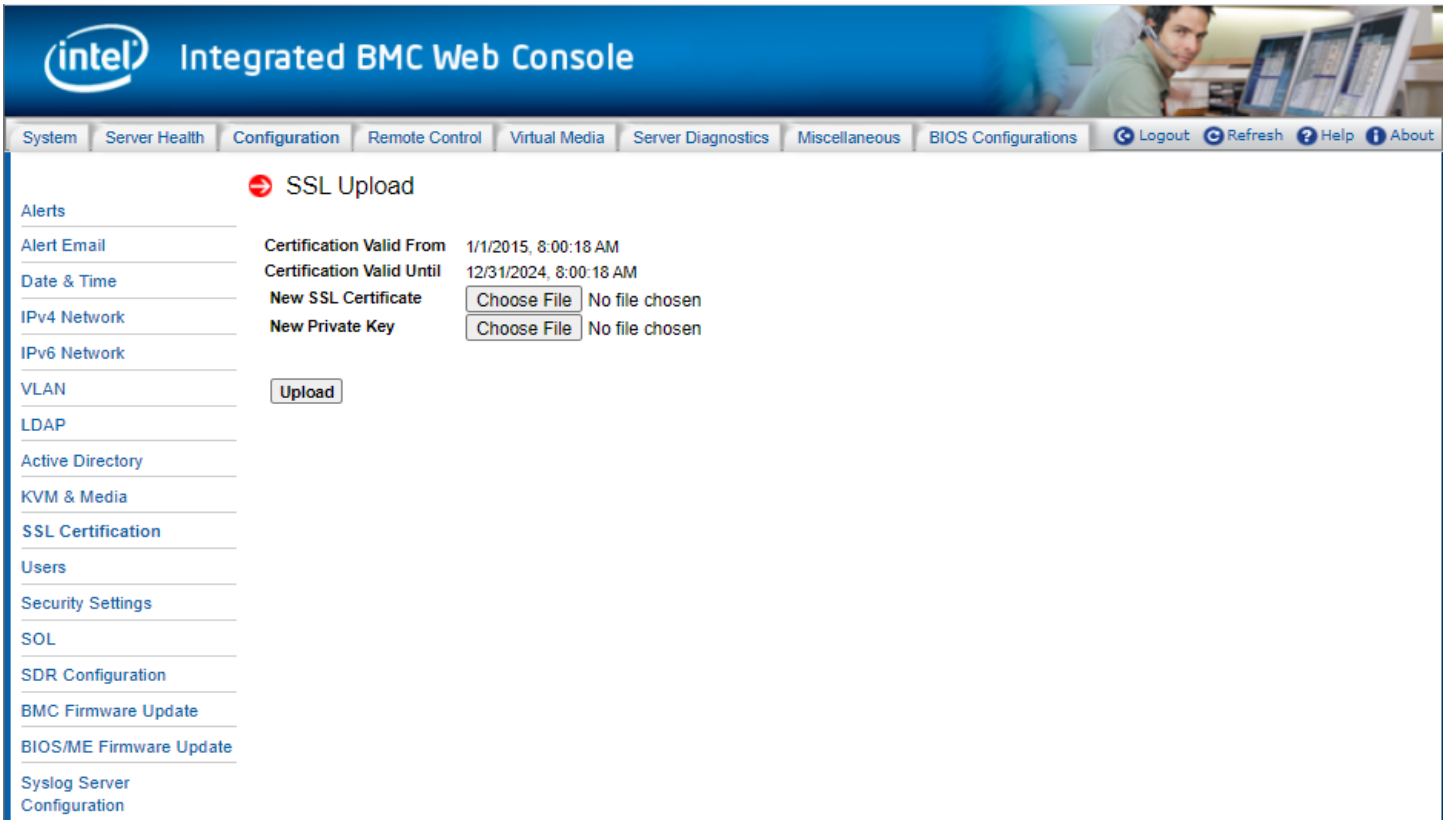

Figure 58. SSL Certification Page

First, upload the SSL certificate. The device will prompt to upload the private key. A notification will be displayed if either of the files is invalid and on successful upload. Click the **Upload** button. On successful upload, the device will prompt to reboot. Click **Ok** to reboot or click **Cancel** to cancel the reboot operation.

7.3.11 Users

The Users page lists the configured users, along with their statuses and network privileges. It also provides the capability to add, modify, and delete users. See Figure 59 for details.

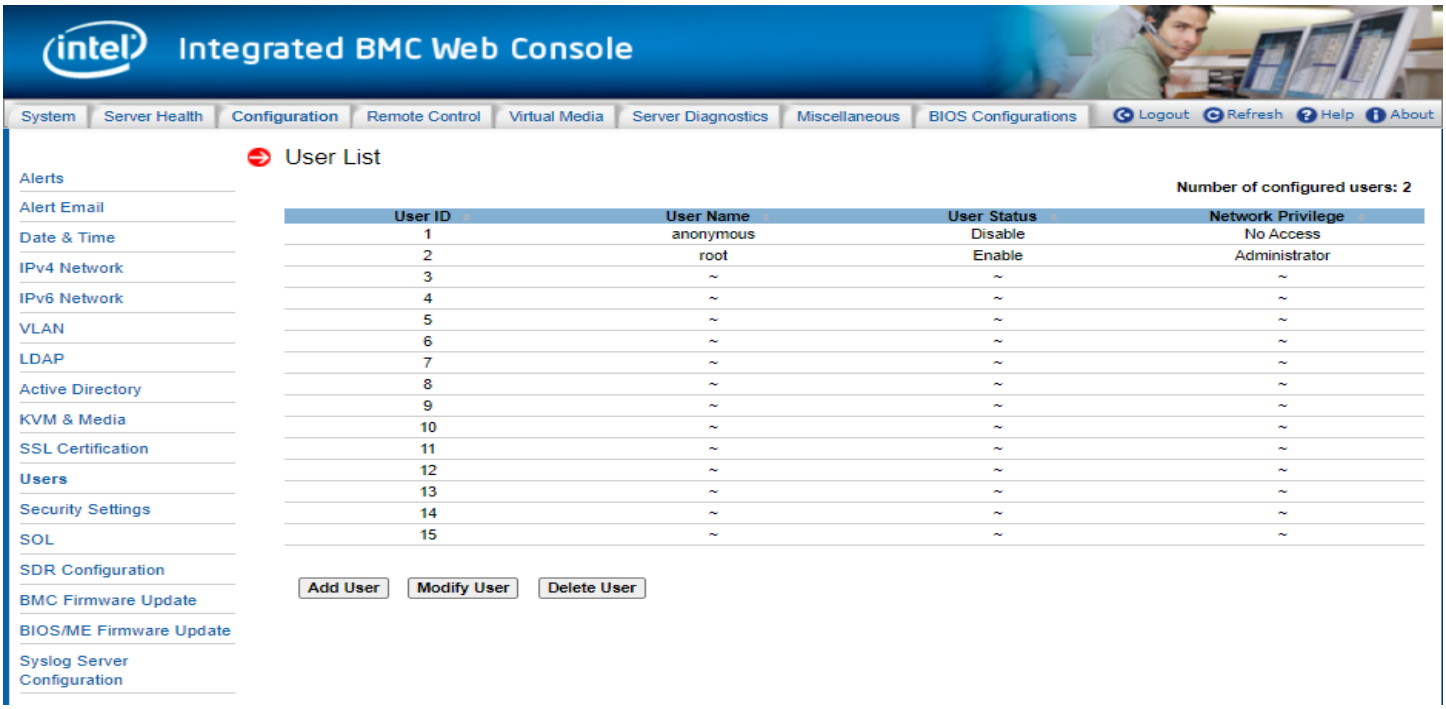

Figure 59. User List Page

This page allows the operator to configure the IPMI users and privileges for this server. UserID 1 (anonymous) may not be renamed or deleted. To add a user, select an empty slot in the list and click the **Add User** button. Set the User Name, Password, and Network Privileges as shown in Figure 60.

Figure 60. Add New User Page

To modify a user, select a user in the list and click the **Modify User** button. Change the User Name, Password, Enable status, and Network Privileges as shown in Figure 61.

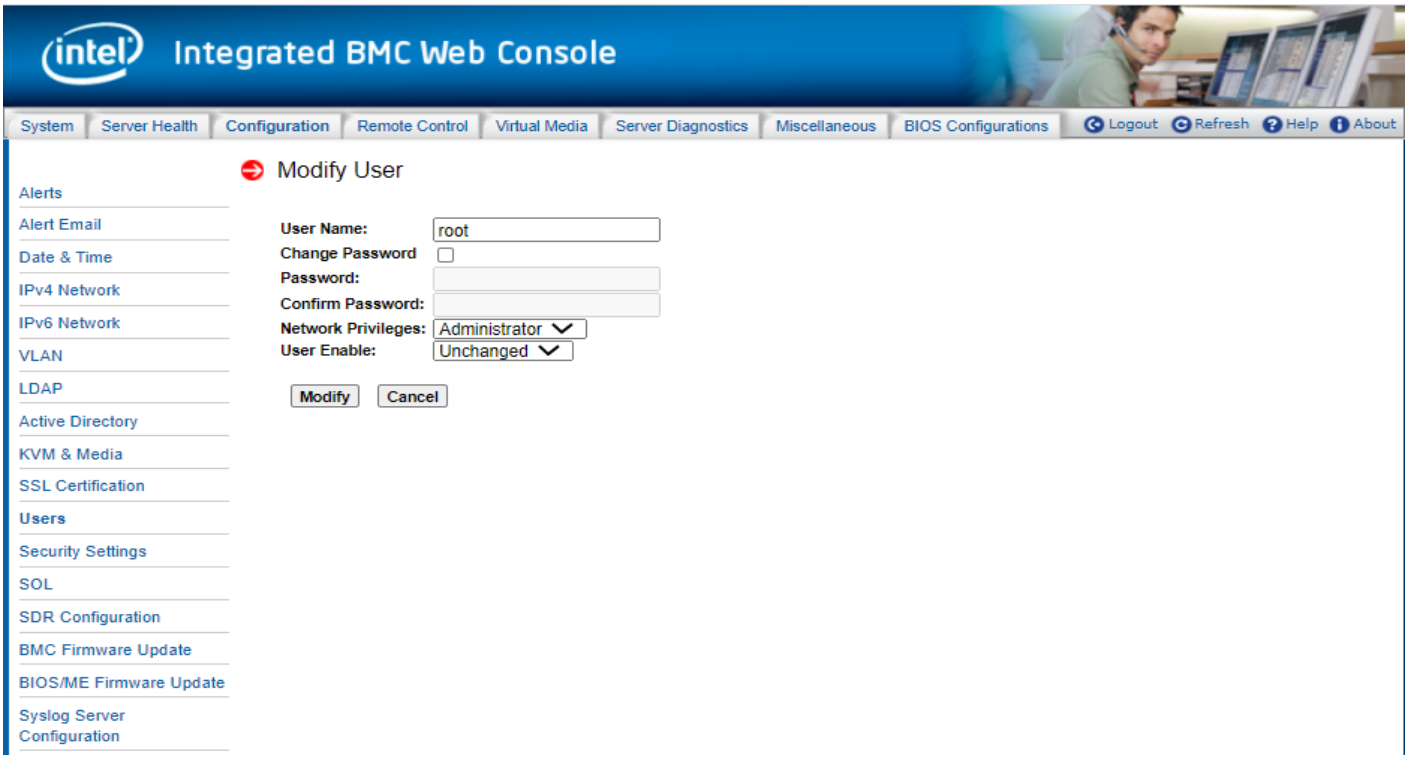

Figure 61. Modify User Page

To delete a user, select the user in the list and click the **Delete User** button (Figure 62).

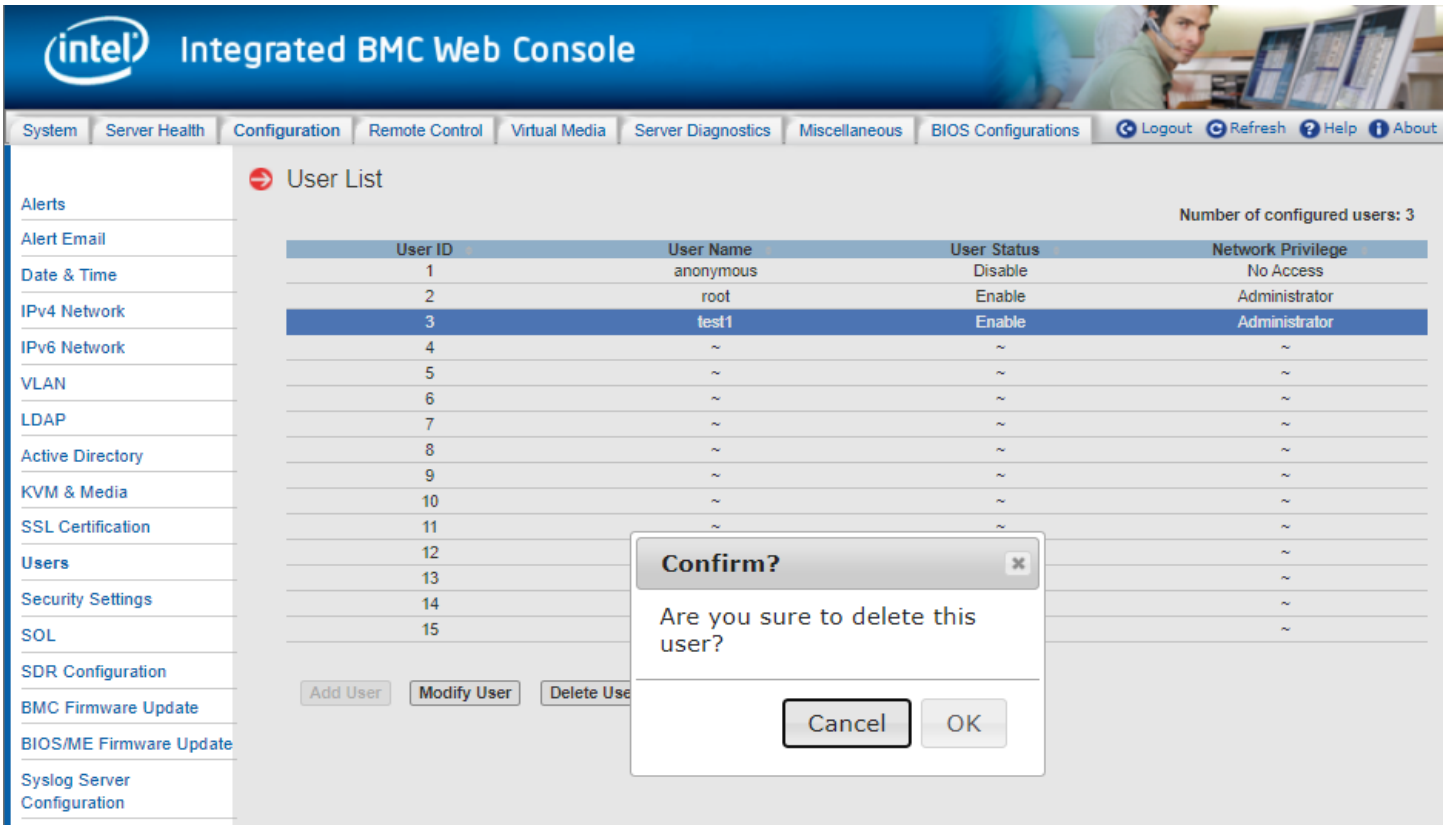

Figure 62. Delete User Page

7.3.12 Security Settings

View and modify the security settings on this page. Configure how many failed login attempts are allowed before a user is locked out and how long the lock-out will last before the user can attempt to log in again. See Figure 63 for details. Table 19 lists the options to modify the security settings.

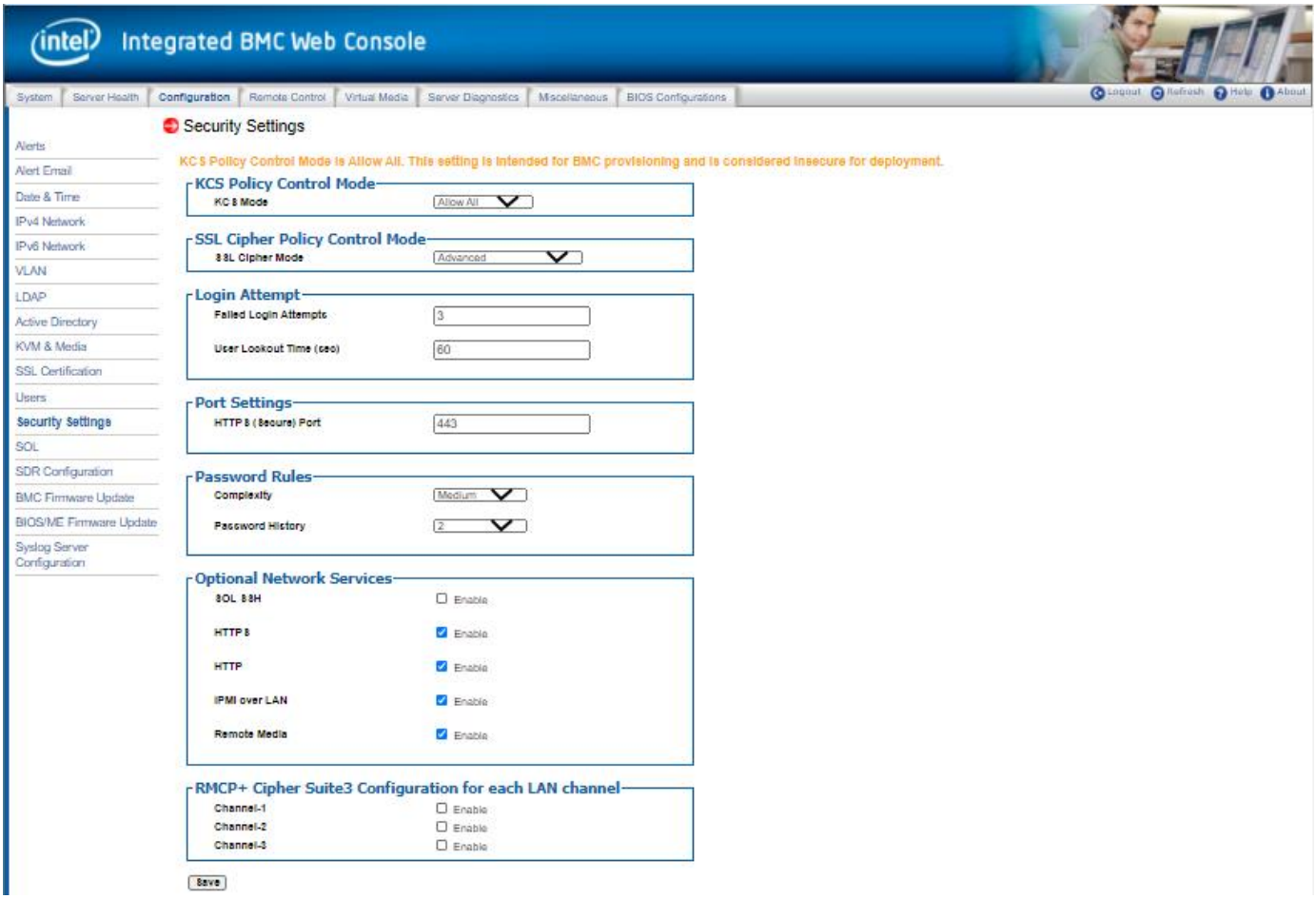

Figure 63. Configuration Security Settings Page

Table 19. Configuration Security Settings Options

Option	Task
KCS Mode	KCS Policy Control Modes allow an authenticated BMC administrative user to control the level of protection from IPMI commands executed over the KCS channels. Within this generation of BMC firmware, 3 different KCS Policy Control Modes are supported: • Allow All – This configuration setting is intended for normal IPMI compliant communications between the Host OS and the BMC. This mode should be used when provisioning the BMC configuration for deployment. • Deny All – This configuration setting disables the IPMI KCS command interfaces between the Host OS and the BMC. This is a configuration that does not comply with IPMI and will impact the operation of the Server Management Software running on the Host OS. This mode only applies to the IPMI commands over the KCS interfaces and does not apply to the authenticated network interfaces to the BMC. • Restricted – This configuration setting enables the use of an Access Control List by the BMC firmware that allows applications executing on the host OS to have access to a limited set of IPMI commands using the KCS interfaces. This is a configuration that does not comply with IPMI and may impact the operation of the Server Management Software running on the Host OS. This mode only applies to the IPMI commands over the KCS interfaces and does not apply to the authenticated network interfaces to the BMC.

Option	Task
SSL Cipher Mode	There are 4 Cipher modes provided for different scenarios: • Advanced - wide browser compatibility, like to most newer browser versions. • Board Compatibility - check the compatibility to other protocols before using it, like IMAPS. • Widest Compatibility - compatibility to most legacy browsers, legacy libraries (still patched), and other application protocols besides HTTPS, like IMAPS. • Legacy - widest compatibility to real old browsers and legacy libraries and other application protocols like SMTP.
Failed Login Attempts	Input the allowed number of Failed Login Attempts. This is the number of failed login attempts a user is allowed before being locked out. Zero means no lockout. Failed Login Attempts should be 0–255. Default is 3 attempts.
User Lockout Time(Sec)	Set the time in seconds that the user is locked out before being allowed to log in again. Zero means User Lockout Time is disabled. If a user was automatically disabled due to the Bad Password threshold, the user will remain disabled until re-enabled via the Set User Access command. User Lockout Time should be 0–65535. Default is 60sec.
HTTPS(Secure) Port	Set the port used for HTTPS (default: 443) web sessions. Changing this setting will immediately terminate all current web sessions.
Complexity	Set Complexity Password level, Medium/High/Low, or Disable Complexity Password feature.
Password History	The feature of password history is to avoid setting a password that is duplicate with one we used earlier for security consideration.
SOL SSH	Enable/disable the SOL SSH service.
HTTPS	Enable/disable the HTTPS service.
HTTP	Enable/disable the HTTP service.
IPMI Over LAN	Enable/disable the RMCP/RMCP+ service.
Remote Media	Enable/Disable the Virtual Media service.
Channel-1	Enable/Disable Cipher Suite3 Configuration for LAN Channel-1.
Channel-2	Enable/Disable Cipher Suite3 Configuration for LAN Channel-2.
Channel-3	Enable/Disable Cipher Suite3 Configuration for LAN Channel-3.
Save	Click to save any changes.

Note: Due to weaknesses in the security of most of the defined cipher suites, they are disabled by default. Only cipher suites 3 and 17 use algorithms that have not been proven to be cryptographically insecure and are enabled by default.

7.3.12.1 EWS access under KCS Restricted/Deny All Mode

Most of EWS content access is allowed across all KCS modes, except for below EWS Page/Options, which are limited to conditional access when KCS mode is set to Restricted Mode/Deny All Mode.

KCS Policy Control Mode – Deny All

This configuration setting disables the IPMI KCS command interfaces between the Host OS and the BMC. This is a non-compliant IPMI configuration that will impact the operation of the Server Management Software running on the Host OS. This only applies to the IPMI commands over the KCS interfaces and does not apply to the authenticated network interfaces to the BMC.

KCS Policy Control Mode – Restricted

This configuration setting enables the use of an Access Control List by the BMC firmware that allows applications executing on the host OS to have access to a limited set of IPMI commands using the KCS interfaces. This is a non-compliant IPMI configuration that may impact the operation of the Server Management Software running on the Host OS.

- Server Power Control Page: Power On Server/**Force-enter BIOS Setup** option will be gray out when KCS = Deny All
- Server Power Control Page: Reset Server/**Force-enter BIOS Setup** option will be gray out when KCS = Deny All

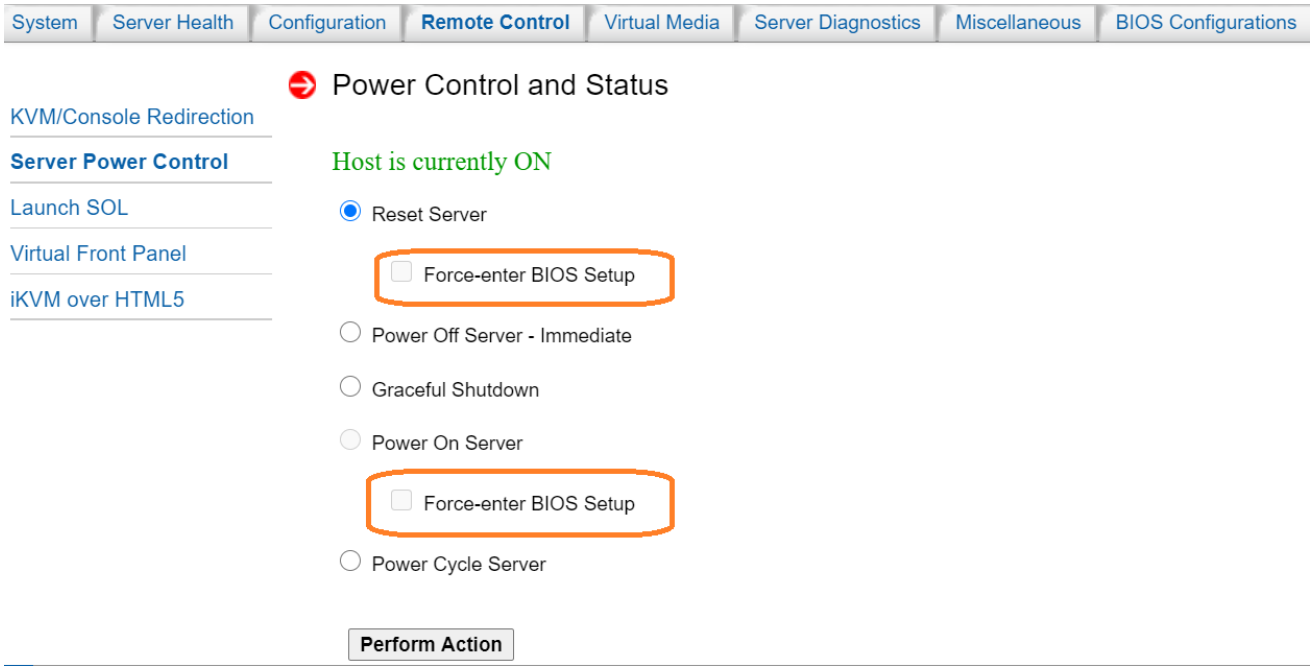

Figure 64. Server Power Control Page

- "BIOS/ME Firmware Update" Page will be gray out when KCS = Deny All.

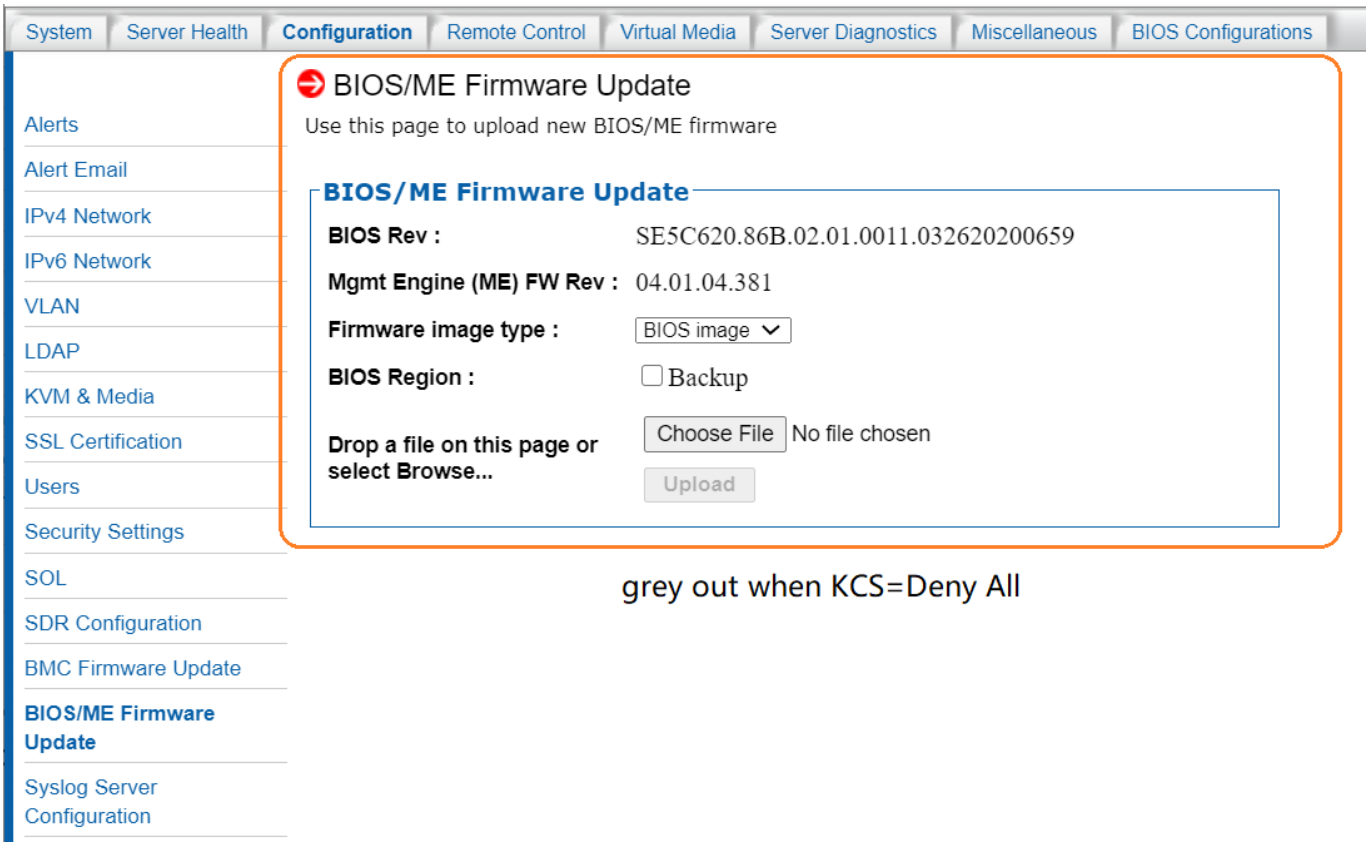

Figure 65. BIOS/ME Firmware Update Page

- "BIOS Configuration" will be unavailable when KCS = Restrict or Deny All mode.

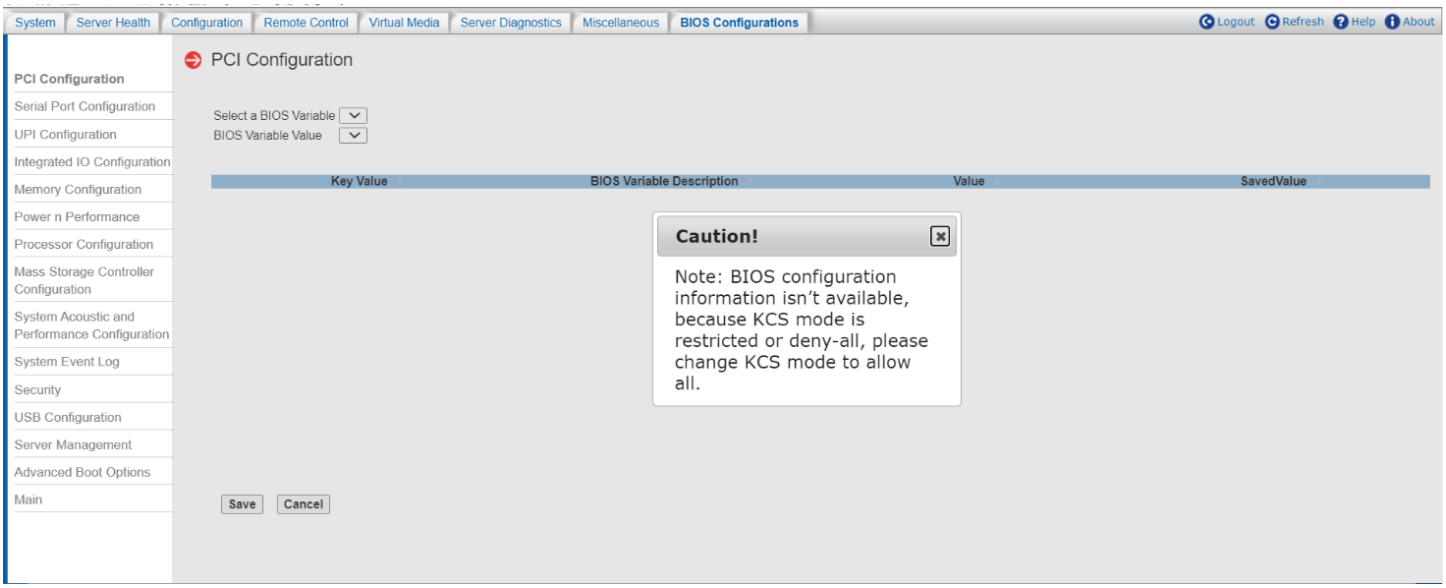

Figure 66. BIOS Configuration Page

- "CPU information" and "DIMM information" Pages will display contents captured on last DC when KCS = Restricted or Deny All mode.

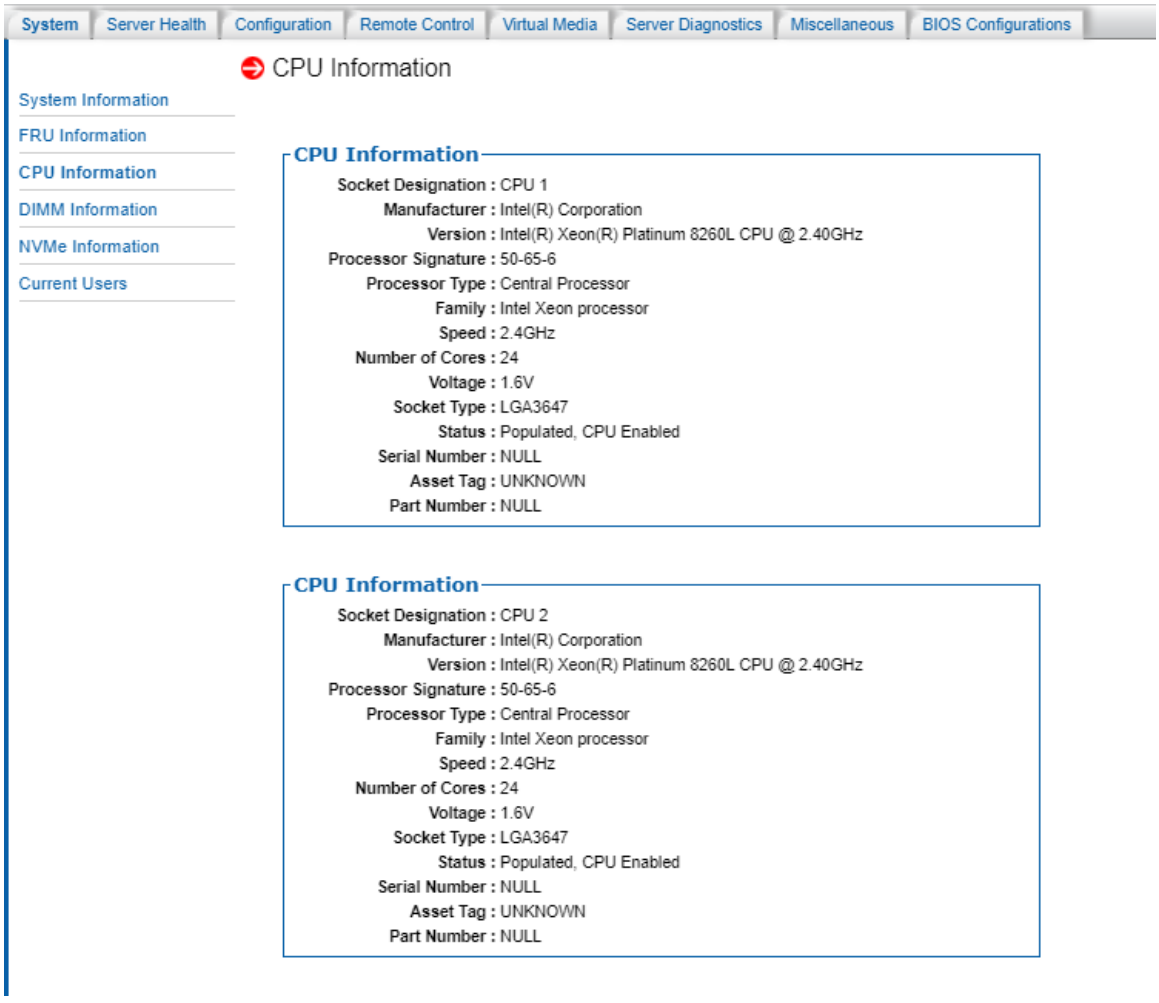

Figure 67. CPU Information Page

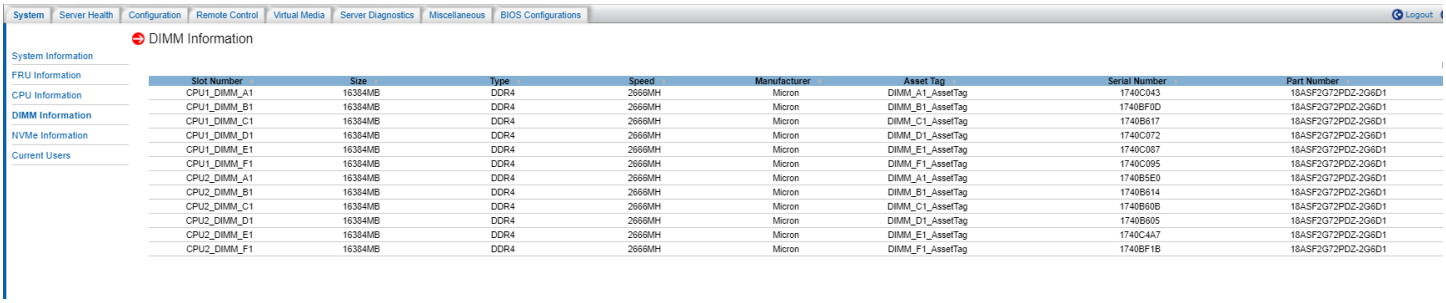

Figure 68. DIMM Information Page

7.3.13 SOL

Use this page to enable or disable SOL for each LAN channel (Figure 69). Table 20 lists the options to modify SOL settings.

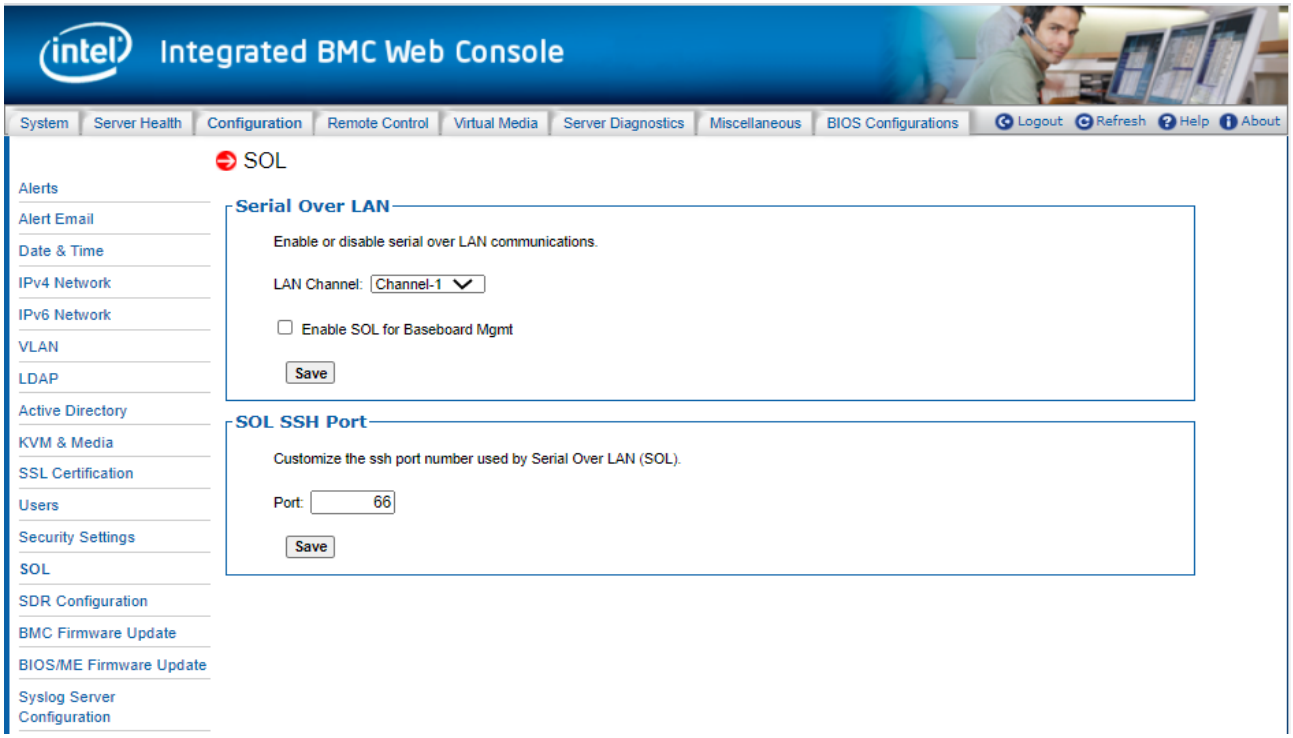

Figure 69. SOL Page

Table 20. SOL Options

Option	Task
LAN Channel	Select the channel on which the user wants to configure the network settings. Lists the LAN Channels available for SOL. The LAN channel describes the physical NIC connection on the server. • Intel® RMM (BMC LAN Channel 3) is the add-in RMM4 NIC. • Baseboard Mgmt (BMC LAN Channel 1) is the onboard, shared NIC configured for management and shared with the operating system. • Baseboard Mgmt 2 (BMC LAN Channel 2) is the second onboard, shared NIC configured for management and shared with the operating system.
Enable SOL for Baseboard Mgmt	Enable or disable Serial-over-LAN for baseboard management controller.
Save (serial-over-LAN)	Click to save any changes for Serial-over-LAN Setting.
Port	Change the SSH port number used by Serial-over-LAN (SOL).
Save (SOL SSH Port)	Click to save any changes for SOL SSH Port Setting.

7.3.14 SDR Configuration

Use this page to upload and parse sensor data repository records and configuration files, which allows updating the FRUSDR package (Figure 70). Table 21 lists the options available on this page.

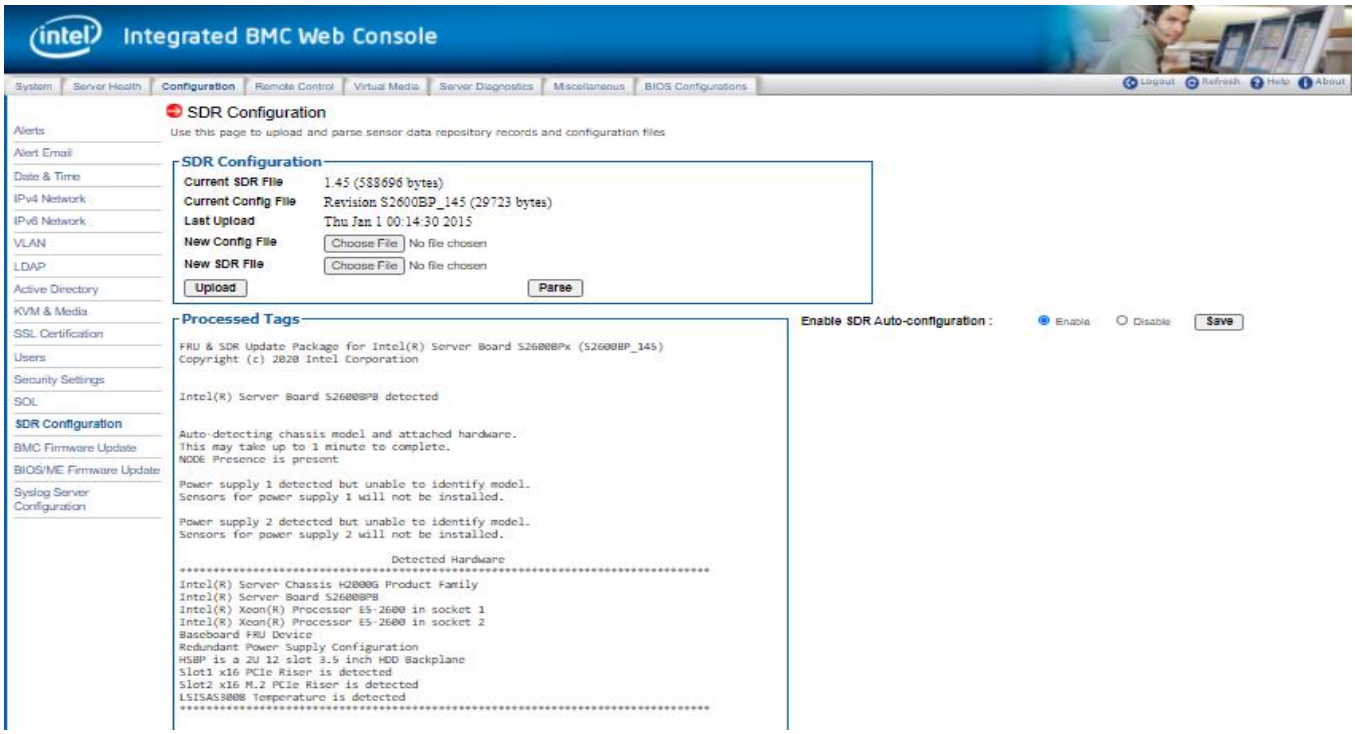

Figure 70. SDR Configuration Page

Table 21. SDR Configuration Options

Option	Task
Current SDR file	Information about the current SDR file is shown here. Version information is only available after a parse has been successfully completed.
Current Config File	Information about the current configuration file is shown here. Version information is only available after a parse has been successfully completed.
Last Upload	The date and time of the last FRUSDR update.
New Config File	Specify new configuration file to upload.
New SDR File	Specify new SDR file to upload.
Upload	Choose a new sensor data record file and configuration file and click "Upload". Uploading large files may take some time, depending on the user's network connection speed.
Parse	Scan and reload SDRs within the BMC. This will cause the BMC to re-arm sensors and may result in duplicate events in the system event log.
Processed Tags	This area shows tags processed on the last successful parse operation. If the parse failed, this area would display the error message.
Enable SDR Auto-configuration	Administrators or operators may enable or disable this feature by clicking the appropriate Enable/Disable radio button and clicking "Save." This section will only be visible to administrators or operators.
Save	Click to save any changes.

7.3.15 BMC Firmware Update

Use this page to upload new images for online-update of BMC firmware (Figure 71). Table 22 lists the options available in this page.

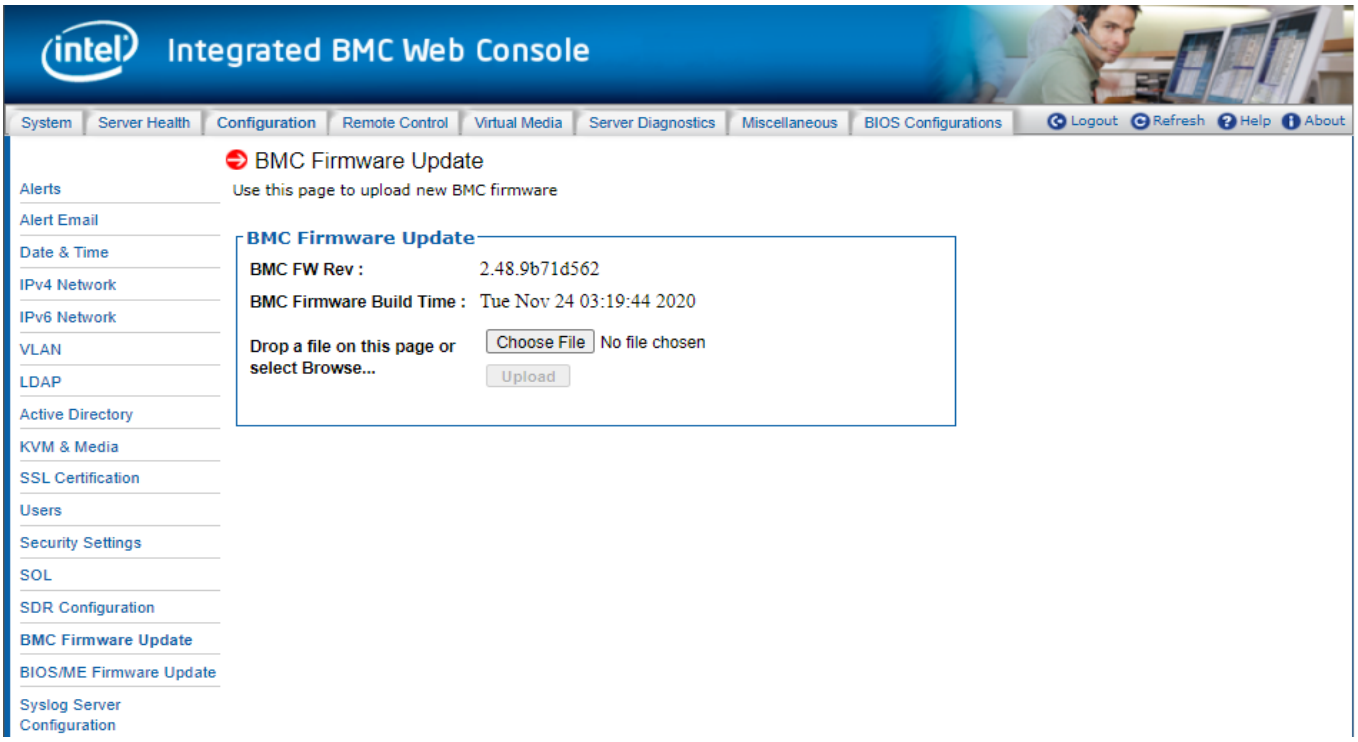

Figure 71. BMC Firmware Update Page

Table 22. BMC Firmware Update Options

Option	Task
BMC FW Rev	Displays the current firmware version.
BMC Firmware Build Time	Displays the firmware build time
Drop a file on this page or select Browse...	The option to select and upload or drop a new firmware image on the page.
Upload	Begin the firmware update process, which will take a couple of minutes. When finished the BMC reboots to run the new firmware. Progress is reported up until the time of reboot, after which it takes about one minute for the embedded web server to start responding again. As all web sessions are terminated on a BMC reboot, log in again to verify that the firmware update was successful.

7.3.16 BIOS/ME Firmware Update

Use the BIOS/ME Firmware update page shown in Figure 72 to upload and update new BIOS/ME firmware. The image version information is available for viewing, as well as the option to select, upload, or drag and drop a new firmware image. By dropping a new image on the page or selecting the **Upload** button, the web service takes a few minutes and begins its firmware update process. Once finished, it stores the image inside the BMC. When performing the update server reboot (DC cycle), the BIOS mounts the image as both the USB virtual media and the image. See Table 23 for all options available on this page.

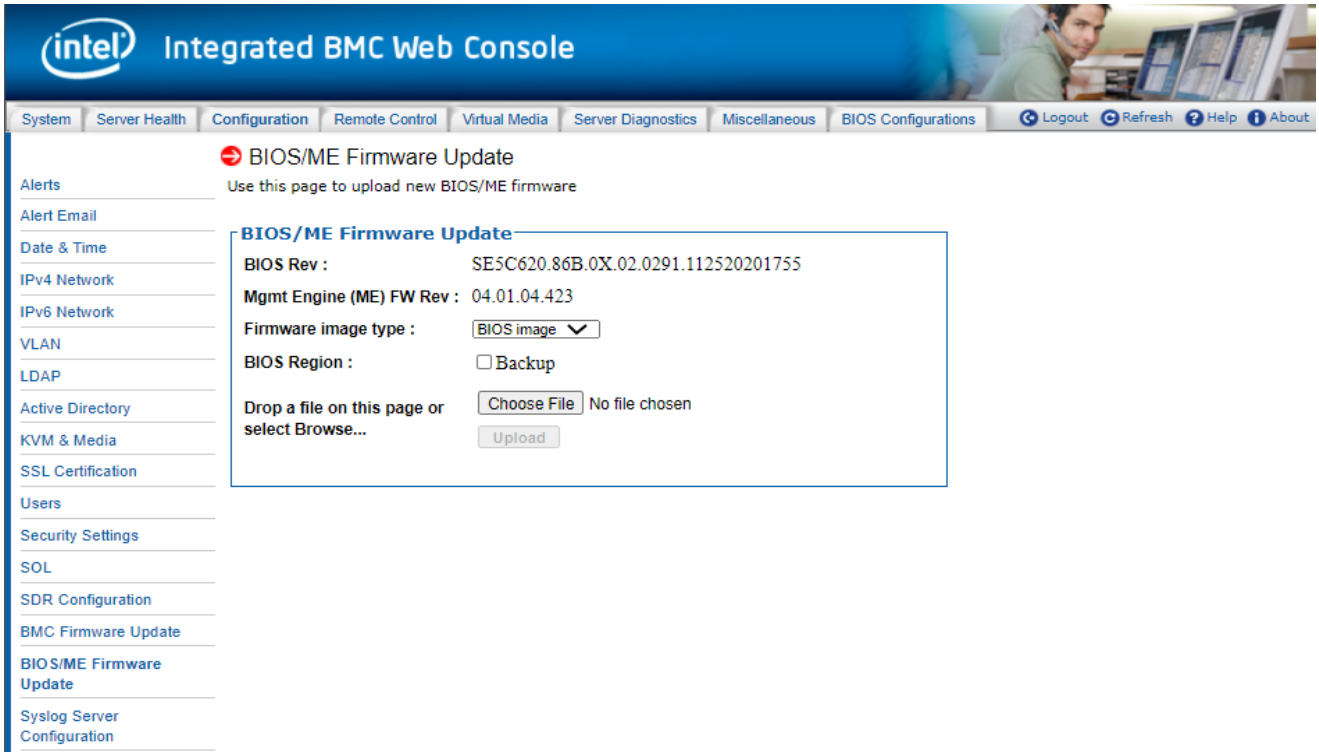

Figure 72. Configuration BIOS/ME Firmware Update Page

Table 23. Configuration BIOS/ME Firmware Update Options

Option	Task
BIOS Rev	Displays the current BIOS version.
Mgmt Engine (ME) FW Rev	Displays the current ME firmware version.
Firmware image type	Select the image type for BIOS/ME firmware update. • BIOS image: OOB update BIOS. • ME image: OOB update ME firmware. • FD image: OOB update flash descriptor.
BIOS Region	When user chooses the image type "BIOS", the Backup region option will appear. When the option is enabled, the Backup region of current BIOS will be updated together.
Drop a file on this page or select Browse...	The option to select and upload or drop a new firmware image on the page.
Upload	Upload the firmware image file.

7.3.17 Syslog Server Configuration

Use the Syslog Server Configuration page to enable the Remote Syslog service or to configure the IP of the Syslog Server. This page allows the logging of any login to the BMC or any configurations to be logged to the Syslog server. See Table 24 for all options available on this page.

Before using the syslog service in the server, it must be configured with the following steps:

1. Open the configuration file by vim /etc/rsyslog.conf
2. Open Modload imudp/UDPServeRun 514/ModLoad imtcp/InputTCPServerRun 514
3. Service syslog restart
4. Set syslog server from EWS--> Configuration--> Syslog Server Configuration
5. Cat /var/log/messages to see log

Figure 73. Syslog Server Configuration Page

Table 24. Syslog Server Configuration Options

Option	Task
Enable Remote Syslog	To enable/disable Remote Syslog, check or uncheck the "Enable Remote Syslog"
Syslog Server Port	The port number of remote Syslog Server is 514
Current Syslog Server IP	Display the current IP address of Syslog Server
New Syslog Server IP	Input the new Syslog Server IP address
Save button	Save the current settings

7.4 Remote Control Tab

The Remote Control tab is used to launch the remote console KVM redirection window, initialize power control, launch SOL, and access the virtual front panel.

7.4.1 KVM/Console Redirection

Use this page to launch the remote console KVM redirection window. This requires a Remote Management Module add-in card to be installed in the remote system; otherwise, the launch button is grayed-out. Clicking **Launch Console** prompts to download a `launch.jnlp` file. When the file is downloaded and launched, the Java redirection window is displayed. Figure 74 shows the details.

Note: Java Runtime Environment* (JRE* Version 6 Update 22 or higher) must be installed on the client before launch of the JNLP file.

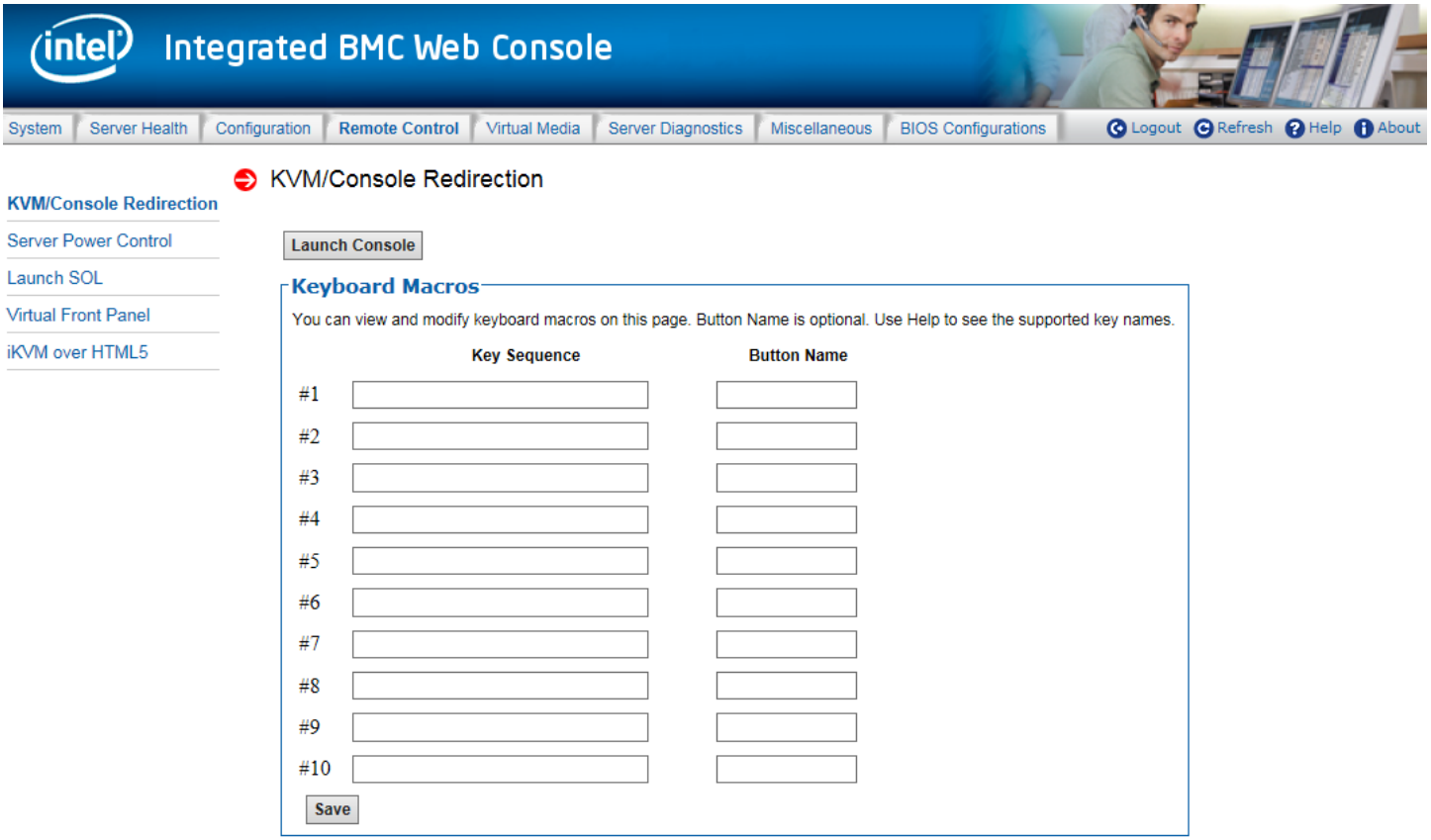

Figure 74. Remote Control KVM Page

Keyboard macros can be configured on this page that appear in the macro menu of the KVM Remote Console application window. Each button is assigned a sequence of keys to execute when the button is clicked.

Each button can optionally be given a short mnemonic name. If this field is blank, the key sequence itself is used as the button label.

Click **Save** to save the changes. If a Remote Console session is open at that time, the changes do not take effect until that session is closed and a new session is opened.

7.4.1.1 Key Sequences

A key sequence is a set of one or more key names separated by a '+' or '-'.

A '+' (plus sign) indicates keep the previous keys pressed while holding down the next key, whereas a '-' (minus sign) indicates release all previous keys first before pressing the next key. A '*' (asterisk) inserts a one second pause in the key sequence.

Key names are either a printable character such as "a", "5", "@", etc. or one of the non-printable keys in the table below. Names in parentheses are aliases for the same key. Numeric keypad keys are prefixed with "NP_". A plain '*' indicates a pause. Use '*' for the actual '*' key. The '\' key must also be escaped as '\\'.

Note: The key sequences are sent to the target as scan codes that get interpreted by the target OS, so they will be affected by modifiers such as Num Lock as well as the target OS keyboard language setting.

Table 25. Macro Non-Printable Key Names

Shift (LShift)	RShift	Ctrl (LCtrl)	RCtrl
Alt (LAlt)	RAlt (AltGr)	Win (LWin)	RWin
Enter	Esc	F1 - F12	
Bksp	Tab	CapsLk	Space
Ins	Del	Home	End
PgUp	PgDn	Context (Menu)	
Up	Left	Down	Right
NumLk	NP_Div	NP_Mult	NP_Minus
NP_Plus	NP_0 - NP_9	NP_Dec	NP_Enter
PrtSc (SysRq)	ScrLk	Pause (Break)	

7.4.2 Server Power Control

The Server Power Control page shows the power status and allows power/reset control of the server Figure 75. Table 26 lists the power control operations that can be performed.

Figure 75. Remote Control Server Power Control Page

Table 26. Remote Control Power Control Options

Option	Task
Reset Server	Hard reset the host without powering off.
Power OFF Server - Immediate	Immediately power off the host.
Graceful Shutdown	Soft power off the host. For the Graceful Shutdown option to function properly the OS must be ACPI aware and be configured to shut down without operator intervention. After a graceful shutdown has been requested, if the system does not shut down as requested, the command cannot be executed again for five minutes.
Power ON Server	Power on the host.
Power Cycle Server	Immediately power off the host and power it back on after one second.
Force-enter BIOS Setup	Enter BIOS setup after powering on the server.
Perform Action	Execute the selected remote power command.

Note: All power control actions are done through the BMC and are immediate actions. It is suggested to gracefully shut down the operating system using the KVM interface or other interface before initiating power actions.

7.4.3 Launch SOL

The Launch SOL page allows launching the SOL console to manage the server remotely. Click **Launch SOL** to download a `launch.jnlp` file. When the file is downloaded and launched, the Java SOL window is displayed. See Figure 78 or Figure 77 details.

Figure 76. Remote Control Launch SOL Page

Starting the SOL console opens an additional window as shown in Figure 78. It displays the screen content of the remote server. The SOL console behaves as if the user were connected to a serial terminal on the remote server. The responsiveness may be slightly delayed depending on the bandwidth and latency of the network between Integrated BMC Web Console and remote console.

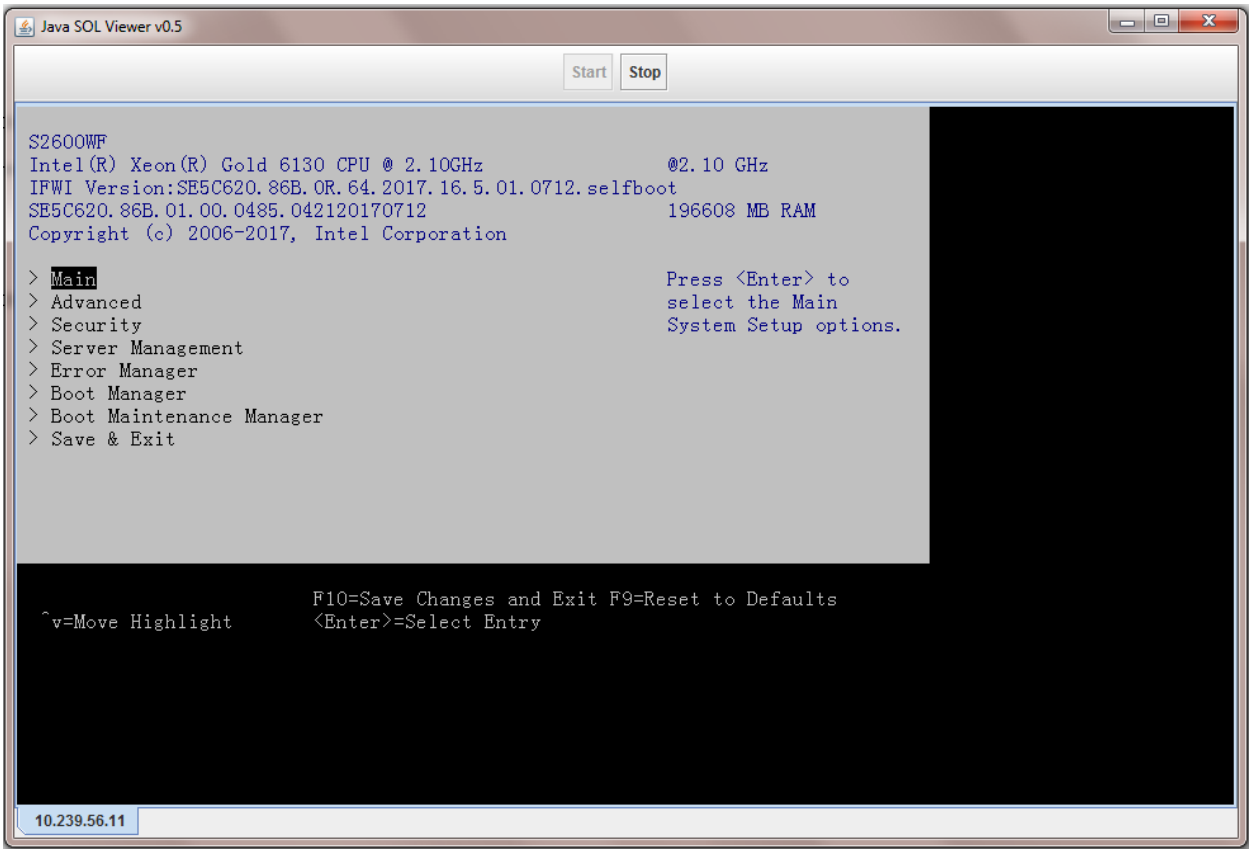

Figure 77. Remote Control Launch SOL Screen Page

Note: Make sure to enable SOL for baseboard management control from **Configuration > SOL** before launching SOL.

7.4.4 Virtual Front Panel

The Virtual Front Panel page provides virtual access to the front panel functionality just like the systems front panel (Figure 78). Table 27 lists the power control operations that can be performed.

Figure 78. Remote Control Virtual Front Panel Page

Table 27. Remote Control Virtual Front Panel Options

Option	Task
Power	Power on or power off.
Reset	Reset the server while system is ON.
Chassis ID	When the **Chassis ID** button is pressed, the chassis ID LED changes to solid on. If the button is pressed again, the chassis ID LED turns off.
Power LED	The power LED shows the system power status. If the Power LED is green, the system is ON. If the Power LED is gray, the system is OFF.
Status LED	The status LED reflects the system status LED status and it is automatically in sync with the BMC every 60 seconds. This reflects the System Status LED.
Chassis ID LED	The Chassis ID LED shows the current system chassis ID status. If the Chassis ID LED is blue, the Chassis ID is ON. If the Chassis ID LED is gray, the Chassis ID is OFF.

7.4.5 iKVM over HTML5

Launch the remote iKVM over HLTM5 redirection window from this page, accessing the two menus listed within: **Keyboard** and **Power Control.**

There are two sub-menus within the **Keyboard** menu:

- **Virtual Keyboard:** Click the submenu **Virtual Keyboard** within the **Keyboard** menu to display a soft keyboard, shown in Figure 81.
- **Keyboard Macro:** Click the submenu **Keyboard Macro** within the **Keyboard** menu to open the keyboard macro menu, shown in Figure 82.

There are four sub-menus within the **Power Control** menu (shown in menu shown in Figure 83):

- **Power On**: Click the **Power On** menu to start the system.
- **Power Off**: Click the **Power Off** menu to turn the system off.
- **Software Shutdown:** Click the **Software Shutdown** menu to gracefully shut down the system.
- **Power Reset:** Click the **Power Reset** menu to reset the system.

Note: A Remote Management Module add-in card is required in the remote system, otherwise the launch button is grayed-out. See Figure 79 or Figure 80 for more details.

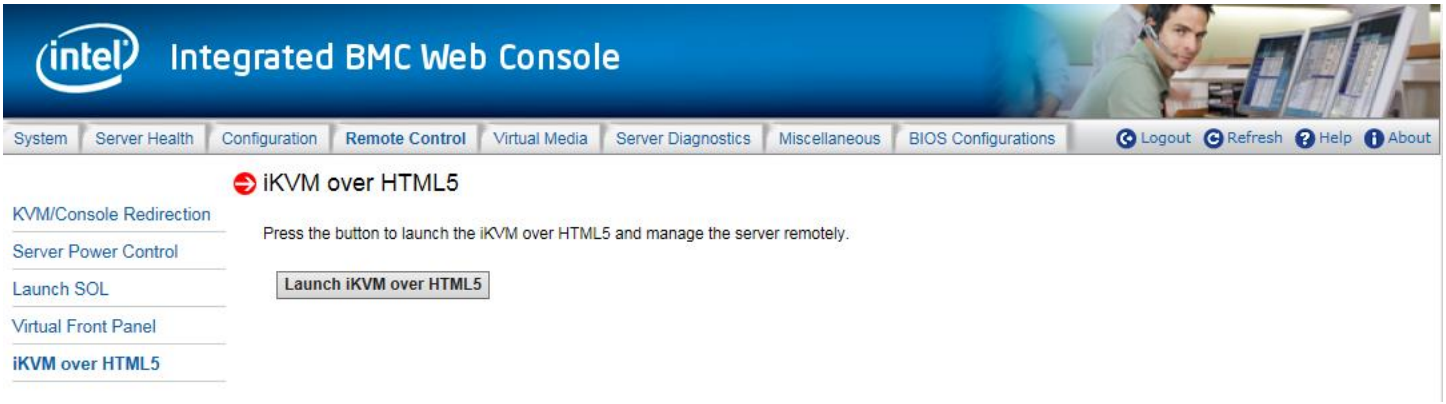

Figure 79. iKVM over HTML5 Page

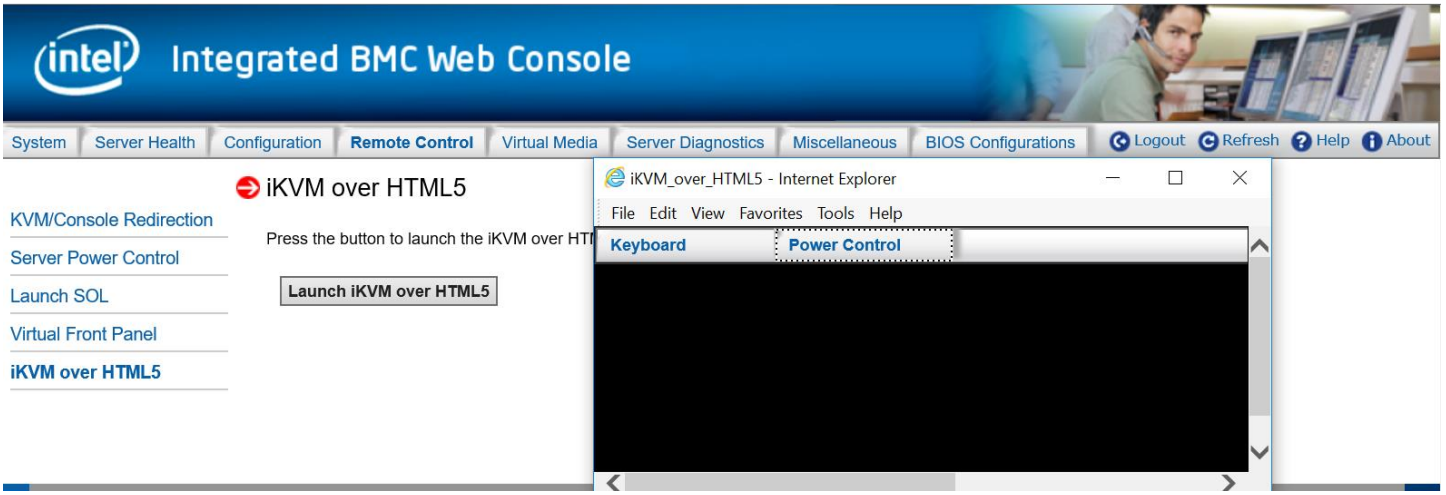

Figure 80. HTML5 Screen Page

Figure 81. HTML5 Virtual Keyboard Page

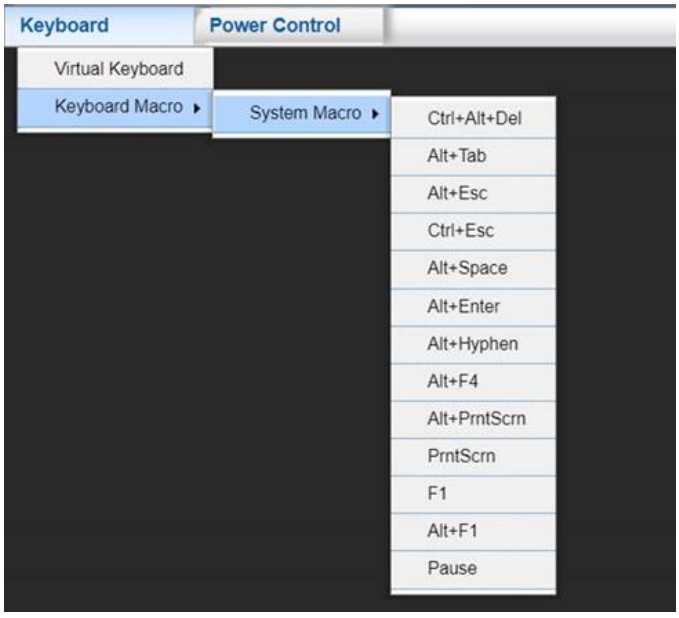

Figure 82. HTML5 Keyboard Macro Menu Page

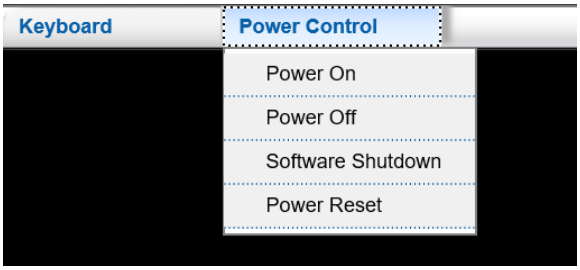

Figure 83. HTML5 Power Control Menu page

7.5 Virtual Media Tab

7.5.1 Virtual Media over HTML5

The Virtual Media tab allows the user to mount a remote drive image file (.img/ima or .iso) as a remote device to the server, and it is similar to Media Redirection.

Virtual Media over HTML5 also provides an HTML5 webpage to mount a folder as a remote device to the server. The filesystem of the remote device is UDF.

Once Virtual Media over HTML5 mounted a remote driver image file, the remote device appears just like a local device to the server, allowing system administrators to install software (including operating systems), copy files, update BIOS, and so on, or boot the server from this device. See Figure 84 for more details.

To open the operation window, click **Launch Virtual Media** over HTML5 as shown in Figure 85. To upload files to the BMC over HTML5, select file type, click the **Select Media** button then click **Plug in** button as shown in Figure 86. Up to three devices may be mounted simultaneously. Table 28 lists the options available in this page.

Note: A Remote Management Module add-in card is required in the remote system, otherwise the Launch Virtual Media over HTML5 button is grayed-out.

Figure 84. Virtual Media over HTML5 Page

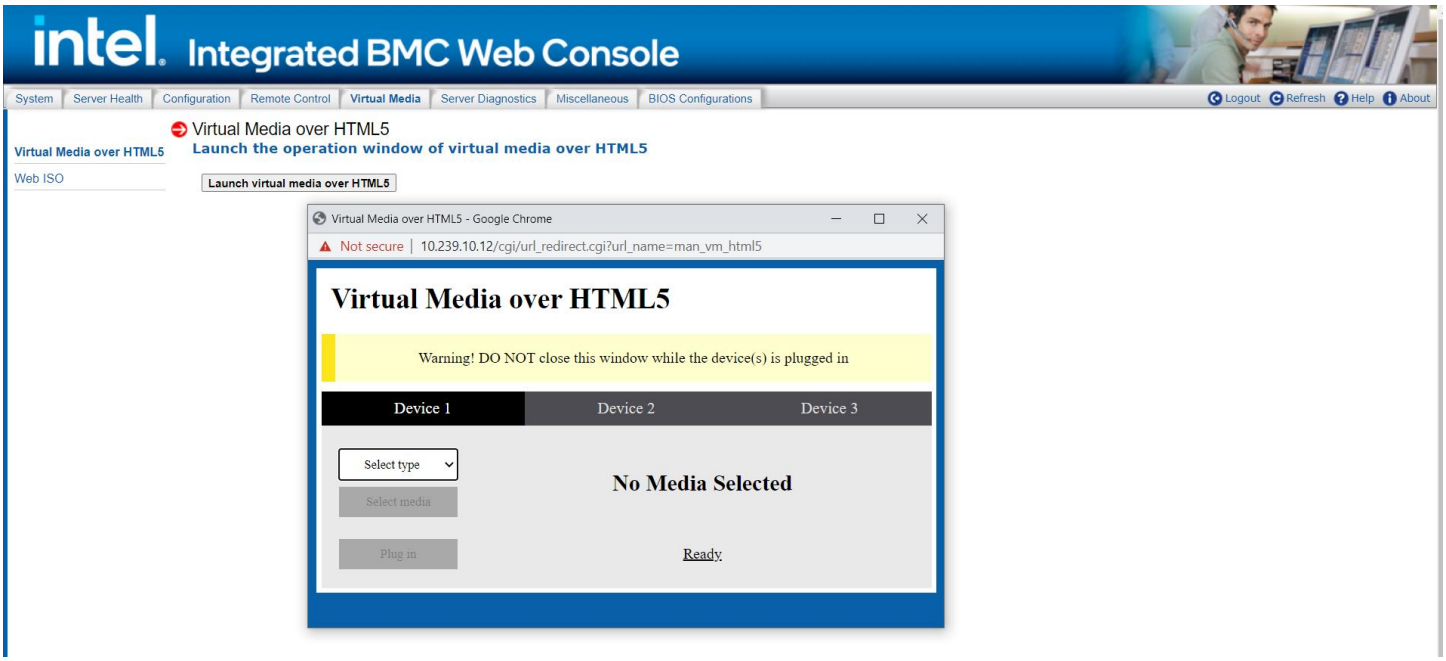

Figure 85. Launch Virtual Media over HTML5 Page

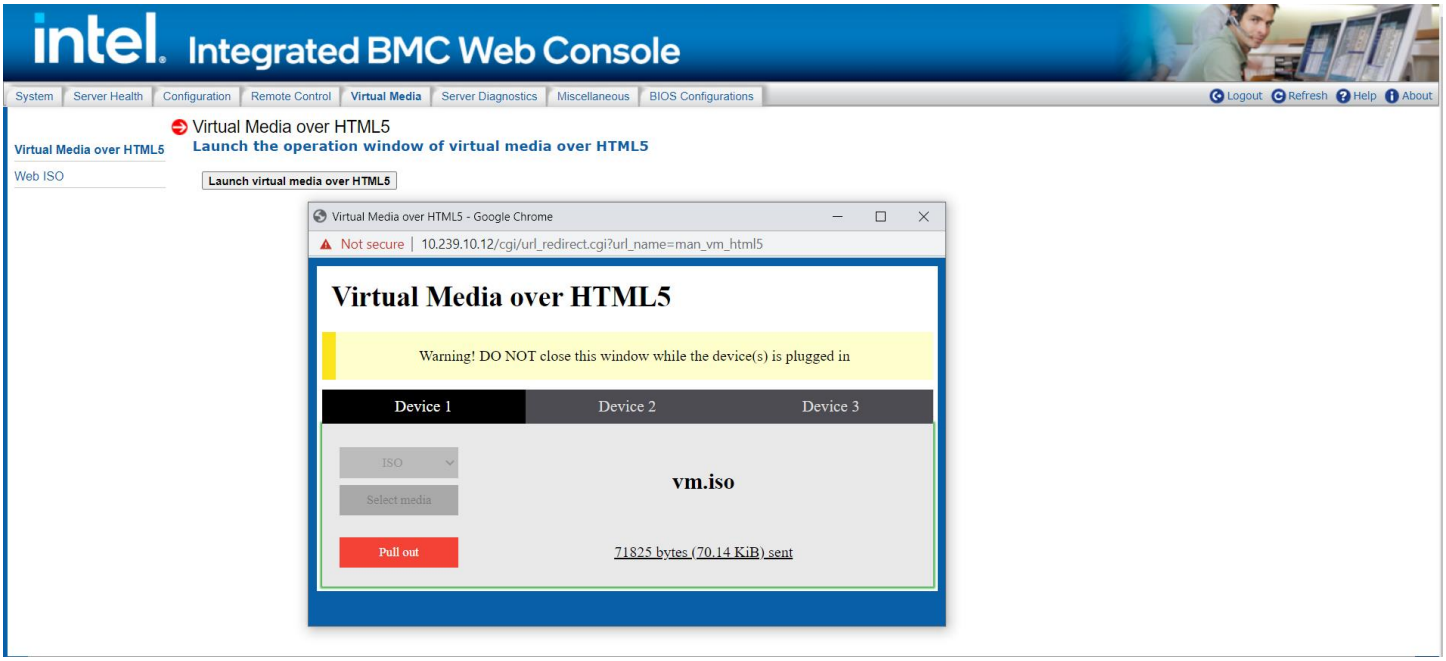

Figure 86. Plug in ISO

Table 28. Virtual Media over HTML5 Options

Option	Task
Device	Select one of three devices.
Select type	Select file type (Folder or ISO or IMG/IMA).
Select media	Choose the file path.
User	User name of Samba* or NFS.
Plug in/Pull out	Mount/umount file.

7.5.2 Web ISO

Web ISO allows the user to share an ISO image using the SMB or the NFS protocol. It allows the user to share the image over a Windows Share* or Linux* Samba* or NFS. This image will be emulated to the host as a USB device.

Figure 87. Web ISO

Table 29. Web ISO Options

Option	Task
Device	Showing the VM status.
Mount type	Samba* or NFS.
Share host	Share host IP address.
Path to image	Image name with path.
User	User name of Samba* or NFS.
Password	Password of Samba* or NFS.

7.6 Server Diagnostics Tab

The Server Diagnostics tab contains general system diagnostics information as explained in the following sub sections.

7.6.1 System Diagnostics

The System Diagnostics page allows administrators to collect system debug information. This feature allows a user to export data into a file that is retrievable for the purpose of sending to an Intel engineer or Intel

partners for enhanced debugging capability. The files are compressed, encrypted, and password protected. The files are not meant to be viewable by the end user but rather provide additional debugging capability to the system manufacturer or an Intel support engineer. See Figure 88 for details.

Figure 88. Server System Diagnostics Page

Click the **Generate Log** button. It may take some time for the debug information to be collected. After the debug log dump is finished, click the debug log filename to save the results as a `*.zip` file on the client system. The file can then be sent to the system manufacturer or an Intel support engineer for analysis.

The data that may be captured using this feature includes but is not limited to:

- **Platform sensor readings** – This includes all "readable" sensors that can be accessed by the BMC firmware and have associated SDRs populated in the SDR repository. This does not include any "event-only" sensors. (All BIOS sensors and some BMC and ME sensors are "event-only", meaning that they are not readable using an IPMI *Get Sensor Reading* command but rather are used just for event logging purposes.)
- **SEL** – The current SEL contents are saved in both hexadecimal and text format.
- **CPU/memory register data** useful for diagnosing the cause of the following system errors: CATERR, ERR2, SMI timeout, PERR, and SERR – The debug data is saved and time stamped for the last three occurrences of the error conditions.
  - PCI error registers
  - MSR registers
  - Integrated Memory Controller (iMC) and Integrated I/O (IIO) module registers
- BMC configuration data
- BMC firmware debug log (syslog) – Captures firmware debug messages.

7.6.2 POST Codes

The POST Codes page displays recent power-on self-test (POST) results. See Figure 89 for details. The time base may be viewed as the time from start of POST, or time since the previous POST code was logged. Select this by clicking the **Show time** drop-down box. All time formats are in `minutes:seconds.milliseconds`.

Previous and current boot POST codes are shown. The current boot codes become previous codes when the system is reset or shut down.

Holding the cursor over a time, POST code, or description highlights all other occurrences of that same POST code. Clicking a time, POST code, or description causes the highlighting to persist until another code is clicked.

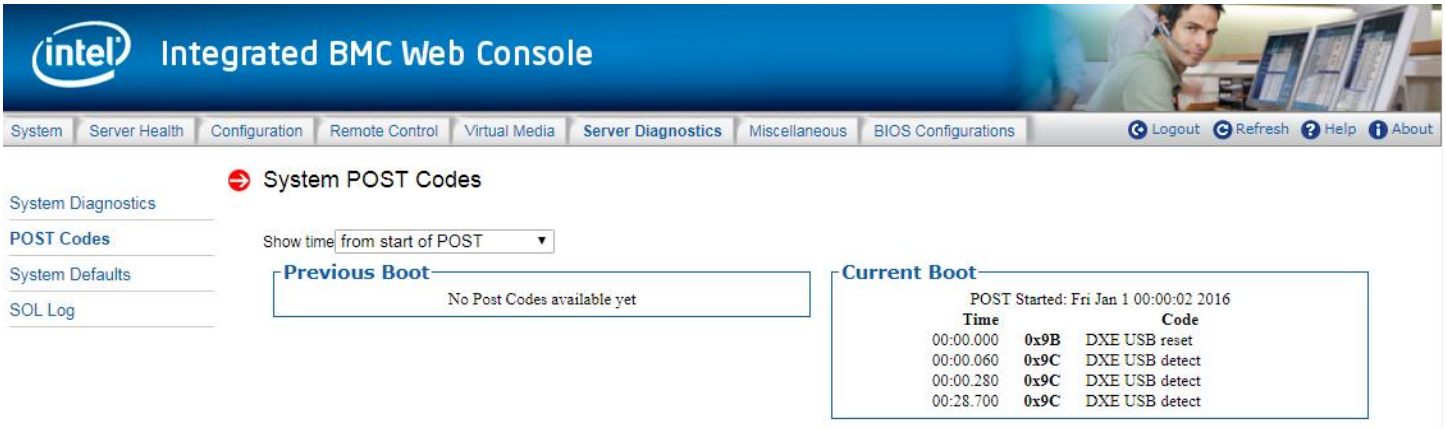

Figure 89. Server Diagnostics POST Codes Page

7.6.3 System Defaults

The System Defaults page allows resetting all BMC settings to factory defaults. See Figure 90 for details. Click the **Restore** button to reset all BMC settings to factory defaults. Once complete, all remote management, including the web server, will not be accessible until users and network settings are restored locally. Settings lost include, but are not limited to:

- All network addresses and settings
- Power restore policies
- Platform event filters
- Alert destinations

This does not affect the BMC's system event log, sensor data repository, or any Node Manager Settings and policies.

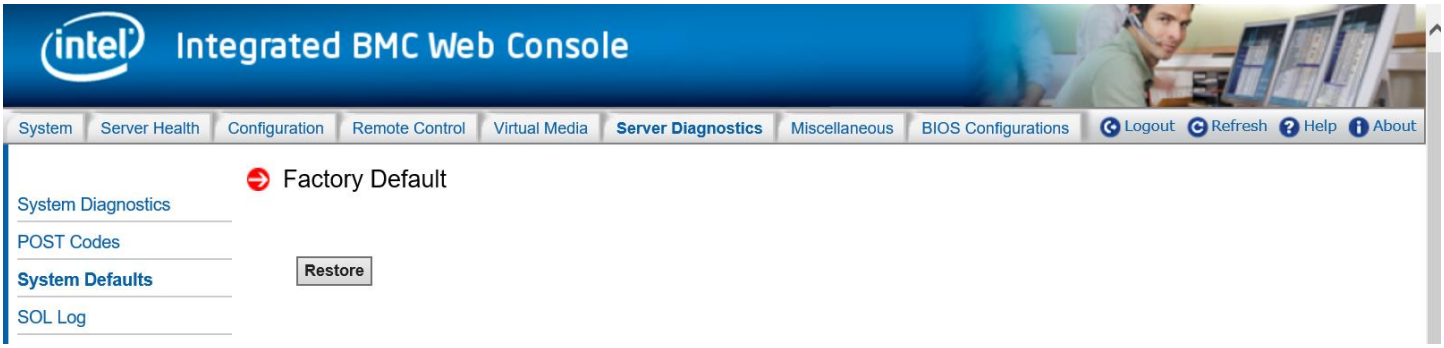

Figure 90. Server Diagnostics Default Page

WARNING: This action will reset all BMC settings to factory defaults and cannot be undone.

7.6.4 SOL Log

The SOL Log page allows enabling/disabling SOL logging and downloading the log (Figure 91). Table 30 lists the SOL log operations that can be performed.

Figure 91. Server Diagnostics SOL Log Page

Table 30. Server Diagnostics SOL Log Options

Option	Task
Enable SOL Log	Enable or disable SOL log.
Save Button for Enable SOL Log	Save the setting of enable/disable SOL log.
Save SOL Log Button for Enable SOL Log	Save the log to the local device.

7.7 Miscellaneous Tab

The **Miscellaneous** tab contains Intel® Node Manager (Intel® NM) configuration, power statistics, and power telemetry information as explained in the following sub sections.

7.7.1 Intel® Node Manager Configuration

Intel® NM configuration is used to view, add, and configure the Intel® Node Manager Policies. See Figure 92 for details. Table 31 lists the options to view, add, and edit the Intel® NM power policies.

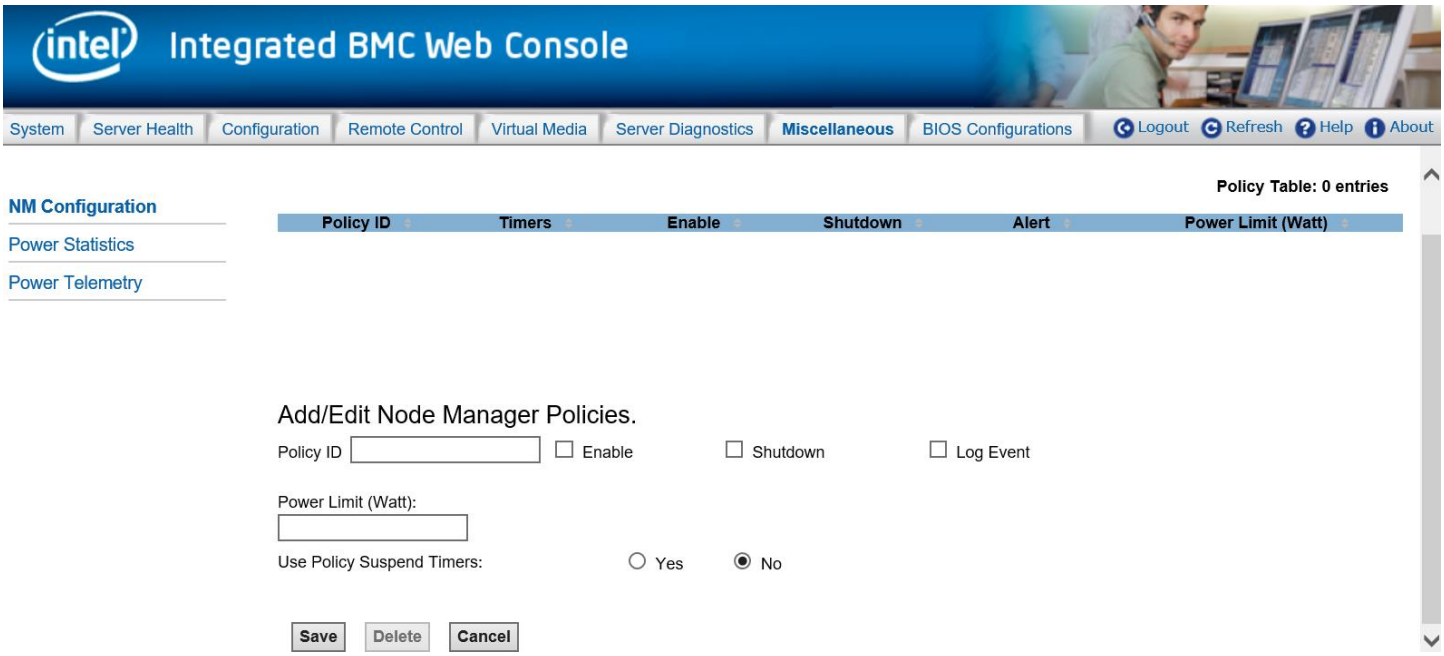

Figure 92. Intel® NM Configuration Page

Table 31. Intel® NM Configuration Options

Option	Task
List of Policies	This table lists the currently configured policies. Selecting an item from the table will populate the editable fields in the settings section below.
Policy ID	The policy ID to add/edit/delete. Valid range is 0–255. In the policy table, policy IDs with an asterisk (*) are policies set externally using a non-platform domain. Changing parameters on these policies will not affect their triggers, trigger limits, reporting periods, correction timeouts, or aggressive CPU throttling settings.
Enabled	Check this box if the policy is to be enabled immediately.
Shutdown	Enable a system shutdown if the policy is exceeded and cannot be corrected within the correction timeout period. The operating system is given 30 seconds to shut down gracefully. If the system is still not shut down after 30 seconds, the BMC initiates an immediate shutdown.
Log Event	Enable the node manager to send a platform event message to the BMC when a policy is exceeded.
Power Limit (Watt)	The desired platform power limit, in watts.
Use Policy Suspend Periods	If enabled, configure policy suspend periods. Each policy may have up to five suspend periods (see Figure 93). Suspend periods are repeatable by day-of-week. Start and stop times are designated in 24-hour format, in increments of 6 minutes. To specify a suspended period crossing midnight, two suspend periods must be used.
Save	Click to save any changes made.
Delete	Select a policy in the list and click to delete.
Cancel	Click to discard changes.

For all policies set through this page, the following default values will be applied:

- **Domain:** Platform – Power for the entire platform.
- **Trigger:** None – Always monitor after end of POST.
- **Aggressive CPU Power Correction:** AUTO – Use of T-states and memory throttling controlled by policy exception actions.
- **Trigger Limit:** None.
- **Reporting Period:** 10 seconds – This is a rolling average for reporting only. It will not affect the average power monitored by the node manager.
- **Correction Timeout:** 22.555 seconds – Maximum time for the NM to correct power before taking an exception action (that is, shutdown or alert).

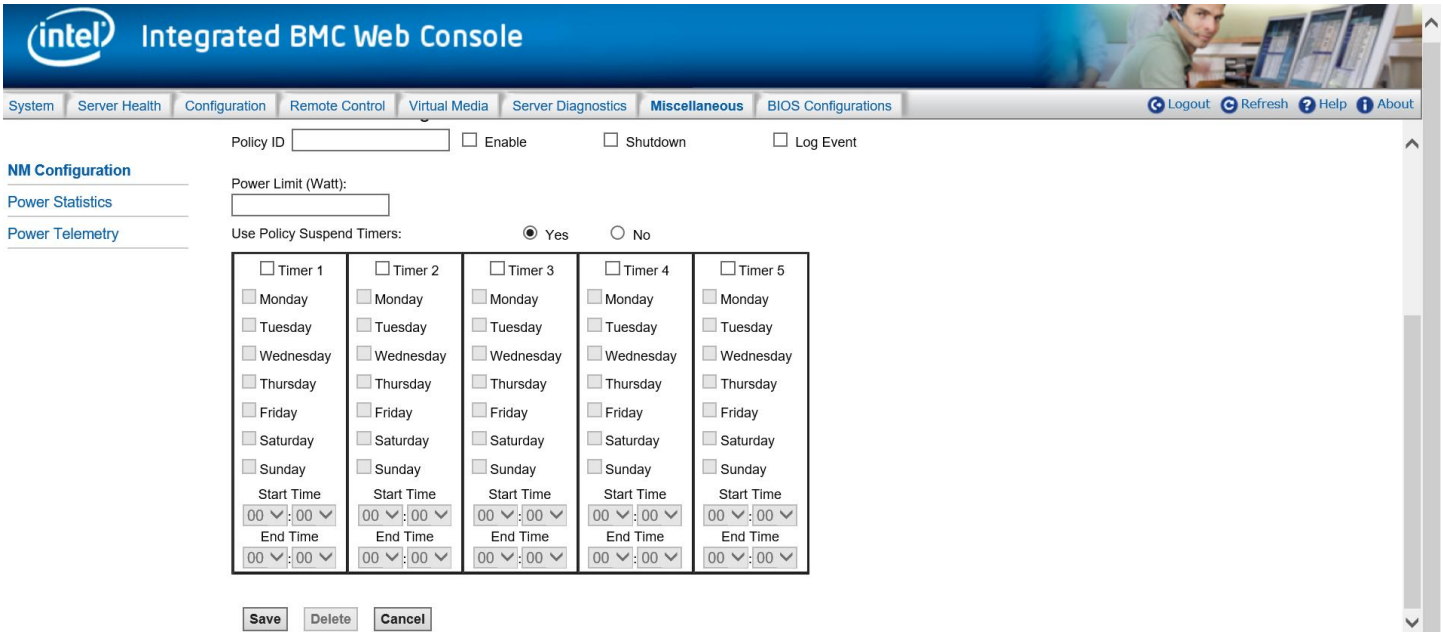

Figure 93. Intel® NM Configuration Suspend Page

7.7.2 Power Statistics

The Power Statistics page displays the entire platform, CPU, and memory power statistics as shown with current, average, maximum, minimum, timestamp and period in Figure 94.

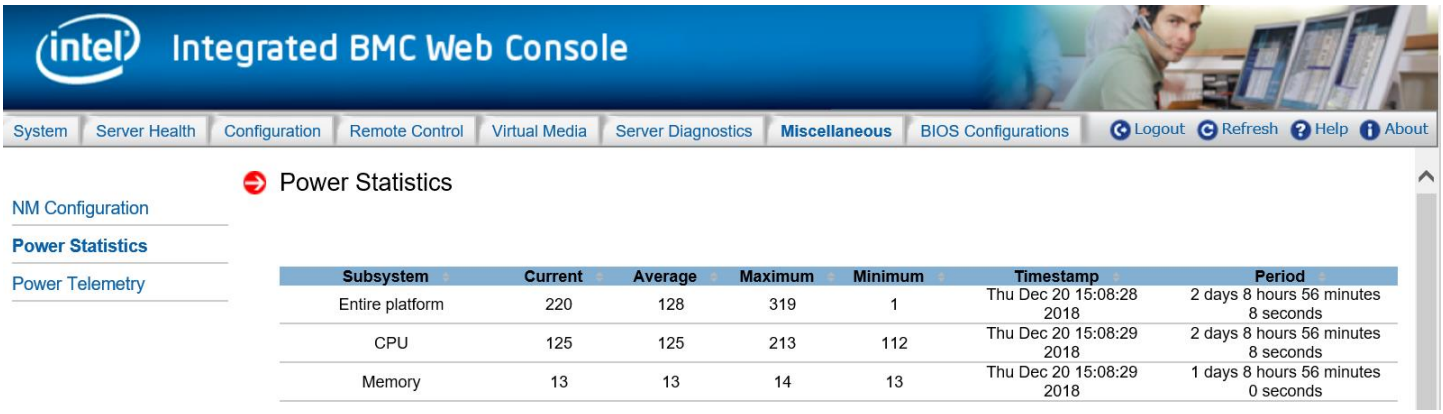

Figure 94. Power Statistics Page

7.7.3 Power Telemetry

The Power Telemetry page provides a method to get onboard component power, including PSU, CPU, memory, PCH, BMC, and other components. See Figure 95 for details. To select a device category, use the **Select a device category** drop-down box (Figure 96).

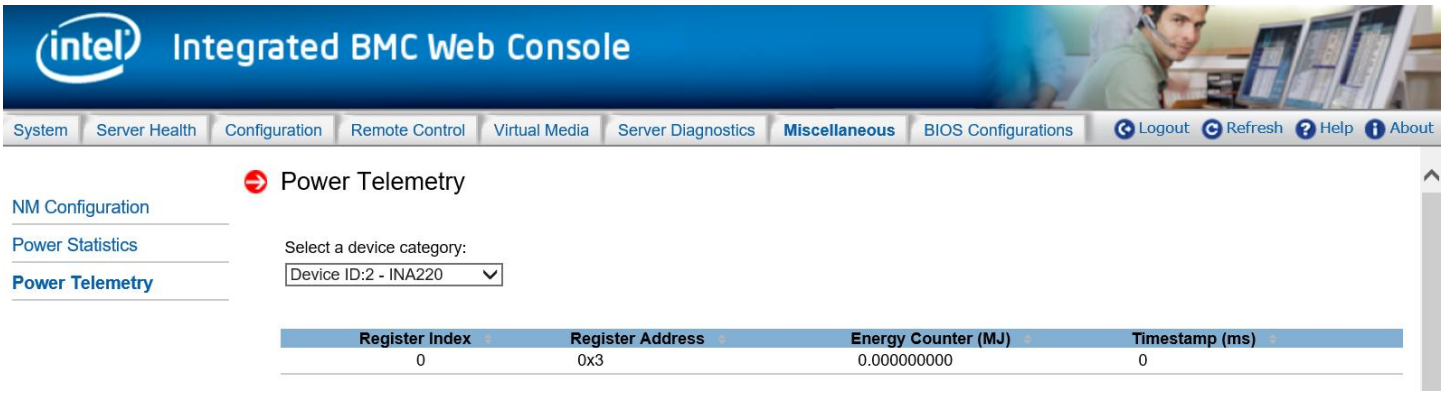

Figure 95. Power Telemetry page

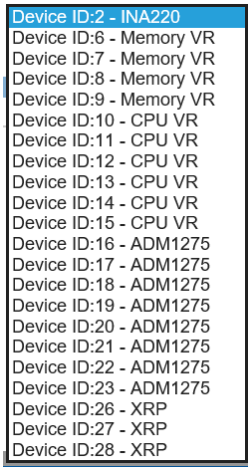

Figure 96. Power Telemetry Device Categories

7.8 BIOS Configurations Tab

The **BIOS Configurations** tab provides a method to configure any BIOS Setup Variables through the BMC EWS, containing the PCI, Serial Port, UPI, IIO, Memory, PnP, Processor, Mass Storage Controller, System Acoustic and Performance, SEL, Security and USB configuration options. To select a bios variable, click the **Select a BIOS Variable** drop-down menu.

Once a BIOS Variable is selected, the corresponding BIOS Variables Current Value will be displayed in the **BIOS Variable Value** drop-down box. Other available options for the corresponding BIOS Variable can be viewed by clicking the **BIOS Variable Value** drop-down box, and if the value needs to be changed for the above variable other available values can be selected from this drop-down box. Once the BIOS Variable Value has been chosen, click the **Save** button and the changed value will then be reflected in the Grid Table.

7.8.1 PCI Configuration

This page allows the user to enable or disable MMIO above 4G/MMIO High base/MMIO Size/Add in video controller/Onboard Video/Fast video/Onboard VGA Always O/ARI Support/SR-IOV Support/UEFI Network Stack/IPv4 PXE Support/IPv6 PXE Support/CPU VMD and so on. See Figure 97 for details.

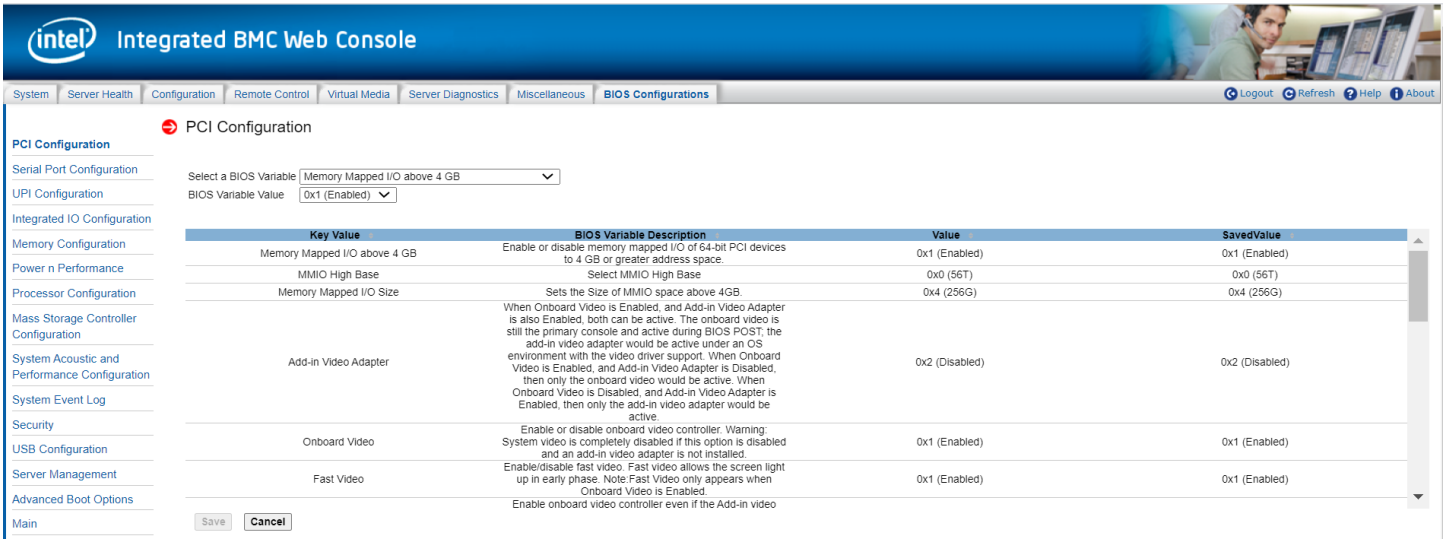

Figure 97. BIOS PCI Configuration Page

7.8.2 Serial Port Configuration

This page allows the user to enable or disable serial port, select serial base I/O address. See Figure 98 for details. Table 32 lists all serial port configuration variables that can be viewed and edited.

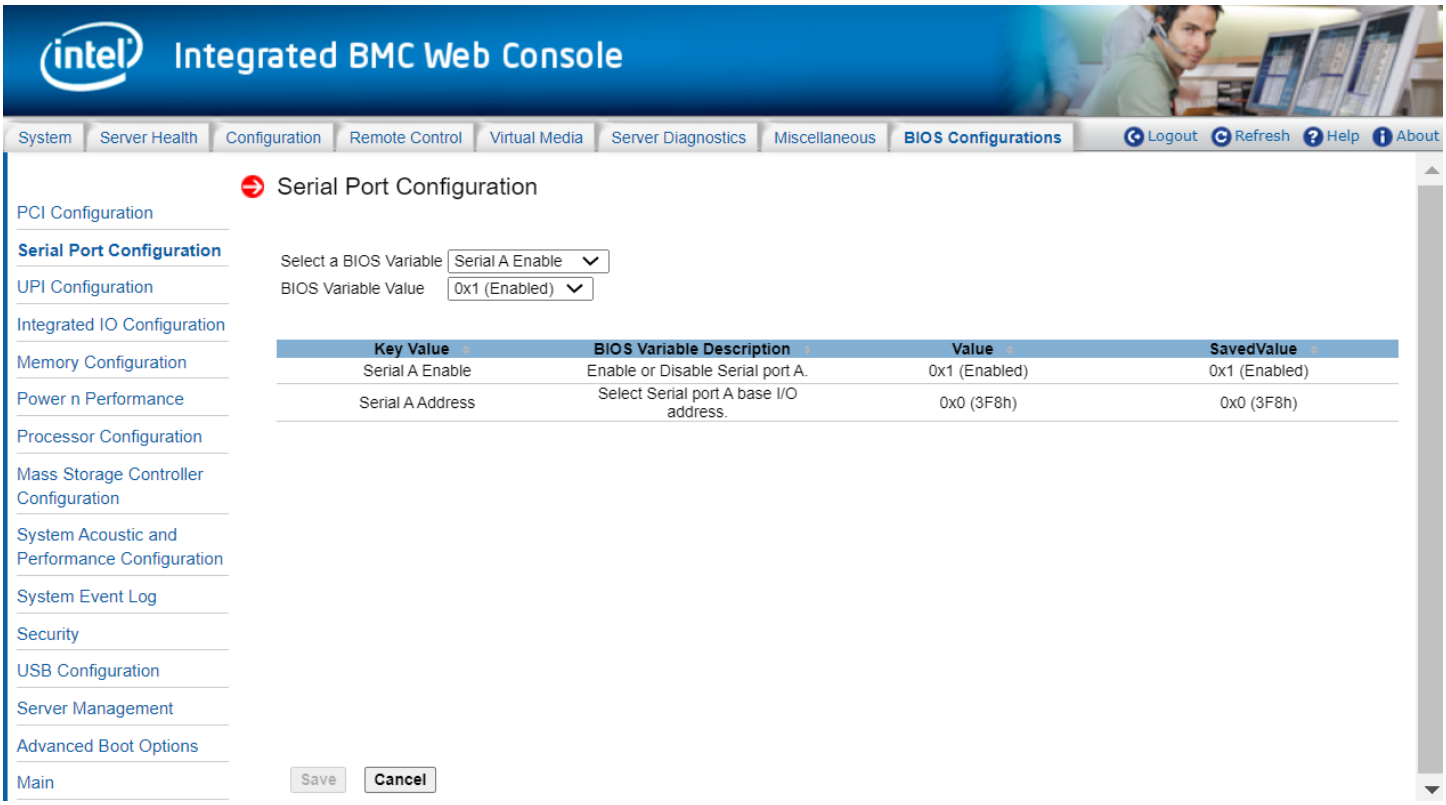

Figure 98. BIOS Serial Port Configuration Page

Table 32. BIOS Serial Port Configuration Variables

Variables	BIOS Variable Description
Serial A Enable	Enable or Disable Serial port A.
Serial A Address	Select Serial port A base I/O address.
Serial B Enable	Enable or Disable Serial port B.
Serial B Address	Select Serial port B base I/O address. This field will not appear when Serial B port enable/disable does not appear

7.8.3 UPI Configuration

This page allows the user to select the UPI frequency/ IO Directory Cache(IODC)/KTI Prefetch/Stale A to S Dir optimization/LLC dead line allocation/Direct To Core(D2C) /Direct To UPI(D2K). See Figure 99 for details. Table 33 lists all UPI configuration variables that can be viewed and edited.

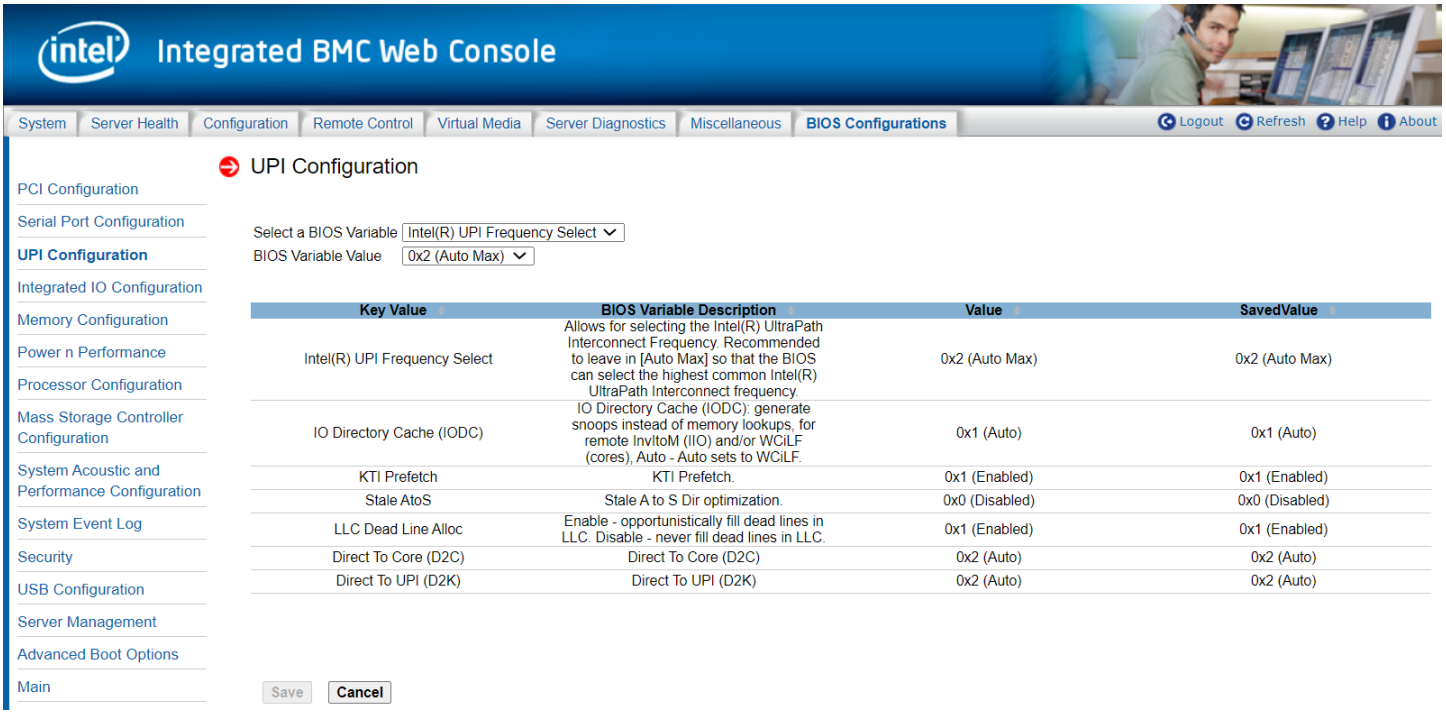

Figure 99. BIOS UPI Configuration Page

Table 33. BIOS UPI Configuration Variables

Variables	BIOS Variable Description
Intel(R) UPI Frequency Select	Select UPI frequency from 0x1(Auto Max), 0x0(9.6GT/s),0x1(10.4GT/s).
IO Directory Cache(IODC)	Enable or disable IO Directory Cache(IODC).
KTI Prefetch	Enable or disable KTI Prefetch.
Stale AtoS	Enable or disable Stale AtoS.
LLC Dead Line Alloc	Switch the LLC Dead Line Alloc mode to enable, disable, or auto.
Direct To Core(D2C)	Switch the Direct To Core(D2C) mode to enable, disable, or auto.
Direct To UPI(D2K)	Switch the Direct To UPI(D2K) mode to enable, disable, or auto.

7.8.4 Integrated IIO Configuration

This page allows the user to configure NTB PCIe* port and BAR23/4/5/45 size, enable/disable NTB Bars/SPLIT Bars. See Figure 100 for details. Table 34 lists all IIO configuration variables that can be viewed and edited.

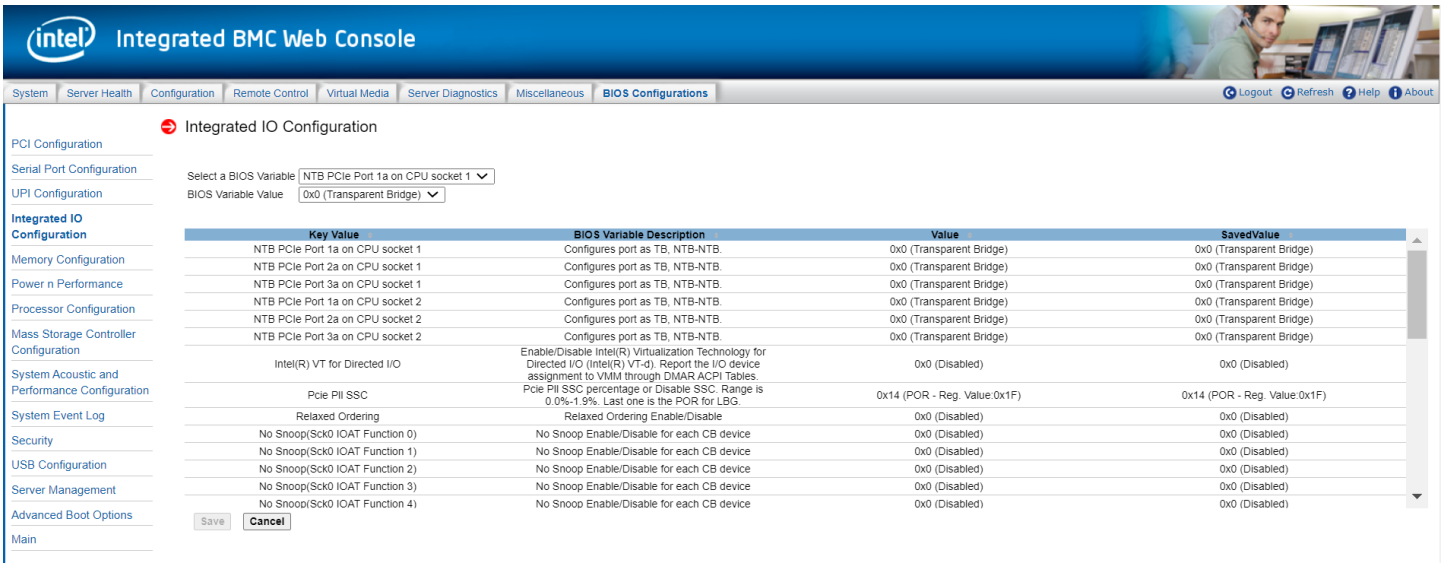

Figure 100. BIOS IIO Configuration Page

Table 34. BIOS IIO Configuration Variables

Variables	BIOS Variable Description
NTB PCIe Port 1a on CPU socket 1 **NTB PCIe Port 2a on CPU socket 1** **NTB PCIe Port 3a on CPU socket 1** **NTB PCIe Port 1a on CPU socket 2** **NTB PCIe Port 2a on CPU socket 2** **NTB PCIe Port 3a on CPU socket 2**	Configure NTB PCIe* port for socket 1 and socket 2.
Enable NTB Bars	Enable or disable NTB Bars.
Enable SPLIT BARs	Enable or disable NTB SPLIT Bars.
Primary BAR 23 Size **Primary BAR 4 Size** **Primary BAR 5 Size** **Primary BAR 45 Size** **Secondary BAR 23 Size** **Secondary BAR 4 Size** **Secondary BAR 5 Size** **Secondary BAR 45 Size**	Select BAR23/4/5/45 size for each PCIe* port on the socket 1 and socket 2.
Intel(R) VT for Directed I/O	Enable or disable Intel® VT for Directed I/O.
Pcie PII SSC	Enable or disable PCIe* PII SSC
Relaxed Ordering	Enable or disable Relaxed Ordering
No Snoop(Sck0 IOAT Function 0) **No Snoop(Sck0 IOAT Function 1)** **No Snoop(Sck0 IOAT Function 2)** **No Snoop(Sck0 IOAT Function 3)** **No Snoop(Sck0 IOAT Function 4)** **No Snoop(Sck0 IOAT Function 5)** **No Snoop(Sck0 IOAT Function 6)** **No Snoop(Sck0 IOAT Function 7)**	Enable or disable for each CB device on sock0.

Variables	BIOS Variable Description
No Snoop(Sck1 IOAT Function 1) **No Snoop(Sck1 IOAT Function 2)** **No Snoop(Sck1 IOAT Function 3)** **No Snoop(Sck1 IOAT Function 4)** **No Snoop(Sck1 IOAT Function 5)** **No Snoop(Sck1 IOAT Function 6)** **No Snoop(Sck1 IOAT Function 7)**	Enable or disable for each CB device on sock1.
DMI-Pcie Port MPSWorkaround	Enable or disable for DMI-Pcie Port MPSWorkaround
Data Link Protocol Error Mask	Enable or disable for Data Link Protocol Error Mask
Surprise Down Error Mask	Enable or disable for Surprise Down Error Mask
Positioned TLP Mask	Enable or disable for Positioned TLP Mask
Flow Control Protocol Error Mask	Enable or disable for Flow Control Protocol Error Mask
Completion Timeout Mask	Enable or disable for Completion Timeout Mask
Unexpected Completion Mask	Enable or disable for Unexpected Completion Mask
Receiver Overflow Mask	Enable or disable for Receiver Overflow Mask
Malformed TLP Mask	Enable or disable for Malformed TLP Mask
ECRC Error Mask	Enable or disable for ECRC Error Mask
ACS Volation Mask	Enable or disable for ACS Volation Mask
Uncorrectable Internal Error Mask	Enable or disable for Uncorrectable Internal Error Mask
MC Blocked TLP Mask	Enable or disable for MC Blocked TLP Mask
AtomicOp Egress Blocked Mask	Enable or disable for AtomicOp Egress Blocked Mask
TLP Prefix Blocked Error Mask	Enable or disable for TLP Prefix Blocked Error Mask

7.8.5 Memory Configuration

This page allows the user to select memory operation speed/IMC interleaving/page policy and enable or disable ADR/Erase-Arm NVDIMMS/restore NVDIMMS/ADDDC sparing/memory sparing/Multi-Rank sparing/memory Corrected Error. See Figure 101 for details. Table 35 lists all memory configuration variables that can be viewed and edited.

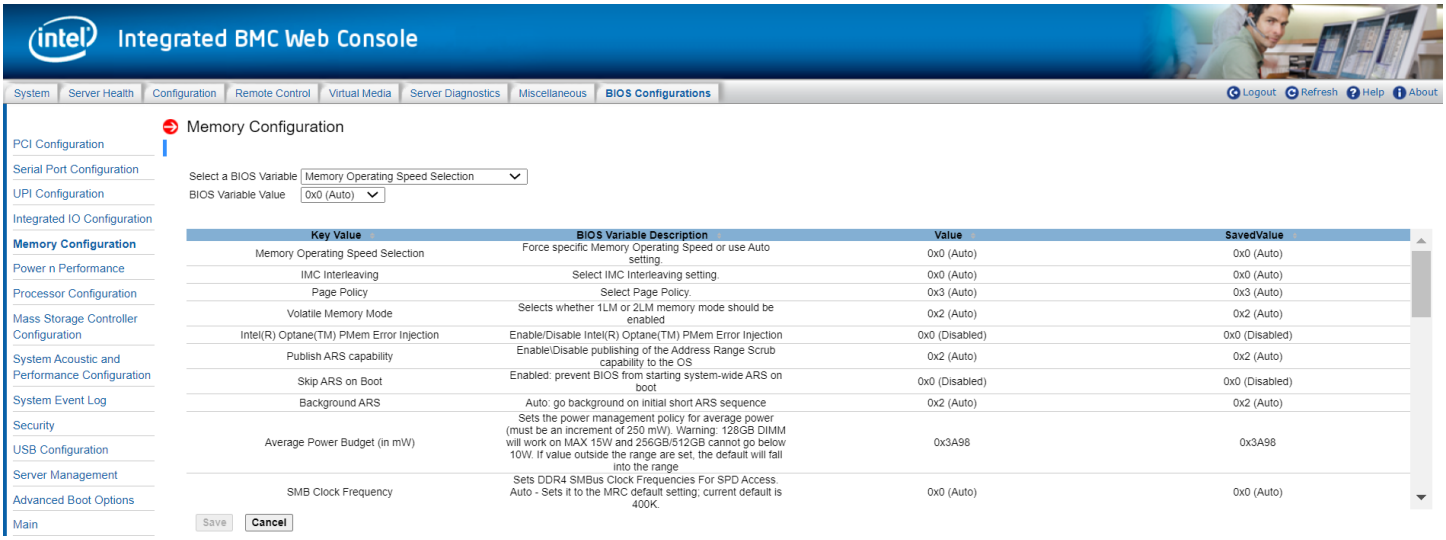

Figure 101. BIOS Memory Configuration Page

Table 35. BIOS Memory Configuration Variables

Variables	BIOS Variable Description
Memory Operating Speed Selection	Force specific Memory Operating Speed or use Auto setting.
IMC Interleaving	Select IMC Interleaving setting.
Page Policy	Select page policy.
Volatile Memory Mode	Select whether 1LM or 2LM memory mode should be enabled.
Intel® Optane™ PMem Error Injection	Enable/Disable Intel® Optane™ PMem Error Injection.
Publish ARS capability	Enable\Disable publishing of the Address Range Scrub capability to the OS.
Skip ARS on Boot	Enabled: prevent BIOS from starting system-wide ARS on boot.
Background ARS	Auto: go background on initial short ARS sequence.
Average Power Budget(in mM)	Sets the power management policy for average power (must be an increment of 250 mW). Warning: 128GB DIMM will work on MAX 15W and 256GB/512GB cannot go below 10W. If value outside the range is set, the default will fall into the range
SMB Clock Frequency	Sets DDR4 SMBus Clock Frequencies For SPD Access. Auto - Sets it to the MRC default setting; current default is 400K.
Snoopy mode for 2LM	Enables new 2LM specific feature to avoid directory updates to far-memory from non-NUMA optimized workloads.
Snoopy mode for AD	Enables new AD (Appdirect) specific feature to avoid directory updates to DDRT memory from non-NUMA optimized workloads.
NVM Performance Setting	NVM baseline performance settings depending on the workload behavior
CR FastGo Configuration	Select CR QoS Configuration Profiles.
CR Latch System Shutdown State	Latch System Shutdown State.
CR QoS	CR QoS tuning recipes.
Thermal Throttling Thresholds Offset	Auto - T_crit-(2/3)C Enable - T_crit-(1/2)C Threshold limits.
Attempt Fast Boot	Enable - Portions of memory reference code will be skipped when possible to increase boot speed on warm boots. Disable - Disables this feature. Auto - Sets it to the MRC default setting; current default is Enabled.
Attempt Fast Cold Boot	Enable - Portions of memory reference code will be skipped when possible to increase boot speed on cold boots. Disable - Disables this feature. Auto - Sets it to the MRC default setting; current default is Enabled.
Enable power cycle policy	Enable/Disable power cycle policy when NVMDIMM receives surprise clock stop.
MRC Promote Warnings	Determines if MRC warnings are promoted to system level.
Promote Warnings	Determines if warnings are promoted to system level.
Halt on mem Training Error	Halt on mem Training Error Disable/Enable.
Thermal Monitor	Enable/Disable Thermal Monitor.
PPR Type	Selects Post Package Repair Type - Hard / Soft / Disabled. Auto - Sets it to the MRC default setting; current default is Soft PPR.
MemTest	Enable - Enables memory test during normal boot. Disable - Disables this feature. Auto - Sets it to MRC default setting; current default is Enable.
MemTest Loops	Number of memory test loops during normal boot, set to 0 to run memory test infinitely
Adv MemTest Options	This option is a bit mask[15:0]: All 0 - disabled: bit-0-XMATS8, bit-1-XMATS16, bit-2-XMATS32, bit-3-XMATS64, bit-4-WCMATS8, bit-5-WCMCH8, bit-6-GNDB64, bit-7-MARCHCM64, bit-11-TWR, bit-12-DATARET, bit-13-MATS8TC1, bit-14-MATS8TC2, bit-15-MATS8TC3
Adv MemTest Reset Failure Tracking List	Enable/disable Reset of the Row Failure Tracking List after each Adv MemTest option. Useful for testing performance of multiple options.
Adv MemTest Conditions	Auto - set test conditions based on test type; Manual - specify global test conditions; Disable - Do not apply test conditions.

Variables	BIOS Variable Description
NUMA Optimized	If enabled, BIOS includes ACPI tables that are required for NUMA-aware Operating Systems.
Sub_NUMA Cluster	When enabled, sub NUMA cluster enabled. If any memory controller has no memory attached, this feature cannot be enabled.
Patrol Scrub	When enabled, performs periodic checks on memory cells and proactively walks through populated memory space, to seek and correct soft ECC errors.
Cloaking	If disabled, CMCI event appears when CE happens. If enabled, CMCI event is blocked when CE happens.

7.8.6 Power n Performance

This page allows the user to configure CPU power and performance policy/workload configuration/TDP level/hardware P-State/, enable or disable uncore frequency scaling/performance P-limit/enhanced Intel® SpeedStep® tech/Intel® configurable TDP/Turbo Boost/C1E /processor C6. See Figure 102 for details. Table 36 lists all PnP configuration variables that can be viewed and edited.

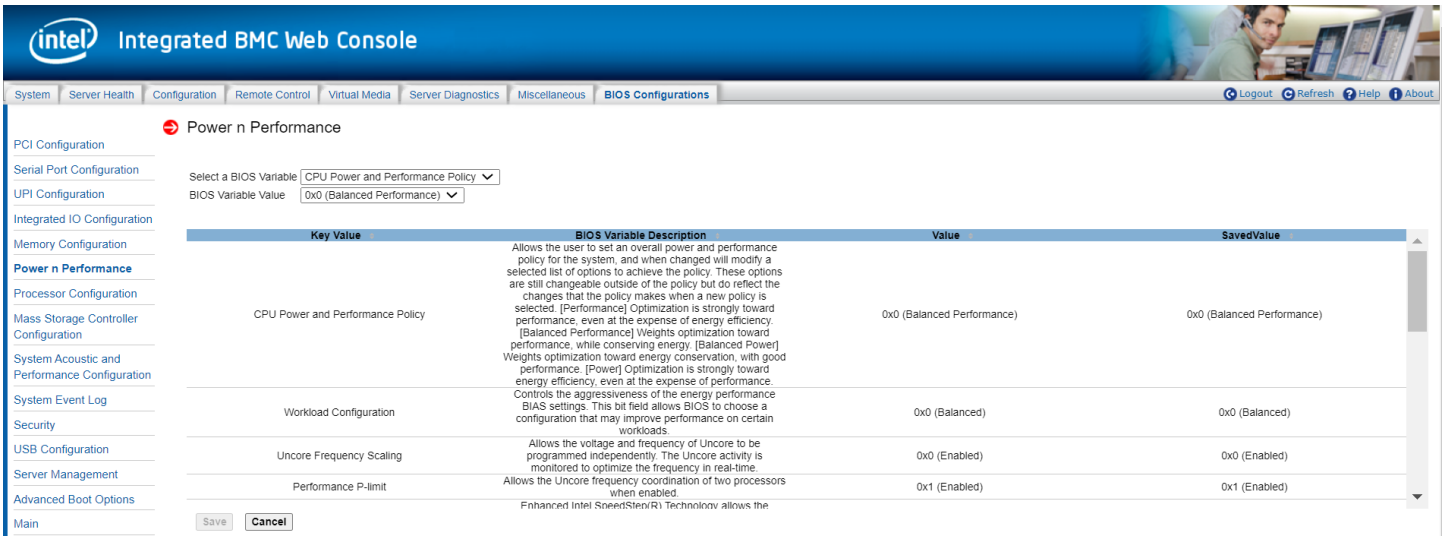

Figure 102. BIOS PnP Configuration Page

Table 36. BIOS PnP Configuration Variables

Variables	BIOS Variable Description
CPU Power and Performance Policy	Allows the user to set an overall power and performance policy for the system, and when changed will modify a selected list of options to achieve the policy. These options are still changeable outside of the policy but do reflect the changes that the policy makes when a new policy is selected. [Performance] Optimization is strongly toward performance, even at the expense of energy efficiency. [Balanced Performance] Weights optimization toward performance, while conserving energy. [Balanced Power] Weights optimization toward energy conservation, with good performance. [Power] Optimization is strongly toward energy efficiency, even at the expense of performance.
Workload Configuration	Controls the aggressiveness of the energy performance BIAS settings. This bit field allows BIOS to choose a configuration that may improve performance on certain workloads.
Uncore Frequency Scaling	Allows the voltage and frequency of Uncore to be programmed independently. The Uncore activity is monitored to optimize the frequency in real-time.
Performance P-limit	Allows the Uncore frequency coordination of two processors when enabled.
Enhanced Intel SpeedStep(R) Tech	Enhanced Intel SpeedStep(R) Technology allows the system to dynamically adjust processor voltage and core frequency, which can result in decreased average power consumption and decreased average heat production. Contact the corresponding OS vendor regarding OS support of this feature.

Variables	BIOS Variable Description
Intel Configurable TDP	Allows the user to disable/enable Intel Config TDP.
Configurable TDP Level	Allows the user to select Intel Config TDP level - Nominal is the default TDP.
Intel(R) Turbo Boost Technology	Intel® Turbo Boost Technology allows the processor to automatically increase its frequency if it is running below power, temperature, and current specifications.
Energy Efficient Turbo	When Energy Efficient Turbo is enabled, the CPU cores only enter the turbo frequency when the PCU detects high utilization.
Hardware P-States	Disable: Hardware chooses a P-state based on OS Request (Legacy P-States) Native Mode: Hardware chooses a P-state based on OS guidance Out of Band Mode: Hardware autonomously chooses a P-state (no OS guidance).
HardwarePM Interrupt	Enable/Disable Hardware PM Interrupt.
EPP Enable	When enabled, HW masks EPP in CPUID[6].10 and uses the Energy Performance Bias Register for Energy vs. Performance Preference input.
APS rocketing	Enable/Disable the rocketing mechanism in the HWP P-state selection pcode algorithm. Rocketing enables the core ratio to jump to max turbo instantaneously as opposed to a smooth ramp up.
Scalability	Enable/Disable the use of scalability in HWP pcode power efficiency algorithms. Scalability is the measure of estimated performance improvement for a given increase in core frequency.
RAPL Prioritization	Enable/Disable core parameter based per core power budgeting. PPO-Budget allocates power budget to cores based on their scalability/EPP.
Package C-State	Enable/Disable RAPL Prioritization allows creating core groups of different priority
C1E	When Enabled, the CPU will switch to the Minimum Enhanced Intel SpeedStep(R) Technology operating point when all execution cores enter C1. Frequency will switch immediately, followed by gradual Voltage switching. When Disabled, the CPU will not transit to the minimum Enhanced Intel SpeedStep(R) Technology operating point when all cores enter C1.
Processor C6	Enable/Disable Processor C6 (ACPI C3) report to OS.

7.8.7 Processor Configuration

This page allows the user to configure the number of cores to enable in each processor package, enable/disable Intel(R) Hyper-Threading/execute disable bit/Intel(R) virtualization/Intel(R) TXT. See Figure 103 for details. Table 37 lists all processor configuration variables that can be viewed and edited.

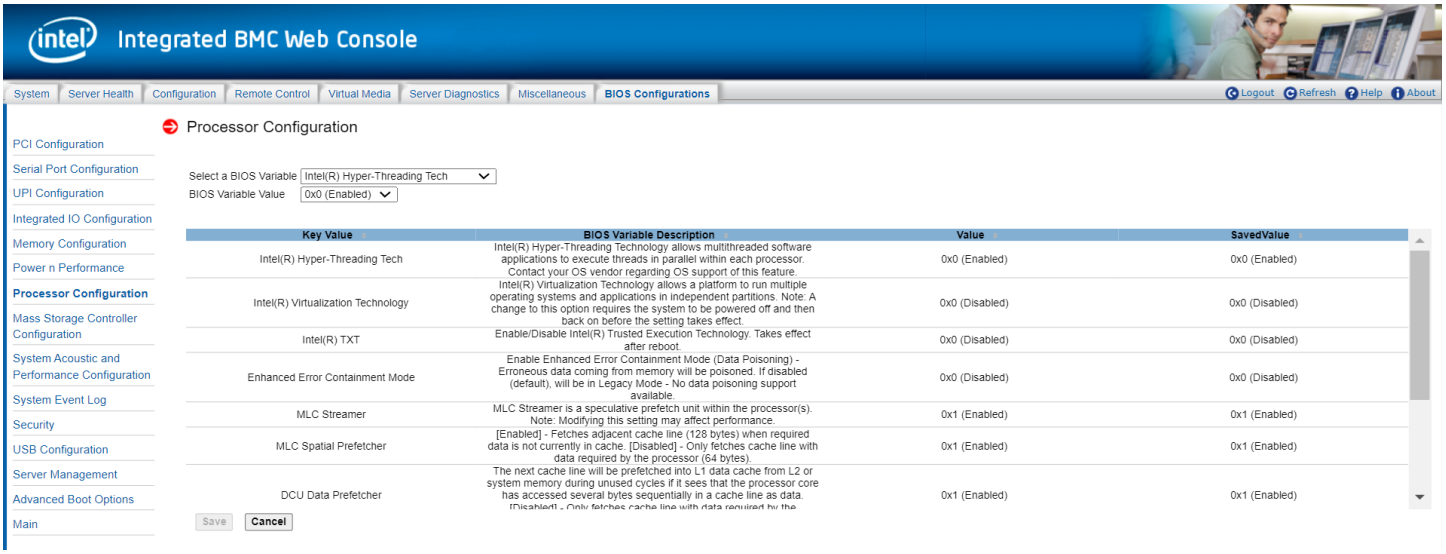

Figure 103. BIOS Processor Configuration Page

Table 37. BIOS Processor Configuration Variables

Variables	BIOS Variable Description
Intel(R) Hyper-Threading Tech	Intel® Hyper-Threading Technology allows multithreaded software applications to execute threads in parallel within each processor. Contact the corresponding OS vendor regarding OS support of this feature.
Intel(R) Virtualization Technology	Intel® Virtualization Technology allows a platform to run multiple operating systems and applications in independent partitions. **Note:** A change to this option requires the system to be powered off and then back on before the setting takes effect.
Intel(R) TXT	Enable/Disable Intel® Trusted Execution Technology. Takes effect after reboot.
Enhanced Error Containment Mode	Enable Enhanced Error Containment Mode (Data Poisoning) - Erroneous data coming from memory will be poisoned. If disabled (default), will be in Legacy Mode - No data poisoning support available.
MLC Streamer	MLC Streamer is a speculative prefetch unit within the processor(s). **Note:** Modifying this setting may affect performance.
MLC Spatial Prefetcher	[Enabled] - Fetches adjacent cache line (128 bytes) when required data is not currently in cache. [Disabled] - Only fetches cache line with data required by the processor (64 bytes).
DCU Data Prefetcher	The next cache line will be prefetched into L1 data cache from L2 or system memory during unused cycles if it sees that the processor core has accessed several bytes sequentially in a cache line as data. [Disabled] - Only fetches cache line with data required by the processor (64 bytes).
DCU Instruction Prefetcher	The next cache line will be prefetched into L1 instruction cache from L2 or system memory during unused cycles if it sees that the processor core has accessed several bytes sequentially in a cache line as data.
X2APIC	Enable/disable extended APIC support.
LLC Prefetch	Enable/Disable LLC Prefetch on all threads.
RDT CAT Opportunistic Tuning	Cache Allocation Technology mask tuning options. NOTE: If IOT is enabled on any socket this option will override to 0x003.
3StrikeTimer	The 3 strike counter can be turned off by writing into the MISC_FEATURE_CONTROL_DISABLE_THREE_STRIKE_CNT(MSR 0x01a4).

7.8.8 Mass Storage Controller Configuration

This page allows the user to configure the AHCI capable SATA controller/SATA RAID options/AHCI capable sSATA controller and enable/disable SATA HDD staggered Spin-up/sSATA HDD Staggered Spin-Up. See Figure 104 for details. Table 38 lists all mass storage controller configuration variables that can be viewed and edited.

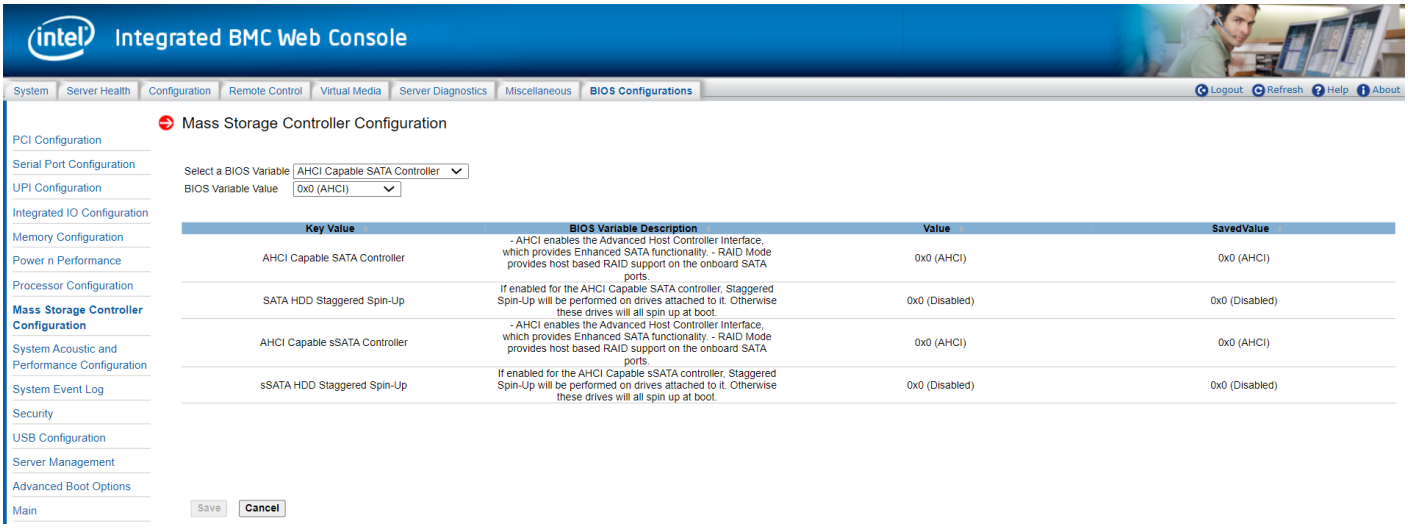

Figure 104. BIOS Mass Storage Controller Configuration Page

Table 38. BIOS Mass Storage Configuration Variables

Variables	BIOS Variable Description
AHCI Capable SATA Controller	AHCI enables the Advanced Host Controller Interface, which provides Enhanced SATA functionality. - RAID Mode provides host based RAID support on the onboard SATA ports.
SATA HDD Staggered Spin-Up	If enabled for the AHCI Capable SATA controller, Staggered Spin-Up will be performed on drives attached to it. Otherwise, these drives will all spin up at boot.
AHCI Capable sSATA Controller	AHCI enables the Advanced Host Controller Interface, which provides Enhanced SATA functionality. - RAID Mode provides host based RAID support on the onboard SATA ports.
sSATA HDD Staggered Spin-Up	If enabled for the AHCI Capable sSATA controller, Staggered Spin-Up will be performed on drives attached to it. Otherwise, these drives will all spin up at boot.

7.8.9 System Acoustic and Performance Configuration

This page allows the user to configure fan speed control profile. See Figure 105 for details. Table 39 lists all system acoustic and performance configuration variables that can be viewed and edited.

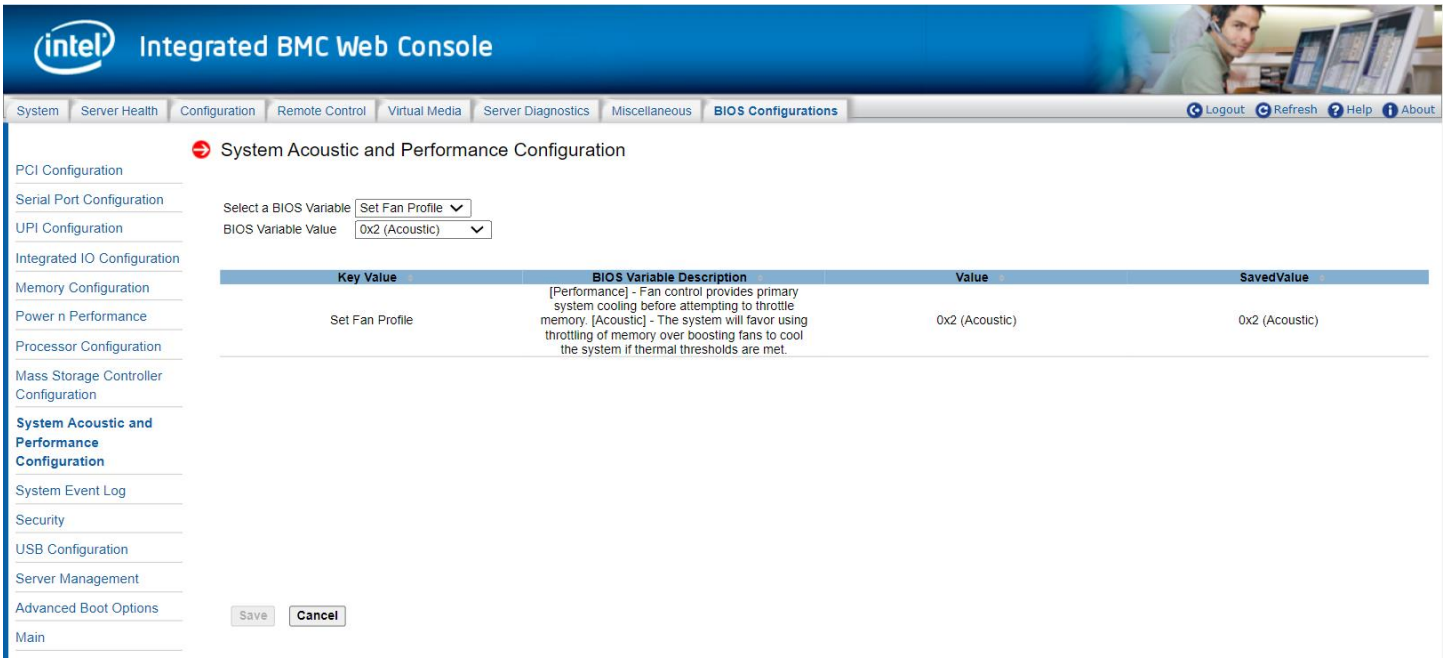

Figure 105. BIOS System Acoustic and Performance Configuration Page

Table 39. BIOS System Acoustic and Performance Configuration Variables

Variables	BIOS Variable Description
Set Fan Profile	[Performance] - Fan control provides primary system cooling before attempting to throttle memory. [Acoustic] - The system will favor using throttling of memory over boosting fans to cool the system if thermal thresholds are met.

7.8.10 System Event Log

This page allows the user to configure what Event types to monitor by System Event log. See Figure 106 for details.

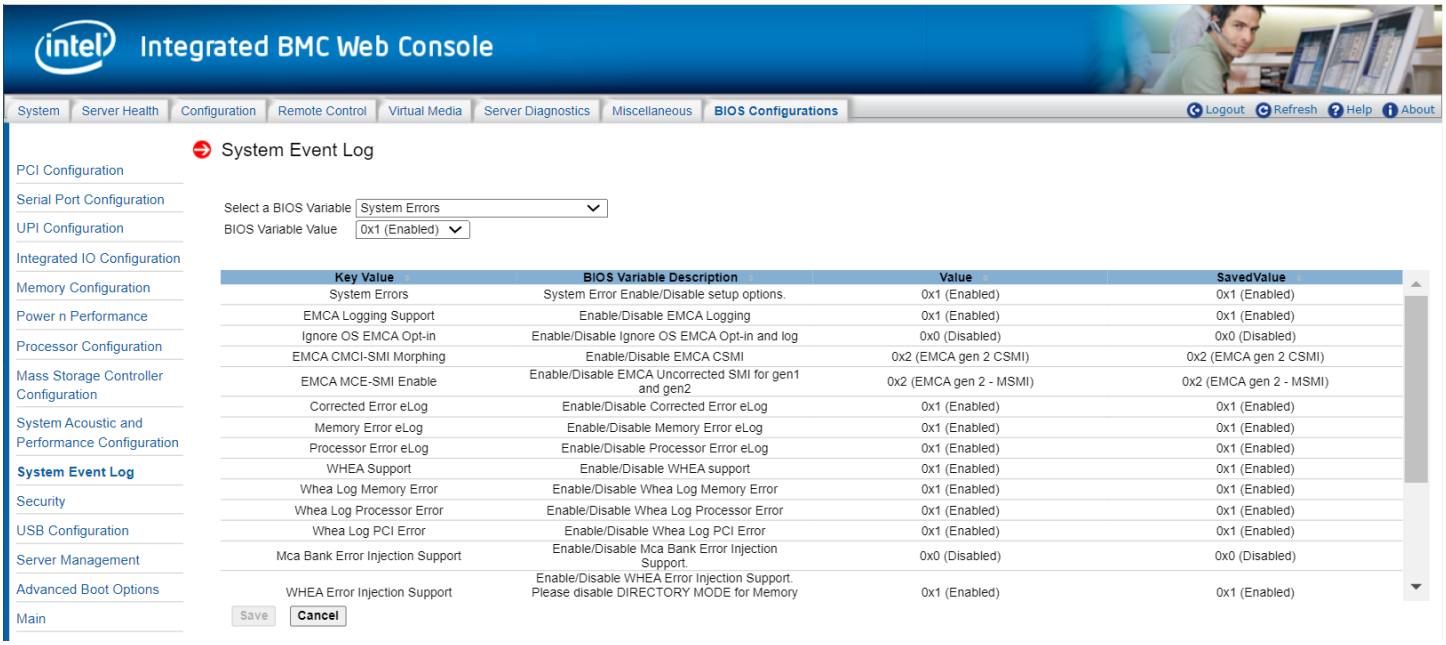

Figure 106. System Event Log Page

7.8.11 Security

This page allows the user to configure BIOS security variables, such as power-on password, front panel lockout, TPM administrative control. See Figure 107 for details. Table 40 lists all security variables that can be viewed and edited.

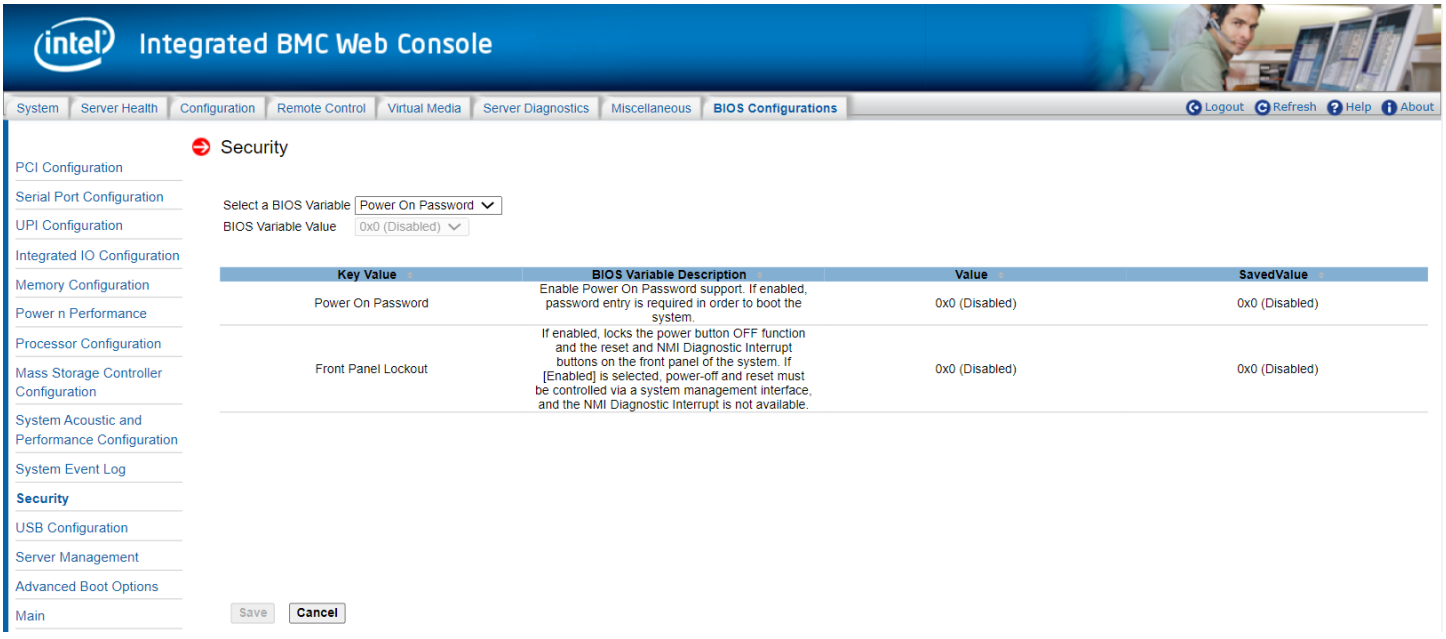

Figure 107. BIOS Security Configuration Page

Table 40. BIOS Security Variables

Variables	BIOS Variable Description
Power On Password	Enable Power On Password support. If enabled, password entry is required in order to boot the system.
Front Panel Lockout	If enabled, locks the power button OFF function and the reset and NMI Diagnostic Interrupt buttons on the system's front panel. If [Enabled] is selected, power-off and reset must be controlled via a system management interface, and the NMI Diagnostic Interrupt is not available.

7.8.12 USB Configuration

This page allows the user to enable/disable legacy USB support/port 60 and port 64 emulation/make USB device non-bootable, configure device reset timeout for USB device. See Figure 108 for details. Table 41 lists all USB configuration variables that can be viewed and edited.

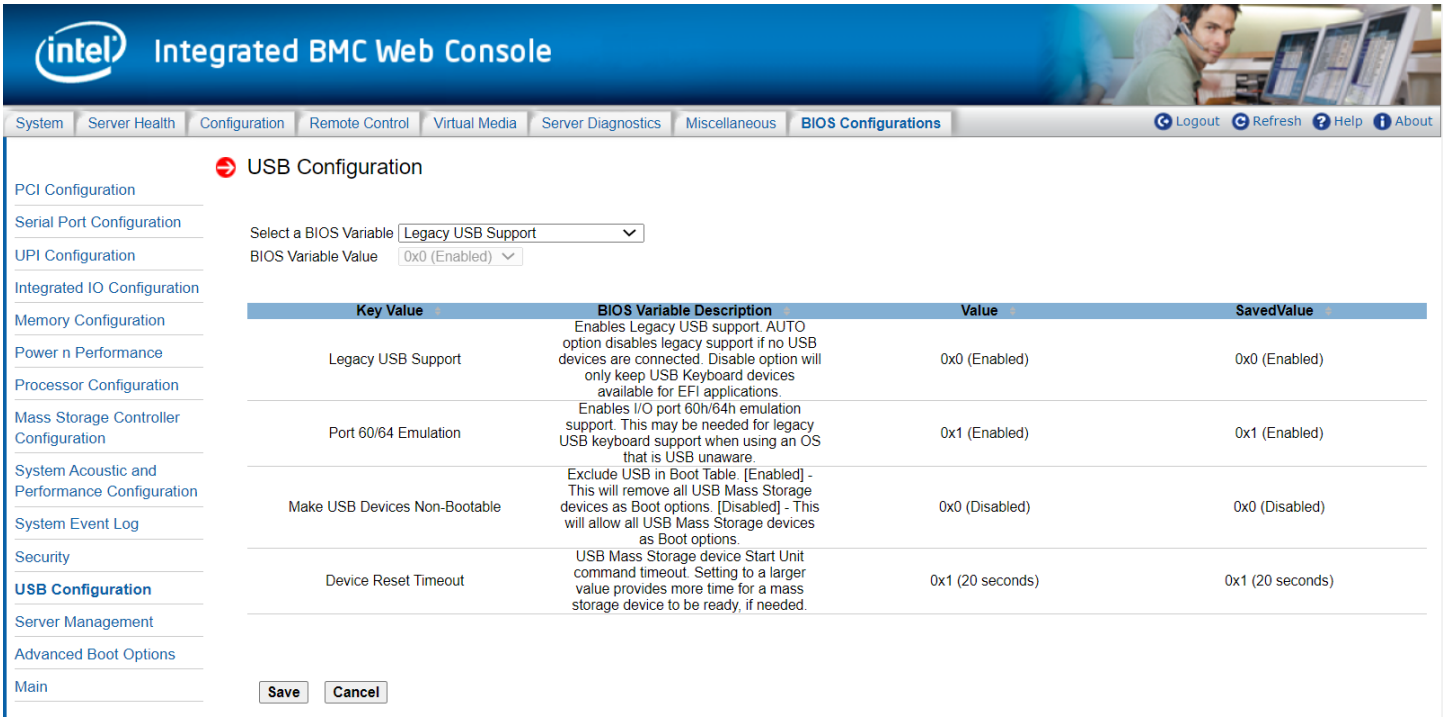

Figure 108. BIOS USB Configuration Page

Table 41. BIOS USB Configuration Variables

Variables	BIOS Variable Description
Legacy USB Support	Enables Legacy USB support. AUTO option disables legacy support if no USB devices are connected. Disable option will only keep USB Keyboard devices available for EFI applications.
Port 60/64 Emulation	Enables I/O port 60h/64h emulation support. This may be needed for legacy USB keyboard support when using an OS that is USB unaware.
Make USB Devices Non-Bootable	Exclude USB in Boot Table. [Enabled] - This will remove all USB Mass Storage devices as Boot options. [Disabled] - This will allow all USB Mass Storage devices as Boot options.
Device Reset Timeout	USB Mass Storage device Start Unit command timeout. Setting to a larger value provides more time for a mass storage device to be ready, if needed.

7.8.13 Server Management

The page allows the user to configure server management features, such as Console redirection enabling. See Figure 109 for details. Table 42 lists all options that can be viewed and edited.

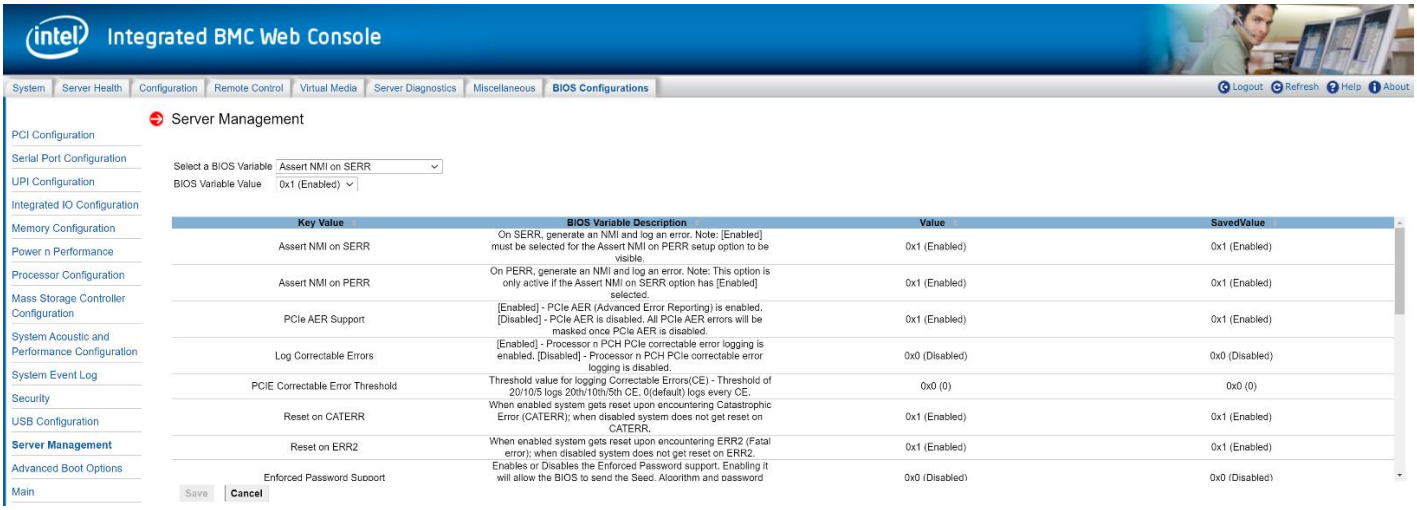

Figure 109. BIOS Server Management Page

Table 42. Server Management

Variables	BIOS Variable Description
Assert NMI on SERR	On SERR, generate an NMI and log an error. **Note:** [Enabled] must be selected for the Assert NMI on PERR setup option to be visible.
Assert NMI on PERR	On PERR, generate an NMI and log an error. **Note:** This option is only active if the Assert NMI on SERR option has [Enabled] selected.
PCIe AER Support	[Enabled] – PCIe* AER (Advanced Error Reporting) is enabled. [Disabled] - PCIe* AER is disabled. All PCIe* AER errors will be masked once PCIe* AER is disabled.
Log Correctable Errors	[Enabled] - Processor n PCH PCIe* correctable error logging is enabled. [Disabled] - Processor n PCH PCIe* correctable error logging is disabled.
PCIE Correctable Error Threshold	Threshold value for logging Correctable Errors(CE) - Threshold of 20/10/5 logs 20th/10th/5th CE, 0(default) logs every CE.
Reset on CATERR	When enabled system gets reset upon encountering Catastrophic Error (CATERR); when disabled system does not get reset on CATERR.
Reset on ERR2	When enabled system gets reset upon encountering ERR2 (Fatal error); when disabled system does not get reset on ERR2.
Enforced Password Support	Enables or Disables the Enforced Password support. Enabling it will allow the BIOS to send the Seed, Algorithm, and password information to the BMC.
Power Restore Delay	Allows a delay in powering up after a power failure, to reduce peak power requirements. The delay can be fixed or automatic between 60–300 seconds.
Power Restore Delay Value	Fixed time period 60–300 seconds for Power Restore Delay.
FRB-2 Enable	Fault Resilient Boot (FRB). The BIOS programs the BMC watchdog timer for approximately 6 minutes. If the BIOS does not complete POST before the timer expires, the BMC will reset the system.
OS Boot Watchdog Timer	The BIOS programs the watchdog timer with the timeout value selected. If the OS does not complete booting before the timer expires, the BMC will reset the system and an error will be logged. Requires OS support or Intel Management Software Support.
OS Boot Watchdog Timer Policy	If the OS watchdog timer is enabled, this is the system action taken if the watchdog timer expires. [Reset] - System performs a reset. [Power Off] - System powers off.
OS Boot Watchdog Timer Timeout	If the OS watchdog timer is enabled, this is the timeout value the BIOS will use to configure the watchdog timer.

Variables	BIOS Variable Description
Plug n Play BMC Detection	If enabled, the BMC will be detectable by operating systems that support plug and play loading of an IPMI driver. Do not enable this option if the corresponding OS does not support this driver.
Console Redirection	Console redirection allows a serial port to be used for server management tasks. [Disabled] - No console redirection. [Serial Port A/B] - Configure serial port A/B for console redirection. Enabling this option will disable display of the Quiet Boot logo screen during POST. [Advanced - Serial Port Configuration - Serial A/B Enable] needs be enabled before enabling this option.
Flow Control	Flow control is the handshake protocol. This setting must match the remote terminal application. [None] - Configure for no flow control. [RTS/CTS] - Configure for hardware flow control.
Baud Rate	Serial port transmission speed. This setting must match the remote terminal application.
Terminal Type	Character formatting used for console redirection. This setting must match the remote terminal application.
Legacy OS Redirection	This option enables legacy OS redirection (i.e., DOS) on serial port. If it is enabled, the associated serial port is hidden from the legacy OS.
Terminal Resolution	Remote Terminal Resolution.

7.8.14 Advanced Boot Options

This page allows the user to configure advanced boot options. See Figure 110 for details. Table 43 lists all Advanced Boot Options that can be viewed and edited.

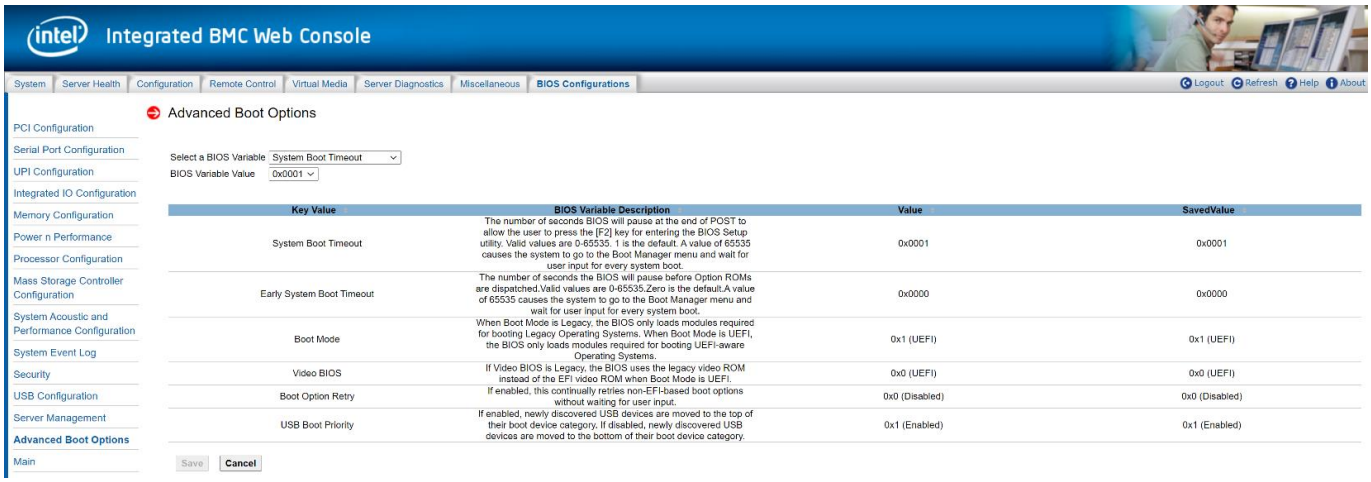

Figure 110. BIOS Advanced Boot Page

Table 43. BIOS Advanced Boot

Variables	BIOS Variable Description
System Boot Timeout	The number of seconds BIOS will pause at the end of POST to allow the user to press the [F2] key for entering the BIOS Setup utility. Valid values are 0–65535. 1 is the default. A value of 65535 causes the system to go to the Boot Manager menu and wait for user input for every system boot.
Early System Boot Timeout	The number of seconds the BIOS will pause before Option ROMs are dispatched. Valid values are 0–65535.Zero is the default. A value of 65535 causes the system to go to the Boot Manager menu and wait for user input for every system boot.
Video BIOS	When Boot Mode is Legacy, the BIOS only loads modules required for booting Legacy Operating Systems. When Boot Mode is UEFI, the BIOS only loads modules required for booting UEFI-aware Operating Systems.
Boot Option Retry	If enabled, this continually retries non-EFI-based boot options without waiting for user input.
USB Boot Priority	If enabled, newly discovered USB devices are moved to the top of their boot device category. If disabled, newly discovered USB devices are moved to the bottom of their boot device category.

7.8.15 Main

This page allows the user to configure main BIOS variables, such as quiet boot. See Figure 111 for details. Table 44 lists all main BIOS variables that can be viewed and edited.

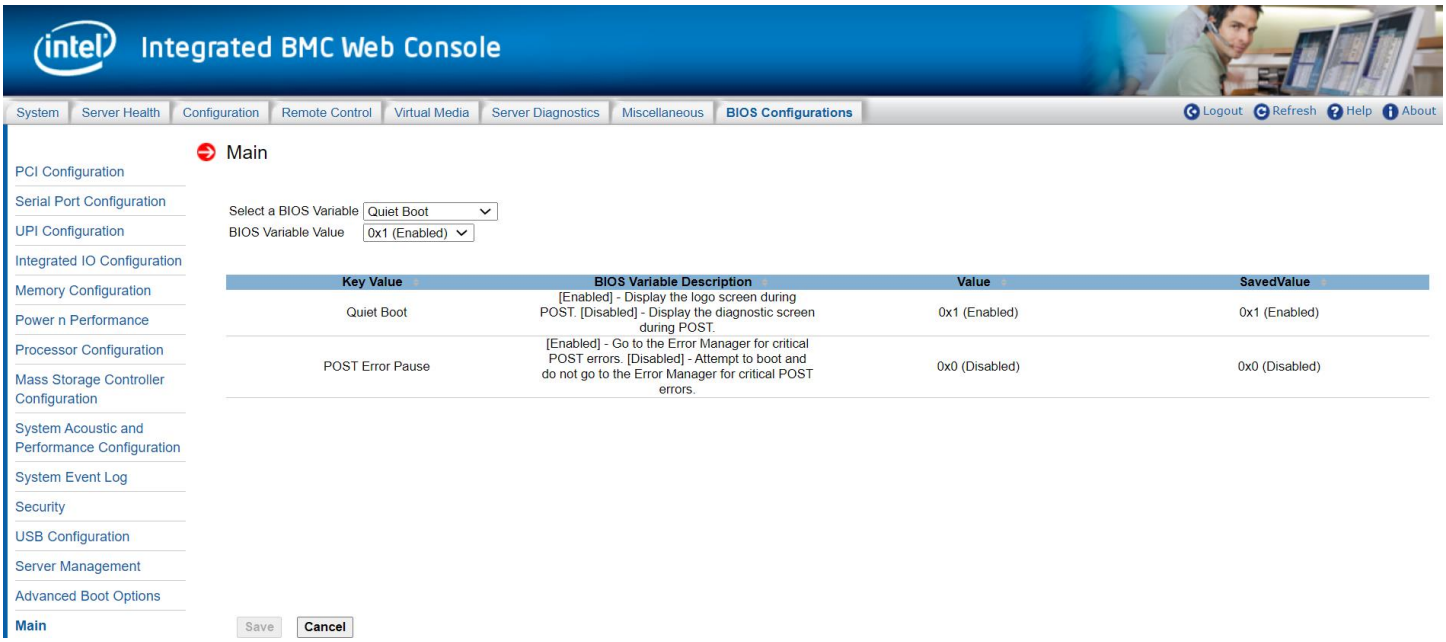

Figure 111. BIOS Main Page

Table 44. BIOS Main Configuration Variables

Variables	BIOS Variable Description
Quiet Boot	[Enabled] - Display the logo screen during POST. [Disabled] - Display the diagnostic screen during POST.
POST Error Pause	[Enabled] - Go to the Error Manager for critical POST errors. [Disabled] - Attempt to boot and do not go to the Error Manager for critical POST errors.

Appendix A. Glossary

Term	Definition
ARP	Address Resolution Protocol
Intel® ASMI	Intel® Advanced Server Management Interface
BMC	Baseboard Management Controller
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
HI	Host Interface
ICMP	Internet Control Message Protocol
IPMI	Intelligent Platform Management Interface
KVM	Keyboard, Video, Mouse
LAN	Local Area Network
LDAP	Lightweight Directory Address Protocol
MAC	Media Access Controller
MII	Media Independent Interface
NIC	Network Interface Controller
Intel® NM	Intel® Node Manager
OOB	Out Of Band – no operating system interaction on server
Intel® RMM4	Intel® Remote Management Module 4
SDR	Sensor Data Record
SOL	Serial-over-LAN
TCP/IP	Transmission Control Protocol/Internet Protocol
UDP	User Datagram Protocol
VLAN	Virtual Local Area Network
KCS	Keyboard Controller Style