HP UEFI System Utilities User Guide for HP ProLiant Gen9 Servers

Abstract

This guide details how to access and use the Unified Extensible Firmware Interface (UEFI) that is embedded in the system ROM of all UEFI-based HP ProLiant Gen9 servers. It details how to access and use both UEFI and Legacy BIOS options provided in BIOS/Platform Configuration menus that were formerly known as the ROM-Based Setup Utility (RBSU). All options and available responses are defined. This document is for the person who installs, administers, and troubleshoots servers and storage systems.

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Contents

1 Introduction

The HP UEFI System Utilities is embedded in the system ROM. The UEFI System Utilities enable you to perform a wide range of configuration activities, including:

- Configuring system devices and installed options.
- Enabling and disabling system features.
- Displaying system information.
- Selecting the primary boot controller or partition.
- Configuring memory options.
- Launching other pre-boot environments, such as the Embedded UEFI Shell and Intelligent Provisioning.

HP ProLiant Gen9 servers that are configured for UEFI Mode can provide:

- Support for boot partitions larger than 2.2 TB. Such configurations could previously only be used for boot drives when using RAID solutions such as HP Smart Array.
- Secure Boot that enables the system firmware, option card firmware, operating systems, and software collaborate to enhance platform security.
- An Embedded UEFI Shell that provides a pre-boot environment for running scripts and tools.
- Operating system specific functionality, such as Microsoft Windows 2012, which supports several features only when installed in UEFI Mode.
- Boot support for option cards that only support a UEFI option ROM.

IMPORTANT: UEFI system configuration options vary by Gen9 platform. This guide documents all available UEFI System Utilities options on an HP ProLiant Gen9 server. You might not see some of the options that are documented in this guide if they are not available on your particular server.

What is UEFI?

Unified Extensible Firmware Interface (UEFI) defines the interface between the operating system and platform firmware during the boot, or start-up process. Compared to BIOS, UEFI supports advanced pre-boot user interfaces. The UEFI network stack enables implementation on a richer network-based OS deployment environment while still supporting traditional PXE deployments. UEFI supports both IPv4 and IPv6 networks. In addition, features such as Secure Boot enable platform vendors to implement an OS-agnostic approach to securing systems in the pre-boot environment.

The HP ROM-Based Setup Utility (RBSU) functionality is available from the UEFI interface along with additional configuration options.

2 Getting started with UEFI System Utilities

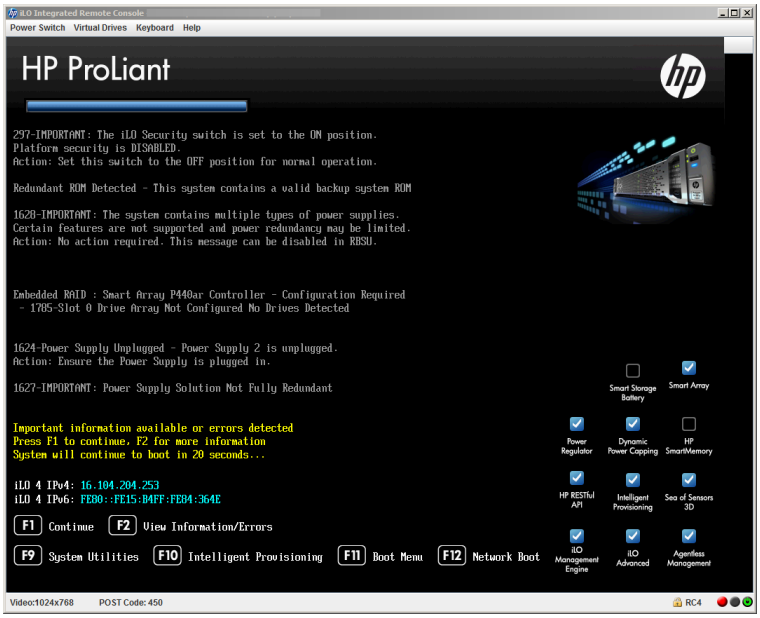
The following information describes how to launch and navigate the HP UEFI System Utilities, how to complete common configuration tasks, and how to update system firmware.

Launching and navigating the HP UEFI System Utilities menus

To launch and navigate the **System Utilities**:

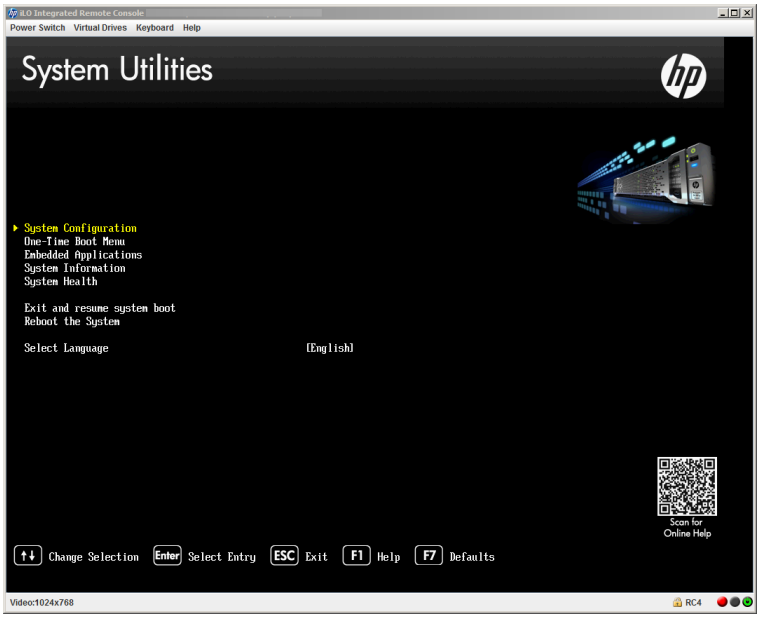
1. Reboot the server.

   The server restarts and the HP ProLiant POST screen appears.



2. Press **F9**.

   The **System Utilities** screen appears.



3. Do any of the following:
   - To navigate and modify settings in the menu-driven interface, press the following keys:
     - Up or down arrow—Selects a menu option. When selected, the color of a menu option changes from white to yellow text.
     - **Enter**—Selects an entry. When a submenu is available, the submenu appears.
     - **Esc**—Returns to the previous screen.
     - **F1**—Displays online help about a selection.
     - **F7**—Loads default UEFI configuration settings and prompts you to:
       - Press **Enter** to apply defaults.
       - Press **Esc** to cancel.
       - Reboot the system for changes to take effect.
   - To access *HP UEFI System Utilities and Shell Command Mobile Help for HP ProLiant Gen9 Servers*, scan the QR code on the bottom of the **System Utilities** screen with your mobile device.
   - To exit the **System Utilities** screen and reboot the server, press **Esc** until the main menu is displayed, and then select one of the following options:
     - Exit and resume system boot—Exits the system and continues the normal boot process. The system continues through the boot order list and launches the first bootable option in the system.
     - Reboot the System—Exits the system and reboots the system without continuing the normal boot process.

     The screen displays the booting process, and the HP ProLiant POST screen appears. Toward the end of the boot process, the boot options screen is displayed. It is visible for several seconds before the system attempts to boot from a supported boot device. .

Overview of the System Utilities screen

IMPORTANT: UEFI system configuration options vary by Gen9 platform. This guide documents all available UEFI System Utilities options on an HP ProLiant Gen9 server. You might not see some of the options that are documented in this guide if they are not available on your particular server.

The **System Utilities** screen is the main screen in the UEFI System Utilities menu-driven interface. Press the up or down arrow keys to select a menu option. A selected option changes color from white to yellow. Press **Enter** to display submenus and other configuration options for your selection. The **System Utilities** screen displays menu options for the following configuration tasks:

- System Configuration—Displays options for viewing and configuring:
  - **BIOS/Platform Configuration (RBSU)**
  - **iLO 4 Configuration Utility**
  - Other system-specific devices, such as installed PCIe cards, NICs and Smart Arrays. For example, **Embedded FlexibleLOM Port 1**.

NOTE: Throughout the menus, the interface attempts to display the proper marketing name for installed PCI devices. If the interface does not recognize a device, it assigns a generic label to the device, such as a `non-HP name`. This generic labeling does not affect the functionality or operation of the device.

- One-Time Boot Menu—Displays options for selecting a boot override option and running a UEFI application from a file system.
- Embedded Applications—Displays options for viewing and configuring:
  - **Embedded UEFI Shell**
  - **Integrated Management Log (IML)**
  - **Active Health System Log**
  - **Firmware Update**
  - **Embedded Diagnostics**
  - **Intelligent Provisioning**
- System Information—Displays options for viewing the server name and generation, serial number, product ID, BIOS version and date, power management controller, backup BIOS version and date, system memory, and processors.
- System Health—Displays options for viewing the current health status of all devices in the system.
- Exit and resume system boot—Exits the system and continues the normal booting process.
- Reboot the system—Exits the system and reboots it by going through the **UEFI Boot Order** list and launching the first bootable option in the system. For example, you can launch the UEFI Shell, if enabled and listed as the first bootable option in the list.
- Select Language—Enables you to select a language to use in the user interface. English is the default language.

Common setup and configuration tasks

Question	Answer
How do I access the **UEFI System Utilities**?	See "Launching and navigating the HP UEFI System Utilities menus" (page 8).
How do I update the firmware or system ROM?	For a description of all methods you can use to update firmware or system ROM, see "Updating firmware or system ROM" (page 12).
How do I use the **Firmware Update** application to upgrade the system ROM to the version included on the USB key already inserted into the server?	
How do I transition from RBSU settings to UEFI settings?	The **BIOS/Platform Configuration (RBSU)** menu replaces the ROM-Based Setup Utility (RBSU) on HP ProLiant Gen9 servers. Use this menu to access and use both UEFI and Legacy BIOS options. See "BIOS/Platform Configuration (RBSU)" (page 13).
When would I want to choose Legacy BIOS Mode rather than UEFI Mode, and vice versa?	Certain situations might require that you operate in Legacy BIOS Mode, such as using VMware ESXi 5.5 on an HP

Question	Answer
	ProLiant BL460c Gen9 Server Blade. UEFI Mode is enabled by default and is required for certain options, including: • Secure Boot, UEFI Optimized Boot, Generic USB Boot, IPv6 PXE Boot, iSCSI Boot, and Boot from URL • Fibre Channel/FCoE Scan Policy • Booting to a hard disk drive larger than 2.2 TB • Booting the Embedded User Partition.
How do I select between Legacy BIOS and UEFI Mode?	See "Boot Mode" (page 23).
How do I determine if a server has UEFI boot options?	See "Boot Options" (page 22).
How do I select a boot device?	To access the **One-Time Boot Menu** where you can select an option for a one-time boot override, do one of following: • Press **F11** during server POST. • On the **System Utilities** screen, select **One-Time Boot Menu**. See Using the One-Time Boot Menu. To modify the boot order for all boots, see UEFI Boot Order, or Legacy BIOS Boot Order.
How do I enable or disable Intel Hyperthreading?	By default, Intel Hyperthreading is enabled. For information about disabling or re-enabling this setting, see "Intel (R) Hyperthreading Options" (page 17).
How do I configure the **Minimum Processor Idle Power Package State** to **No Package State**?	By default, this is set to **Package C6 (retention) State**, the lowest processor idle power state. To change this setting, see "Minimum Processor Idle Power Package C-State" (page 37).
How do I configure the time zone?	See "Date and Time" (page 67).
How do I save my configuration changes and reboot the system?	1. When you are done making changes, if you do not see the prompt `Changes are pending. Do you want to save changes and exit?`, press **F10** to display it. 2. Press **Y** to save your changes. A `Change saved` confirmation prompt appears. 3. Select a reboot option and press **Enter**: • Exit and resume system boot—Exits the system and continues the normal boot process. The system continues through the boot order list and launches the first bootable option in the system. • Reboot the System—Exits the system and reboots the system without continuing the normal boot process.
How do I enter the **Embedded UEFI Shell**?	See "Embedded UEFI Shell" (page 82).
How do I enter the **Embedded Diagnostics**, view information, and then exit back to the **System Utilities**?	See "Embedded Diagnostics" (page 48).
How do I view the Device Health Status of all installed options and devices?	See "System Health" (page 86).
How do I use CONREP to replicate UEFI settings?	See "Configuration Replication Utility (CONREP)" (page 88).

Updating firmware or system ROM

You can use any of the following methods to update firmware or system ROM:

- The **Firmware Update** option in the **System Utilities**. See "Updating firmware from the System Utilities" (page 12).
- The `fwupdate` command in the **Embedded UEFI Shell**. See "fwupdate" in the *HP UEFI Shell User Guide for HP ProLiant Gen9 Servers*.
- HP Service Pack for ProLiant (SPP)
- HP online flash components

Updating firmware from the System Utilities

Use this option to update firmware components in the system, including the system BIOS, NICs, and storage cards. Your system can be set to either Legacy BIOS Mode or UEFI Mode.

To update device firmware:

1. Access the System ROM Flash Binary component for your server from the HP Support Center (http://www.hp.com/go/hpsc). When searching for the component, always select **Cross operating system** to locate the binary file.
2. Copy the binary file to a USB media or iLO virtual media.
3. Attach the media to the server.
4. Launch the **System Utilities**.
5. From the **System Utilities** screen, select **Embedded Applications→Firmware Update** and press **Enter**.
6. Select a device and press **Enter**.

   The **Firmware Updates** screen lists details about your selected device, including the current firmware version in use.
7. Select **Select Firmware File** and press **Enter**.
8. Select the flash file in the **File Explorer** list and press **Enter**.

   The firmware file is loaded and the **Firmware Updates** screen lists details of the file in the **Selected firmware file** field.
9. Select **Image Description** and press **Enter**, then select a firmware image and press **Enter** again. A device can have multiple firmware images.
10. Select **Start firmware update** to update the firmware components in the system.

3 Using the System Configuration menu options

The **System Configuration** menu displays options for:

- BIOS/Platform Configuration (RBSU)
- Using the iLO 4 Configuration Utility
- Viewing Smart Array Controller information
- Viewing and configuring NIC and FCoE settings

NOTE: You might see options for configuring your system devices, such as an embedded NIC. For example, **Embedded FlexibleLOM Port 1**. These items reflect installed PCIe cards. Devices vary based on your system.

To access **System Configuration** options:

1. From the **System Utilities** screen, select **System Configuration** and press **Enter**.
2. Select an option and press **Enter**.

BIOS/Platform Configuration (RBSU)

The **BIOS/Platform Configuration (RBSU)** menu replaces the ROM-Based Setup Utility (RBSU) on HP ProLiant Gen9 servers. Use this menu to access and use both UEFI and Legacy BIOS options, including:

- System Options
- Boot Options
- Network Options
- Embedded UEFI Shell options
- Power Management
- Performance Options
- Server Security
- PCI Device Enable/Disable
- Server Availability
- BIOS Serial Console and EMS
- Server Asset Information
- Advanced Options
- System Default Options
- Date and Time

To access **BIOS/Platform Configuration (RBSU)** options:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)**.
2. Select an option and press **Enter**.

System Options

This menu displays the following options:

- Serial Port Options
- USB Options
- Processor Options

- SATA Controller Options
- Virtualization Options
- Boot Time Optimization
- Memory Operations

To access **System Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration→System Options**.
2. Select an option and press **Enter**.

Serial Port Options

This menu displays the following options:

- Embedded Serial Port
- Virtual Serial Port

NOTE: For proper screen resolution, set the console resolution in the terminal software to **100x31**.

To access **Serial Port Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Serial Port Options**.
2. Select an option and press **Enter**.

Embedded Serial Port

Use this option to assign a logical COM port address and associated default resources to a selected physical serial port. The operating system can overwrite this setting.

To assign an **Embedded Serial Port**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Serial Port Options→Embedded Serial Port** and press **Enter**.
2. Select a setting and press **Enter**. Options include:
   - **COM 1: IRQ4: I/O: 3F8h-3FFh** (default)
   - **COM 2: IRQ3: I/O: 2F8h-2FFh**
   - **Disabled**
3. Press **F10** to accept your selection.

Virtual Serial Port

Use this option to assign a logical COM port address and the associated default resources used by the Virtual Serial Port (VSP). VSP enables the iLO Management Controller to appear as a physical serial port to support the BIOS Serial Console and the operating system serial console.

To assign a **Virtual Serial Port**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Serial Port Options→Virtual Serial Port** and press **Enter**.
2. Select a setting and press **Enter**. Options include:
   - **COM 1: IRQ4: I/O: 3F8h-3FFh**
   - **COM 2: IRQ3: I/O: 2F8h-2FFh** (default)
   - **Disabled**
3. Press **F10** to save your selection.

USB Options

This menu displays the following options:

- USB Control
- USB Boot Support
- Removable Flash Media Boot Sequence
- Virtual Install Disk
- Embedded User Partition
- Internal SD Card Slot
- USB 3.0 Mode

To access **USB Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→USB Options** and press **Enter**.
2. Select an option and press **Enter**.

USB Control

Use this option to configure how USB ports and embedded devices operate at startup.

To set **USB Control**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→USB Options→USB Control** and press **Enter**.
2. Select a setting and press **Enter**:
   - **USB Enabled** (default)—Enables all USB ports and embedded devices.
   - **External USB Port Disabled**—Disables external USB ports while maintaining full support for embedded USB devices managed by the ROM and operating system.
3. Press **F10** to save your selection.

USB Boot Support

Set this option to disabled to prevent the system from booting any USB devices connected to the server. This includes preventing boot to virtual media devices and the embedded SD or SD card slot, if supported.

To enable or disable **USB Boot Support**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→USB Options→USB Boot Support** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—The system can boot from USB devices connected to the server.
   - **Disabled**—The system cannot boot from USB devices connected to the server.
3. Press **F10** to save your selection.

Removable Flash Media Boot Sequence

Use this option to select which USB or SD Card devices to search first when enumerating boot devices. You can select whether the system attempts to boot external USB drive keys, internal USB drive keys, or the internal SD Card slot first. The **Removable Flash Media Boot Sequence** does not override the device boot order in the Standard Boot Order (IPL) option. Configure this option when Boot Mode is set to Legacy BIOS Mode because UEFI Mode enables you to boot from an USB device available in the boot list. See "Boot Mode" (page 23).

To select the **Removable Flash Media Boot Sequence**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→USB Options→Removable Flash Media Boot Sequence** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Internal SD Card First**—Boots using the internal SD card slot.
   - **Internal Drive Keys First**—Boots using the internal USB drive keys.
   - **External Drive Keys First** (default)—Boots using external USB drive keys.
3. Press **F10** to save your selection.

Virtual Install Disk

Use this option to enable or disable the virtual install disk. The virtual install disk contains drivers specific to the server that an operating system can use during installation. When this option is enabled, Microsoft Windows Server automatically locates required drivers and installs them, eliminating the need for user intervention and the requirement that a driver be present on external media during operating system installation. In some cases, the virtual install disk remains visible from the installed operating system as a read-only drive. During manual installations using Intelligent Provisioning, this option is disabled automatically.

To enable or disable **Virtual Install Disk**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→USB Options→Virtual Install Disk** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled**—The Virtual Install Disk appears as a drive in the operating system.
   - **Disabled** (default)—The Virtual Install Disk does not appear as a drive in the operating system.
3. Press **F10** to save your selection.

Embedded User Partition

Use this option to enable or disable the Embedded User Partition. This is a general purpose 1 GB disk partition on non-volatile flash memory that is embedded on the system board. When the Embedded User Partition is enabled, and your server is configured in UEFI Mode, you can use the embedded partition to install and boot VMware ESXi.

NOTE:

- Booting the Embedded User Partition is only supported in UEFI Mode.
- HP recommends that you regularly back up data on the Embedded User Partition.

To enable or disable the **Embedded User Partition**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→USB Options→Embedded User Partition** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled**—When the partition is formatted, enables the server to have read and write access to the Embedded User Partition.

     NOTE: After you enable the Embedded User Partition, you must format it by using the server operating system software.

   - **Disabled** (default)—The server does not have access to the Embedded User Partition.
3. Press **F10** to save your selection.

NOTE: You can also configure the Embedded User Partition using the HP RESTful Interface Tool. See the RESTful Interface Tool documentation at: http://www.hp.com/go/restfulinterface/docs.

Internal SD Card Slot

Use this option to enable or disable the internal SD (Secure Digital) card slot. The slot holds an SD non-volatile flash memory card that is embedded on the system board.

To enable or disable the **Internal SD Card Slot**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→USB Options→Internal SD Card Slot** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—The server can access the internal SD card slot.
   - **Disabled**—The server cannot access the internal SD card slot.
3. Press **F10** to save your selection.

USB 3.0 Mode

Use this option is set the **USB 3.0 Mode**.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→USB Options→USB 3.0 Mode** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Auto** (default)—USB 3.0-capable devices operate at USB 2.0 speeds in the pre-boot environment and during boot. When a USB 3.0 capable OS USB driver loads, USB 3.0 devices transition to USB 3.0 speeds. This mode is compatible with operating systems that do not support USB 3.0 while still allowing USB 3.0 devices to operate at USB 3.0 speeds with modern operating systems.
   - **Enabled**—USB 3.0-capable devices operate at USB 3.0 speeds at all times (including the pre-boot environment) when in UEFI Mode. Do not use this mode with operating systems that do not support USB 3.0. When operating in Legacy BIOS Mode, the USB 3.0 ports do not function in the pre-boot environment and are not bootable.
   - **Disabled**—USB 3.0-capable devices function at USB 2.0 speeds at all times.
3. Press **F10** to save your selection.

Processor Options

This menu displays the following options:

- Intel (R) Hyperthreading Options
- Processor Core Disable
- Processor x2APIC Support

NOTE: Options that appear on this menu vary by server model.

To access **Processor Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Processor Options** and press **Enter**.
2. Select an option and press **Enter**.

Intel (R) Hyperthreading Options

Use this option to disable or enable the logical processor cores on processors supporting Intel Hyperthreading technology. Intel Hyperthreading improves overall performance for applications that benefit from a higher processor core count. The option is supported through the system BIOS.

NOTE: Hyperthreading is not supported on all processors. For more information, see the documentation for your processor model.

To disable or enable **Intel (R) Hyperthreading**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Processor Options→Intel (R) Hyperthreading Options** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables the logical processor cores on processors supporting Intel Hyperthreading technology.
   - **Disabled**—Disables the logical processor cores on processors supporting Intel Hyperthreading technology.
3. Press **F10** to save your selection.

Processor Core Disable

Use this option to specify the number of cores to enable per processor socket. Unused cores are disabled. Setting this option can:

- Reduce processor power usage
- Improve overall performance for applications that benefit from higher performance cores rather than more processing cores
- Solve issues with software that is licensed on a per-core basis

To set the number of enabled processor cores:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Processor Options→Processor Core Disable** and press **Enter**.
2. Enter the number of cores to enable per processor socket and press **Enter**.

   NOTE:
   - If you enter an incorrect value, all cores are enabled.
   - If you enter **0**, all cores are enabled.
3. Press **F10** to save your selection.

Processor x2APIC Support

Use this option to enable or disable x2APIC support. When enabled, processor x2APIC support helps operating systems run more efficiently on high core count configurations and optimizes interrupt distribution in virtualized environments. Enabled mode does not enable x2APIC hardware, but provides the support necessary to the operating system. Unless you are using an older hypervisor or operating system that is not compatible with x2APIC support, leave this option enabled.

To enable or disable **Processor x2APIC Support**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Processor Options→Processor x2APIC Support** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Generates the ACPI x2APIC control structures, and adds the option of enabling x2APIC support to the operating system when it loads.
   - **Disabled**—Disables x2APIC support.
3. Press **F10** to save your selection.

SATA Controller Options

This menu displays the following Serial Advanced Technology Attachment options:

- Embedded SATA Configuration
- SATA Secure Erase

To access **SATA Controller Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→SATA Controller Options** and press **Enter**.
2. Select an option and press **Enter**.

Embedded SATA Configuration

Use this option to enable embedded chipset SATA controller support for your installed OS. You can select AHCI or HP Dynamic Smart Array RAID support. Make sure that you are using the correct operating system drivers for your selected option. Depending on your server model, either SATA AHCI or HP Dynamic Smart Array RAID support are enabled by default.

△ **CAUTION:** HP Dynamic Smart Array is not supported when the boot mode is configured to Legacy BIOS Mode. Enabling HP Dynamic Smart Array RAID results in data loss or data corruption on existing SATA drives. Back up all drives before enabling this option.

See your operating system documentation before enabling SATA AHCI support to ensure your base media drivers support this feature.

To enable Embedded SATA support:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→SATA Controller Options→Embedded SATA Configuration** and press **Enter**.
2. Ensure that you are using the correct AHCI or RAID system drivers for your SATA option.
3. Select a setting and press **Enter**:
   - **Enable SATA AHCI Support**—Enables the embedded chipset SATA controller for AHCI.
   - **Enable HP Dynamic Smart Array RAID Support**—Enables the embedded chipset SATA controller for HP Dynamic Smart Array RAID.
4. Press **F10** to save your selection.

SATA Secure Erase

Use this option to control whether **SATA Secure Erase** functionality is supported. This function prevents the Secure Freeze Lock command from being sent to SATA hard drives.

NOTE: This option operates on hard drives when:

- The SATA controller is in AHCI mode
- The hard drive supports the Secure Erase command

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→SATA Controller Options→SATA Secure Erase** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled**—The Security Freeze Lock command is not sent to supported SATA hard drives, enabling Secure Erase to function.
   - **Disabled** (default)—Disables Secure Erase.
3. Press **F10** to save your selection.

Virtualization Options

This menu displays the following options:

- Virtualization Technology
- Intel (R) VT-d
- SR-IOV

To access **Virtualization Options**:

- From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Virtualization Options** and press **Enter**.

Select an option and press **Enter**.

Virtualization Technology

Use this option to enable Intel Virtualization Technology on a Virtual Machine Manager (VMM).

NOTE: You do not need to disable **Virtualization Technology** if you are using a VMM or an operating system that does not support AMD-V virtualization.

To enable **Virtualization Technology**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Virtualization Options→Virtualization Technology** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables a VMM supporting this option to use hardware capabilities provided by UEFI Intel processors.
   - **Disabled**—Does not enable a VMM to use hardware capabilities provided by UEFI Intel processors.
3. Press **F10** to save your selection.

Intel (R) VT-d

Use this option to enable Intel Virtualization Technology for Directed I/O (VT-d) on a Virtual Machine Manager (VMM).

NOTE:

- If you are not using a hypervisor or an operating system that supports this feature, it is not necessary to set the Intel (R) VT-d option to disabled. You can leave it enabled.
- Intel VT-d Coherency Support is disabled by default and is not configurable.

To enable **Intel (R) VT-d**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Virtualization Options→Intel (R) VT-d** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables a hypervisor or operating system supporting this option to use hardware capabilities provided by Intel's Virtualization Technology for directed I/O
   - **Disabled**—Does not enable a hypervisor or operating system supporting this option to use hardware capabilities provided by Intel's Virtualization Technology for directed I/O
3. Press **F10** to save your selection.

SR-IOV

The SR-IOV (Single root I/O virtualization) interface is an extension to the PCI express (PCIe) specification. It enables the BIOS to allocates more PCI resources to PCIe devices. Enable this

option for a PCIe device or operating system that supports SR-IOV. Leave it enabled when using a hypervisor.

To enable **SR-IOV** support:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Virtualization Options→SR-IOV** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables a hypervisor to create virtual instances of a PCIe device, potentially increasing performance.
   - **Disabled**—Does not enable a hypervisor to create virtual instances of a PCIe device.
3. Press **F10** to save your selection.

Boot Time Optimization

This menu displays the following options:

- Dynamic Power Capping Functionality
- Extended Memory Test
- Memory Fast Training

To access **Boot Time Optimization** options:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Boot Time Optimization** and press **Enter**.
2. Select an option and press **Enter**.

Dynamic Power Capping Functionality

Use this option to configure when the system ROM executes power calibration during the boot process.

To configure **Dynamic Power Capping Functionality**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Boot Time Optimization→Dynamic Power Capping Functionality** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Auto**—Power calibration runs the first time the server is booted and is only run again when the hardware configuration settings of the server change.
   - **Enabled** (default)—Power calibration runs on every system boot.
   - **Disabled**—Power calibration does not run, and Dynamic Power Capping is not supported.
3. Press **F10** to save your selection.

Extended Memory Test

Use this option to configure whether the system validates memory during the memory initialization process. When enabled and uncorrectable memory errors are detected, the memory is mapped out, and the failed DIMMs are logged to the Integrated Management Log.

To enable or disable **Extended Memory Test**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Boot Time Optimization→Extended Memory Test** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables **Extended Memory Test**.

NOTE: This setting might significantly increase system boot time.

- **Disabled**—Disables **Extended Memory Test**.

3. Press **F10** to save your selection.

Memory Fast Training

Use this option to configure memory training on server reboots. When enabled, the platform uses the previously saved memory training parameters determined from the last cold boot of the server, which improves server boot time.

To enable or disable **Memory Fast Training**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Boot Time Optimization→Memory Fast Training** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables Memory Fast Training, enabling the server to use previously saved memory training parameters.
   - **Disabled**—The platform performs a full memory training on every server reboot.

     NOTE: This setting might significantly increase system boot time.

3. Press **F10** to save your selection.

Memory Operations

This menu displays the following option:

- Advanced Memory Protection

Advanced Memory Protection

Use this option to configure additional memory protection with Error Checking and Correcting (ECC). Advanced ECC provides the largest memory capacity to the operating system.

To configure **Advanced Memory Protection**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Options→Memory Operations→Advanced Memory Protection** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Advanced ECC Support** (default)—Provides the largest memory capacity to the operating system while protecting the system against all single-bit failures and some multi-bit failures.
   - **Online Spare with Advanced ECC Support**—Enables the system to automatically map out a group of memory that is receiving excessive correctable memory errors. This memory is replaced by a spare group of memory.
   - **Mirrored Memory with Advanced ECC Support**—Provides the maximum protection against uncorrected memory errors that might otherwise result in a system failure. You must install additional memory to provide mirrored memory to the operating system.
3. Press **F10** to save your selection.

Boot Options

This menu displays the following options:

- Boot Mode
- UEFI Optimized Boot
- Boot Order Policy

- UEFI Boot Order
- Advanced UEFI Boot Maintenance
- Legacy BIOS Boot Order

NOTE: Reboot the server after making changes to the boot mode.

To access **Boot Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Boot Options** and press **Enter**.
2. Select an option and press **Enter**.

Boot Mode

Use this option to set the boot mode for the system. HP ProLiant Gen9 servers provide two boot mode configurations: UEFI Mode and Legacy BIOS Mode. Certain boot options described in this guide require that you select a specific boot mode.

By default, the boot mode is set to **UEFI Mode**. The system must boot in **UEFI Mode** to use the following options:

- Secure Boot, UEFI Optimized Boot, Generic USB Boot, IPv6 PXE Boot, iSCSI Boot, and Boot from URL
- Fibre Channel/FCoE Scan Policy
- Embedded User Partition
- BL140i Smart Array SW RAID controller

NOTE: The boot mode you use must match the operating system installation. If not, changing the boot mode can impact the ability of the server to boot to the installed operating system.

To select a **Boot Mode**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Boot Options→Boot Mode** and press **Enter**.
2. Select a setting and press **Enter**:
   - **UEFI Mode** (default)—Configures the system to boot to a UEFI compatible operating system.

     NOTE: Configure the system to use native UEFI graphic drivers when booting to the **UEFI Mode**.

   - **Legacy BIOS Mode**—Configures the system to boot to a traditional operating system in Legacy BIOS compatibility mode. Certain situations, such as using VMware ESXi 5.5, might require that you operate in this mode.
3. Press **F10** to save your selection.
4. Reboot the server for the change to take effect.

UEFI Optimized Boot

Use this option to enable or disable **UEFI Optimized Boot**, which controls the video settings that the system BIOS uses.

Before changing this setting, consider the following:

- If you are running Microsoft Windows 2008 or Windows 2008 R2 operating systems, and the system is configured for UEFI Mode, this option must be set to disabled. Legacy BIOS Mode components are needed for video operations in Windows.
- **Boot Mode** must be set to **UEFI Mode** when this option is enabled. See "Boot Mode" (page 23).
- This option must be enabled to:
  - Enable and use **Secure Boot**. See "Secure Boot Settings" (page 49).
  - Operate VMware ESXi.

To enable or disable **UEFI Optimized Boot**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Boot Options→UEFI Optimized Boot** and press **Enter**.
2. Select an option and press **Enter**:
   - **Enabled** (default)—Configures the system BIOS to boot using native UEFI graphic drivers. Select this setting for compatibility with VMware ESXi on a system configured for UEFI Mode, and to enable and use **Secure Boot Mode**.
   - **Disabled**—Configures the system BIOS to boot using INT10 legacy video expansion ROM. Select this setting to boot Windows Server 2008 R2 in UEFI Mode.
3. Press **F10** to save your selection.
4. Reboot the server for the change to take effect.

Boot Order Policy

Use this option to control the system behavior when attempting to boot devices per the **UEFI Boot Order** list and no bootable device is found.

To set the **Boot Order Policy**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Boot Options→Boot Order Policy** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Retry Boot Order Indefinitely** (default)—Configures the system to continuously attempt the boot order until a bootable device is found.
   - **Attempt Boot Order Once**—Configures the system to attempt to execute all items in the boot menu once, and halts the system.
   - **Reset After Failed Boot Attempt**—Configures the system to attempt to execute all items once, and reboots the system.
3. Press **F10** to save your selection.
4. Reboot the server for the change to take effect.

UEFI Boot Order

Use this option change the **UEFI Boot Order** list. This list shows you the order in which the server attempts to boot various UEFI configured options. To boot to a particular option, the option must be at the top of the list so that the server boots the option first.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Boot Options→UEFI Boot Order** and press **Enter**.
2. Use the arrow keys to navigate within the boot order list.
3. Press the **+** key to move an entry higher in the boot list.
4. Press the **-** key to move an entry lower in the list.
5. Press **F10** to save your selection.

You can reboot the server to boot to the option at the top of the list.

NOTE: You can also configure the **UEFI Boot Order** list using the HP RESTful Interface Tool. See the RESTful Interface Tool documentation at: http://www.hp.com/go/restfulinterface/docs.

Advanced UEFI Boot Maintenance

This menu displays the following options:

- Add Boot Option
- Delete Boot Option

To access **Advanced UEFI Boot Maintenance** options:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Boot Options→Advanced UEFI Boot Maintenance** and press **Enter**.
2. Select an option and press **Enter**.

Add Boot Option

Use this option to select an x64 UEFI application with an `.efi` extension, such as an OS boot loader or other UEFI application, to add as a new UEFI boot option.

The new boot option is appended to the boot order list. When you select a file, you are prompted to enter the boot option description (which is then displayed in the **UEFI Boot Order** list), as well as any optional data to be passed to an `.efi` application.

To add a UEFI boot option to the boot order list:

1. Attach FAT16 or FAT32–partitioned media that contains the `.efi` file you want to add as an option.
2. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Boot Options→Advanced UEFI Boot Maintenance→Add Boot Option** and press **Enter**.
3. Browse for an .EFI application from the list and press **Enter**.
4. If necessary, continue to press **Enter** to drill-down through the menu options.
5. Enter a boot option description and optional data and press **Enter**.

   The new boot option appears in the **UEFI Boot Order** list.
6. Select **Commit changes and exit** to save your selection.

You can reboot the server to boot to the new option.

Delete Boot Option

To delete a boot option from the **UEFI Boot Order** list:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Boot Options→Advanced UEFI Boot Maintenance→Delete Boot Option** and press **Enter**.
2. Select one or more options from the list. Press **Enter** after each selection.
3. Select an option and press **Enter**:
   - **Commit Changes and Exit**
   - **Discard Changes and Exit**

Legacy BIOS Boot Order

When your server is configured in Legacy BIOS Mode, you can change the order of the Legacy BIOS boot order. The boot order list defines how the server looks for OS boot firmware.

To change the **Legacy BIOS Boot Order**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Boot Options→Legacy BIOS Boot Order** and press **Enter**.

2. Use the arrow keys to navigate within the boot order list.
3. Press the **+** key to move an entry higher in the boot list.
4. Press the **-** key to move an entry lower in the list.
5. Press **F10** to save your selection.

You can reboot the server to boot to the option at the top of the list.

Network Options

This menu displays the following options:

- Network Boot Options
- Pre-Boot Network Settings
- iSCSI Boot Configuration
- VLAN Configuration

To access **Network Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options** and press **Enter**.
2. Select an option and press **Enter**.

Network Boot Options

This menu displays the following options:

- UEFI PXE Boot Policy
- IPv6 DHCP Unique Identifier
- Network Boot Retry Support
- Network Interface Cards (NICs)
- PCIe Slot Network Boot

To access **Network Boot Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→Network Boot Options** and press **Enter**.
2. Select an option and press **Enter**.

UEFI PXE Boot Policy

Use this option to set the order of network boot targets in the **UEFI Boot Order** list.

NOTE: When both IPv4 and IPv6 are enabled, each network boot target appears twice in the **UEFI Boot Order** list (one for IPv4 and the other for IPv6). You can only configure this option when Boot Mode is set to UEFI. For more information, see "Boot Mode" (page 23).

To set the **UEFI PXE Boot Policy**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→Network Boot Options→UEFI PXE Boot Policy** and press **Enter**.
2. Select a setting and press **Enter**:
   - **IPv4 then IPv6**—Modifies the **UEFI Boot Order** list to include all existing IPv4 targets before any existing IPv6 targets. New network IPv4 boot targets are added before IPv6 targets.
   - **IPv4**—Removes all existing IPv6 network boot targets in the **UEFI Boot Order** list. New IPv6 network boot targets are not added to the list.
   - **IPv6**—Removes all existing IPv4 network boot targets in the **UEFI Boot Order** list. New IPv4 network boot targets are not added to the list.

- **IPv6 then IPv4**—Modifies the **UEFI Boot Order** list to include all existing IPv4 targets before any existing IPv6 targets. New network IPv6 boot targets are added before IPv4 targets.
- **Auto** (default)—Modifies the order of the existing network boot targets in the **UEFI Boot Order** list. New network boot targets are added to the end of the list using the system ROM's default policy.

3. Press **F10** to save your selection.
4. Reboot the server for the changes to take effect.

IPv6 DHCP Unique Identifier

Use this option to select how the UEFI BIOS obtains the DHCP Unique Identifier (DUID) for IPv6 PXE Boot. DHCPv6 clients use this identifier to get an IP address from a DHCPv6 server. By default, the system uses the server's Unique Universal Identifier (UUID).

NOTE: Boot Mode must be set to UEFI Mode to configure these options. See "Boot Mode" (page 23).

To set the **IPv6 DHCP Unique Identifier**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→Network Boot Options →IPv6 DHCP Unique Identifier** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Auto** (default)—Uses the server's UUID.
   - **DUID-LLT**—Uses the DUID Link Layer address plus a Time value.
3. Press **F10** to accept your selection.

Network Boot Retry Support

Use this option to enable or disable the network boot retry function. By default, the system BIOS attempts to boot the network device, such as a PXE device, up to 20 times before attempting to boot the next IPL device.

To enable or disable **Network Boot Retry Support**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→Network Boot Options →Network Boot Retry Support** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables network boot retry.
   - **Disabled**—Disables network boot retry.
3. Press **F10** to accept your selection.

Network Interface Cards (NICs)

Use these options to enable network boot (PXE or FCoE) for an installed NIC. Devices listed vary from system to system and can include, for example:

- **Embedded LOM 1 Port 1**
- **Embedded FlexibleLOM 1 Port 1**

NOTE: You might need to configure the NIC firmware to activate the boot option.

To configure network boot for a NIC:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→Network Boot Options** and press **Enter**.
2. Select a NIC and press **Enter**.

3. Select a setting and press **Enter**:
   - **Network Boot** (default)—Enables network boot.
   - **Disabled**—Disables network boot
4. Press **F10** to accept your selection.
5. If you selected **Network Boot**, reboot the server so that the NIC boot option appears in the **UEFI Boot Order** list or the **Legacy BIOS Boot Order** list.

PCIe Slot Network Boot

Use this option to enable or disable UEFI PXE boot for NIC cards in PCIe slots. Devices listed vary from system to system and can include, for example:

- **Slot 3 NIC Port 1 Boot**
- **Slot 3 NIC Port 2 Boot**

NOTE: Boot Mode must be set to UEFI to configure this option. See "Boot Mode" (page 23).

To configure **PCIe Slot Network Boot**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→Network Boot Options →PCIe Slot Network Boot** and press **Enter**.
2. Select a PCIe slot entry and press **Enter**.
3. Select a setting and press **Enter**:
   - **PXE Boot** (default)—Enables PXE boot.
   - **Disabled**—Disables PXE boot
4. Press **F10** to accept your selection.

Pre-Boot Network Settings

Use this option to configure a pre-boot network interface and related settings.

IMPORTANT: You do not need to use the Embedded UEFI Shell `ifconfig` command on a network interface if you plan to run `webclient` or `ftp` over the same interface because these interface and IP address settings are automatically selected by the **Pre-Boot Network Settings** configured in the System Utilities.

If the interface used by `ftp` and `webclient` happens to be configured by `ifconfig`, that setting is erased and, instead, the System Utilities **Pre-Boot Network Settings** menu is applied on the interface when the commands are run.

To configure **Pre-Boot Network Settings**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→Pre-Boot Network Settings** and press **Enter**.

2. Select and configure the network interface from the list of available interfaces in the system. Press **Enter** after each selection. Options are:
   - **Pre-Boot Network Interface**—Specifies the network interface used for pre-boot network connections.
     - **Auto** (default)—The system uses the first available port with a network connection.
     - **Embedded NIC**—The system uses the selected NIC. If the selected NIC has more than one port, the system only uses the first available port with a network connection.
   - **DHCPv4**—Enables or disables obtaining the pre-boot network IPv4 configuration from a DHCP server.
     - **Enabled** (default)—Enables DHCPv4 IPv4 network address configuration.

       NOTE: This setting makes IPv4 address, subnet mask, gateway, and DNS settings unavailable because values are supplied automatically.
     - **Disabled**—Disables DHCPv4 address configuration, requiring you to manually configure the following static IP address settings.
       - **IPv4 Address**
       - **IPv4 Subnet Mask**
       - **IPv4 Gateway**
       - **IPv4 Primary DNS**
       - **IPv4 Secondary DNS**
   - **Boot from URL**—Specifies a network URL to a bootable ISO or EFI file. Enter a URL in either HTTP or FTP format, using either an IPv4 server address or host name. IPv6 addresses are not supported. When configured, this URL is listed as a boot option in the UEFI Boot Order list. Then you can select this option from the boot order list to download the specified file to the system memory and enable the system to boot from the file.

     NOTE: To use this setting:
     - Configure the pre-boot network settings to access the URL location.
     - Leave the boot mode set to UEFI Mode.

     When booting from an ISO file, use a file that the system can use to boot a preliminary operating system environment, such as WinPE, mini-Linux, or VMware ESX installer. Doing so enables further installation to proceed over an OS network connection. ISO files that contain the full OS installation media are not supported.

iSCSI Boot Configuration

This menu displays the following UEFI iSCSI Software Initiator Boot options. For more information, see "ISCI boot" in the *HP UEFI Deployment Guide for HP ProLiant Gen9 Servers*.

- iSCSI Initiator Name
- Add an iSCSI Boot Attempt
- Delete iSCSI Boot Attempts
- iSCSI Attempts

NOTE: Boot Mode must be set to UEFI Mode to configure these options. See "Boot Mode" (page 23).

To access **iSCSI Boot Configuration** options:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→iSCSI Boot Configuration** and press **Enter**.
2. Select an option and press **Enter**.

NOTE: You can also configure iSCSI Boot settings using the HP RESTful Interface Tool. See the RESTful Interface Tool documentation at: http://www.hp.com/go/restfulinterface/docs.

iSCSI Initiator Name

Use this option to add an iSCSI initiator name.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→iSCSI Boot Configuration→iSCSI Initiator Name** and press **Enter**.
2. Enter a unique name for the iSCSI initiator using iSCSI Qualified Name (IQN) format. For example: `iqn.2001-04.com.example:uefi-13021088`.

   NOTE: EUI format is not supported.

3. Press **Enter**.

Add an iSCSI Boot Attempt

Use this option to configure an iSCSI boot target.

NOTE: When iSCSI is enabled on a network port, you must disable PXE for that port. See "PCIe Slot Network Boot" (page 28).

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→iSCSI Boot Configuration→Add an iSCSI Boot Attempt** and press **Enter**.

   A message appears stating that this boot attempt will not be in effect until the next server reboot.
2. Press **Enter**.
3. Select a port on which to attempt iSCSI boot and press **Enter**.
4. Complete the configuration settings and press **Enter** to save each setting.
   - **iSCSI Attempt Name**—Enter a name.
   - **iSCSI Boot Control**—Select **Enabled**. (The default setting is **Disabled**).
   - **IP Address Type**—Select **IPv4**.
   - **Connection Retry Count**—Enter a value from 0 to 16. Default is 0 (no retries).
   - **Connection Timeout**—Enter a value in milliseconds from 100 to 20000. Default is 1000.
   - **Initiator DHCP**—Press **Enter** to enable configuring the iSCSI initiator address from DHCP.
   - **Target DHCP Config**—Disable this option (clear the check box), and enter a target name, IP address, port and boot LUN. This option is enabled by default.
   - Optional: **Authentication Type**—If required, select **CHAP** and complete the CHAP entries.
5. Select **Save Changes**.
6. Reboot the server for the changes to take effect.

Delete iSCSI Boot Attempts

Use this option to delete one or more iSCSI boot targets.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→iSCSI Boot Configuration→Delete iSCSI Boot Attempts** and press **Enter**.

2. Select an iSCSI boot target entry and press **Enter**.
3. Select **Commit Changes and Exit**.
4. Reboot the server for the changes to take effect.

iSCSI Attempts

Use this option to view iSCSI boot attempts.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→iSCSI Boot Configuration→iSCSI Attempts** and press **Enter**.
2. Select an entry from the list and press **Enter** to view or modify the details about the boot attempt.

VLAN Configuration

Use this option to set the global VLAN configuration for all enabled network interfaces, including those used in PXE boot, iSCSI boot, and HTTP boot, and for all pre-boot network access from the Embedded UEFI Shell.

To configure global VLAN settings:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Network Options→VLAN Configuration** and press **Enter**.
2. Complete the following and press **Enter** after each selection or data entry.
   - **VLAN Control**—Select **Enabled** to enable VLAN tagging on all enabled network interfaces. This setting is disabled by default.
   - **VLAN ID**—When **VLAN Control** is enabled, enter a global VLAN ID of 0 to 4094 for all enabled network interfaces.
   - **VLAN Priority**—When **VLAN Control** is enabled, enter a priority value of 0 to 7 for VLAN tagged frames.
3. Press **F10** to save your settings.

Storage Options

This menu displays the following options:

- Fibre Channel/FCoE Scan Policy
- Embedded Storage Boot Policy
- PCIe Storage Boot Policy

To access **Storage Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Storage Options** and press **Enter**.
2. Select an option and press **Enter**.

Fibre Channel/FCoE Scan Policy

Use this option to change the default policy for scanning for valid FC/FCoE (or boot from SAN) boot targets.

NOTE:

- This setting is only available in UEFI Mode. For Fibre Channel controllers in PCIe slots, this setting is overridden by the PCIe Storage Boot Policy setting.
- Changing the Fibre Channel boot scan setting from the default setting might significantly increase boot time.

To set the **Fibre Channel/FCoE Scan Policy**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Storage Options→Fibre Channel/FCoE Scan Policy** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Scan All Targets**—Each installed FC/FCoE adapter scans all available targets.
   - **Scan Configured Targets Only** (default)—Each installed FC/FCoE adapter only scans targets that are preconfigured in the device settings. This setting overrides any individual device settings configured in the device-specific setup.
3. Press **F10** to save your selection.
4. Reboot the server for the change to take effect.

Embedded Storage Boot Policy

Use this option to select the UEFI BIOS boot targets for embedded storage controllers.

NOTE: This setting is only available in UEFI Mode.

To set the **Embedded Storage Boot Policy**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Storage Options→Embedded Storage Boot Policy** and press **Enter**.
2. Select a storage controller and press **Enter**.
3. Select a setting and press **Enter**:
   - **Boot All Targets** (default)—All valid boot targets attached to the storage controller are available to the **UEFI Boot Order** list.
   - **Boot Limit to 3 Targets**—A maximum of three boot targets attached to the storage controller are available to the **UEFI Boot Order** list.
   - **Boot No Targets**—No boot targets attached to the storage controller are available to the **UEFI Boot Order** list.
4. Press **F10** to save your selection.

PCIe Storage Boot Policy

Use this option to select the UEFI BIOS boot targets for storage controllers in PCIe slots.

NOTE: This setting is only available in UEFI Mode. It overrides the Fibre Channel/FCoE Scan Policy setting for Fibre Channel controllers in PCIe slots.

To set the **PCIe Storage Boot Policy**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Storage Options→PCIe Storage Boot Policy** and press **Enter**.
2. Select a storage controller and press **Enter**.
3. Select a setting and press **Enter**.
4. Press **F10** to save your selection.

Embedded UEFI Shell options

This menu displays the following options:

- Embedded UEFI Shell
- Add Embedded UEFI Shell to Boot Order
- UEFI Shell Script Auto-Start
- Shell Auto-Start Script Location
- Network Location for Shell Auto-Start Script

See the *HP UEFI Shell User Guide for HP ProLiant Gen9 Servers* for details on running Shell scripts.

To access the **Embedded UEFI Shell** options:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Embedded UEFI Shell** and press **Enter**.
2. Select an option and press **Enter**.

Embedded UEFI Shell

Use this option to enable or disable the **Embedded UEFI Shell**. The **Embedded UEFI Shell** is a pre-boot command line environment for scripting and running UEFI applications, including UEFI boot loaders. The **Embedded UEFI Shell** also provides CLI-based commands you can use to obtain system information, and to configure and update the system BIOS. Enabling this option adds the **Embedded UEFI Shell** to the UEFI boot options.

NOTE: Boot Mode must be set to UEFI to configure this option. See "Boot Mode" (page 23).

To enable or disable the **Embedded UEFI Shell**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Embedded UEFI Shell→Embedded UEFI Shell** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Launches the **Embedded UEFI Shell** from the pre-boot environment. You can add the **Embedded UEFI Shell** to the **UEFI Boot Order** list if the boot mode is configured to UEFI. See "Add Embedded UEFI Shell to Boot Order" (page 33).
   - **Disabled**—The **Embedded UEFI Shell** is not available in the pre-boot environment and you cannot add it to the **UEFI Boot Order** list.
3. Press **F10** to save your selection.

See the *HP UEFI Shell User Guide for HP ProLiant Gen9 Servers* for details on running Shell scripts.

Add Embedded UEFI Shell to Boot Order

Use this option to add the **Embedded UEFI Shell** as an entry in the **UEFI Boot Order** list.

NOTE:

- This option is only available when the **Embedded UEFI Shell** is enabled and Boot Mode is set to UEFI Mode.
- After you enable this option, you must Reboot the server for the **Embedded UEFI Shell** to appear in the **UEFI Boot Order** list.

To add the **Embedded UEFI Shell** to the boot order list:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Embedded UEFI Shell→Add Embedded UEFI Shell to Boot Order** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Adds the embedded UEFI Shell to the boot order list.
   - **Disabled**—The embedded UEFI Shell is not added to the boot order list.
3. Press **F10** to save your selection.
4. Reboot the server for the Embedded UEFI Shell to appear in the **UEFI Boot Order** list.

UEFI Shell Script Auto-Start

Use this option to enable or disable automatic execution of the Embedded UEFI Shell startup script during Shell startup. You can use the startup script to create a RAM disk, download files from the network, collect data, upload results back to network, and then boot to the OS without rebooting the system. You can store the script file on local media, or access it from a network location. You must name the script file `startup.nsh` and place it on local media or a network location accessible

to the server. When auto-start is enabled, the **Shell Auto-Start Script Location** option is set to **Auto**, the Shell looks for the script file in any of the FAT16 or FAT32 file systems available.

NOTE:

- This option is only available when the Embedded UEFI Shell is enabled and Boot Mode is set to UEFI Mode.
- It is recommended that you have only one `startup.nsh` file on one file system. See "Boot Mode" (page 23), and the HP UEFI Shell User Guide for HP ProLiant Gen9 Servers.

To enable or disable **UEFI Shell Script Auto-Start**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Embedded UEFI Shell→UEFI Shell Script Auto-Start** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled**—The UEFI Shell startup script executes during Shell startup.
   - **Disabled** (default)—The UEFI Shell startup script does not execute during Shell startup.
3. Press **F10** to save your selection.
4. Reboot the server for the change to take effect.

Shell Auto-Start Script Location

Use this option to select the location of the Embedded UEFI Shell startup script. When **UEFI Shell Script Auto-Start** is enabled, this setting specifies where the Shell looks for the `startup.nsh` file.

To set the **Shell Auto-Start Script Location**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Embedded UEFI Shell→Shell Auto-Start Script Location** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Auto** (default)—The Shell looks for the script file in any of the FAT16 or FAT32 file systems available.
   - **File Systems on Attached Media**—The Shell looks for the script file in a specific FAT16 or FAT32 file system.
   - **Network Location**—The Shell looks for the script file at a specific URL.
3. Press **F10** to save your selection.
4. Reboot the server for the change to take effect.

Network Location for Shell Auto-Start Script

Use this option to set the network URL location of the UEFI Shell startup script. You can specify a URL in HTTP or FTP format using either an IPv4 server address or host name. The script file at the location must end with a `.nsh` file extension. When **UEFI Shell Script Auto-Start** is enabled, and the **Shell Auto-Start Script Location** is set to **Network Location**, the Shell attempts to load and execute the startup script from the network location pointed to by the specified URL.

To set the **Network Location for Shell Script Auto-Start**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Embedded UEFI Shell→Network Location for Shell Script-Auto Start** and press **Enter**.
2. Enter a network location and press **Enter**. Use HTTP or FTP format and an IPv4 server address or host name.

   NOTE: IPv6 server addresses are not supported.

3. Press **F10** to save your selection.
4. Reboot the server for the change to take effect.

Power Management

This menu displays the following options:

- Power Profile
- Power Regulator
- Minimum Processor Idle Power Core C-State
- Minimum Processor Idle Power Package C-State
- Advanced Power Options

To access **Power Management** options:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management** and press **Enter**.
2. Select an option and press **Enter**.

Power Profile

Use this option to select a power profile based on power and performance characteristics.

The following table shows **Power Profile** settings available on HP ProLiant Gen9 servers and the **Power Management** options supported by each profile. For a description of each option, see the following procedures.

NOTE:

- Not all of the options in this table are adjustable on all servers. However, even if you do not have the option of adjusting some of these settings, they default to the values shown here.
- When you select **Custom** as your **Power Profile** setting, all available settings for the **Power Management** options are available to customize your configuration.

Power Management option	Power Profile settings			
	Balanced Power and Performance	**Minimum Power Usage**	**Maximum Performance**	**Custom**
Power Regulator	Dynamic Power Savings Mode	HP Static Low Power Mode	Static High Performance Mode	All available options.
Minimum Processor Idle Power Core C-State	C6 State	C6 State	No C-states	All available options.
Minimum Processor Idle Power Package C-State	Package C6 (retention) State	Package C6 (retention) State	No Package State	All available options.
Advanced Power Management option				
Intel QPI Link Power Management	Enabled	Enabled	Disabled	All available options.
Intel QPI Frequency	Auto	Minimum QPI Speed	Auto	All available options.
Energy/Performance Bias	Balanced Performance	Power Savings Mode	Maximum Performance	All available options.
Maximum Memory Bus Frequency	Auto	1333 MHz	Auto	All available options.
Channel Interleaving	Enabled	Disabled	Enabled	All available options.

Power Management option	Power Profile settings			
	Balanced Power and Performance	Minimum Power Usage	Maximum Performance	Custom
Maximum PCI Express Speed	Maximum Supported	PCIe Generation 1	Maximum Supported	All available options.
Intel DMI Link Frequency	Auto	Auto	Auto	All available options.

You can configure Power Management settings in either of two ways:

- Use Intelligent Provisioning Quick Configs to select a basic policy for performance versus power usage. See the *HP Intelligent Provisioning User Guide for HP ProLiant Gen9 Servers* on the HP web site (http://www.hp.com/go/intelligentprovisioning/docs).
- Use the System Utilities **Power Management** options to configure individual settings as described in the following procedures.

To set the **Power Profile** from the System Utilities:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Power Profile** and press **Enter**.
2. Select a setting and **Enter**:
   - **Balanced Power and Performance** (default)—Provides optimum settings to maximize power savings with minimal impact to performance for most operating systems and applications.
   - **Minimum Power Usage**—Enables power reduction mechanisms that can negatively affect performance. This mode guarantees a lower maximum power usage by the system.
   - **Maximum Performance**—Disables all power management options that can affect negatively affect performance.
   - **Custom**—Enables you to configure a custom profile for your environment.

     Selecting this as your **Power Profile** setting makes all available settings for the **Power Management** options available.
3. Press **F10** to save your selection.

Power Regulator

Use this option to set the **Power Regulator** mode for ProLiant support. These settings can help you increase server efficiency and manage power consumption.

NOTE: Certain processors support only one power state and operate at their initialized frequency, regardless of the selected **Power Regulator** mode.

To set the **Power Regulator** mode:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Power Regulator** and press **Enter**.
2. Select a setting and **Enter**:
   - **Dynamic Power Savings Mode** (default)—Automatically varies processor speed and power usage based on processor utilization. This mode uses an HP ROM-based algorithm to monitor processor activity. It can reduce overall power consumption with little or no impact to performance, and does not require OS support.
   - **Static Low Power Mode**—Reduces processor speed and power usage. Guarantees a lower maximum power usage for the system. This mode is useful in environments where power availability is constrained and it is critical to lower the maximum power use of the system.

- **Static High Performance Mode**—Processors run in the maximum power and performance state, regardless of the OS power management policy. This mode is useful in environments where performance is critical and power consumption is less important.
- **OS Control Mode**—Processors run in their maximum power and performance state at all times, unless the OS enables a power management policy.

3. Press **F10** to save your selections.

Minimum Processor Idle Power Core C-State

Use this option to select the lowest idle power (C-State) of the processor that the operating system uses. The higher the C-State, the lower the power usage of that idle state.

To set the **Minimum Processor Idle Power Core C-State**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Minimum Processor Idle Power Core C-State** and press **Enter**.
2. Select a setting and press **Enter**:
   - **C6 State** (default—lowest)
   - **C3 State**
   - **C1E State**
   - **No C-states**
3. Press **F10** to save your selection.

Minimum Processor Idle Power Package C-State

Use this option to configure the lowest processor idle power state (C-State). The processor automatically transitions into package C-States based on the Core C-States in which cores on the processor have transitioned. The higher the package C-State, the lower the power usage of that idle package state. Package C6 (non-retention) is the lowest power idle package state supported by the processor.

NOTE: This option is available on servers with Intel processors.

To set the **Minimum Processor Idle Power Package C-State**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options→Minimum Processor Idle Power Package C-State** and press **Enter**.
2. Select an option and press **Enter**:
   - **Package C6 (retention) State** (default—lowest)
   - **Package C6 (non-retention) State**
   - **No Package State**
3. Press **F10** to save your selection.

Advanced Power Options

This menu displays the following options:

- Intel QPI Link Power Management
- Intel QPI Link Frequency
- Energy/Performance Bias
- Maximum Memory Bus Frequency
- Channel Interleaving
- Maximum PCI Express Speed

- Dynamic Power Savings Mode Response
- Collaborative Power Control`
- Redundant Power Supply Mode
- Intel DMI Link Frequency

To access **Advanced Power Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options** and press **Enter**.
2. Select an option and press **Enter**.

Intel QPI Link Power Management

Use this option to enable or disable power management for QPI (Quick Path Interconnect) links. When enabled, QPI links are put into a low power state when the links are not being used. This lowers power usage with minimal performance effect.

NOTE: This option is available on servers with multiple Intel processors. You can configure it on systems with two or more CPUs.

To enable or disable **Intel QPI Link Power Management**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options→Intel QPI Link Power Management** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables power management on QPI links.
   - **Disabled**—Disables power management on QPI links.
3. Press **F10** to save your selection.

Intel QPI Link Frequency

Use this option to set the QPI link frequency to a low speed. Doing so can reduce power consumption, but can also impact system performance.

NOTE: You can configure this option on systems with two or more CPUs.

To set the **Intel QPI Link Frequency**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options→Intel QPI Link Frequency** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Auto** (default)
   - **Min QPI Speed**
3. Press **F10** to save your selection.

Energy/Performance Bias

Use this option to configure several processor subsystems to optimize the processor's performance and power usage.

NOTE: Options vary by installed processors.

To set **Energy/Performance Bias**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options→Energy/Performance Bias** and press **Enter**.

2. Select a setting and press **Enter**:
   - **Maximum Performance**—Provides the highest performance and lowest latency. Use this setting for environments that are not sensitive to power consumption.
   - **Balanced Performance** (default)—Provides optimum power efficiency and is recommended for most environments.
   - **Balanced Power**—Provides optimum power efficiency based on server utilization.
   - **Power Savings Mode**—Provides power savings for environments that are power sensitive and can accept reduced performance.
3. Press **F10** to save your selection.

Maximum Memory Bus Frequency

Use this option to configure the system to run memory at a lower maximum speed than that supported by the installed processor and DIMM configuration.

To set the **Maximum Memory Bus Frequency**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options→Maximum Memory Bus Frequency** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Auto** (default)—Memory runs at the maximum speed supported by the system configuration
   - **1333MHz**
   - **1066MHz**
   - **800MHz**
3. Press **F10** to save your selection.

Channel Interleaving

Use this option to enable or disable a higher level of memory interleaving. Typically, higher levels of memory interleaving result in maximum performance. However, reducing the level of interleaving can result in power savings.

To set **Channel Interleaving**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options→Channel Interleaving** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables the highest level of interleaving for which the system memory is configured.
   - **Disabled**—Does not enable memory interleaving.
3. Press **F10** to save your selection.

Maximum PCI Express Speed

Use this option to lower the maximum PCI-express speed at which the server enables PCI-express devices to operate. Doing so can resolve issues with problematic PCI-express devices.

To set the **Maximum PCI Express Speed**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options→Maximum PCI Express Speed** and press **Enter**.

2. Select a setting and press **Enter**:
   - **Maximum Supported** (default)—Configures the platform to run at the maximum speed supported by the platform or the PCIe device (whichever is lower.)
   - **PCIe Generation 1.0**—Configures the platform to run at PCIe Generation 1.0, the lowest speed possible in the PCIe links.

     NOTE: This setting might affect the performance of high-end cards, such as 10GbE NIC cards and I/O accelerators.
3. Press **F10** to save your selection.

Dynamic Power Savings Mode Response

Use this option to enable the system ROM to control processor performance and power state depending on the processor workload. This option configures the response time for switching between these states.

To set **Dynamic Power Savings Mode Response**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options→Dynamic Power Savings Mode Response** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Fast** (default)—Sets a fast response time. This setting is optimal for most workloads where low latency response to an increase in processor demand is a requirement.
   - **Slow**—Sets a slow response time. This setting is optimal for workloads where a longer latency response to an increase in processing demand is an acceptable trade-off for reduced power consumption.

     NOTE: Depending on your processor workload, selecting this option can negatively affect performance.
3. Press **F10** to save your selection.

Collaborative Power Control

Use this option to enable or disable **Collaborative Power Control**. For operating systems that support the Processor Clocking Control (PCC) interface, enabling this option configures the operating system to request processor frequency changes, even when the **Power Regulator** option is set to **Dynamic Power Savings Mode** on the server. For operating systems that do not support the PCC Interface, or when the **Power Regulator** mode is not configured for **Dynamic Power Savings Mode**, this option has no impact on system operation.

To enable or disable **Collaborative Power Control**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options→Collaborative Power Control** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—The operating system requests processor frequency changes.
   - **Disabled**—The operating system does not request processor frequency changes.
3. Press **F10** to save your selection.

Redundant Power Supply Mode

Use this option to set how the system handles redundant power supply configurations. All High Efficiency Mode settings provide the most power efficient operation when you are using redundant power supplies by keeping half of the power standby mode at lower power usage levels

To set the **Redundant Power Supply Mode**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options→Redundant Power Supply Mode** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Balanced Mode** (default)—Shares the power delivery equally between all installed power supplies.
   - **High Efficiency Mode (Auto)**—The system selects between the odd or even power supply based on a semi-random distribution within a group of systems.
   - **High Efficiency Mode (Odd Supply Standby)**—The system places the odd power supply in standby.
   - **High Efficiency Mode (Even Supply Standby)**—The system places the even power supply in standby.
3. Press **F10** to save your selection.

Intel DMI Link Frequency

Use this option to force the link speed between the processor and south bridge to run at slower speeds. Doing so can reduce power consumption, but can also impact system performance.

NOTE: You can configure this option on systems with two or more CPUs.

To set the **Intel DMI Link Frequency**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Power Management→Advanced Power Options→Intel DMI Link Frequency** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Auto** (default)
   - **Min QPI Speed**
3. Press **F10** to save your selection.

Performance Options

This menu displays the following options:

- Intel (R) Turbo Boost Technology
- ACPI SLIT Preferences
- Advanced Performance Tuning Options

To access **Performance Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options** and press **Enter**.
2. Select an option and press **Enter**.

Intel (R) Turbo Boost Technology

Use this option to enable or disable Intel Turbo Boost Technology. The technology controls whether the processor transitions to a higher frequency than the processor's rated speed if the processor has available power and is within temperature specifications.

To configure **Intel (R) Turbo Boost Technology**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Intel (R) Turbo Boost Technology** and press **Enter**.

2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables the logical processor cores on processors supporting hyperthreading technology.
   - **Disabled**—Reduces power usage and also reduces the system's maximum achievable performance under some workloads.
3. Press **F10** to save your selection.

ACPI SLIT Preferences

Use this option to enable or disable ACPI SLIT. The ACPI SLIT (Advanced Configuration and Power Interface System Locality Information Table) defines the relative access times between processors, memory subsystems, and I/O subsystems. Operating systems that support the SLIT can use this information to improve performance by allocating resources and workloads more efficiently.

To enable or disable **ACPI SLIT Preferences**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→ACPI SLIT Preferences** and press **Enter.**
2. Select a setting and press **Enter**:
   - **Enabled**—Enables ACPI SLIT.
   - **Disabled** (default)—Does not enable ACPI SLIT.
3. Press **F10** to save your selection.

Advanced Performance Tuning Options

This menu displays the following options:

- Node Interleaving
- Intel NIC DMA Channels (IOAT)
- HW Prefetcher
- Adjacent Sector Prefetcher
- DCU Stream Prefetcher
- DCU IP Prefetcher
- QPI Bandwidth Optimization (RTID)
- Memory Proximity Reporting for I/O
- I/O Non-posted Prefetching
- NUMA Group Size Optimization
- Intel Performance Monitoring Support

To access **Advanced Performance Tuning Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options** and press **Enter**.
2. Select an option and press **Enter**.

Node Interleaving

Use this option to enable or disable NUMA node interleaving. Typically, you can obtain optimum performance on NUMA nodes by leaving this option disabled (the default setting). When this option is enabled, memory addresses are interleaved across the memory installed for each processor and some workloads might experience improved performance.

IMPORTANT: Enabling **Node Interleaving** can impact operating system performance.

To enable or disable **Node Interleaving**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options→ Node Interleaving** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled**—Memory addresses are interleaved across the memory installed for each processor. All nodes must be of equal memory size. System performance might be impacted.
   - **Disabled** (default)—Disables **Node Interleaving**, providing optimum performance in most environments.
3. Press **F10** to accept your selection.

Intel NIC DMA Channels (IOAT)

Use this option to enable or disable DMA acceleration on Intel NICs. If your server does not have Intel NICs, leave this setting disabled

To enable or disable **Intel NIC DMA Channels (IOAT)**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options→Intel NIC DMA Channels (IOAT)** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled**
   - **Disabled** (default)
3. Press **F10** to save your selection.

HW Prefetcher

Use this option to disable or enable the processor prefetch function. In most environments, leave it enabled for optimal performance. With certain workloads, disabling this option might provide a performance benefit. Do so only after performing application benchmarking to verify improved performance in a particular environment.

NOTE: This option is available on servers with Intel processors. Disabling this option is not recommended because it can degrade system performance.

To enable or disable **HW Prefetcher**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options→HW Prefetcher** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.

Adjacent Sector Prefetcher

Use this option to disable or enable the adjacent sector prefetch function. In most environments, leave the option enabled for optimal performance. With certain workloads, disabling it might provide a performance benefit. Do so only after performing application benchmarking to verify improved performance in a particular environment.

IMPORTANT: Disabling this option is not recommended because it typically degrades system performance.

To enable or disable **Adjacent Sector Prefetch**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options→Adjacent Sector Prefetch** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.

DCU Stream Prefetcher

Use this option to enable or disable the DCU stream prefetch function. In most environments, leave the option enabled for optimal performance. With certain workloads, disabling it might provide a performance benefit. Do so only after performing application benchmarking to verify improved performance in a particular environment.

To enable or disable **DCU Stream Prefetcher**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options→DCU Stream Prefetcher** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.

DCU IP Prefetcher

Use this option to enable or disable the DCU IP stream prefetch function. In most environments, leave the option enabled for optimal performance. With certain workloads, disabling it might provide a performance benefit. Do so only after performing application benchmarking to verify improved performance in a particular environment.

To enable or disable **DCU IP Prefetcher**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options→DCU IP Prefetcher** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.

QPI Bandwidth Optimization (RTID)

Use this option to configure the QPI link between two processor for optimal performance.

To set **QPI Bandwidth Optimization (RTID)**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options→QPI Bandwidth Optimization (RTID)** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Balanced Performance** (default)—Provides the best performance for most applications and benchmarks.
   - **Optimized for I/O (Alternate RTID)**—Increases bandwidth from I/O devices, such as GPUs, that rely on direct access to system memory.

NOTE:

- This setting is available on systems with two or more CPUs.
- Using this setting can have a negative impact on memory and system performance.

3. Press **F10** to save your selection.

Memory Proximity Reporting for I/O

Use this option to set whether the system ROM reports the proximity relationship between I/O devices and system memory to the operating system. Most operating systems can use this information to efficiently assign memory resources for devices, such as network controllers and storage devices.

NOTE: Certain I/O devices might not be able to take advantage of I/O handling benefits if their OS drivers are not properly optimized to support this feature. For more information, see your operating system and I/O device documentation.

To enable or disable **Memory Proximity Reporting for I/O**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options→Memory Proximity Reporting for I/O** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.

I/O Non-posted Prefetching

Use this option to enable or disable the I/O non-posted prefetch function. In most environments, leave the option enabled for optimal performance. With certain workloads, disabling it might provide a performance benefit. Do so only after performing application benchmarking to verify improved performance in a particular environment.

To enable or disable **I/O Non-posted Prefetching**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options→I/O Non-posted Prefetching** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.

NUMA Group Size Optimization

Use this option to configure how the system ROM reports the number of logical processors in a NUMA (Non-Uniform Memory Access) node. The resulting information helps the operating system group processors for application use.

To set **NUMA Group Size Optimization**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options→NUMA Group Size Optimization** and press **Enter**.

2. Select a setting and press **Enter**:
   - **Clustered** (default)—Optimizes groups along NUMA boundaries, providing better performance.
   - **Flat**—Enables applications that are not optimized to take advantage of processors spanning multiple groups to utilize more logical processors.
3. Press **F10** to save your selection.

Intel Performance Monitoring Support

Use this option to provide Intel Performance Monitoring Toolkit support to certain chipset devices .This option does not impact system performance.

To enable or disable **Intel Performance Monitoring Support**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Performance Options→Advanced Performance Tuning Options→Intel Performance Monitoring Support** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled**—Enables support.
   - **Disabled** (default)—Disables support.
3. Press **F10** to save your selection.

Server Security

This menu displays the following options:

- Set Power On Password
- Set Admin Password
- One-Time Boot Menu (F11 Prompt)
- Intelligent Provisioning (F10 Prompt)
- Embedded Diagnostics
- Embedded Diagnostics Mode
- No-Execute Protection
- Processor AES-NI Support
- Intel (R) TXT Support
- Secure Boot Settings
- Trusted Platform Module options

To access **Server Security** options:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security** and press **Enter**.
2. Select an option and press **Enter**.

Set Power On Password

Use this option to set a password for accessing the server during the boot process. When powering-on the server, a prompt appears where you enter the password to continue. To disable or clear the password, enter the password followed by a / (slash) when prompted.

NOTE: In the event of an Automatic Server Recovery (ASR) reboot, the power-on password is bypassed and the server boots normally.

To set the power-on password:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Set Power On Password** and press **Enter**.
2. If you are resetting the password, enter your old password, and press **Enter**.
3. Enter a new password and press **Enter**. A password can be:
   - 31 characters maximum
   - Any combination of numbers, letters, and special characters

   A message appears telling you the password setting is successful.
4. Confirm the password and press **Enter**.

   A message appears confirming that the password is set.
5. Press **F10** to save your entry.

Set Admin Password

Use this option to set an administrator password to protect the server configuration. If enabled, you are prompted for this password before being allowed to modify the configuration.

To set the administrator password:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Set Admin Password** and press **Enter**.
2. If you are resetting the password, enter your old password, and press **Enter**.
3. Enter a new password and press **Enter**. A password can be:
   - 31 characters maximum
   - Any combination of numbers, letters, and special characters
4. Confirm the password and press **Enter**.

   A message appears confirming that the password is set.
5. Press **F10** to save your entry.

One-Time Boot Menu (F11 Prompt)

Use this option to control whether you can press the **F11** key to boot directly to the **One-Time Boot Menu** during the current boot. This option does not modify the normal boot order settings. By default, this option is enabled, and you can boot directly into the **One-Time Boot Menu** in the **System Utilities** by pressing **F11** in the HP ProLiant main screen after a server reboot. See "Using the One-Time Boot Menu" (page 81).

To enable or disable the **One-Time Boot Menu F11 Prompt**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→One-Time Boot Menu (F11 Prompt)** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.
4. Reboot the server for the change to take effect.

Intelligent Provisioning (F10 Prompt)

Use this option to control whether you can press the **F10** key to access Intelligent Provisioning from the HP ProLiant POST screen.

To enable or disable the **Intelligent Provisioning F10 Prompt**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Intelligent Provisioning (F10 Prompt)** and press **Enter**.

2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.
4. Reboot the server for the change to take effect.

Embedded Diagnostics

Use this option to enable or disable UEFI **Embedded Diagnostics** functionality. When enabled, you can launch it from the **System Utilities**→**Embedded Applications**→**Embedded Diagnostics** menu. See "Embedded Diagnostics" (page 83).

To enable or disable **Embedded Diagnostics**:

1. From the **System Utilities** screen, select **System Configuration**→**BIOS/Platform Configuration (RBSU)**→**Server Security**→**Embedded Diagnostics** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables you to launch **Embedded Diagnostics**.
   - **Disabled**—Prevents you from launching **Embedded Diagnostics**.
3. Press **F10** to save your selection.

Embedded Diagnostics Mode

Use this option select whether to view **Embedded Diagnostics** in auto or text console mode. See "Embedded Diagnostics" (page 83).

NOTE: If you connect to the server using a BIOS serial console, you must view **Embedded Diagnostics** in text mode and not in auto (graphical) mode.

To set the **Embedded Diagnostics Mode**:

1. From the **System Utilities** screen, select **System Configuration**→**BIOS/Platform Configuration (RBSU)**→**Server Security**→**Embedded Diagnostics Mode** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Auto** (default)—Displays **Embedded Diagnostics** in graphical mode.
   - **Text Mode**—Displays **Embedded Diagnostics** in text mode.
3. Press **F10** to save your selection.

No-Execute Protection

Use this option to enable or disable protection against malicious code and viruses on your system. When enabled, memory is marked as non-executable unless the location contains executable code. If viruses attempt to insert and execute code from non-executable memory locations, these viruses are intercepted and an exception is generated. This option is enabled by default.

NOTE:

- Your operating system must support this option for you to enable it.
- Be sure this option is enabled if you are using a Virtual Machine Manager, such as VMware ESX/ESXi and Windows Hyper-V.

To enable or disable **No-Execute Protection**:

1. From the **System Utilities** screen, select **System Configuration**→**BIOS/Platform Configuration (RBSU)**→**System Options**→**Server Security**→**No-Execute Protection** and press **Enter**.

2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.

Processor AES-NI Support

Use this option to enable or disable the Advanced Encryption Standard Instruction Set in the processor.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Processor AES-NI Support** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables AES-NI support.
   - **Disabled**—Disables AES-NI support.
3. Press **F10** to save your selection.

Intel (R) TXT Support

Use this option to enable or disable Intel TXT (Trusted Execution Technology) support for servers with Intel processors.

NOTE: Enabling the TXT support option automatically enables:

- All Intel processor cores
- Hyperthreading. See "Intel (R) Hyperthreading Options" (page 17).
- VT-d. See "Intel (R) VT-d" (page 20).
- TPM. See "Trusted Platform Module options" (page 54).

Disabling any of these features while TXT is enabled can prevent TXT from working properly.

To enable or disable TXT support:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Intel (R) TXT Support** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled**—Enables TXT support.
   - **Disabled** (default)—Disables TXT support.
3. Press **F10** to save your selection.

Secure Boot Settings

Secure Boot is a server security feature that is completely implemented in the BIOS and does not require special hardware. Secure Boot ensures that each component launched during the boot process is digitally signed and that the signature is validated against a set of trusted certificates embedded in the UEFI BIOS. Secure Boot validates the software identity of the following components in the boot process:

- UEFI drivers loaded from PCIe cards
- UEFI drivers loaded from mass storage devices
- Pre-boot UEFI shell applications
- OS UEFI boot loaders

When Secure Boot is enabled:

- Firmware components and operating systems with boot loaders must have an appropriate digital signature to execute during the boot process.
- Operating systems must support Secure Boot and have an EFI boot loader signed with one of the authorized keys to boot.

  For more information about supported operating systems, see the *HP UEFI System Utilities and Shell Release Notes for HP ProLiant Gen9 Servers* on the HP website (http://www.hp.com/go/ProLiantUEFI/docs).

You can customize the certificates embedded in the UEFI BIOS by adding or removing your own certificates, either from a management console directly attached to the server, or by remotely connecting to the server using the iLO 4 Remote Console.

You can configure Secure Boot using:

- The **System Utilities** options described in the following sections.
- The HP RESTful API. For more information, see the HP website http://www.hp.com/support/restfulinterface/docs.

You can use the `secboot` command in the Embedded UEFI Shell to display Secure Boot databases, keys, and security reports.

Before you enable Secure Boot, make sure you:

- Select **UEFI Mode**. See "Boot Mode" (page 23).
- Enable **UEFI Optimized Boot**. See "UEFI Optimized Boot" (page 23).

The **Secure Boot Settings** menu displays the **Current Secure Boot State** (disabled is the default) and the following options:

- Secure Boot Enforcement
- Advanced Secure Boot Options

To access **Secure Boot Settings**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings** and press **Enter**.
2. Select an option and press **Enter**.

Secure Boot Enforcement

To enable or disable Secure Boot:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Secure Boot Enforcement** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled**—Enables Secure Boot.
   - **Disabled** (default)—Disables Secure Boot.
3. Reboot the server for the Secure Boot settings to take effect.

Advanced Secure Boot Options

This menu displays the following options:

- Platform Key (PK) Options
- Key Exchange Key (KEK) Options
- Allowed Signatures Database (DB) Options
- Forbidden Signatures Database (DBX) Options

- Delete all keys (PK, KEK, DB, DBX)
- Reset all keys to platform defaults

NOTE: Changing the default security certificates can cause the system to fail booting from some devices. It can also cause the system to fail launching certain system software such as Intelligent Provisioning.

To access **Advanced Secure Boot Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options** and press **Enter**.
2. Select an option and press **Enter**.

Platform Key (PK) Options

A Platform Key protects the next key from uncontrolled modification. This menu displays the following options:

- Enroll PK
- Delete Platform Key (PK)

To access **Platform Key (PK) Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Platform Key (PK) Options** and press **Enter**.
2. Select an option and press **Enter**.

Enroll PK

Use this option to enroll a PK certificate.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Platform Key (PK) Options→Enroll PK** and press **Enter**.
2. Select **Enroll PK Using File** and press **Enter**.
3. Enter the name of a file on an attached media device. Supported formats include .der, .cer, and .crt.
4. (Optional) To apply a signature GUID to this key:
   a. Select **Signature GUID (optional)** and press **Enter**.
   b. Enter an ID and press **Enter**. Use the following GUID format (36 characters): `11111111-2222-3333-4444-1234567890ab`.
      - For Hewlett Packard certificates, enter `F5A96B31-DBA0-4faa-A42A-7A0C9832768E`
      - For Microsoft certificates, enter `77fa9abd-0359-4d32-bd60-28f4e78f784b`
      - For SUSE certificates, enter `2879c886-57ee-45cc-b126-f92f24f906b9`
5. Select **Commit changes and exit** to save your changes.

Delete Platform Key (PK)

Use this option to delete a PK certificate.

NOTE: Deleting the Platform Key forces Secure Boot to be disabled until you enroll a new PK.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Platform Key (PK) Options→Delete Platform Key (PK)** and press **Enter**.

2. Select a key from the list and press **Enter**.
3. Press **Enter** to delete the key.
4. Reboot the server.

Key Exchange Key (KEK) Options

The Key Exchange Key protects the signature database from unauthorized modifications. No changes can be made to the signature database without the private portion of this key. This menu displays the following options:

- Enroll KEK Entry
- Delete KEK Entry

To access **Key Exchange Key (KEK) Option**s:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Key Exchange Key (KEK) Options** and press **Enter**.
2. Select an option and press **Enter**.

Enroll KEK Entry

Use this option to enroll a Key Exchange Key certificate.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Key Exchange Key (KEK) Options→Enroll KEK Entry** and press **Enter**.
2. Select **Enroll KEK using File** and press **Enter**.
3. Enter the name of a file on an attached media device. Supported formats include .der, .cer, and .crt.
4. (Optional) To apply a signature GUID to this key:
   a. Select **Signature GUID (optional)** and press **Enter**.
   b. Enter an ID and press **Enter**. Use the following GUID format (36 characters): `11111111-2222-3333-4444-1234567890ab`.
      - For Hewlett Packard certificates, enter `F5A96B31-DBA0-4faa-A42A-7A0C9832768E`
      - For Microsoft certificates, enter `77fa9abd-0359-4d32-bd60-28f4e78f784b`
      - For SUSE certificates, enter `2879c886-57ee-45cc-b126-f92f24f906b9`
5. Select **Commit changes and exit** to save your changes.

Delete KEK Entry

Use this option to delete a Key Exchange Key.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Platform Key (PK) Options→Delete KEK Entry** and press **Enter**.
2. Select a key from the list and press **Enter**.
3. Press **Enter** to delete the key.

Allowed Signatures Database (DB) Options

The Allowed Signatures Database maintains signatures of codes that are authorized to run on the platform. This menu displays the following options:

- Enroll Signature
- Delete Signature

To access **Allowed Signatures Database (DB) Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Allowed Signatures Database (DB) Options** and press **Enter**.
2. Select an option and press **Enter**.

Enroll Signature

Use this option to enroll a signature in the Allowed Signatures Database.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Allowed Signatures Database (DB) Options→Enroll Signature** and press **Enter**.
2. Select **Enroll Signature Using File** and press **Enter**.
3. Enter the name of a file on an attached media device. Supported formats include .der, .cer, and .crt.
4. (Optional) To apply a signature GUID to this signature:
   a. Select **Signature GUID (optional)** and press **Enter**.
   b. Enter an ID and press **Enter**. Use the following GUID format (36 characters): `11111111-2222-3333-4444-1234567890ab`.
      - For Hewlett Packard certificates, enter `F5A96B31-DBA0-4faa-A42A-7A0C9832768E`
      - For Microsoft certificates, enter `77fa9abd-0359-4d32-bd60-28f4e78f784b`
      - For SUSE certificates, enter `2879c886-57ee-45cc-b126-f92f24f906b9`
5. Select **Commit changes and exit** to save your changes.

Delete Signature

Use this option to delete a signature from the Allowed Signatures Database.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Allowed Signatures Database (DB) Options→Delete Signature** and press **Enter**.
2. Select a signature from the list and press **Enter**.
3. Press **Enter** to delete the signature.

Forbidden Signatures Database (DBX) Options

The Forbidden Signatures Database maintains signatures of codes that are not authorized to run on the platform. This menu displays the following options:

- Enroll Signature
- Delete Signature

To access **Forbidden Signatures Database (DBX) Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Forbidden Signatures Database (DBX) Options** and press **Enter**.
2. Select an option and press **Enter**.

Enroll Signature

Use this option to enroll a signature in the Forbidden Signatures Database.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Forbidden Signatures Database (DBX) Options→Enroll Signature** and press **Enter**.
2. Select **Enroll Signature Using File** and press **Enter**.

3. Enter the name of a file on an attached media device. Supported formats include .der, .cer, and .crt.
4. (Optional) To apply a signature GUID to this signature:
   a. Select **Signature GUID (optional)** and press **Enter**.
   b. Enter an ID and press **Enter**. Use the following GUID format (36 characters): `11111111-2222-3333-4444-1234567890ab`.
      - For Hewlett Packard certificates, enter `F5A96B31-DBA0-4faa-A42A-7A0C9832768E`
      - For Microsoft certificates, enter `77fa9abd-0359-4d32-bd60-28f4e78f784b`
      - For SUSE certificates, enter `2879c886-57ee-45cc-b126-f92f24f906b9`
5. Select **Commit changes and exit** to save your changes.

Delete Signature

Use this option to delete a signature from the Forbidden Signatures Database.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Forbidden Signatures Database (DBX) Options→Delete Signature** and press **Enter**.
2. Select a signature from the list and press **Enter**.
3. Press **Enter** to delete the signature.

Delete all keys (PK, KEK, DB, DBX)

Use this option to delete all keys in the system, including the Platform Key.

NOTE: Changing the default security certificates can cause the system to fail booting from some devices, or to fail launching certain software such as Intelligent Provisioning.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Delete all keys (PK, KEK, DB, DBX)** and press **Enter**.
2. Press **Enter** to delete all keys.

Reset all keys to platform defaults

Use this option to reset all keys to platform defaults.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Secure Boot Settings→Advanced Secure Boot Options→Reset all keys to platform defaults** and press **Enter**.
2. Press **Enter** to reset all keys.

Trusted Platform Module options

Use this menu to access Trusted Platform Module (TPM) options for servers configured with a TPM. TPM enables the firmware and operating system to take measurements of all phases of the booting process. For information on installing and enabling the TPM module option, see the user documentation for your server model.

CAUTION: A TPM locks all data access if you do not follow proper procedures for modifying the server, including updating system or option firmware, replacing hardware such as the system board and hard drive, and modifying TPM OS settings.

To configure **Trusted Platform Module options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Security→Trusted Platform Module options** and press **Enter**.

2. Select an option and press **Enter**, then select a setting for that option and press **Enter** again. On servers configured with an optional TPM, you can set the following:
   - **TPM Operation**—Sets the operational state of TPM. Options are:
     - **No Action** (default)—There is no TPM configured.
     - **Enabled**—TPM and **Secure Boot** (when enabled) are fully functional.
     - **Disabled**—TPM is visible but functionality is limited. This option also resets TPM to factory settings, clearing assigned passwords, keys, or ownership data.

       NOTE: Disabling TPM can prevent the server from booting to the TPM-aware operating system if the OS uses TPM measurements.
   - **TPM Visibility** (default)—Sets whether TPM is hidden form the operating system. Options are:
     - **Visible** (default)
     - **Hidden**—Hides TPM from the operating system. **Secure Boot** is disabled and TPM does not respond to any commands. Use this setting to remove TPM options from the system without having to remove the actual hardware.
   - **TPM Binding**—Sets whether data is encrypted using a TPM bind key, which is a unique RSA key. Options are:
     - **Enabled**
     - **Disabled** (default)
   - **TPM UEFI Option ROM Measurement**—Enables or disables (skips) measuring UEFI PCI operation ROMs. Options are:
     - **Enabled** (default)
     - **Disabled**
3. Verify that your new **Current TPM Type** and **Current TPM State** settings appear at the top of the screen.
4. Press **F10** to save your selection.

PCI Device Enable/Disable

Use this option to enable or disable embedded and add-in PCI devices. Disabling devices re-allocates the resources (memory, I/O, and ROM space and power) that are normally allocated to the device. By default, all devices are enabled.

To enable or disable devices:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→PCI Device Enabled/Disable** and press **Enter**.
2. Select a device on the system from the list and press **Enter**.
3. Select **Enable** or **Disable** and press **Enter**.
4. Press **F10** to save your selection.

Server Availability

This menu displays the following options:

- ASR Status
- ASR Timeout

- Wake-On LAN
- POST F1 Prompt
- Power Button Mode
- Automatic Power-On
- Power-On Delay

To access **Server Availability** options:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Availability** and press **Enter**.
2. Select an option and press **Enter**.

ASR Status

Use the option to enable or disable ASR (Automatic Server Recovery). When enabled, the system automatically reboots if the server locks up. ASR is enabled by default.

NOTE: The System Management driver must be loaded to use this option.

To enable or disable ASR:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Availability→ASR Status** and press **Enter**.
2. Select a setting and press **Enter**.
   - **Enabled** (default)
   - **Disabled**—Disables all ASR functionality.
3. Press **F10** to save your selection.

ASR Timeout

When ASR is enabled, you can use this option to set the time to wait before rebooting the server in the event of an operating system crash or server lockup. When the server has not responded in the selected amount of time, the server automatically reboots.

To set **ASR Timeout**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Availability→ASR Timeout** and press **Enter**.
2. Select a setting and press **Enter**:
   - **5 Minutes**
   - **10 Minutes** (default)
   - **15 Minutes**
   - **20 Minutes**
   - **30 Minutes**
3. Press **F10** to save your selection.

Wake-On LAN

Use this option to enable or disable the ability of the server to power on remotely when it receives a special packet. When enabled, **Wake-On LAN** powers up the system remotely using a WOL-capable NIC. This option requires a WOL-capable NIC, NIC driver, and operating system.

NOTE: If you enable this option, remove all power cords before adding or removing any adapters. Some adapters can cause the system to power on when added or removed.

To enable or disable **Wake-On LAN**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Availability→Wake-On LAN** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled**
   - **Disabled** (default)
3. Press **F10** to save your selection.

POST F1 Prompt

Use this option to configure how the system displays the `F1` key in the server POST screen. When enabled and an error occurs, you can press the `F1` key to continue with the server power up sequence.

To configure the **POST F1 Prompt**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Availability→POST F1 Prompt** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Delayed 20 seconds** (default)—If an error occurs, the system pauses for 20 seconds at the `F1` prompt, and then continues to boot the OS.
   - **Delayed 2 seconds**—If an error occurs, the system pauses for two seconds at the `F1` prompt, and then continues to boot the OS.
   - **Disabled**—If an error occurs, the system bypasses the `F1` prompt and continues to boot.
3. Press **F10** to save your selection.

A series of system tests execute during POST and:

- If failures occur that allow the system to continue operating, the system continues to boot and then posts a message.
- If critical components fail or are missing, the server attempts to boot. If it can boot, it posts a message and an `F1` prompt.
- If the system cannot run with the missing or failed components, it halts until those components are replaced.

Power Button Mode

Use this option to enable or disable momentary power button functionality. **Power Button Mode** does not affect the four-second power button override or the remote power control functionality.

To set the **Power Button Mode**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Availability→Power Button Mode** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—Enables the momentary power button functionality.
   - **Disabled**—Disables the momentary power button functionality.
3. Press **F10** to save your selection.

Automatic Power-On

Use this option to configure the server to automatically power on when AC power is applied to the system. By default, the system returns to its previous power state when AC power is restored after an AC power loss. This option sets the system to always return to the "on" state, even if it was in the "off" state when power was lost.

To set **Automatic Power-On**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Availability→Automatic Power-On** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Always Power On**—The system automatically returns to a power on state.
   - **Always Power Off**—The system automatically returns to a power off state.
   - **Restore Last Power State** (default)—The system automatically returns to its previous power off state.
3. Press **F10** to save your selection.

Power-On Delay

Use this option to set whether or not to delay the server from turning on for a specified time. This enables staggering when servers power up after a power loss, which can prevent power usage spikes.

NOTE: These events override the **Power-On Delay** setting and immediately power on the server:

- Pressing the power button using the iLO Virtual Power Button
- **Wake-ON LAN** events
- RTC (Real-Time Clock) wake-up events

To set **Power-On Delay**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Availability→Power-On Delay** and press **Enter**.
2. Select a setting and press **Enter**:
   - **No Delay** (default)
   - **Random Delay**
   - **15 Second Delay**
   - **30 Second Delay**
   - **45 Second Delay**
   - **60 Second Delay**
3. Press **F10** to save your selection.

BIOS Serial Console and EMS

BIOS Serial Console and EMS console redirection enable you to view POST error messages and run RBSU remotely through a serial connection to the server COM port or iLO Virtual Serial port. To do so, you do not need a keyboard or mouse. This menu displays the following options:

- BIOS Serial Console Port
- BIOS Serial Console Emulation Mode
- BIOS Serial Console Baud Rate
- EMS Console

NOTE: Some languages or characters might require that you use a specific emulation mode.

To access **BIOS Serial Console and EMS** options:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→BIOS Serial Console and EMS** and press **Enter**.
2. Select an option and press **Enter**.

BIOS Serial Console Port

Use this option to configure how to redirect video and keystrokes through the serial port. When set, this option can interfere with non-terminal devices attached to the serial port. If this occurs, set it to disabled.

NOTE: When setting this option, ensure your terminal software is using a Unicode character set (for example: UTF-8).

IMPORTANT: This option is not supported on Japanese or Simplified Chinese systems.

To set the **BIOS Serial Console Port**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→BIOS Serial Console and EMS→BIOS Serial Console Port** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Auto** (default)
   - **Disabled**
   - **Physical Serial Port**
   - **Virtual Serial Port**
3. Press **F10** to save your selection.
4. If you enabled BIOS Serial Console, connect a null modem cable to the serial port/COM port on which it is enabled.

BIOS Serial Console Emulation Mode

Use this option to select a serial console emulation mode type. Your selection depends on the emulation you want to use in your serial terminal program (for example, Hyper Terminal or PuTTY). The BIOS emulation mode must match the selected mode in the terminal program. When you select ANSI mode, some special characters are displayed in the serial console (for example, a degree symbol °).

To set the **BIOS Serial Console Emulation Mode**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→BIOS Serial Console and EMS→BIOS Serial Console Emulation Mode** and press **Enter**.
2. Select a setting and press **Enter**:
   - **VT100** (default)
   - **ANSI**
   - **VT100+**
3. Press **F10** to save your selection.

BIOS Serial Console Baud Rate

Use this option to set the transfer rate at which data is transmitted through the serial port.

To set the **BIOS Serial Console Baud Rate**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→BIOS Serial Console and EMS→BIOS Serial Console Baud Rate** and press **Enter**.
2. Select a setting and press **Enter**:
   - **9600**
   - **19200**
   - **38400**

- **57600**
- **115200** (default)

3. Press **F10** to save your selection.

EMS Console

Use this option to configure the ACPI serial port settings for redirecting the Windows Server Emergency Management (EMS) console.

When setting this option for redirecting EMS through a network connection, do the following:

- If you are using iLO 4, select the value (COM1 or COM2) that corresponds to the resources assigned to the **Virtual Serial Port** in the **System Options→Serial Port Options** menu.
- If you are redirecting EMS through a physical serial port, select the value (COM1 or COM2) that corresponds to the resources assigned to the **Embedded Serial Port** in the **System Options→Serial Port Options** menu.

To configure the **EMS Console**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→BIOS Serial Console and EMS→EMS Console** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Disabled** (default)
   - **COM1**
   - **COM2**
3. Press **F10** to save your selection.

EMS provides input and output support for all Microsoft Windows kernel components, including the loader, setup, recovery console, OS kernel, blue screens, and the Special Administration Console. The Special Administration Console is a text mode management console that is available after Windows Server 2008 or 2012 OS is initialized.

Microsoft enables EMS in the OS, and you must also enable EMS in the ROM. When enabled, EMS assumes the serial port for redirection and can cause interference with other devices attached to the serial port. To avoid interference, EMS is disabled in the system ROM by default on HP ProLiant ML and DL servers. If EMS is disabled in Windows Server 2008 or 2012, perform the following steps to update the `boot.ini` file:

1. Enable the EMS console on a COM port.
2. Press **F10** to save your selection.
3. Reboot the server.

Server Asset Information

This menu displays the following options:

- Server Information
- Administrator Information
- Service Contact Information
- Custom POST Message

To access **Server Asset Information** options:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Asset Information** and press **Enter**.
2. Select an option and press **Enter**.

Server Information

Use this option to enter reference information for the server administrator.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Asset Information→Server Information** and press **Enter**.
2. Select a setting and press **Enter**, then complete or select an entry and press **Enter** again:

   NOTE: For text settings, enter a maximum of 14 characters. By default, all values are blank.

   - **Server Name**—Enter a server name.
   - **Server Asset Tag**—Enter a server asset number.
   - **Asset Tag Protection**—Select a setting:
     - **Unlocked**(default)
     - **Locked**—Locks asset tag information. The asset tag is not erased if you restore default system settings.
   - **Server Primary OS**—Enter a description of the primary OS of the server.
   - **Server Other Information**—Enter additional text describing the server.
   - **Power-On Logo**—Select a setting:
     - **Enabled** (default)—Displays the logo during system boot.
     - **Disabled**—Does not display the logo during system boot.

       NOTE: This setting does not affect system boot times.

3. Press **F10** to save your selection.

Administrator Information

Use this option to enter contact information for the server administrator.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Asset Information→Administrator Information** and press **Enter**.
2. Select a setting and press **Enter**, then complete an entry and press **Enter** again:

   NOTE: The number of characters allowed for each entry varies by server model. By default, all values are blank.

   - **Administrator Name**—Enter the server administrator's name.
   - **Administrator Phone Number**—Enter the server administrator's phone number.
   - **Administrator E-mail Address**—Enter the server administrator's e-mail address.
   - **Administrator Other Information**—Enter additional text relating to the server administrator.
3. Press **F10** to save your selection.

Service Contact Information

Use this option to enter service contact information for the server administrator.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Asset Information→Service Contact Information** and press **Enter**.
2. Select a setting and press **Enter**, then complete an entry and press **Enter** again:

NOTE: The number of characters allowed for each entry varies by server model. By default, all values are blank.

- **Service Contact Name**—Enter the service contact's name.
- **Service Phone Number**—Enter the service contact's phone number.
- **Service Contact E-mail Address**—Enter the service contact's e-mail address.
- **Service Contact Other Information**—Enter additional text relating to the service contact.

3. Press **F10** to save your selection.

Custom POST Message

Use this option to enter a custom message to display during server POST on the HP ProLiant POST screen.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Server Asset Information→Custom POST Message** and press **Enter**.
2. Enter a message of up to 60 characters and press **Enter**.
3. Press **F10** to save your settings.

Advanced Options

This menu displays the following options:

- ROM Selection
- Video Options
- Embedded Video Connection
- Fan and Thermal Options
- Advanced System ROM Options

To access **Advanced Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options** and press **Enter**.
2. Select an option and press **Enter**.

ROM Selection

On a server with redundant ROMs, you can use this option to revert the server to a previous BIOS ROM image.

To set the **ROM Selection**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→ROM Selection** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Use Current ROM** (default)
   - **Switch to Backup ROM**—Reverts to the image in use before the last flash event.
3. Press **F10** to save your selection.

Video Options

Use this option to configure the video display. By default, the system BIOS disables the embedded video controller when an optional video controller is installed in the system. You can use this option to leave the embedded video controller enabled so that the iLO remote video functions properly and also provides dual-head video support. Early system startup video is always displayed to the embedded video controller.

NOTE:

- The ability to support dual-head video between the embedded and a stand-up device depends on support from the operating system. For more information, see your operating system documentation.
- When multiple optional video cards are installed, the card that is selected as primary is based on PCI enumeration, which varies by platform. You might have to remove and reinstall the cards in a different order to control which card is the primary controller.

To set **Video Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Video Options** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Add-in Video Enabled, Embedded Video Disabled** (default)—The system only displays video to the first discovered add-in video controller.
   - **Both Add-in and Embedded Video Enabled**—The system displays video to the embedded and the first discovered add-in video controller.
3. Press **F10** to save your selection.

Embedded Video Connection

Use this option to configure an external video connection to the embedded video connection.

To set the **Embedded Video Connection**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Embedded Video Connection** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Auto** (default)—The external video connection to the embedded video controller is automatically disabled to save power when a monitor is not attached. It is enabled automatically when a monitor is attached (including when the server is operating).
   - **Always Disabled**—The external video connection to the embedded video controller is disabled and a monitor connected to this port does not display except during system boot.
   - **Always Enabled**—The external video connection to the embedded video controller is always enabled. This option is only required if a monitor is attached with a monitor detection that does not function, causing Auto mode to not work properly.
3. Press **F10** to save your selection.

Fan and Thermal Options

This menu displays the following options:

- Thermal Configuration
- Thermal Shutdown
- Fan Installation Requirements
- Fan Failure Policy

To access **Fan and Thermal Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Fan and Thermal Options** and press **Enter**.
2. Select an option and press **Enter**.

Thermal Configuration

Use this option to select the fan cooling method for the system.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Fan and Thermal Options→Thermal Configuration** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Optimal Cooling** (default)—Provides the most efficient solution by configuring fan speeds to the minimum required to provide adequate cooling.
   - **Increased Cooling**—Operates fans at a higher speed.

     NOTE: This setting is only advised for configurations that differ from typical HP-supported configurations that cannot be cooled adequately via **Optimal Cooling**, the default setting.

   - **Maximum Cooling**—Provides the maximum cooling available for the system.
3. Press **F10** to save your selection.

Thermal Shutdown

Use this option to configure the system to shut down when a fan failure occurs in non-redundant fan mode. A shutdown is initiated due to non-redundant fan failures or temperature increases beyond the pre-set threshold. If disabled, the System Management Driver ignores thermal events and the system immediately powers off in data-destructive situations.

To enable or disable **Thermal Shutdown**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Fan and Thermal Options→Thermal Shutdown** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)—The server automatically shuts down when the internal server temperature reaches within five degrees of the critical level.
   - **Disabled**—The server does not automatically shut down when the internal server temperature reaches within five degrees of the critical level. Shutdown occurs when the temperature reaches the critical level.
3. Press **F10** to save your selection.

Fan Installation Requirements

Use this option to configure how the server reacts when all required fans are not installed. Operating the server without the required fans can result in damage to the hardware components.

To set **Fan Installation Requirements**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Fan and Thermal Options→Fan Installation Requirements** and press **Enter**.

   Select a setting and press **Enter**:
   - **Enable Messaging** (default)—The server displays messages and log events to the Integrated Management Log (IML) when required fans are not installed. The server can still boot and operate. This is the recommended setting.
   - **Disable Messaging**—The server does not display message and log events when required fans are not installed. All indications that the server is operating without required fans are removed.
2. Press **F10** to save your selection.

Fan Failure Policy

Use this option to configure how the server reacts when fans fail, resulting in the server not having required fans in operation.

NOTE: Operating a server without the required fans installed and operating is not recommended and can impact the ability for the system to cool components properly. It can also result in damage to hardware components.

To set the **Fan Failure Policy**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Fan and Thermal Options→Fan Failure Policy** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Shutdown/Halt on Critical Fan Failures** (default)—The server cannot boot or operate if it does not have required fans operating due to one or more fan failures. This is the recommended setting.
   - **Allow Operation with Critical Fan Failures**—The server can boot and operate if it does not have required fans operating due to one or more fan failures.

   Press **F10** to save your selection.

Extended Ambient Temperature Support

Use this option to enable the server to operate at higher ambient temperatures than are normally supported.

NOTE: This option is only supported by specific hardware configurations. See your HP server documentation before enabling extended ambient temperature support. Improper system operation or damage to hardware components can result from enabling these features in unsupported configurations.

To enable or disable **Extended Ambient Temperature Support**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Fan and Thermal Options→Extended Ambient Temperature Support** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Disabled** (default)
   - **Enabled for 40c Ambient (ASHRAE 3)**—Enables the server to operate in environments with ambient temperatures up to 40 degrees Celsius.
   - **Enabled for 45c Ambient (ASHRAE 4)**—Enables the server to operate in environments with ambient temperatures up to 45 degrees Celsius.

   NOTE: Not all Gen9 servers support both 40c Ambient (ASHRAE 3) and 45c Ambient (ASHRAE 4).
3. Press **F10** to save your selection.

Advanced System ROM Options

This menu displays the following options:

- NMI Debug Button
- PCI Bus Padding Options
- Consistent Device Naming
- Mixed Power Supply Reporting

- Serial Number
- Product ID

To access **Advanced System ROM Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Advanced System ROM Options** and press **Enter**.
2. Select an option and press **Enter**.

NMI Debug Button

Use this function to enable or disable debug functionality when the system experiences a software lock-up. The NMI Debug Button generates an NMI to enable the use of the operating system debugger.

NOTE: When enabled, pressing the NMI Debug Button on the system board during normal operation halts the system.

To enable or disable the **NMI Debug Button**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Advanced System ROM Options→NMI Debug Button** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.

PCI Bus Padding Options

Use this option to enable or disable the default PCI Bus padding, which provides each expansion slot with an extra PCI Bus number. By default, the System BIOS pads one PCI bus for each expansion slot to allow expansion cards with PCI-PCI bridges to not affect current bus numbering schemes. Do not disable this option unless you encounter a specific problem with your expansion card.

To enable or disable **PCI Bus Padding Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Advanced System ROM Options→PCI Bus Padding Options** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.

Consistent Device Naming

Use this option to set the level of Consistent Device Naming. On supported operating systems, device naming controls how NIC ports are named based on their locations in the system.

NOTE: Existing NIC connections retain their names until reinstalled under the OS environment.

To set device naming:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Advanced System ROM Options→Consistent Device Naming** and press **Enter**.

2. Select a setting and press **Enter**:
   - **CDN Support for LOMs only**—Embedded NICs and FlexibleLOM (not NICs installed in expansion slots) are named based on their locations in the system.
   - **Disabled** (default)—All NIC ports are named based on their locations in the system.
3. Press **F10** to save your selection.

Mixed Power Supply Reporting

Use this option to set whether the server logs messages when a mixed supply configuration is present.

To enable or disable **Mixed Power Supply Reporting**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Advanced System ROM Options→Mixed Power Supply Reporting** and press **Enter**.
2. Select a setting and press **Enter**:
   - **Enabled** (default)
   - **Disabled**
3. Press **F10** to save your selection.

Serial Number

Use this option to re-enter the server serial number after replacing the system board. Consult a qualified IT service specialist for assistance in modifying this value. This ID must match the ID located on the chassis.

To enter a chassis **Serial Number**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Advanced System ROM Options→Serial Number** and press **Enter**.
2. Enter the serial number and press **Enter**.
3. Press **F10** to save your entry.
4. Press **Enter** to confirm your change.

Product ID

Use this option to re-enter the server product ID after replacing the system board. This ID must match the ID located on the chassis.

To enter a **Product ID**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Advanced Options→Advanced System ROM Options→Product ID** and press **Enter**.
2. Enter the product ID and press **Enter**.
3. Press **F10** to save your entry.
4. Press **Enter** to confirm your change.

Date and Time

Use this option to set the system date and time on the server.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→Date and Time** and press **Enter**.
2. Select a setting and press **Enter**, then complete your entry and press **Enter** again:
   - **Date (mm-dd-yyyy)**—Enter the date in a month-day-year (mm-dd-yyyy) format.
   - **Time (hh:mm:ss)**—Enter the time in a 24–hour format (hh:mm:ss) format.
   - **Time Zone**—Use the up and down arrow keys to select your current time zone for the system

- **Daylight Savings Time**:
  - **Enabled**—Adjusts the local time displayed by one hour for Daylight Savings Time.
  - **Disabled** (default)—Does not adjust the local time displayed for Daylight Savings Time.
- **Time Format**:
  - **Coordinated Universal Time (UTC)** (default)—Calculates the time stored in the hardware Real Time Clock (RTC) from the associated **Time Zone** setting.
  - **Local Time**—Removes the use of the **Time Zone** setting. This option is useful for addressing interaction issues between Windows operating systems set in Legacy BIOS Mode.

3. Press **F10** to save your settings.

System Default Options

This menu displays the following options:

- Restore Default System Settings
- Restore Default Manufacturing Settings
- Default UEFI Device Priority
- User Default Options

To access **System Default Options**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Default Options** and press **Enter**.
2. Select an option and press **Enter**.

Restore Default System Settings

Use this option to reset all BIOS configuration settings to their default values and immediately and automatically restart the server.

Selecting this option resets all platform settings except:

- **Secure Boot** BIOS settings
- **Date and Time** settings
- Primary and redundant **ROM Selection** (if supported)

You can save a custom default configuration to use during a system restore. Doing so saves settings you might otherwise lose. See "User Default Options" (page 69).

△ **CAUTION:** When you select use this option to reset configuration settings, any modifications that you have made might be lost.

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Default Options→Restore Default System Settings** and press **Enter**.
2. Select a setting and press **Enter**:
   - **No, cancel the restore procedure.**
   - **Yes, restore the default settings.**
3. Press **Enter** to reboot the server for changes to take effect.

Restore Default Manufacturing Settings

Use this option to reset all BIOS configuration settings to their default manufacturing values and delete all UEFI non-volatile variables, such as boot configuration and Secure Boot security keys (if Secure Boot is enabled). Previous changes that you have made might be lost.

The difference between this action and the **Restore Default System Settings** option described in the previous section is that **Restore Default Manufacturing Settings** erases all UEFI variables. An OS can write UEFI variables that store such things as entries in the boot order and key database information for Secure Boot. When you **Restore Default Manufacturing Settings**, this information is cleared, whereas it is retained when you **Restore Default System Settings**.

You can save a custom default configuration to use during a system restore. Doing so saves settings you might otherwise lose. See "User Default Options" (page 69).

To restore default manufacturing settings:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Default Options→Restore Default Manufacturing Settings** and press **Enter**.
2. Select a setting and press **Enter**:
   - **No, cancel the restore procedure.**
   - **Yes, restore the default settings.**
3. Press **Enter** to reboot the server for your changes to take effect.

Default UEFI Device Priority

Use this option to change the UEFI device priority that is used when default system settings are restored. The initial **UEFI Boot Order** list is created based on the priorities defined here. Before you change the priority list, you must configure and save user defaults as described in the next section, User Default Options. When the default configuration settings are loaded, the settings from the saved **Default UEFI Device Priority** list are used instead of the system or factory defaults.

To configure the **Default UEFI Device Priority**:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Default Options→Default UEFI Device Priority** and press **Enter**.
2. Select an entry and press **Enter**.
3. Use the **+** key to move the entry higher in the list. Use the **-** key to move it lower in the list. Use the arrow keys to navigate through the list.
4. Press **F10** to save your settings.

User Default Options

Use these options to save or erase a configuration as the custom default configuration. Configure the system as necessary and then enable this option to save the configuration as the default configuration. When the system loads the default settings, the custom default settings are used instead of the manufacturing defaults.

To save or erase custom default settings:

1. From the **System Utilities** screen, select **System Configuration→BIOS/Platform Configuration (RBSU)→System Default Options→User Default Options** and press **Enter**.

2. Select an option and press **Enter**, then select a setting for the option and press **Enter** again:
   - **Save User Defaults**
     - **Yes, Save**—Saves the current settings as the system default settings.
     - **No, Cancel** (default)—Does not save the current settings as the system default settings.
   - **Erase User Defaults**
     - **Yes, erase the current settings**—Erases (deletes) the current user-defined default settings. Once deleted, you can only restore these setting manually.
     - **No, Cancel** (default)—Does not erase the current user-defined default settings
3. Press **F10** to save your settings.

4 Using the iLO 4 Configuration Utility

The iLO 4 Configuration Utility is available in the HP UEFI System Utilities. The utility has the following options:

- Network Options
- Advanced Network Options
- User Management
- Setting Options
- About
- Set to Factory Defaults

For more information, see the *HP iLO 4 User Guide* at http://www.hp.com/go/ilo/docs.

Accessing the iLO 4 Configuration Utility menu

The **iLO 4 Configuration Utility** is embedded in the system ROM of HP ProLiant servers that support UEFI.

You can access the iLO 4 Configuration Utility from the physical system console, or by using an iLO remote console session.

1. Optional: If you access the server remotely, start an iLO remote console session.

   You can use the .NET IRC or Java IRC.
2. Restart or power on the server.
3. Press **F9** in the ProLiant POST screen to start the UEFI System Utilities.
4. From the **System Utilities** screen, select **System Configuration→iLO 4 Configuration Utility**.
5. From the **iLO 4 Configuration Utility** screen, select an option and press **Enter**.

   Use the iLO 4 Configuration Utility to perform the following tasks:

   - Configuring Network Options
   - Configuring Advanced Network Options
   - Managing iLO users by using the iLO 4 Configuration Utility
   - Configuring access settings by using the iLO 4 Configuration Utility
   - Viewing information about iLO
   - Resetting iLO to the factory default settings by using the iLO 4 Configuration Utility
   - Resetting iLO by using the iLO 4 Configuration Utility

Configuring Network Options

Use the **iLO 4 Configuration Utility Network Options** menu to configure basic iLO network options.

1. Optional: If you access the server remotely, start an iLO remote console session.

   You can use the .NET IRC or Java IRC.
2. Restart or power on the server.
3. Press **F9** in the ProLiant POST screen to start the UEFI System Utilities.
4. From the **System Utilities** screen, select **System Configuration→iLO 4 Configuration Utility→Network Options**.

5. From the **Network Options** screen, view or update the following values:
   - **MAC Address** (read-only)—The MAC address of the selected iLO network interface.
   - **Network Interface Adapter**—Specifies the iLO network interface adapter to use. Select **ON** to enable the iLO Dedicated Network Port. Select **Shared Network Port** to use the Shared Network Port. **OFF** disables all network interfaces to iLO.

     The Shared Network Port option is available only on supported servers.

     For more information about the iLO NIC settings, see the *HP iLO 4 User Guide*.
   - **Transceiver Speed Autoselect** (iLO Dedicated Network Port only)—Enables iLO to negotiate the highest supported link speed and duplex settings when connected to the network. This option is available only when **Network Interface Adapter** is set to **ON**.
   - **Transceiver Speed Manual Setting** (iLO Dedicated Network Port only)—Sets the link speed for the iLO network interface. This option is available only when **Network Interface Adapter** is set to **ON** and **Transceiver Speed Autoselect** is set to **OFF**.
   - **Transceiver Duplex Setting** (iLO Dedicated Network Port only)—Sets the link duplex setting for the iLO network interface. This option is available only when **Network Interface Adapter** is set to **ON** and **Transceiver Speed Autoselect** is set to **OFF**.
   - **VLAN Enable** (Shared Network Port only)—Enables the VLAN feature.

     When the Shared Network Port is active and VLAN is enabled, the iLO Shared Network Port becomes part of a VLAN. All network devices with different VLAN tags will appear to be on separate LANs, even if they are physically connected to the same LAN. This option is available only when **Network Interface Adapter** is set to **Shared Network Port**.
   - **VLAN ID** (Shared Network Port only)—If you enabled VLAN, enter a VLAN tag. All network devices that you want to communicate with each other must have the same VLAN tag. The VLAN tag can be any number between 1 and 4094. This option is available only when **Network Interface Adapter** is set to **Shared Network Port**.
   - **DHCP Enable**—Configures iLO to obtain its IP address (and many other settings) from a DHCP server.
   - **DNS Name**—The DNS name of the iLO subsystem (for example, `ilo` instead of `ilo.example.com`).

     This name can be used only if DHCP and DNS are configured to connect to the iLO subsystem name instead of the IP address.
   - **IP Address**—The iLO IP address. If DHCP is used, the iLO IP address is supplied automatically. If DHCP is not used, enter a static IP address.
   - **Subnet Mask**—The subnet mask of the iLO IP network. If DHCP is used, the subnet mask is supplied automatically. If DHCP is not used, enter a subnet mask for the network.
   - **Gateway IP Address**—The iLO gateway IP address. If DHCP is used, the iLO gateway IP address is supplied automatically. If DHCP is not used, enter the iLO gateway IP address.
6. Press **F10** to save your changes.
7. Press **Esc** until the main menu is displayed.
8. Select **Exit and Resume Boot** in the main menu, and then press **Enter**.
9. When prompted to confirm the request, press **Enter** to exit the utility and resume the boot process.

Configuring Advanced Network Options

Use the **iLO 4 Configuration Utility Advanced Network Options** menu to configure advanced iLO network options.

1. Optional: If you access the server remotely, start an iLO remote console session.

   You can use the .NET IRC or Java IRC.
2. Restart or power on the server.
3. Press **F9** in the ProLiant POST screen to start the UEFI System Utilities.
4. From the **System Utilities** screen, select **System Configuration→iLO 4 Configuration Utility→Advanced Network Options**.
5. From the **Advanced Network Options** screen, view or update the following values, as needed:
   - **Gateway from DHCP**—Specifies whether iLO uses a DHCP server-supplied gateway.
   - **Gateway #1**, **Gateway #2**, and **Gateway #3**—If **Gateway from DHCP** is disabled, enter up to three iLO gateway IP addresses.
   - **DHCP Routes**—Specifies whether iLO uses the DHCP server-supplied static routes.
   - **Route 1**, **Route 2**, and **Route 3**—If **DHCP Routes** is disabled, enter the iLO static route destination, mask, and gateway addresses.
   - **DNS from DHCP**—Specifies whether iLO uses the DHCP server-supplied DNS server list.
   - **DNS Server 1**, **DNS Server 2**, **DNS Server 3**—If **DNS from DHCP** is disabled, enter the primary, secondary, and tertiary DNS servers.
   - **WINS from DHCP**—Specifies whether iLO uses the DHCP server-supplied WINS server list.
   - **Register with WINS Server**—Specifies whether iLO registers its name with a WINS server.
   - **WINS Server #1** and **WINS Server #2**—If **WINS from DHCP** is disabled, enter the primary and secondary WINS servers.
   - **Domain Name**—The iLO domain name. If DHCP is not used, enter a domain name.
6. Press **F10** to save the changes.
7. Press **Esc** until the main menu is displayed.
8. Select **Exit and Resume Boot** in the main menu, and then press **Enter**.
9. When prompted to confirm the request, press **Enter** to exit the utility and resume the normal boot process.

Managing iLO users by using the iLO 4 Configuration Utility

You can use the **iLO 4 Configuration Utility** to perform the following user management tasks:

- "Adding user accounts" (page 73)
- "Editing or removing user accounts" (page 74)

Adding user accounts

Use the iLO 4 Configuration Utility **User Management** menu to configure local iLO user accounts.

1. Optional: If you access the server remotely, start an iLO remote console session.

   You can use the .NET IRC or Java IRC.
2. Restart or power on the server.
3. Press **F9** in the ProLiant POST screen to start the UEFI System Utilities.
4. From the **System Utilities** screen, select **System Configuration→iLO 4 Configuration Utility→User Management**.
5. From the **User Management** screen, select **Add User**, and then press **Enter**.

6. From the **Add User** screen, select from the following privileges.

   To enable a privilege, set it to **YES**. To disable a privilege, set it to **NO**.

   - **Administer User Accounts**—Enables a user to add, edit, and delete local iLO user accounts. A user with this privilege can change privileges for all users. If you do not have this privilege, you can view your own settings and change your own password.
   - **Remote Console Access**—Enables a user to remotely access the host system Remote Console, including video, keyboard, and mouse control.
   - **Virtual Power and Reset**—Enables a user to power-cycle or reset the host system. These activities interrupt the system availability. A user with this privilege can diagnose the system by using the **Generate NMI to System** button.
   - **Virtual Media**—Enables a user to use the Virtual Media feature on the host system.
   - **Configure Settings**—Enables a user to configure most iLO settings, including security settings, and to remotely update the iLO firmware. This privilege does not enable local user account administration.
7. Enter the following user account details:
   - **New User Name** appears in the user list on the **User Administration** page. It does not have to be the same as the **Login Name**. The maximum length for a user name is 39 characters. The user name must use printable characters. Assigning descriptive user names can help you to easily identify the owner of each login name.
   - **Login Name** is the name you must use when logging in to iLO. It appears in the user list on the **User Administration** page, on the **iLO Overview** page, and in iLO logs. The **Login Name** does not have to be the same as the **User Name**. The maximum length for a login name is 39 characters. The login name must use printable characters.
   - **Password** and **Password Confirm** set and confirm the password that is used for logging in to iLO. The maximum length for a password is 39 characters. Enter the password twice for verification.
8. Create as many user accounts as needed, and then press **F10** to save the changes.
9. Press **Esc** until the main menu is displayed.
10. Select **Exit and Resume Boot** in the main menu, and then press **Enter**.
11. When prompted to confirm the request, press **Enter** to exit the utility and resume the boot process.

Editing or removing user accounts

Use the **iLO 4 Configuration Utility User Management** menu to edit or remove local iLO user accounts.

1. Optional: If you access the server remotely, start an iLO remote console session.

   You can use the .NET IRC or Java IRC.
2. Restart or power on the server.
3. Press **F9** in the ProLiant POST screen to start the UEFI System Utilities.
4. From the **System Utilities** screen, select **System Configuration→iLO 4 Configuration Utility→User Management**.
5. From the **User Management** screen, select **Edit/Remove User**, and then press **Enter**.
6. From the **User Management→Edit/Remove User** screen, select the **Action** menu for the user name you want to edit or delete, and then press **Enter**.
7. Select one of the following, and then press **Enter**.
   - **No Change**—Returns you to the main menu.
   - **Delete**—Deletes this user.
   - **Edit**—Edits the user.

8. Depending on your selection in Step 7, do one of the following:
   - If you selected **No Change**, no further action is needed.
   - If you selected **Delete**, the user name is marked to be deleted when you save the changes on this page.
   - If you selected **Edit**, update the login name, password, or user permissions.
9. Update as many user accounts as needed, and then press **F10** to save the changes.
10. Press **Esc** until the main menu is displayed.
11. Select **Exit and Resume Boot** in the main menu, and then press **Enter**.
12. When prompted to confirm the request, press **Enter** to exit the utility and resume the boot process.

Configuring access settings by using the iLO 4 Configuration Utility

Use the **iLO 4 Configuration Utility Setting Options** menu to configure iLO access settings.

1. Optional: If you access the server remotely, start an iLO remote console session.

   You can use the .NET IRC or Java IRC.
2. Restart or power on the server.
3. Press **F9** in the ProLiant POST screen to start the UEFI System Utilities.
4. From the **System Utilities** screen, select **System Configuration→iLO 4 Configuration Utility→Setting Options**.
5. From the **Setting Options** screen, view or update the following values, as needed:
   - **iLO 4 Functionality**—Enables or disables the iLO 4 features. The iLO network and communications with operating system drivers are terminated when iLO functionality is disabled.

     For ProLiant Gen8 servers only: To re-enable iLO functionality, disable iLO security with the system maintenance switch, and then set **iLO 4 Functionality** to **Enabled**. For more information about using the system maintenance switch, see the *Maintenance and Service Guide* for your server model.

     For ProLiant Gen9 servers only: To re-enable iLO functionality, set **iLO 4 Functionality** to **Enabled**.

     The iLO functionality cannot be disabled on blade servers.
   - **iLO 4 Configuration Utility**—Enables or disables the iLO 4 Configuration Utility. If this option is set to **Disabled**, the iLO 4 Configuration Utility menu item is not available when you access the UEFI System Utilities.
   - **Require Login for iLO 4 Configuration**—Determines whether a user-credential prompt is displayed when a user accesses the iLO 4 Configuration Utility. If this setting is **Enabled**, a login dialog box opens when you access the iLO 4 Configuration Utility.
   - **Show iLO 4 IP Address during POST**—Enables the display of the iLO network IP address during host server POST.
   - **Local Users**—Enables or disables local user account access.

- **Serial CLI Status**—This setting enables you to change the login model of the CLI feature through the serial port. The following settings are valid:
  - **Enabled-Authentication Required**—Enables access to the iLO CLP from a terminal connected to the host serial port. Valid iLO user credentials are required.
  - **Enabled-No Authentication Required**—Enables access to the iLO CLP from a terminal connected to the host serial port. iLO user credentials are not required.
  - **Disabled**—Disables access to the iLO CLP from the host serial port. Use this option if you are planning to use physical serial devices.
- **Serial CLI Speed (bits/second)**—This setting lets you change the speed of the serial port for the CLI feature. The following speeds (in bits per second) are valid: **9600**, **19200**, **57600**, and **115200**. You need to set the serial port configuration to no parity, 8 data bits, and 1 stop bit (N/8/1) for correct operation.

  NOTE: The 38400 speed is supported in the iLO web interface, but is not currently supported by the iLO 4 Configuration Utility.

6. Press **F10** to save the changes.
7. Press **Esc** until the main menu is displayed.
8. Select **Exit and Resume Boot** in the main menu, and then press **Enter**.
9. When prompted to confirm the request, press **Enter** to exit the utility and resume the boot process.

Viewing information about iLO

Use the **iLO 4 Configuration Utility About** menu to view iLO information.

1. Optional: If you access the server remotely, start an iLO remote console session.

   You can use the .NET IRC or Java IRC.
2. Restart or power on the server.
3. Press **F9** in the ProLiant POST screen to start the UEFI System Utilities.
4. From the **System Utilities** screen, select **System Configuration→iLO 4 Configuration Utility→About**.

   The **About** screen includes the following information:
   - **Firmware Date**—The iLO firmware revision date.
   - **Firmware Version**—The iLO firmware version.
   - **iLO CPLD Version**—The iLO complex programmable logic device version.
   - **Host CPLD Version**—The ProLiant server complex programmable logic device version.
   - **Serial Number**—The iLO serial number.
   - **RBSU Date**—The iLO 4 Configuration Utility revision date.
   - **PCI BUS**—The PCI bus to which the iLO processer is attached.
   - **Device**—The device number assigned to iLO in the PCI bus.
5. Press **Esc** until the main menu is displayed.
6. Select **Exit and Resume Boot** in the main menu, and then press **Enter**.
7. When prompted to confirm the request, press **Enter** to exit the utility and resume the boot process.

Resetting iLO to the factory default settings by using the iLO 4 Configuration Utility

Use the iLO 4 Configuration Utility **Set to Factory Defaults** menu to reset iLO to the factory default settings.

△ **CAUTION:** This operation clears all user and license data.

1. Optional: If you access the server remotely, start an iLO remote console session.

   You can use the .NET IRC or Java IRC.
2. Restart or power on the server.
3. Press **F9** in the ProLiant POST screen to start the UEFI System Utilities.
4. From the **System Utilities** screen, select **System Configuration→iLO 4 Configuration Utility→Set to factory defaults**.

   The iLO 4 Configuration Utility prompts you to select **YES** or **NO**.
5. Select **YES**, and then press **Enter**.

   The iLO 4 Configuration Utility prompts you to confirm the reset request.

   The iLO system is reset, and you cannot access the iLO 4 Configuration Utility until after the next system reboot.

   You can press **Enter** to confirm, or press **Esc** to cancel.
6. Press **Enter**.

   iLO resets to the factory default settings. If you are managing iLO remotely, the remote console session is automatically ended.
7. Resume the boot process:
   a. Optional: If you are managing iLO remotely, wait for the iLO reset to finish, and then start the iLO remote console.

      The iLO 4 Configuration Utility screen is still open from the previous session.
   b. Press **Esc** until the main menu is displayed.
   c. Select **Exit and Resume Boot** in the main menu, and then press **Enter**.
   d. When prompted to confirm the request, press **Enter** to exit the screen and resume the boot process.

NOTE: If a server has an installed iLO Advanced license when you perform this procedure, the iLO Advanced icon might be selected when the server boot process finishes. The icon will be set correctly after POST completes, or after the server is shut down, powered off, and then powered on again.

Resetting iLO by using the iLO 4 Configuration Utility

If iLO is slow to respond, you can use the iLO 4 Configuration Utility **Reset iLO** menu to perform a reset.

Resetting iLO does not make any configuration changes, but it ends all active connections to iLO. You must have the Configure iLO Settings privilege to reset iLO using this method.

1. Optional: If you access the server remotely, start an iLO remote console session.

   You can use the .NET IRC or Java IRC.
2. Restart or power on the server.
3. Press **F9** in the ProLiant POST screen to start the UEFI System Utilities.
4. From the **System Utilities** screen, select **System Configuration→iLO 4 Configuration Utility→Reset iLO**.

   The iLO 4 Configuration Utility prompts you to select **YES** or **NO**.

5. Select **YES**, and then press **Enter**.

   The iLO 4 Configuration Utility prompts you to confirm the reset request.

   When you reset iLO, the iLO 4 Configuration Utility is not available again until the next reboot.

6. Press **Enter**.

   iLO resets. If you are managing iLO remotely, the remote console session is automatically ended.

7. Resume the boot process:
   a. Optional: If you are managing iLO remotely, wait for the iLO reset to finish, and then start the iLO remote console.

      The UEFI System Utilities are still open from the previous session.

   b. Press **Esc** until the main menu is displayed.
   c. Select **Exit and Resume Boot** in the main menu, and then press **Enter**.
   d. When prompted to confirm the request, press **Enter** to exit the utility and resume the normal boot process.

5 Viewing Smart Array Controller information

You can use the **System Configuration** menu to view device information about installed Smart Array Controllers. HP 12 Gb/s capable SAS Smart Array controllers (for example, the HP Smart Array P44ar controller) support UEFI-based servers.

NOTE: Install only HP Smart Array Controllers that are listed as supported for your server and that are running the latest versions of HP Smart Array Controller firmware. Other HP Smart Array controllers are not supported and might not function properly in this server. Before installing the operating system, use the latest HP Service Pack for ProLiant in Offline mode to upgrade the firmware to the latest version. Supported controllers not using the proper firmware display as an unknown device in the system configuration. For more information, see the HP Smart Array Controllers compatibility matrix at http://www.hp.com/go/smartarray/gen8compat.

To view information about a Smart Array Controller:

1. From the **System Utilities** screen, select **System Configuration** and press **Enter**.
2. Select a Smart Array controller and press **Enter**.

   The **System Configuration** screen displays information about the embedded device.
3. Select an option and press **Enter**:
   - **Device Information**—View firmware version, firmware release date, UEFI driver version, PCI device ID, and PCI slot number.
   - **Enable/Disable Smart Array Debug Messages**—View whether debug messages are enabled for this device. An **X** indicates that the option is enabled.
   - **Exit and launch HP Smart Storage Administrator (HPSSA)**—Select to access options for HP Smart Storage Administrator, including configuring and monitoring the status of Smart Array controllers.

6 Viewing and configuring NIC and FCoE settings

You can use the **System Configuration** menu to view information about and to configure installed system devices, such as embedded NICs and FCoEs. Devices listed and configuration options available vary by system.

To view NIC and FCoE configuration settings:

1. From the **System Utilities** screen, select **System Configuration** and press **Enter**.
2. Select an **Embedded FlexibleLOM** and press **Enter**.

   The **System Configuration** screen displays information about the embedded device.

Enabling NPAR

Enabling NPAR (NIC Partitioning multi-function mode) is one of the configuration settings you can set from the **System Configuration** menu. NPAR enables you to partition a NIC into multiple virtual NICs with multiple PCI physical functions per port. Each PCI function is associated with a different virtual NIC. To the OS and the network, each physical function appears as a separate NIC port.

NOTE: The following procedure shows how to enable NPAR on an **Embedded FlexibleLOM** card. NIC options vary by system.

To enable NPAR:

1. From the **System Configuration** screen, select an **Embedded FlexibleLOM** and press **Enter**.

   Information and configuration options related to the embedded device appear.
2. Select **Multi-Function Mode** and press **Enter**.
3. Select **NPAR1.5** and press **Enter**.
4. Press **F10** to save your settings.

   Up to eight virtual NICs for this device are now available.

7 Using the One-Time Boot Menu

Use the **One-Time Boot Menu** to select a UEFI boot option for a one-time boot override. The option you select does not modify your predefined boot order settings.

If you use a USB key or virtual media through the iLO 4 Remote Console, you must refresh this menu so the devices appear. To do so, press **Esc** to exit the **System Utilities**, then re-enter the **One-Time Boot Menu** selection from the **System Utilities** menu.

To configure a One-Time Boot Menu:

1. From the **System Utilities** screen, select **One-Time Boot Menu** and press **Enter**.
2. Select an option to use as a one-time boot override and press **Enter**:
   - OS boot manager, such as **Windows Boot Manager**—Lists the boot manager for your installed OS.
   - **Generic USB Boot**—Provides a placeholder for any USB device that is bootable in UEFI. You can set the boot priority of this option, and retain this priority for use with USB devices you might install in the future. Setting this priority does not affect priorities set for individual USB devices in the **UEFI Boot Order** list. Newly-added USB devices appear at the bottom of the list by default, and you can move those entries in the list and boot from them as well.

     NOTE: This option is only available in UEFI Mode. The system attempts to boot all UEFI bootable USB devices in the order you specify in the **Generic USB Boot** entry, even if installed individual USB devices are configured lower in the boot order.

   - Embedded Flexible LOMs
   - Embedded UEFI Shell
   - Embedded SATA Port
   - **Run a UEFI Application from a file system**—Enables you to select a UEFI application to run from a file system. You can browse all FAT file systems that are available in the system. You can also select an x64 UEFI application (with a .EFI extension) to execute (can be an OS boot loader or any other UEFI application).
   - **Legacy BIOS One-Time Boot Menu**—Exits and launches the **Legacy BIOS One-Time Boot Menu**, where you can select a specific override option for this boot only. This option does not modify your boot order mode settings. Reboot the server for this change to take effect.

The system boots automatically to the selected option.

8 Working with Embedded Applications

This menu displays the following options:

- Embedded UEFI Shell
- Integrated Management Log (IML)
- Active Health System Log
- Firmware Update
- Embedded Diagnostics
- Intelligent Provisioning

To access **Embedded Applications**:

1. From the **System Utilities** screen, select **Embedded Applications** and press **Enter**.
2. Select an option and press **Enter**.

Embedded UEFI Shell

Use this option to launch the **Embedded UEFI Shell** screen. Before doing so, make sure you have:

- Selected **UEFI Mode** from the **Boot Options** menu. See "Boot Mode" (page 23).
- Enabled the **Embedded UEFI Shell**. See "Embedded UEFI Shell" (page 33).

To launch the **Embedded UEFI Shell**:

1. From the **System Utilities** screen, select **Embedded Applications→Embedded UEFI Shell** and press **Enter**.

   The **HP Embedded UEFI Shell** screen appears.
2. Press any key to acknowledge that you are physically present.

   This step ensures that certain features, such as disabling **Secure Boot** or managing the **Secure Boot** certificates using third-party UEFI tools, are not restricted.
3. If an administrator password is set, enter it at the prompt and press **Enter**.

   The `Shell>` prompt appears.
4. Enter the commands required to complete your task.
5. Enter the `exit` command to exit the Shell.

For information on running commands, see the *HP UEFI Shell User Guide for HP ProLiant Gen9 Servers*.

Integrated Management Log (IML)

Use this option to view or clear the Integrated Management Log (IML). The IML provides a record of historical events that have occurred on the server. Entries in the IML can help you diagnose issues or identify potential issues. The IML timestamps each event with one-minute granularity.

To view or clear the **Integrated Management Log (IML)**:

1. From the **System Utilities** screen, select **Embedded Applications→Integrated Management Log** and press **Enter**.
2. Select an option and press **Enter**:
   - **View IML**—Displays the Integrated Management Log records.
   - **Clear IML**—Clears all entries in the Integrated Management Log.

Active Health System Log

To download an Active Health System Log:

1. From the **System Utilities** screen, select **Embedded Applications→Active Health System Log** and press **Enter**.
2. Select **Download Active Health System Log** and press **Enter**.
3. Complete the following and press **Enter** after each selection or data entry.
   - **Download Entire Log**—Unless you are advised by support personnel to download AHS records for the life of the server, leave this disabled (not selected). The default setting is disabled.
   - **Range Start Date**—Enter a starting date for log collection.
   - **Range End Date**—Enter an ending date for log collection.

     NOTE: By default, the system downloads logs from the previous seven days. Use the **Range Start Date** and **Range End Date** fields to specify a different time period.

   - **Select File Location**—Select this to open a File Explorer screen and select the FAT16 FAT32 partition on local or virtual writable media on which to download the AHS log.

     NOTE: HP recommends storing AHS logs on USB or HDD media. Storing logs on SD cards is not supported.

   - Optional: Add your customer information, including support case number, and contact information.
4. Select **Start Download** and press **Enter**.

   The HP UEFI firmware communicates with iLO to download the requested AHS log files and package them into one `.ahs` file.
5. When requested by HP Customer Support, copy your stored `.ahs` file, and email it to your customer support representative.

NOTE: You can also download AHS log files by selecting **System Utilities→System Health→Download Active Health System Log**.

Firmware Update

Use this option to update firmware components in the system, including the system BIOS, NICs, and storage cards. For more information, see "Updating firmware from the System Utilities" (page 12).

Embedded Diagnostics

Use this option to launch the HP ProLiant Hardware Diagnostics menu. From there, you can view health summary status, run system tests and component tests, and view test logs.

To enable launching **Embedded Diagnostics** from the **System Utilities**, see "Embedded Diagnostics" (page 48). To select the **Embedded Diagnostics Mode**, see "Embedded Diagnostics Mode" (page 48)

To launch **Embedded Diagnostics**:

1. From the **System Utilities** screen, select **Embedded Applications→Embedded Diagnostics** and press **Enter**.

   The HP ProLiant Hardware Diagnostics screen appears.

2. Select an option and press **Enter**:
   - **System Health**—Lists a Health Summary (status for BIOS hardware, fans, temperature, battery, memory, network, and storage), Fans (zone, label, status, and speed), Temperature (label, location, status, current reading, and cautions), Power Supplies (power supply summary and smart storage battery), Processors, Memory, NIC Information, Storage, and Firmware Information
   - **System Tests**—Lists information and gives you options for checking hardware subsystems to ensure they are working properly. The Quick Test option performs a 10-minute check of the hardware. The Extensive Test option performs a full check of the hardware and can take two or more hours to complete.
   - **Component Tests**—Lists information and gives you options for checking Processor, Memory, Hard Drive, Keyboard, Mouse, Network, Optical Drive, System Board, USB Port, and Video tests.
   - **Test Logs**—Displays test logs, which contain information about test type and results, including failures.
   - **IML Log**—Displays all IML log files, which include information about the severity, class, initial time, and update time.
   - **Language**—Selects your language for the Embedded Diagnostics.
   - **Exit**—Exits the **Embedded Diagnostics** menu and returns you to the **System Utilities** screen.

Intelligent Provisioning

Use this option to launch Intelligent Provisioning. Intelligent Provisioning is a single-server deployment tool embedded in HP ProLiant Gen9 servers that simplifies HP ProLiant server setup, providing a reliable and consistent way to deploy HP ProLiant server configurations. This option lets you select the Intelligent Provisioning host override option for this boot only. It does not modify the normal boot order or boot mode settings. For more information, see the *HP Intelligent Provisioning User Guide for HP ProLiant Gen9 Servers* on the HP web site (http://www.hp.com/go/intelligentprovisioning/docs).

To launch **Intelligent Provisioning**:

1. From the **System Utilities** screen, select **Embedded Applications** and press **Enter**.
2. Select **Intelligent Provisioning** and press **Enter**.
3. Reboot the server to return to the **System Utilities** menu.

9 Viewing System Information and System Health

Use the **System Utilities** screen to access options for viewing:

- System Information
- System Health

To view **System Information** and **System Health**:

- From the **System Utilities** screen, select **System Information** or **System Health** and press **Enter**.

System Information

Use the **System Information** screen to view detailed information about your server and to check that the firmware version is updated after you apply an update.

1. From the **System Utilities** screen, select **System Information** and press **Enter**.
2. Select any of the following to display related information, and press **Enter**.

- **Summary**—Shows a summary of system settings, including:
  - **System Name**
  - **Serial Number**
  - **Product ID**
  - **BIOS Version** and **Backup BIOS Version**
  - **Power Management Controller FW Version**
  - **User Defaults**
  - **Boot Mode**
  - **System Memory**
  - Processor types
  - iLO IPv4 and IPv6 IP addresses
  - Embedded **Network Devices**
- **Processor**—Shows detailed processor information. including:
  - **CPU** number, **Socket** number and **Socket Locator** label
  - Whether the CPU socket is **Populated** with a CPU package
  - A brief CPU **Manufacturer Description** and a list of **Characteristics** that the CPU supports
  - The **Core Count**, the number of enabled cores, and **Thread Count** (number of logical cores) in the CPU package
  - The **Rated Speed** and **External Clock Speed** of the CPU
  - The **Voltage** of the CPU package
  - A list of **Microcode Patches** being installed by the BIOS
  - L1, L2, and L2 cache size and speed

- **Memory Information**—Shows detailed memory information, including
  - **Total System Memory**
  - **Total Memory Slots**
  - Operating frequency and voltage
  - The **Number of Slots** connected to the CPU
  - The number of **Installed Modules** that are directly connected to the CPU
- **PCI Device Information**—Shows detailed information about each PCI device.
- **Firmware Information**—Shows detailed firmware information, including:
  - **System ROM** and **Redundant System ROM**
  - **Power Management Controller Firmware** and boot loader
  - Hardware PAL/CPLD, SPS, and APML firmware
  - **Smart Storage Battery Firmware**
  - Smart Array and NIC firmware

NOTE: You can also view firmware information using the HP RESTful Interface Tool. See the RESTful Interface Tool documentation at: http://www.hp.com/go/restfulinterface/docs.

System Health

Use the **System Health** screen to check the health status of all devices in the system. This screen shows, for example, the presence of any unsupported devices found during the boot process. You can also use this screen to collect Active Health System (AHS) logs, which enable you to better address system issues.

To check system health:

1. From the **System Utilities** screen, select **System Health** and press **Enter**.
2. Select **View System Health** and press **Enter**.

To download an Active Health System Log:

1. From the **System Utilities** screen, select **System Health** and press **Enter**.
2. Select **Download Active Health System Log** and press **Enter**.

   The Active Health System Log screen appears. This is the same screen that appears when you select **System Utilities→Embedded Applications→Active Health System Log**.
3. Follow steps 3 through 5 in Active Health System Log.

10 Rebooting the system and selecting a language

Use the **System Utilities** screen to:

- Exit and resume system boot
- Reboot the System
- Select Language

To access screens for rebooting the system and selecting a language:

- From the **System Utilities** screen, select **Exit and resume system boot**, **Reboot the system** or **Select Language** and press **Enter**.

Exit and resume system boot

Use this option to exit the system and continue the normal boot process. The system continues through the boot order list and launches the first bootable option in the system. For example, you can launch the UEFI Embedded Shell, if it is enabled and selected as first bootable option in the **UEFI Boot Order** list.

To exit and resume boot:

1. From the **System Utilities** screen, select **Exit and resume system boot** and press **Enter**.

   A confirmation message appears.
2. Press **Enter** to exit and resume normal boot.

Reboot the System

Use this option to exit the system and reboot the system without continuing with the normal boot process.

To reboot the system:

1. From the **System Utilities** screen, select **Reboot the System** and press **Enter**.

   A confirmation message appears.
2. Press **Enter** to reboot the system.

Select Language

Use this option to select the current language for the system.

To select a system language:

1. From the **System Utilities** screen, select **Select Language** and press **Enter**.
2. Select an option and press **Enter**:
   - **English**
   - **Japanese**
   - **Simplified Chinese**
3. Press **F10** to save your selection.

11 Configuration flows (manual and scripted)

You can configure a server using either of the following methods:

- Manual configuration flow
- Scripted configuration flow

Manual configuration flow

You can use BIOS/Platform Configuration (RBSU) to configure an HP server manually. When the server is powered up in an unconfigured state, BIOS/Platform Configuration (RBSU) executes when you press **F9**, to configure the server.

NOTE:

- Manual flow does not apply for servers with an integrated ATA RAID IDE controller.
- Manual flow is not necessary for servers with Embedded Server Setup.

After the server is configured using the BIOS/Platform Configuration (RBSU):

1. Restart or power up the server.
2. Press **F9** to enter the System Utilities screen.
3. Select **BIOS Platform/Configuration (RBSU)** to configure BIOS settings.
4. Select **iLO 4** to configure iLO settings.

Scripted configuration flow

You can use BIOS/Platform Configuration (RBSU) with the Scripting Toolkit (STK) to create standard server configuration scripts to automate many of the manual steps in the server configuration process. You can find the Scripting Toolkit on the HP website (http://www.hp.com/go/ProLiantSTK).

The following utilities are provided in the toolkit:

- Configuration Replication Utility (CONREP)
- HP Smart Storage Administrator (HP SSA)

Configuration Replication Utility (CONREP)

CONREP with HP ProLiant Gen9 and other UEFI enabled servers is shipped in the Scripting Toolkit (STK) and is a utility that operates with the BIOS/Platform Configuration (RBSU) to replicate hardware configuration on ProLiant Gen8 and later servers. This utility is run during State 0, Run Hardware Configuration Utility when performing a scripted server deployment. CONREP reads the state of the system environment variables to determine the configuration and then writes the results to an editable script file. This file can then be deployed across multiple servers with similar hardware and software components. For more information, see the *HP Scripting Toolkit User Guide* for your operating system environment on the HP website (http://www.hp.com/go/stk/docs).

CONREP –l (Load from Data File)

This is an example of usage for HP ProLiant servers not using the Oxx ROM family. To load the BIOS configuration settings from a previously captured/edited data file (in this case "sl160zconrep.dat") to an SL160z G6 server:

```
[root@ilo002481b08134 conrep]# ./conrep -l -xconrepSL160zg6_20090728.xml -fsl160zconrep.dat
conrep 3.00 - Scripting Toolkit Configuration Replication Program
Copyright (c) 2007-2012 Hewlett-Packard Development Company, L.P.
System Type: ProLiant SL160z G6
ROM Date : 07/28/2009
```

```
ROM Family : O33
Processor Manufacturer : Intel
XML System Configuration : conrep_SL160zg6_20090728.xml
Hardware Configuration : sl160zconrep.dat
Loading configuration from sl160zconrep.dat.
ASM values not set! aborting
CONREP Return code: 0
```

HP RESTful API support for UEFI

HP ProLiant Gen9 servers include support for configuring UEFI BIOS settings using the HP RESTful API, a management interface that server management tools can use to perform configuration, inventory, and monitoring of an HP ProLiant server. A REST client uses HTTPS operations to configure supported server settings, such as iLO 4 and UEFI BIOS settings. For more information about the HP RESTful API and the HP RESTful Interface Tool, see the HP website (http://www.hp.com/support/restfulinterface/docs).

HP Smart Storage Administrator (HP SSA)

HP ProLiant Gen9 servers support Smart Storage Administrator (HP SSA). HP SSA Scripting is a standalone application that is distributed with the HP SSA CLI application. For more information, see the *HP Scripting Toolkit for Windows User Guide* at http://www.hp.com/support/STK_Windows_UG_en, and the HP SSA guides at http://www.hp.com/go/smartstorage/docs.

12 Troubleshooting

This section has troubleshooting information about:

- Unable to boot devices in UEFI Mode
- Restoring system defaults

Unable to boot devices in UEFI Mode

Symptom: You see a message that the option or device you want to boot cannot be found, or it is listed in the system configuration as an unknown device.

Possible causes and solutions

- You are attempting to boot to an option that does not have a UEFI Option ROM driver.

  Verify that your option card has a UEFI option driver (Option ROM) that supports either x64 or EFI Byte Code for boot functionality.

  NOTE:

  - UEFI drivers do not display messages on the System Utilities screen or provide function key prompts.
  - If you replace the motherboard, UEFI variables are lost.
  - You must configure PXE servers with a boot image. For x64 EFI machines, you must also configure the DHCP server to support x64 EFI DHCP boot requests. For more information, see the UEFI Information Library: http://www.hp.com/go/ProLiantUEFI/docs.

- You are attempting to boot to an option that is not supported or is not running the latest firmware.
  1. Refer to the Quick Specs or Read This First card for your server to make sure your card is supported before you install it. Although third-party UEFI cards might work, they are not optimized for HP ProLiant Gen9 servers running HP UEFI System Utilities.
  2. Verify that the correct information is listed in System Utilities Health Settings for the option. See "System Health" (page 86).
  3. If necessary, use the latest HP Service Pack for ProLiant in Offline mode to upgrade the firmware to the latest version.
- You are booting Microsoft Windows 2008 R2, and UEFI Optimized Boot is enabled.

  Disable UEFI Optimized Boot. See "UEFI Optimized Boot" (page 23).
- You are booting VMware ESX, and UEFI Optimized Boot is disabled.

  Enable UEFI Optimized Boot. See "UEFI Optimized Boot" (page 23).
- Your default boot mode settings are different than your user-defined settings.

  Save a custom default configuration to use during a system restore. See "User Default Options" (page 69).

Restoring system defaults

Symptoms:

After moving a drive from one server to another in Windows, you see an error message that certain settings cannot be found.

After replacing a motherboard, you lose your configuration settings, such as Secure Boot.

Possible causes and recommendations

Moving drives and replacing system hardware can disrupt pointers to previously-configured settings.

Try the following:

- Restore default system settings. See "Restore Default System Settings" (page 68).
- Restore factory defaults. See "Restore Default Manufacturing Settings" (page 69).

You can save a custom default configuration to use during a system restore. Doing so saves settings you might otherwise lose. See "User Default Options" (page 69).

13 Support and other resources

Contacting HP

For worldwide technical support information, see the HP Support Center:

http://www.hp.com/go/hpsc

Before contacting HP, collect the following information:

- Product model names and numbers
- Technical support registration number (if applicable)
- Product serial numbers
- Error messages
- Operating system type and revision level
- Detailed questions

Access to HP support materials

Access to some updates might require product entitlement when accessed through the HP Support Center. You must have an HP Passport set up with relevant entitlements. For more information, see the website:

www.hp.com/support/AccessToSupportMaterials

Subscription service

Receive, by email, support alerts announcing product support communications, driver updates, software releases, firmware updates, and customer-replaceable component information by signing up at http://www.hp.com/go/myadvisory.

To change options for support alerts you already receive, click the **Sign in** link on the right.

Related information

The latest documentation for the HP UEFI System Utilities and Embedded Shell is available at: http:// www.hp.com/go/ProLiantUEFI/docs. Available documents include:

- *HP UEFI Shell User Guide for HP ProLiant Gen9 Servers*
- *HP UEFI Shell Quick Reference Card for HP ProLiant Gen9 Servers*
- *HP UEFI System Utilities and Shell Release Notes for HP ProLiant Gen9 Servers*
- *HP UEFI Deployment Guide for HP ProLiant Gen9 Servers*

HP UEFI System Utilities and Shell Command Mobile Help for HP ProLiant Gen9 Servers is available by scanning the QR code located at the bottom of the System Utilities screen, or at http:// www.hp.com/qref/ProLiantUEFI/Help.

Websites

- UEFI Specification: http://www.uefi.org/specifications
- UEFI Learning Resources: http://www.uefi.org/learning_center
- UEFI EDK2 project on SourceForge (download specifications and code): http://sourceforge.net/apps/mediawiki/tianocore

Typographic conventions

Table 1 Document conventions

Convention	Element
Blue text: Table 1 (page 93)	• Cross-reference links and e-mail addresses • A cross reference to the glossary definition of the term in blue text
Blue, bold, underlined text	email addresses
Blue, underlined text: http://www.hp.com	Website addresses
Bold text	• Keys that are pressed • Text typed into a GUI element, such as a box • GUI elements that are clicked or selected, such as menu and list items, buttons, tabs, and check boxes
Italic text	Text emphasis
`Monospace` text	• File and directory names • System output • Code • Commands, their arguments, and argument values
`Monospace, italic` text	• Code variables • Command variables
`Monospace, bold` text	Emphasized monospace text

WARNING! Indicates that failure to follow directions could result in bodily harm or death.

CAUTION: Indicates that failure to follow directions could result in damage to equipment or data.

IMPORTANT: Provides clarifying information or specific instructions.

NOTE: Provides additional information.

TIP: Provides helpful hints and shortcuts.

HP Insight Remote Support

HP strongly recommends that you register your device for remote support to enable enhanced delivery of your HP Warranty, HP Care Pack Service, or HP contractual support agreement. HP Insight Remote Support supplements your monitoring continuously to ensure maximum system availability by providing intelligent event diagnosis, and automatic, secure submission of hardware event notifications to HP, which will initiate a fast and accurate resolution, based on your product's service level. Notifications can be sent to your authorized HP Channel Partner for onsite service, if configured and available in your country.

HP Insight Remote Support is available as part of your HP Warranty, HP Care Pack Service, or HP contractual support agreement. For more information, see the product documentation on the HP website (http://www.hp.com/go/insightremotesupport/docs).

Glossary

ACR	Array Configuration Replication Utility
AHCI	Advanced Host Controller Interface
ASR	Automatic Server Recovery
CHAP	Challenge-Handshake Authentication Protocol
CNA	Converged Network Adapter
CONREP	Configuration Replication utility
CPLD	Complex Programmable Logic Device. Controls the write access to the secure NVRAM using a write-once register that BIOS programs with a password during boot.
ECP	Extended Capabilities Port Mode
EFI	Extensible Firmware Interface
EMS	Emergency Management Services
EPP	Enhanced Parallel Port Mode
EUI	Extended Unique Identifier
IDE	Integrated Device Electronics
iLO	Integrated Lights-Out
IMD	Integrated Management Display
IML	Integrated Management Log
IOMMU	I/O Memory Management Unit
IPL	Initial Program Load
IRQ	Interrupt Request
iSCSI	Internet Small Computer System Interface
LPT	Local Port
MEMBIST	Memory Built-in Self Test
MPS	Multi-Processor Specification
NMI	Non-Maskable Interrupt
NUMA	Non-Uniform Memory Architecture
NVRAM	Non-Volatile Memory
ORCA	Option ROM Configuration for Arrays
PCC	Processor Clocking Control
PCI	Peripheral Component Interface
PCI-X	Peripheral Component Interconnect Extended
PCIe	Peripheral Component Interconnect Express
POST	Power-On Self-Test
PXE	Pre-Boot Execution Environment
QPI	Intel's QuickPath Interconnect
RBSU	ROM-Based Setup Utility
ROM	Read-Only Memory
RTC	Real-Time Clock
SATA	Serial Advanced Technology Attachment
SPP	Standard Parallel Port Mode
TPM	Trusted Platform Module
UEFI	Unified Extensible Firmware Interface

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