Managing an Intel® Server System 2020

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64-bit computing on Intel architecture Requires a system with a 64-bit enabled processor, chipset, BIOS and software. Performance will vary depending on the specific hardware and software you use. Consult your PC manufacturer for more information. For more information, visit http://www.intel.com/info/em64t

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FIRMWARE UPDATE PACKAGE (SUP)

The Firmware Update Package (SUP) is released by Intel on a quarterly basis and is used to update the Firmware (FW) of an Intel server system through the EFI shell. The SUP package includes the following:

- BIOS - <Version_BOOT.signed.cap>
- BMC (Baseboard management controller) <Version.bin>
- ME (Management Engine) <Version_ME.signed.cap>
- FD (Flash Descriptor) <Version_FD.signed.cap>
- SDR (Sensor Data Record) <Plaftom.sdr>
- FRU (Field Replaceable Unit) - <Platform_Configuragiotn.fru>

- The SUP package includes utilities to flash the firmware components as follows:
  - iflash32.efi – update BIOS, ME and FD
  - frusdr.efi – update FRU&SDR
  - fwpiaupd.efi – update BMC
- The SUP package includes scripts (.nsh) to automate the firmware update . The file “Master.cfg” helps during the installation to identify the system configuration to install the proper and the Sensor Data Record (SDR) installation based on the FRU (Field Replaceable Unit

SOFTWARE FIRMWARE UPDATE PACKAGE (SFUP)

The System Firmware Update Package (SFUP) is released by Intel on quarterly basis and is used to update the Firmware (FW) of an Intel server system from the Operating systems (Windows® and Linux®). To use the SFUP, one first needs to install the Intel® One-boot Flash Update (OFU) tool.

- The SFUP includes the following binary files.
  - BIOS - <Version_BOOT.signed.cap>
  - BMC (Baseboard management controller) <Version.bin>
  - ME (Management Engine) <Version_ME.signed.cap>
  - FD (Flash Descriptor) <Version_FD.signed.cap>
  - SDR (Sensor Data Record) <Plaftom.sdr>
  - FRU (Field Replaceable Unit) - <Platform_Configuragiotn.fru>
- The customizable file “flashupdt.cfg” included in the package is used to select the FW component to install.

Notice: The OFU cannot be used to install a SUP. SUPs are only installable through EFI, while SFUPs are installable using the OFU.

UPDATING SYSTEM FIRMWARE FROM UEFI

1. Download the SUP package of your Intel® Sever System
2. Unzip the package into the USB Root
3. Insert the USB in your Intel® Server System
4. Boot your Intel® Server System to the USB pressing “F6” key and then select “Boot to EFI shell”
5. Automatically the system will run the “Startup.nsh” script that will update the all FW components.
6. If the user only wants to update a specific component, they can press the “esc” key when starting the “EFI shell” and then run the update script for component required.

- The available scripts in the SUP are:
  - Startup.nsh – Install all fw components
  - UpdBios.nsh - Installs only BIOS
  - UpdFD.nsh – Installs only Flash descriptor (ME)
  - FwUpdateBMC.nsh – Installs the Baseboard Management Controller (BMC)
  - UpdMe.nsh – Installs only Management Engine (ME)
  - UpdS9200WKFRUSDR.nsh – Installs the Sensor Data Record (SDR) and Field Replaceable Unit (FRU)

DEMO FW UPDATE FROM EFI

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How to install Intel® One-boot Flash Update tool (OFU) in Linux.

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UPDATING SYSTEM FIRMWARE FROM OS

Prerequisite: The supported Operating System (Windows* or Linux*) must have installed the Intel® One Boot Flash Update Utility (OFU).

- Update from Linux /Windows ®

1. Download the Software Firmware Update Package (SFUP) that is applicable for your server by searching for your system family and picking the BIOS that can be applied using OFU (e.g. Intel® Server Board S2600BP Family BIOS and Firmware Update for Intel® One Boot Flash Update (Intel® OFU) and WinPE)"
2. Unzip the SFUP package into a folder
3. Run the following command in the Windows* command line/Linux* terminal window: from folder <OFU _Install_folder name>:\flashupdt -u <SFUP_folder_name>\flashupdt.cfg
4. Reboot the system to apply the BIOS and ME to finalize the firmware installation

- The user can refer to the SFUP release notes to follow the process of updating the firmware using Windows® PE.

DEMO FW update from OS

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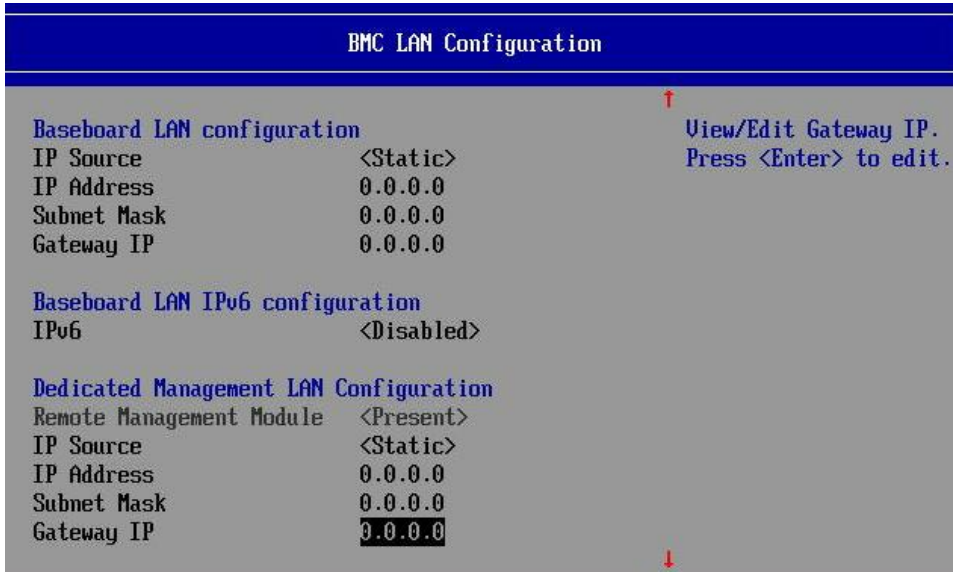
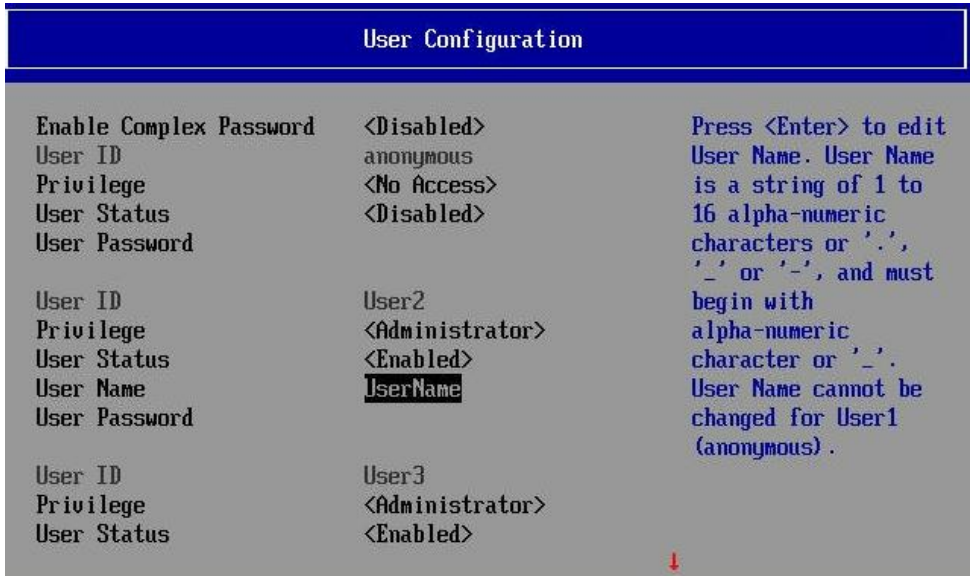
BMC INITIAL SETUP

1. Turn on the server system
2. Press the “f2” key during the system boot and enter the BIOS menu
3. Go to “Setup Server Management” -> “BMC LAN Configuration”
4. Select “BMC LAN Configuration” and configure a valid IP address of the “Dedicated Management Port”
5. Select “User Configuration” and enable the Administrator account, name and password





BMC WEB

RMM4 BMC User Guide

System	Server Health	Configuration	Remote Control	Virtual Media	Server Diagnostics	Miscellaneous	BIOS Configurations
System Information	Sensor Readings	Alerts	KVM/Console Redirection	Virtual Media over HTML5	System Diagnostics	NM Configuration	NIC Configuration
FRU Information	Event Log	Alert Email	Server Power Control	Web ISO	POST Codes	Power Statistics	PCI Configuration
CPU		IPv4 Network	Launch SOL		System Debug Logs	Power Telemetry	Serial Port Configuration
DIMM Information		IPv6 Network	Virtual Front Panel		SOL log		UPI Configuration
NVMe Information		VLAN	iKVM over HTML5				Integrated IO Configuration
Current Users		LDAP					Memory Configuration
		KVM & Media					Power n Performance
		SSL Certification					Mass Storage Controller Configuration
		User					System Acoustic and Performance Configuration
		Security Settings					System Event Log
		SDR Configuration					FPGA Configuration
		SOL					Override ICC Spread Spectrum Configuration
		BMC Firmware Update					Security
		BIOS/ME Firmware Update					USB Configuration
		Syslog Server Configuration					Server Management
							Advanced Boot Options
							Main

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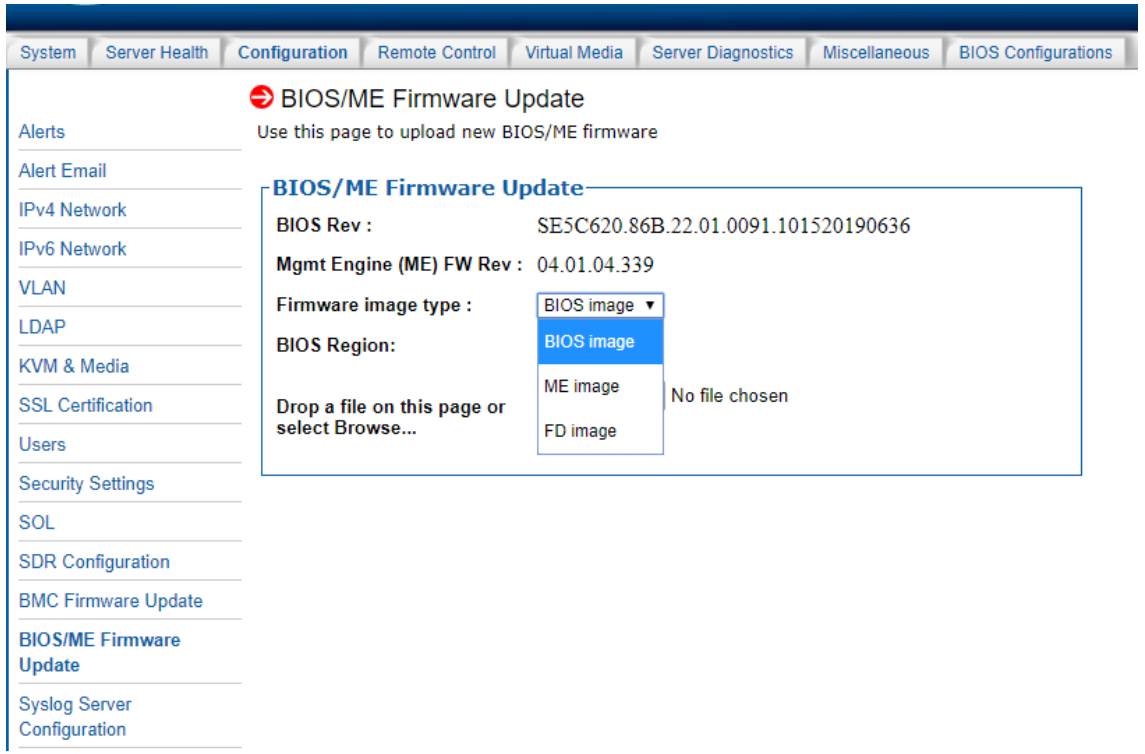
FIRMWARE UPDATE FROM BMC WEB

A system administrator can update the FW from the BMC Web, and select the specific component to flash (BIOS, BMC, FD,ME, FRU, SDR).

- The BMC must be previously configured with a valid IP address and Administrator account.
  1. Type the BMC IP address in the browser.
  2. Log on using Administrator credentials
  3. Select the “Configuration” tab
- If you plan to update the BMC then
  1. Select “BMC Firmware Update”
  2. Click on “Choose File”
  3. Pick the appropriate BMC .BIN file (e.g. “Purley_2.42.d0b788a4.bin”)
  4. Click on “Upload”



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FIRMWARE UPDATE FROM BMC WEB: CONTINUED

If you plan to update the BIOS or the Management Engine Firmware, or the FD image, select “BIOS/ME Firmware Update”

If you plan to update the BIOS

1. Select “BIOS Image” from the “Firmware image Type” combo-box.
2. Select “Choose File” and pick the appropriate signed BOOT .CAP file (e.g. “R02010011_Production_ACM_TXT_BOOT.signed.CAP”)

If you plan to update the ME,

1. Select “ME Image” from the “Firmware image Type” combo-box.
2. Select “Choose File” and pick the appropriate signed ME .CAP file (e.g. “R02010011_Production_ACM_TXT_ME.signed.CAP”)

If you plan to update the FD,

1. Select “FD Image” from the “Firmware image Type” combo-box.
2. Select “Choose File” and pick the signed FD .CAP file (e.g. “R02010011_Production_ACM_TXT_FD.signed.CAP”)
3. After you are done with your selection, click the “Upload” button

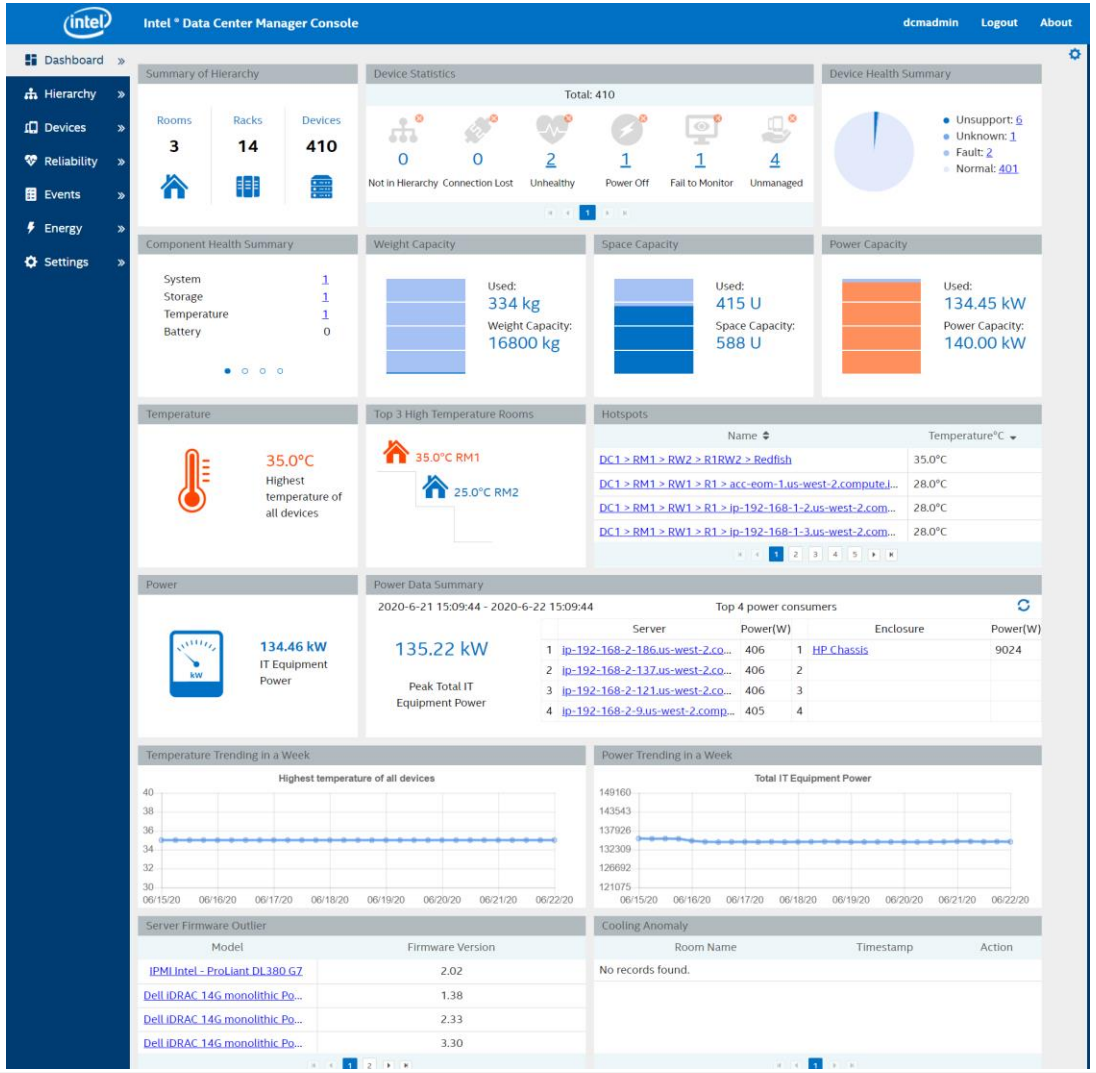
Notice: Reboot the system by going to menu item “Remote Control”, and then sub-menu item “Server Power Control”, then select the “Power Cycle Server” radio button and then the “Perform Action” button.

INTEL® DCM OVERVIEW

Intel® Data Center Manager (DCM) is an out-of-band software solution for monitoring and managing the inventory, utilization, health, power, and thermals of servers and a variety of other types of IT devices.

Intel DCM is the official manageability solution for all Intel Server Systems with Intel® Remote Management Module (RMM4). With its simple and intuitive Web-based interface, users can easily accomplish provisioning tasks such as firmware updates and configuration changes.

Intel® DCM Download/Documentation



Reach out to dcmsales@intel.com for more information

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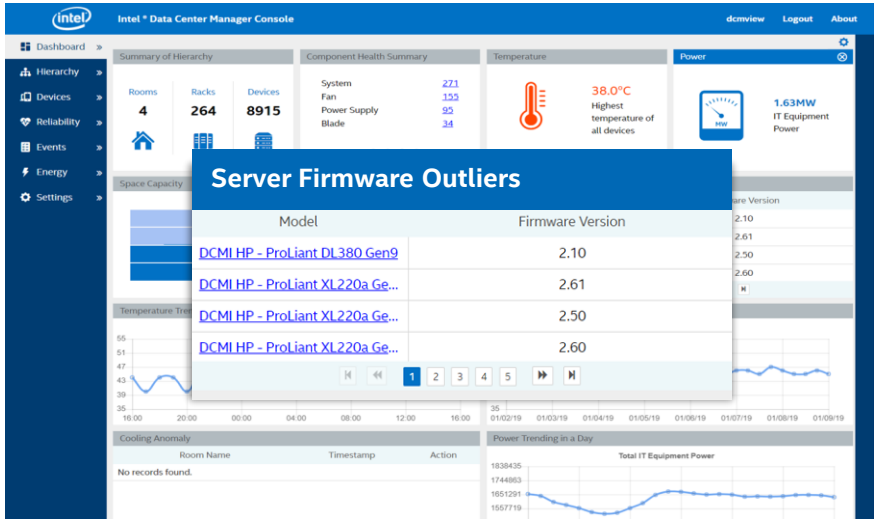
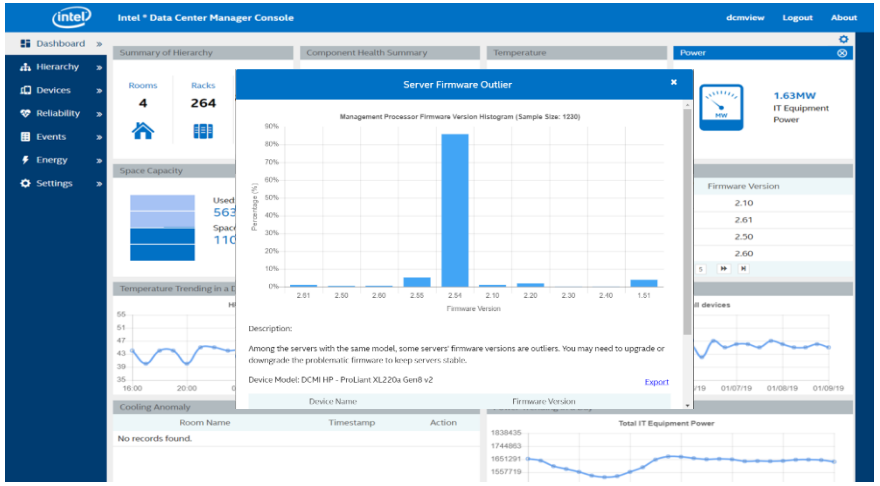
IDENTIFYING SERVER FIRMWARE VERSION OUTLIERS USING INTEL® DCM

- When users manage servers using Intel® DCM, they can see the firmware version of each server
- Users can also see firmware version differences between servers of the same model using the “firmware version outlier” feature
- This feature can be used to ensure that servers are running with the best health, performance, reliability and security features





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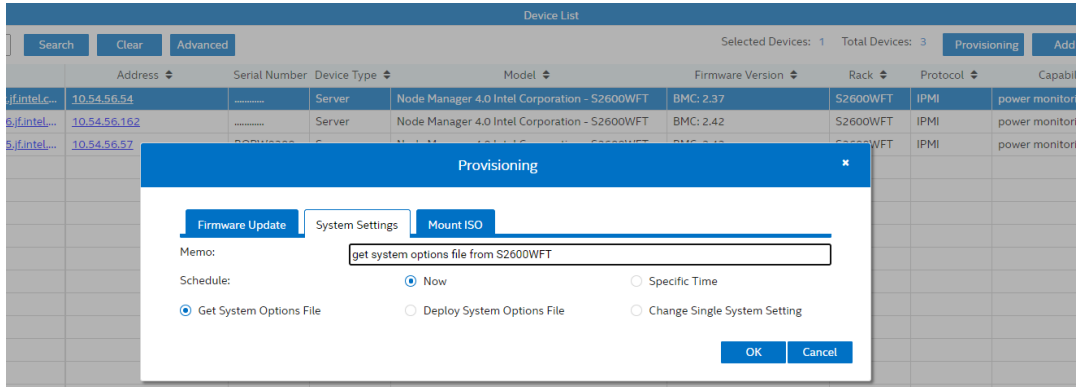
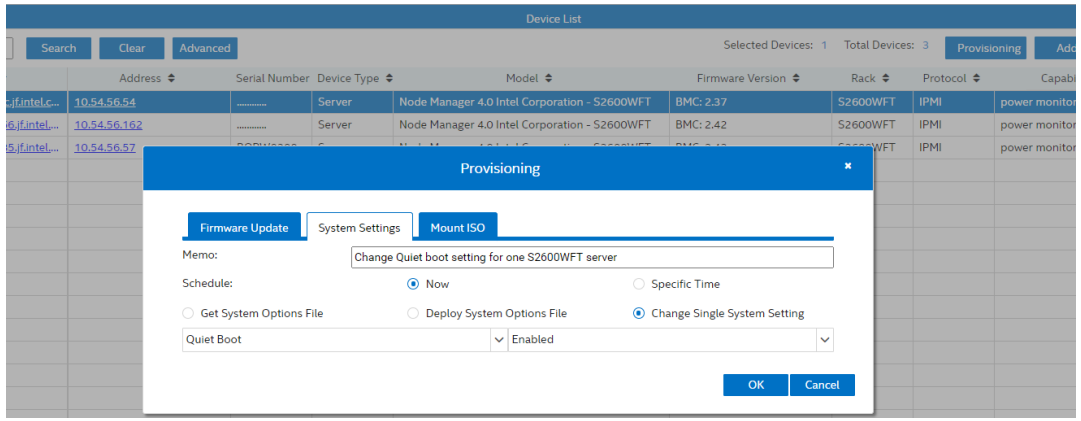
UPDATING SYSTEM SETTINGS FROM INTEL® DCM

- Users can create an options file that contains all the system settings for a single Intel System Server
- Users can edit this file locally, then deploy it to any number of servers of the same model to ensure that they all have the same settings
- There is also the option to change a single system setting for a server such as “Quiet Boot”, along with other settings





Notice: Tasks like FW updating, getting or setting system settings require a server reboot.

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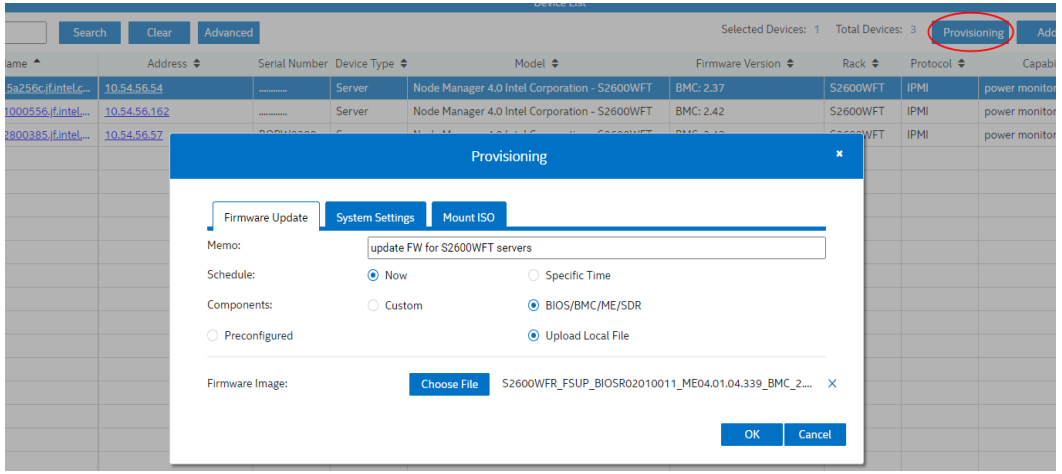
UPDATING SERVER FIRMWARE FROM INTEL® DCM

- Users can create provisioning tasks to update the firmware of one or more Intel System Servers of the same model using a single SFUP package as shown in the image
- Users can also create or choose a custom package to do EFI-based firmware updates of other components including NVMe, SSD, Networking, RAID, among others.



Notice: Server firmware updating via DCM is currently only possible for Intel Server systems.

DEMO FW Update from Intel® DCM

Click here

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SYSTEM CONFIGURATOR TOOL (SYSCFG)

The Intel® Save and Restore System Configuration Utility (SYSCFG) is used for saving and restoring firmware and BIOS settings to a binary/INI file, and for configuring firmware and BIOS settings through a command-line interface. The utility can:

- Display or set a variety of system BIOS and management firmware settings
- Save system settings to or restore them from a file
- Save system Debug Logs

Examples of SysCFG commands to do the BMC initial setup (alternative method).

- Set BMC LAN channel to DCHP/Static IP address
  - syscfg.efi /le <Channel#> dhcp
  - syscfg.efi /le <Channel#> static <IPaddress> <subnet>
- Create admin user account
  - syscfg.efi /u <User_id> <User_Name> <Password>
  - syscfg.efi /up <UserAccount> <User_id> ADMIN
- Enable user account on Lan channel
  - syscfg.efi /ue <user_id> enable <LAN_Chanel>
- Set user privileges
  - Syscfg.efi /up <user_id> <LAN_channel> operator\admin
- Display and change Boot order
  - Syscfg.efi /bbo
  - Syscfg.efi /bbo “” EFI NW HDD DVD
- Save and restore BIOS settings (.ini file)
  - Syscfg.efi /s <filename.ini>
  - Syscfg.efi /r <filename.ini>

SYSCFG GUIDE

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OVERVIEW OF THE INTEL® SDPTOOL

Intel® Server Debug and Provisioning (SDPTool) is a single-server tool to debug and provision Intel® Server Boards and Intel® Server Systems remotely through BMC Out-of-band network. SDPTool can run over Linux® or Windows® Operating Systems. User Guide.

SDPTool Features

- SDPtool Can be integrated into Intel® DCM
- Collect and modify settings (BIOS, BMC, Power, among others…)
- Collect information of server system components (Sensors and logs)
- Remote Media redirection and KVM
- Perform FW update

Notice: Refer to SDPtool installation release notes for supported Operating Systems distributions.

FIRMWARE UPDATE WITH SDPTOOL

Using SUP folder, Run from Windows* command prompt (CMD) or from Linux terminal the following SDPtool command.

- SDPTool <ipv4> <Username> <password> update <SUP folder> [-no_user_interaction] [-softreset]

To update the BIOS/ME/BMC/SDR system firmware, an SUP package must be used instead of a SFUP package. This feature makes use or flash utilities and images within the SUP package.

- -no_user_interaction: flag to reboot the system without prompt
- -softreset: flag to soft reboot the system in case the system is in OS mode.

Example: SDPTool 192.168.1.10 admin admin123 update SUP/S2600WT

Notice: SUP_folder – Path to update the package (SUP) is required and to be provided as argument.

SYSTEM INFORMATION TOOL (SYSINFO)

The Intel® System Information retrieval tool (Sysinfo) is a tool used to collect information from the server system:

- Platform information: Hardware configuration, sensor readings, BIOS/BMC versions and settings, SEL, etc.
- OS information: OS version, SP version, Software/Application version and OS logs.
- RAID information: RAID configuration, settings and RAID logs

It can run from UEFI and Operating Systems (Windows® and Linux®).

- Intel® System Information User guide

DEMO SYSINFO

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BIOS RECOVERY JUMPER

The BIOS recovery jumper is used when the BIOS has become corrupted and is non-functional, once the jumper is enabled the system boots to a secondary pre-loaded BIOS image and enables the customer to load a new BIOS image to replace the corrupted primary one. Also the BIOS recovery jumper might be required if FW installed has a security revision that prevents do perform FW downgrade.

Notice: The BIOS recovery jumper is located inside of the server system and varies on each Intel® Server System, please refer to the Technical Product Specifications document of your Server.

BIOS RECOVERY JUMPER: CONTINUED

1. Power down the compute module.
2. Look inside of server and locate the jumper. Refer to the Product Family Setup and Service Guide of your server product.
3. Move the “BIOS Recovery” jumper from pins 1 – 2 (default) to pins 2 – 3 (BIOS recovery position).
4. Re-install any removed server assembly if was needed to move the jumper.
5. Power on the server. The system automatically boots to the EFI shell.
6. Update the BIOS using the standard BIOS update instructions provided with the System Firmware Update Package (SFUP).
7. After the BIOS update completes successfully, power down the server.
8. Move the BIOS recovery jumper back to pins 1 – 2 (default).
9. Re-install any riser assembly if needed.
10. Power on the compute module. During POST, press <F2> to access the BIOS setup utility to configure and save desired BIOS options.

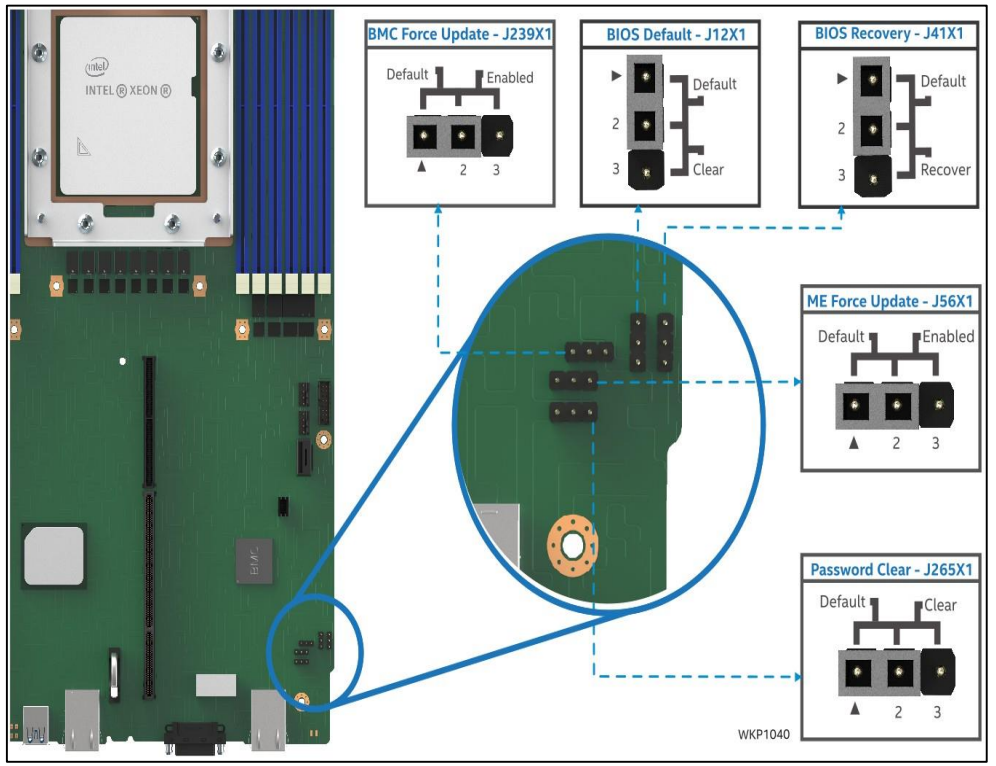

Image of Jumper location in a Intel® Server System S9200WK

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RAID

User Guide

ERST2

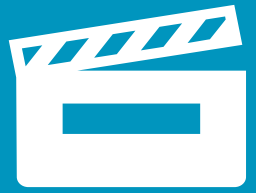
User Guide

Intel® VROC

User Guide

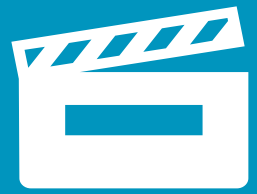
DEMO RAID Configurations

VROC-SATA



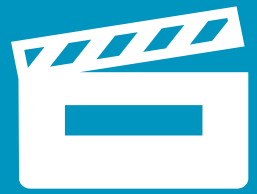
Encryption

from BIOS

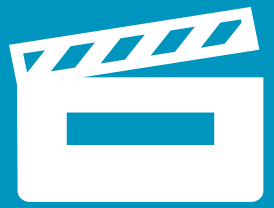


Encryption

from Linux

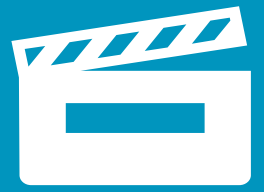


ESRT2



Configure

VROC



RAID controller

FW update

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IPMI COMMANDS

The Intelligent Platform Management Interface (IPMI) is a set of computer interface specifications used by the BMC that provides management and monitoring capabilities independently of the host system's CPU, firmware (BIOS or UEFI) and operating system. IPMI command line tool.

Chassis command examples
ipmitool –I lanplus -H 192.168.10.1 -Uadmin –P password - c17 chassis status
ipmitool –I lanplus -H 192.168.10.1 -Uadmin –P password - c17 chassis power on
ipmitool –I lanplus -H 192.168.10.1 -Uadmin –P password - c17 chassis power off
ipmitool –I lanplus -H 192.168.10.1 -Uadmin –P password - c17 chassis power cycle

Disable Cold Redundancy - CR feature disable raw
ipmitool raw 0x30 0x2d 0x01 0x00

Enable Cold Redundancy - CR feature enable raw
ipmitool raw 0x30 0x2d 0x01 0x01

Get Cold Redundancy - Setting status
ipmitool raw 0x30 0x2e 0x00

Get Cold Redundancy Status- CR feature status raw
ipmitool raw 0x30 0x2e 0x01

Get PSU FW Revisions raw
ipmitool -H SUTIPAddress -U SUTUserName -P SUTPass raw 0x06 0x52 0x0f 0xb0 0x04 0xD9 <-- MRF_FW_REVISION for PSU1
ipmitool -H SUTIPAddress -U SUTUserName -P SUTPass raw 0x06 0x52 0x0f 0xb2 0x04 0xD9 <-- MRF_FW_REVISION for PSU2
ipmitool -H SUTIPAddress -U SUTUserName -P SUTPass raw 0x06 0x52 0x0f 0xb4 0x04 0xD9 <-- MRF_FW_REVISION for PSU3

Notice: Add switch "–I lanplus" to run remotely: ipmitool.efi –I lanplus –H <Remote_Host_IP_Address> -U <User> -P <Password> command

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IPMI COMMANDS: CONTINUED

Read/dump the FRU information
ipmitool –I lanplus -H 192.168.10.1 -Uadmin –P password - c17 fru

Show all SDR Types Available
ipmitool –Ilanplus -H192.168.1.170 -U admin -P password - c17 sdr type help

BMC Cold Reset
ipmitool –Ilanplus -H192.168.1.170 -U admin -P password - c17 bmc reset cold
ipmitool raw 0x30 0x2d 0x01 0x01

Read/dump the SDR information
ipmitool –I lanplus -H 10.55.55.32 -U admin -P password - c17 sdr

Clear SEL entries
ipmitool –I lanplus -H 10.55.55.32 -U admin -P password - c17 sel cl
LAN command examples – configuring BMC (channel 3, userid 2)
ipmitool lan set 3 access on
ipmitool lan set 3 ipsrc static
ipmitool lan set 3 ipaddr <BMC_IP_Address> netmask <Net_Mask>
ipmitool user enable 2
ipmitool user set name 2 admin

Set privilege for user id 2 (root) to admin (1-Call Back, 2-User, 3-Operator, 4-Administrator, 5-OEM Proprietary, F-No Access)
ipmitool user priv 2 4 3

Set access to user and provide privileges
ipmitool channel setaccess 2 2 callin=on link=off ipmi=on privilege=4

Set the LAN
ipmitool lan set 2 access on
ipmitool lan set 2 ipsrc static
ipmitool lan set 2 ipaddr <BMC_IP_Address>
ipmitool lan set 2 netmask <Net_Mask>
ipmitool lan set 2 auth admin password

Get BIOS info; entire record; start at 0
ipmitool raw 0x30 0x27 0x00 0xFF 0x00
Response Data (convert from Hex to Dec and then to ASCII)
23 53 45 35 43 36 30 30 2e 38 36 42 2e 30 31 2e *** 35 (23h) bytes *** SE5C600.86B.01.
30 33 2e 30 30 30 32 2e 30 36 32 30 32 30 31 32 *** 03.0002.06202012
31 35 30 34 *** 1504
BIOS version = SE5C600.86B.01.03.0002.062020121504

CUSTOMIZING THE "MASTER.CFG" FILE

The "Master.cfg" file is included in the SFUP firmware update package and is used during the installation process to identify the system's configuration and consequently install the proper SDR based on the FRU. During the FW installation the master file displays a menu prompting for user interaction. Users can modify the "Master.cfg" file to customize this menu. For example, they can comment out the lines as follows to skip the menu prompts.

```
//   DISPLAY      ""
//    MENUTITLE     "Select the function you want to perform:"
//    MENU         "SDR"      "Update only the SDR"
//    MENU         "FRU"      "Update only the FRU"
//    MENU         "BOTH"     "Update both the SDR and the FRU"
//    MENU         "ASSET"    "Modify the Asset Tag Only"
//    MENU         "FCT"      "Functional Test"
//    MENU         "FOQM"     "Functional Outgoing Manufacturing Test"
//    MENU         "SHIPPING"  "Default shipping configuration"
//    MENU         "EXIT1"    "Exit FRU/SDR update"
//    MENUPROMPT
      DISPLAY      " "

//    IFSET "BOTH"
          SET "SDR"
//        SET "FRU"
//    ENDIF
```

Notice: Intel® does not recommend modify the Master.cfg without the proper technical knowledge

CUSTOMIZING THE "FLASHUPDT.CFG" FILE

The "flashupdt.cfg" file is included in the SFUP firmware update package and is used to select which firmware component to install. The user can prevent FW components from install by commenting out the appropriate lines using "//". Below is an sample "flashupdt.cfg" file that has been edited with comments to only install the BMC and BIOS, but not install ME, FD, and FRU/SDR.

```
FWDNAME   "Purley_2.41.a443c540.bin"  filetype=fwimg
//   To Update BackupBios image, uncomment the following instruction with the correct BIOS cap file
BIOSNAME  "22010092_BOOT.signed.cap" UpdateBackupBios
//IMENAME   "22010092_ME.signed.cap"
//BIOSNAME  "22010092_FD.signed.cap"
//CFGNAME   "master.cfg"

// End of configuration file
```

RETRIEVING LOGS: 5 TYPES OF LOGS

There are 5 types of logs that are worth noting:

1. **System Debug Log (SDL):** This is the most complete log and is used to troubleshoot BMC and system level issues.
2. **System Event Log (SEL):** Provides logs of system during a period of time, but not BMC logs.
3. **Sensor Readings:** Real time system sensor readings. Helps monitor system temperature, voltage system fans, voltage, etc.
4. **POST codes:** Logs BIOS POST codes from the previous and current boots. Used when the system is not booting properly.
5. **SOL log.** This is disabled by default. When enabled, it dump the communication of the Serial Over LAN.

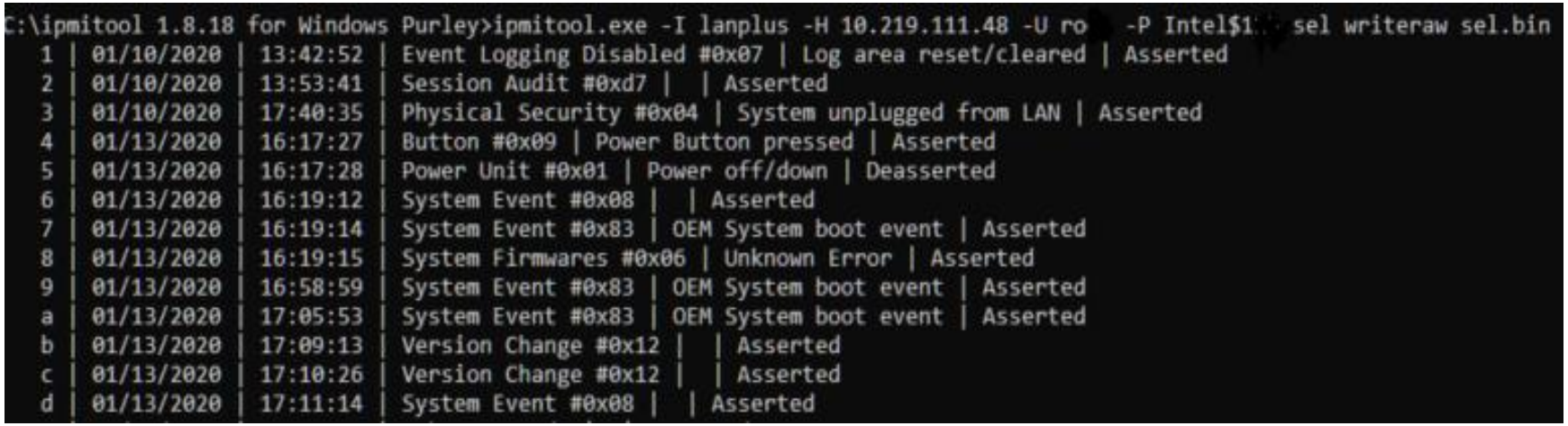
RETRIEVING LOGS: THROUGH EWS

The System Debug Logs (SDL) can be retrieved by logging onto the BMC Embedded Web Server (EWS) through the BMC IP address and clicking on the “Generate Log” button as shown below. A ZIP file will then be generated and listed. When the link is clicked on, the SDL ZIP file is downloaded.

RETRIEVING LOGS: THROUGH IPMI, SYSCFG AND SYSINFO

The System Event Log (SEL) can be retrieved by the following 3 methods:

1) By running the IPMI command: ipmitool –I lanplus –H <Host_IP> -U Ro –P Intel$ -c17 sel writeraw sel.bin



Notice: The user must have installed IPMItool v 1.8.18 or newer. The parameter –C17 is needed to operate with Chipper suite

2) By running the Syscfg command: ./syscfg /sbmcdl Public SysDebLog.zip

3) By running the Sysinfo command ./sysinfo

INTEL® MEMORY AND STORAGE TOOL – INTEL® MAS

The Intel® Memory and Storage Tool (Intel® MAS) is a drive management tool for Intel® SSD's and Intel® Optane™ memory devices, supported on Windows, Linux and ESXi*. Use this tool to manage PCIe*/NVMe- and SATA-based Client and Datacenter Intel® SSD devices and update to the latest firmware. Intel® MAS comes in 2 versions: a Command-Line Interface (CLI) and a Graphical_User Interface (GUI) version.

- Download the GUI version of Intel® Memory and Storage Tool from Here
- Download the CLI version of Intel® Memory and Storage Tool from Here

Intel® MAS unifies support and functionality of existing Intel tools such as the Intel® SSD Data Center Tool (Intel® SSD DCT) and the Intel® SSD Pro Administrator Tool.

Notice: ESXi signed files may be added for download at a later date.

Demo using Intel® MAS

Using Intel® MAS

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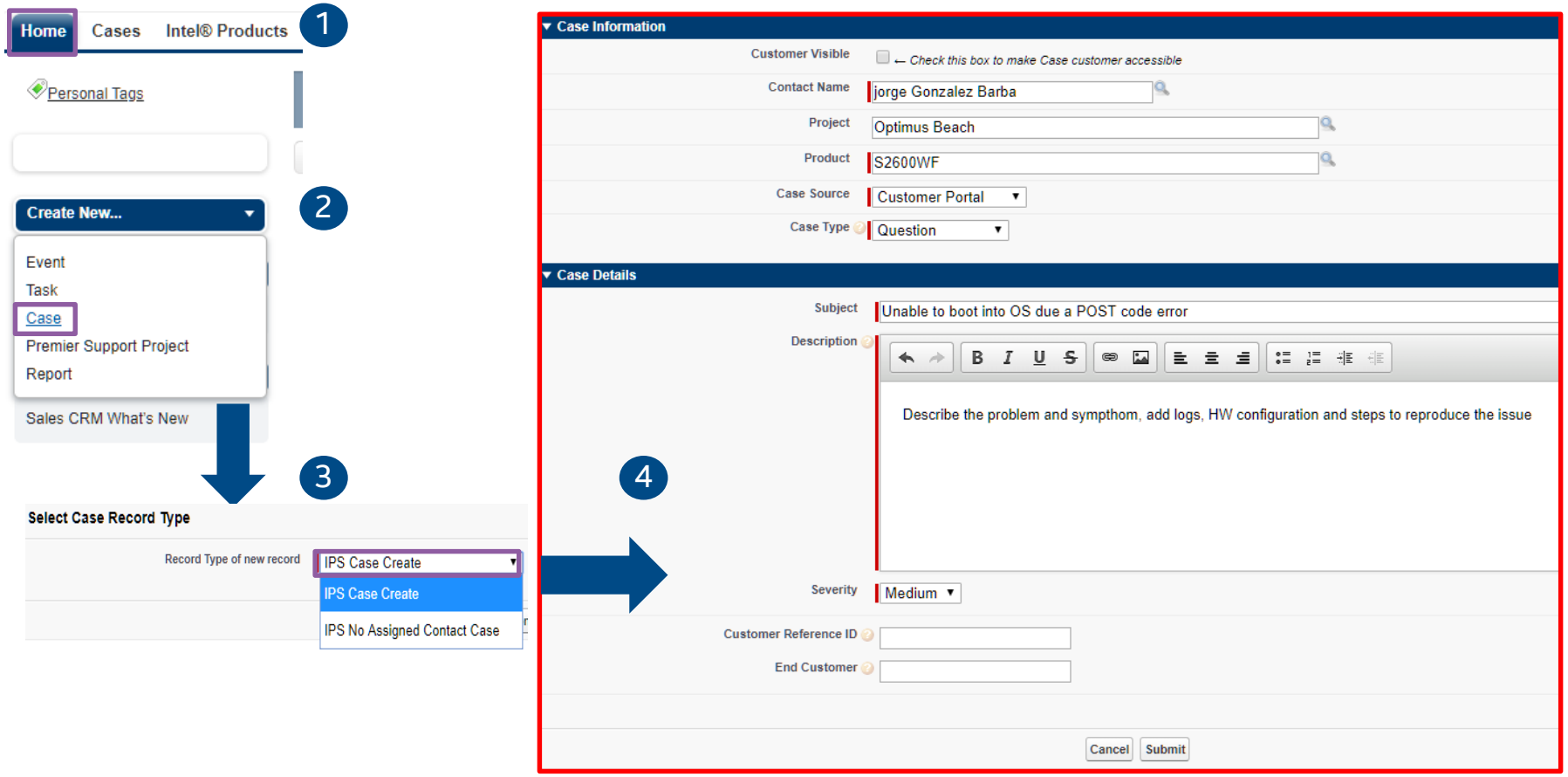
HOW TO SUBMIT AN IPS (INTEL PREMIER SUPPORT) TICKET

https://premiersupport.intel.com

Notice: User requires to have an account on IPS web, please contact your Intel representative otherwise you can request support as shown in next slide.



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- User Guide for Intel® Server Debug and Provisioning Tool
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- Server Test Submission (STS) reports
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Product Documentation/Demos (public)

Compatibility

CONTACTING GLOBAL CUSTOMER SUCCESS

Intel® Server and Storage Products Support Reference

Contacting Intel Technical Support:

1-866-655—6565*, available for registered Intel Technology Partners with a valid channel member ID, 24x7, English Only.
For a list of local toll free numbers and hours of operation, go to:
Asia Pacific Region https://www.intel.sg/content/www/xa/en/support/contact-support/apac-contact.html.
Europe, Middle East Region https://www.intel.co.uk/content/www/uk/en/support/contact-support/emea-contact.html
Latin America Region https://www.intel.la/content/www/xl/es/support/contact-support/lar-contact.html
North America Region : Phone Number: 1-916-377-7000

Live Chat Available 24x5

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Data required prior to submission of the issue

Technical Issue Report Form for Intel® Server Products and Intel® Storage Products
This form is designed to provide information on what to prepare before contacting Intel Technical Support or when submitting an issue online. This will help customer support to respond faster and provide relevant recommendations.

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