HP Integrity iLO 3 Operations Guide

Abstract

This document contains specific information that is intended for users of this HP product.

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Warranty

HP will replace defective delivery media replacement for a period of one year (12 months) following the date of purchase. Startup technical software support – Available for no additional charge by calling Support up to 90 days from the date of purchase. Phone support assisting customers with installation, set-up and questions pertaining to the canned scripts and respective usages are supported. Worldwide numbers for Support are available at: http://welcome.hp.com/country/us/en/wwcontact.html

Complete warranty can be found at: http://www1.itrc.hp.com/service/home/home.do

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1 Introduction

The Integrated Lights-Out Management Processor (iLO MP) for Integrity servers is an autonomous management subsystem embedded directly on the server. The iLO MP is the foundation of High Availability (HA) embedded server and fault management. The iLO MP also provides system administrators with secure remote management capabilities regardless of server status or location. The iLO is available whenever the server is connected to a power source, even if the server main power switch is in the Off position

Remote access is the key to maximizing efficiency of administration and troubleshooting for enterprise servers. Integrity servers are designed so that administrative functions that are performed locally, can also be performed remotely. The iLO enables remote access to the operating system console, control over the server power and hardware reset functionality, and works with the server to enable remote network booting through a variety of methods.

With the release of Integrity iLO 3, Integrity servers introduce a new concept in remote management solutions which automatically scale with the size of your system. Integrity iLO 3 is an integral part of the management architecture inside new Integrity multi-bladed conjoined servers. Integrity iLO 3 management is included in all newer Integrity systems and ships with a full iLO Advanced license factory installed in every server.

This document addresses HP Integrated Lights-Out 3 (iLO 3) for the HP Integrity BL860c i2, BL870c i2, and BL890c i2 Server Blades; and HP Integrity rx2800 i2/i4 servers. To learn more about Integrity iLO, see www.hp.com/go/integrityilo. For information on iLO for ProLiant servers and ProLiant BladeSystem server blades, see the HP website at www.hp.com/go/iLO.

Superdome 2

On HP Superdome 2 servers, every cell blade contains a physical iLO 3 chip. The Superdome 2 Onboard Administrator is the primary interface for managing a Superdome Complex collecting and centralizing all data from the iLOs. Because the Superdome 2 OA is the primary interface, you do not have to directly access the iLOs. Consequently on Superdome 2, the iLO 3 GUI interface is not available, and access to the CLI is restricted. The iLO 3 functions (such as assigning virtual media), which in a BladeSystem require a user "drill down" from the OA to an iLO, are now brought up into the Superdome 2 OA. The iLO 3 functions invisibly inside the server. User commands are directed to the iLO from the Superdome 2 OA.

The iLO 3 user interfaces are not eliminated from HP Superdome 2 iLO 3, but login capability to iLO 3 command-line interface is limited to Auto Login from the Onboard Administrator.

In addition, on HP Superdome 2 servers, iLO 3 firmware is updated as part of the HP Superdome 2 complex firmware update process, managed from the Onboard Administrator.

For information on the HP BladeSystem Onboard Administrator (OA) for HP Superdome 2 servers, see the *HP Superdome 2 Onboard Administrator User Guide* on the HP website at www.hp.com/go/integrity_servers-docs.

IMPORTANT: This guide addresses server-specific details that vary between server products. These details are frequently updated. For the latest server-specific product information, see the product-specific Quickspecs on the HP website at www.hp.com/go/integrityilo.

Features

Integrity iLO 3 features provide essential lights-out functionality on iLO 3-supported HP servers as well as:

- System board management functions
- Diagnostics and troubleshooting
- Control of power, reset, and Transfer of Control (TOC)/INIT capabilities

- Monitoring of server health and status
- Display of detailed information about the various internal subsystems and field replaceable units (FRUs)
- At-a-glance virtual front panel to monitor system status and see the state of front panel LEDs
- Display and recording of system events with 4X larger console log to capture more administrative information
- Scalable management: automatically grows with your multi-bladed Integrity servers, easily managed through a consolidated iLO interface
- Direct System Firmware updating: use HP SUM, or iLO 3 directly, to easily update system firmware without OS assistance, even while the OS is running or the server power is off

Integrity iLO 3 advanced features provide additional functionality such as 3X faster virtual media with higher performance file transfers and updates. In addition, the advanced features increase security by integrating iLO 3 user administration with the Active Directory or eDirectory. Integrity iLO 3 advanced features are enabled automatically on every Integrity server equipped with iLO 3. The Integrity iLO 3 Advanced Pack license is built into every system. No additional licensing is needed.

Integrity iLO is completely independent of the host system and the operating system. It has its own microprocessor and runs its own firmware. The operating system cannot send packets out on the MP LAN, and packets on the MP LAN cannot go to the operating system. The MP LAN is exclusive to iLO and is driven by an embedded real-time operating system (RTOS) running on iLO.

NOTE: The following *ProLiant* iLO 3 features are not available on Integrity iLO 3:

- Virtual Folder
- Shared LAN
- Graphics Console Replay

Integrity iLO 3 features

Always-on capability

Integrity iLO 3 is active and available through the connections of the iLO MP LAN and the local serial port as long as the power cord is plugged in. In the event of a complete power failure, iLO 3 data is protected by an onboard battery backup.

Multiple access methods

Access methods, with the exception of the serial console, can be enabled or disabled.

The available methods to access iLO 3 are as follows:

LAN	Using Telnet, web, or SSH to access the iLO MP LAN **NOTE:** Integrity iLO 3 ships with Telnet disabled by default.
Local serial port	Using a terminal or laptop computer for direct connection
Web	Using a graphical user interface (GUI)

Mirrored console

The system console output stream is reflected to all connected console users. Any user with write access can provide input.

Remote power and reset

Integrity iLO 3 enables you to view and control the power state of the server. It also provides options to reset the system or iLO 3.

Virtual front panel

The virtual front panel (VFP) presents a summary of the system front panel using direct console addressing.

Security

Integrity iLO 3 provides strong security for remote management in IT environments, such as the following:

- User-defined TCP/IP ports
- User accounts and access management
- Lightweight Directory Access Protocol (LDAP)-based directory services authentication and authorization
- Encrypted communication using SSL and SSH

  Integrity iLO 3's web GUI is supported with Microsoft Internet Explorer version 7 and 8, or Firefox version 11. The Remote Serial Console and vMedia applets require the 32-bit Java Plug-in 1.6.0_31.

User password access control

Integrity iLO 3 is restricted by user accounts. User accounts are password protected and are assigned access rights that define a specific level of access to the server and to the iLO 3 MP commands. Integrity iLO 3 supports both LDAP directory user authentication and locally stored iLO 3 user accounts. Integrity iLO 3 users can have any of the following user rights:

Remote console access	Right to access the system console (the host operating system). This does not bypass host authentication requirements, if any.
Virtual power & reset	Right to configure power settings and reset the host platform.
Configure iLO settings	Right to configure all iLO 3 MP settings and some system settings, such as the power restore policy.
Administer user accounts	Right to create, modify, and delete local iLO 3 user accounts.
Virtual Media	Enables you to connect devices such as CD/DVD-ROM drives, network drives, and USB keys as virtual devices through the network.

Multiple users

Multiple users can interact with iLO 3. However, iLO 3 command mode and console mode are mirrored, allowing only one user at a time to have write access to the shared console. When a command is completed, write access is released, and any user can initiate another command.

IMPORTANT: Although iLO 3 can support multiple simultaneous connections, to do so can impact performance. HP does not recommend running more than eight simultaneous connections.

Integrity iLO 3 supports the following connections simultaneously:

- Four web (each web connection can have a remote serial console connection as well and not be counted as part of the total number of connections allowed)
- Six SSH

- One console serial port
- Two Telnet
- One vMedia

System management homepage

The HP Insight Management Agents support a web interface for access to runtime management data through the HP System Management Homepage. The HP System Management Homepage is a secure web-based interface that consolidates and simplifies the management of individual servers and operating systems. By aggregating data from HP Insight Management Agents and other management tools, the System Management Homepage provides an intuitive interface to review in-depth hardware configuration and status data, performance metrics, system thresholds, and software version control information.

Firmware upgrades

Firmware upgrades enhance the functionality of iLO 3.

The iLO 3 MP firmware and system firmware is remotely upgradeable from an HTTP/HTTPS source.

Integrity iLO 3 has direct system firmware updating capability. To easily update system firmware without OS assistance, even while the OS is running or the server power is off, use HP SUM, or iLO 3 directly.

Internal subsystem information

Integrity iLO 3 displays information about the following internal subsystems:

- FRU information
- System power state and fan status
- Processor Status

DHCP and DNS support

Integrity iLO 3 supports the Dynamic Host Configuration Protocol (DHCP) and the Domain Name System (DNS) configuration options for acquiring network information through the MP LAN port. When iLO 3 starts, it acquires the port configuration stored on a DHCP server to assign an IP address to the MP LAN port. If DNS is configured, then this information is updated on the DNS server. The simplest method to connect for the first time to iLO 3 is with the default DNS name, for example `ilo0014c39c064f`. You can find the default DNS name on the iLO Network Information Tag.

NOTE:

- On server blades, the iLO Network Information Tag is located on the right side of the monarch blade.
- On HP Integrity rx2800 i2/i4 servers, the iLO Network Information Tag is located on a pull-tab the front panel.

Group actions

Group actions is not currently supported in Integrity iLO 3.

Group actions using HP SIM

HP Systems Insight Manager (HP SIM) is a system-level management tool that supports running commands from HP SIM using the SSH interface. HP SIM enables you to perform similar management activities across multiple iLO 3s (group actions) without requiring you to access each iLO 3 individually. Group actions are launched from the HP SIM GUI and are supported at all times, regardless of the server power state.

You can download HP SIM from the HP website. For more information about HP SIM, see the HP website at http://www.hp.com/go/hpsim. For the user guide, see the Information Library.

SNMP

SNMP is not currently supported in Integrity iLO 3.

Event logging

Integrity iLO 3 provides event logging, display, and keyword search of console history and system events. The event log records the following information:

- iLO 3 MP login and logout events
- Command logging for specific commands

Directory-based secure authentication and authorization using LDAP

Directory-based authentication and authorization enables iLO 3 user accounts to be defined in a centralized database on an LDAP server. Integrity iLO 3 users are authenticated when logging in to iLO 3 and authorization is given each time an iLO 3 command runs. This provides a centralized database (LDAP server) of all user accounts and avoids the overhead of creating users in each iLO 3.

Directory authentication occurs by enabling Extended Schema or Default Schema. When Extended Schema is used, the schema in the directory server must be extended. When Default Schema is selected, schema extension is not needed.

Schema-free LDAP

Schema-free LDAP enables you to use directory authentication to log in to iLO 3 without having to perform any schema extension on the directory server or snap-in installation on the client. In addition to general directory integration benefits, iLO 3 schema-free integration provides the following:

- Minimal maintenance and administration
- Reliable security

Not extending the schema on the directory server means the directory server does not recognize the iLO 3 object or privileges, and the only thing the iLO 3 queries from the directory server is to authenticate the user name and password.

Integrated Remote Console

The Integrated Remote Console (IRC) is a signed Direct X application, which enables a user to securely manage HP Integrity servers with iLO. The IRC integrates the keyboard, video, and mouse functions into a virtual interface, providing an experience similar to that of the remote server graphics console. With the IRC, you can view the server system graphics display to directly interact with the server and perform maintenance activities, as well as open and run applications on the server, using the keyboard and mouse control. The console uses the hardware acceleration and advanced graphics features in .NET Framework. The console is launched by using Microsoft ClickOnce technology.

The IRC window remains open until one of the following events occurs:

- You sign out of the iLO interface by using the link in the banner
- The IRC does not detect keyboard or mouse activity for 15 minutes
- Another user disconnects IRC

IRC is supported with Integrity iLO 3 v1.3 management processors. For older iLO 3 systems, you can obtain IRC with a system firmware upgrade. No additional licensing is required.

NOTE: To use IRC, you must have a physical VGA chip installed on the server. VGA is an optional accessory on some Integrity server models. IRC requires ActiveX control and is supported only with clients running Windows Internet Explorer.

Virtual Media

Virtual Media (vMedia) enables connections of a CD/DVD-ROM physical device or image file from the local client system to the remote server. The virtual device or image file can be used to boot the server with an operating system that supports USB devices.

Using vMedia depends on a reliable network with good bandwidth, which is especially important when you are performing tasks such as large file transfers or operating system installs.

Virtual Media for USB Flash is supported in some Integrity iLO 3 systems. In Integrity iLO 3 v1.00, Virtual Media Flash is supported as a read-only device in the Unified Extensible Firmware Interface (UEFI) environment where it provides a convenient way to attach I/O firmware update files for updating through EFI tools. In iLO 3 v1.00, iLO vMedia Flash can be initiated through the iLO 3 user interface but not from the BladeSystem Onboard Administrator. Expanded vMedia Flash support will be available in a future iLO 3 firmware release.

NOTE: If iLO 3 MP is reset, Integrity iLO 3 vMedia is disconnected. HP does not recommend using iLO 3 vMedia with firmware update tools such as HPOFM, which reset the MP midway through the update process.

Power Management

Integrity iLO Power Management features do not require an Advanced Pack license, but do require a power-aware operating system such as HP-UX 11iv3. Integrity iLO 3 systems ship equipped with an iLO 3 Advanced license which enables the following power management features:

Power & Reset
Enables you to view and control the power state of the server and also provides options to reset the system.

Power Meter Readings
Provides 24-hour graphing of power and temperature data and integration with HP Insight Control Power Manager.

Power Regulator & Capping
Provides an easy way to manually set power efficiency modes. Works in cooperation with a host OS enabled with power management control.

A supporting operating system must be installed and booted before the Integrity iLO Power Regulator and Capping tab displays the choices for power modes: Dynamic Power Savings, Static Low Power, Static High Power, or OS Control modes.

Integrity iLO 3 Power management features can be accessed through the iLO web GUI or the Integrity MP text user interface.

HP Insight Control power management

HP Insight Control power management, a plug-in to HP SIM, is an integrated power monitoring and management application that provides centralized control of server power consumption and thermal output. Integrity iLO 3 v1.00 with built-in Advanced license is integrated with Insight Control power management for power monitoring. Insight Control-initiated power regulation will be supported in a future iLO 3 firmware release.

For other operating systems, Insight Control 6.1 licenses can be applied to enable power management on Integrity servers. Information on HP Insight power management is available on the HP website at http://www.hp.com/go/insight.

iLO 3 Advanced Pack licensing

Advanced Pack licenses are built into every system that has Integrity iLO 3, no additional licensing is required. Multi-bladed Integrity servers, such as BL870c i2 and BL890c i2, contain multiple iLOs and each iLO contains a model-based iLO Advanced license key. This means that in multi-bladed servers, if individual blades are reordered or replaced, then the iLO Advanced keys do not have to be transferred or reapplied as all blades in that model contain identical model-based Integrity iLO keycodes.

NOTE: ProLiant iLO keycodes do not work on Integrity blades and vice versa.

Components and cables required for iLO 3 operation

Table 1 Required components and cables

Supported System	Required Components	Required Cables[1]
BL860c i2, BL870c i2, and BL890c i2	Front console serial port	SUV or DB-9 cable
	Rear OA/iLO network port	LAN cable
rx2800 i2/i4	iLO 3 hardware is integrated into the system board	LAN, serial, and VGA cables

[1] Cables are not provided with the server.

Integrity iLO 3 supported browsers and client operating systems

Integrity iLO 3 has an independent microprocessor. This architecture ensures that the majority of iLO 3 functionality is available regardless of the host operating system. At first release, Integrity iLO 3 web GUI functions are supported by Mozilla FireFox or Microsoft Internet Explorer.

Table 2 Supported Browsers by Operating System

Operating System		Firefox 11	IE 7	IE 8
HP-UX 11.31		X		
Windows				
	Vista SP2 / XP SP3 / 7	X	X	X
	WS2008 R2		X	X

You can view an updated list of supported browsers and operating systems for all Integrity iLO products on the HP website at http://www.hp.com/go/integrityilo. The browser and OS information is located in the **Quickspecs** document located on this website.

Related links:

- Java for HP-UX
  - http://www.hp.com/products1/unix/java/versions/index.html
  - http://www.hp.com/products1/unix/java/archives/index.html
- Java for OpenVMS
  - http://h18012.www1.hp.com/java/alpha
- Mozilla Firefox for HP-UX
  - http://www.hp.com/products1/unix/java/firefox/index.html
    Note: 1.5.0.00 needs patch
  - http://www.hp.com/go/firefox
- Mozilla Firefox for Linux®
  - http://linuxcoe.corp.hp.com
- Mozilla Firefox for Windows and Linux
  - http://www.mozilla.com/firefox
- Browser Support 1.5.0
  - http://java.sun.com/j2se/1.5.0/system-configurations.html

Security

You must have strong security surrounding the iLO 3 device. HP security requirements for iLO 3 include the following:

Authentication

Integrity iLO 3 incorporates authentication techniques with the use of Secure Socket Layer (SSL) encryption. It is password-based for web and password- and key-based for secure shell (SSH).

Authorization

Using local accounts, iLO 3 enables you to define up to 19 separate users and to vary the server access rights of each user. The directory services capabilities of iLO 3 enables you to maintain network user accounts and security policies in a central, scalable database that supports thousands of users, devices, and management roles.

Integrity

Integrity iLO 3 incorporates a trusted Java applet for vMedia.

Privacy

Integrity iLO 3 uses SSL for web connections, RSL-RC4 encryption for serial console, and SSH-DES3/DES128 2.0 recommended encryption algorithms for SSH-based connections. You can enable or disable Telnet, web, and SSH connectivity.

NOTE: Integrity iLO 3 ships with Telnet disabled by default.

Login

Integrity iLO 3 enforces a progressive login delay after failed login attempts have occurred (default three) to protect the iLO from brute force dictionary attacks.

IMPORTANT: Ensure that physical access to the server is limited. You can clear passwords by pressing the iLO 3 Physical Presence button for longer than 8 seconds.

IMPORTANT: For greater security, HP recommends that iLO 3 management traffic be on a separate dedicated management network that is configured to allow only limited access from selected secure systems by designated system administrators. This acts as the first line of defense against security attacks. A separate network enables you to physically and logically control which systems are allowed to connect to the network and the iLO 3 LAN port.

2 Ports, buttons, LEDs, and components

The iLO 3 functions are available through the server MP LAN port and the local port. On HP Integrity server blades, the iLO management LAN port is routed internally to the HP BladeSystem Onboard Administrator (OA) management LAN.

For locations and descriptions of iLO 3 LEDs, ports, and buttons on your server, see your user service guide or system specifications.

For more information on the Onboard Administrator for HP server blades, see the c3000 or c7000 Enclosure documentation and The BladeSystem Onboard Administrator documentation.

iLO 3 Physical Presence button

The iLO 3 Physical Presence button enables you to reset iLO 3 and reset the user-specific values to factory default values. A momentary (4–8 second)s press causes a soft reset of iLO 3 when the button is released.

NOTE: There is no hard reset for iLO.

IMPORTANT: Physical Presence buttons on all conjoined blades are functional. However, only the buttons on monarch blades will enable TPM physical presence and iLO 3 security override modes, and events. Pressing this button on auxiliary blades will only cause a soft reset. A momentary press (less than 4 seconds) on the monarch blade resets the entire group of iLOs for the nPartition.

The iLO 3 Physical Presence button has multiple functions, depending on the length of time it is pressed. It enables you to reset iLO, enter TPM physical presence mode, and enter security override mode.

NOTE: When you use the Physical Presence button to perform an iLO 3 security override, it does not require powering off, removing a blade, or rebooting your OS.

- A momentary press of the button (less than 4 seconds) resets iLO and clears any security override or TPM physical presence mode that were initiated by this button.

  NOTE: The reset will fail if an iLO firmware upgrade is in process.

  NOTE: When you reset iLO, you lose LAN connections immediately.

- A 4–8 second press of the button places the system in physical presence mode for 15 minutes.

  NOTE: The physical presence mode will be cleared if, during the 15 minute period, you press the Physical Presence button for 4 seconds or less.

  NOTE: The 15–minute timer will restart if, during the active physical presence mode period, you press the Physical Presence button for 4–8 seconds.

- An 8–12 second press of this button places iLO into security override mode for 15 minutes. Security override mode enables you to enter iLO without being challenged for a password, enabling you to set up users.

  NOTE: The security override mode will be cleared if, during the 15 minute period, you press the Physical Presence button for 4 seconds or less.

  NOTE: The 15–minute timer will restart if, during the active security override mode period, you press the Physical Presence button for 8–12 seconds.

  NOTE: iLO 3 does not log out any connected users when the 15–minute security override mode period ends.

- Pressing the Physical Presence button for more than 12 seconds has no effect on the system.
- The UID LED blinks once after holding the Physical Presence button for 4 seconds, and once again after holding the button for 8 seconds. This helps you gauge how long the button press has been held.

  NOTE: If the UID LED is blinking when the Physical Presence button is pressed, a firmware update is in progress. During a firmware update, no iLO actions take place if the Physical Presence button is pressed.

- Blade systems without an OA account (or rack systems) are configured to permit creating or modifying user passwords while in the Security Override mode.

  NOTE: Security override mode is not needed for blade systems accessed via an Onboard Administrator (OA) account. You can auto-login through the OA to iLO. Then you can use the iLO TUI's UC command (MP>CM>UC) or iLO GUI's Administration>User Administration>Local Accounts page to either create a user or modify the password of an existing user

  Procedure 1 Creating or modifying user passwords in Security Override mode.

  1. Unplug the manageability LAN cable.

     NOTE: (For security reasons, this is the safest approach. Later, you will connect to iLO via the serial port.)

  2. On the monarch blade, press the Physical Presence button for 8–12 seconds to place the system into Security override mode.

     TIP: The UID LED will blink at 4 seconds, and again at 8 seconds. You can release the button after the second blink.

  3. Login to iLO via the serial port with no user name or password.
  4. In iLO, perform the following steps:
     a. Create a new user, or modify the password of an existing user.
     b. Re-enable security via the TUI or via the GUI.
  5. Plug in the manageability LAN cable.

  TIP: At the end of this procedure, you do not need to press the Physical Presence button on the monarch blade. This avoids the soft reset to iLO.

- Some special commands on the TPM require physical presence due to their sensitive nature.

  Procedure 2 Using TPM Physical Presence mode for special commands

  On the monarch blade, press the Physical Presence button for 4–8 seconds to put the system in Physical Presence mode.

  TIP: The UID LED will blink at 4 seconds, and again at 8 seconds. You can release the button after the first blink.

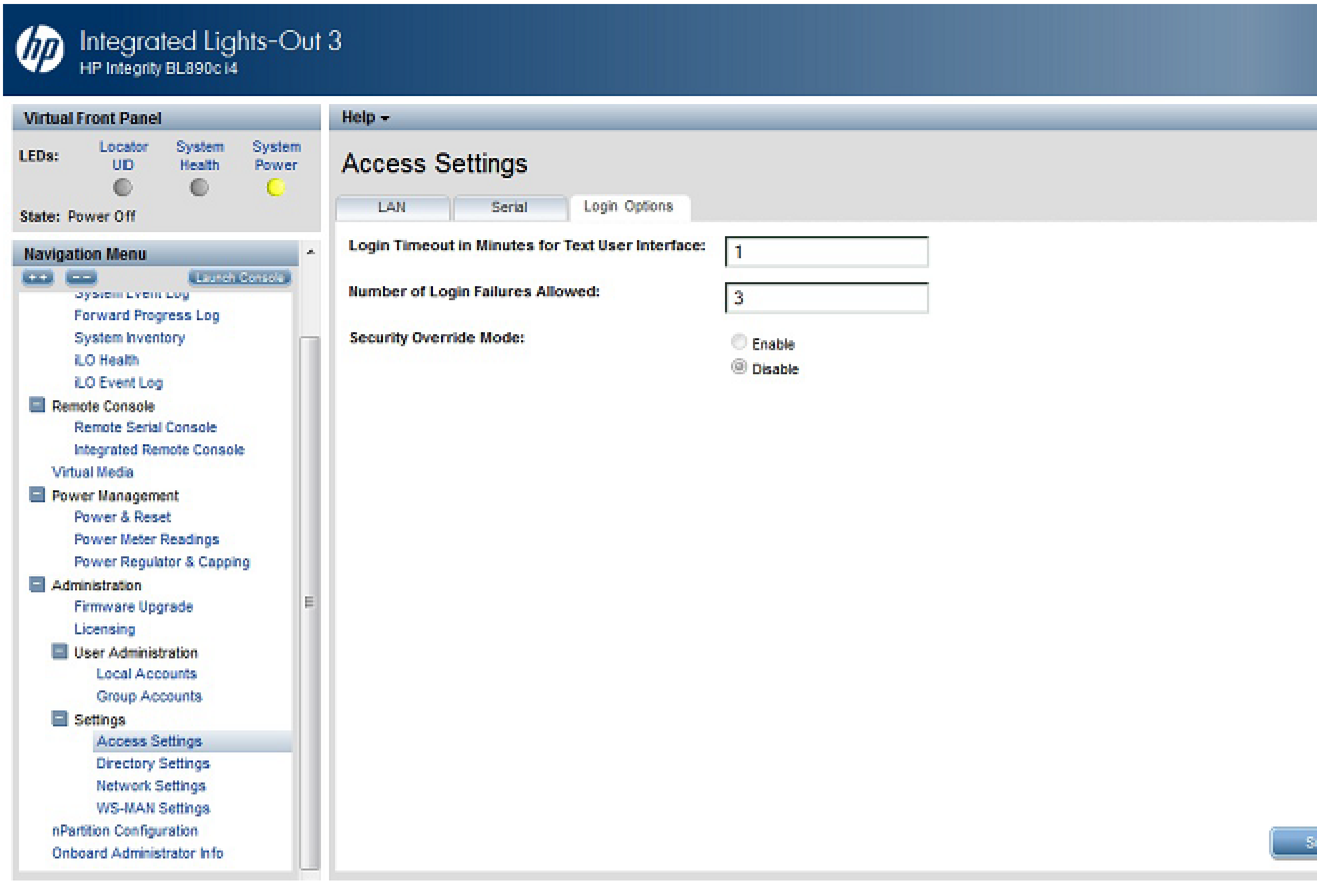
  1. From a workstation on the network, or via the local serial connection, login to iLO, and bring up the console (MP>CO).
  2. Perform the special TPM commands.

3. To exit, wait the remainder of the 15 minutes for the TPM physical presence mode to expire.

   NOTE: Alternatively, you can exit immediately by pushing the Physical Presence button for less than 4 seconds; however, this action will reset iLO.

- The **Login Timeout in Minutes** feature, shown in the iLO GUI screen below and in the text user interface (see `so` command), disables logins after too many login failure attempts occur in a short timeframe. The login delay protects the iLO from brute force dictionary attacks. The iLO system administrator can configure the number of login failures allowed (default is 3). This option is in the TUI's SO command or the GUI's Access Settings page (see below). Once the fault threshold has been reached, the login process is delayed and an event is placed in the iLO Event Log (IEL). If the attack persists, a critical event will also be placed in the System Event Log (SEL).

Figure 1 iLO 3 GUI Access Settings screen showing menu for TUI interface settings



Login Timeout in Minutes for Text User Interface: 1

Number of Login Failures Allowed: 3

Security Override Mode: ○ Enable ● Disable

Procedure 3 Canceling iLO Login Timeout via local Physical Presence button

The system administrator with physical access to the server can bypass authentication and cancel any progressive Login Delay in progress by pressing the Physical Presence button on the monarch blade 8–12 seconds to enter Security Override mode, or by pressing the Physical Presence button less than 4 seconds to reset iLO.

TIP: The UID LED will blink at 4 seconds, and again at 8 seconds. The first blink signals Physical Presence mode (release the button after the first blink), and the second signals Security Override mode (release the button after the second blink.

When iLO is in Security Override mode, all authentication is suspended for 15 minutes, or until someone exits Security Override mode by performing any of the following actions:

- Pressing the Physical Presence button less than 4 seconds
- Manually exiting through the iLO TUI's SO command
- Manually exiting through the iLO GUI's Access Settings web page

1. The system administrator should examine both the IEL and SEL to determine the cause of the login failures. (Login Delay must be cancelled before you can login to iLO to view the IEL and SEL.)
2. *TBD*

HP Integrity server blade components

For port locations and console connection procedures, see your server blade documentation. Also, for HP server blades, see the c3000 or c7000 Enclosure documentation and The BladeSystem Onboard Administrator documentation.

HP BladeSystem Enclosures

c7000 Enclosure

The HP BladeSystem c7000 Enclosure is an evolution of the entire rack-mounted infrastructure. It consolidates and repackages all the supporting infrastructure elements — compute, storage, network, and power into a single infrastructure-in-a-box that accelerates the integration and optimization of the data center.

It is optimized for enterprise data center applications. It fits into standard size HP and third-party racks; accommodates BladeSystem c-Class server blades, storage blades, and interconnect modules; and provides all the power, cooling, and I/O infrastructure needed to support them.

For information on port locations and console connection procedures, see the HP BladeSystem c7000 Enclosure setup and installation guide on the HP website at http://h20000.www2.hp.com/bizsupport/TechSupport/DocumentIndex.jsp?contentType=SupportManual.

c3000 Enclosure

The HP BladeSystem c3000 Enclosure is similar to the c7000. The Intelligent Management through the Onboard Administrator gives you complete control of your bladed infrastructure. For information on port locations and console connection procedures, see the HP BladeSystem c3000 Enclosure setup and installation guide on the HP website at on the HP website at http://h20000.www2.hp.com/bizsupport/TechSupport/HPBladesystemc3000Enclosure.

Onboard Administrator

The BladeSystem Onboard Administrator (OA) for the HP BladeSystem c7000 Enclosure is the enclosure MP, subsystem, and firmware base used to support the HP Integrity server blades and all the managed devices contained within the enclosure. Together with the enclosure HP Insight Display, the Onboard Administrator has been designed for both local and remote administration of HP BladeSystem c-Class.

This module and firmware provides:

- Wizards for simple, fast setup and configuration
- Highly available and secure access to the HP Bladesystem infrastructure
- Security roles for server, network, and storage administrators
- Automated power and cooling of the HP Bladesystem infrastructure
- Agent-less device health and status

- Thermal Logic power and cooling information and control
- email or Insight Display communications of problems within the enclosure

Each c7000 Enclosure is shipped with a first Onboard Administrator module/firmware. If needed, you can order a second redundant Onboard Administrator module for each enclosure. When two Onboard Administrator modules are present in a c7000 Enclosure, they work in an active - standby mode, assuring full redundancy of the c7000 Enclosure integrated management.

Before setting up the HP BladeSystem OA, HP recommends that you read the *HP BladeSystem Onboard Administrator User Guide* on the HP website at HP BladeSystem c-Class Onboard Administrator.

Reading the guides ensures that you understand the HP BladeSystem OA and that you properly complete the initial setup to facilitate its proper functioning.

Integrity rx2800 i2/i4 servers

For complete information on the HP Integrity rx2800 i2/i4 server, such as server components, ports, LEDs, and specifications, see the *HP Integrity rx2800 i2 Server User Service Guide* and *HP Integrity rx2800 i4 Server User Service Guide* on the HP website at http://www.hp.com/go/Integrity_Servers-docs.

3 Getting connected to iLO 3

This chapter provides information on getting connected to iLO 3.

The ways you connect to iLO 3 will depend on whether you have a rackmount server or a server blade.

ⓘ **IMPORTANT:** For greater security, HP recommends that iLO 3 management traffic be on a separate dedicated management network that is configured to allow only limited access from selected secure systems by designated system administrators. This acts as the first line of defense against security attacks. A separate network enables you to physically and logically control which systems are allowed to connect to the network and the iLO 3 LAN port.

Rackmount server connection

For a rackmount server, you can connect directly through the serial console or you can connect using the MP LAN.

To set up the console:

1. Determine the physical access method to connect cables. There are two physical connections to iLO 3:
   - Console serial port (RS-232)
   - MP LAN port
2. Assign an IP address to the iLO 3 MP LAN using one of the following methods:
   - DHCP and DDNS. Though there are several methods to configuring the LAN, HP recommends DHCP with DNS. DHCP with DNS comes preconfigured with default factory settings, including a default user account and password. Use the DNS name on the iLO Network Information Tag located on the front panel.
   - Console serial port (RS-232). Use this method to assign a static IP address instead of using DHCP.

Preparing to set up iLO 3

Perform the following tasks before you configure the iLO 3 MP LAN:

- Determine the physical access method to select and connect cables.
- Determine the iLO 3 MP LAN configuration method and assign an IP address if necessary.

Determining the physical iLO 3 access method

Before you can access iLO 3, you must determine the correct physical connection method.

There are several ways you can physically connect to iLO 3. Table 3 lists the appropriate connection method, required connection components, and connectors to the host console.

Use Table 3 to determine your physical connection method.

Table 3 physical connection matrix

Connection Method	Required Connection Components
Console serial port (RS-232)	• Host console • Console serial port (RS-232) DB-9F to DB-9F cable (modem eliminator cable) • Emulation terminal device (for example, a PC, laptop, or ASCII terminal) These connection methods directly attach to the iLO 3 MP through the console serial port. This is an RS-232 connection from a workstation to the server's iLO 3 MP console serial port. Serial cable concentrators are used to provide switched access from one workstation to multiple servers. Typically, the console serial port method is used by an administrator in the data center.
LAN port	10/100 LAN cable Remote access to the iLO 3 is a more convenient method. This remote access is through the MP LAN port. Depending on your LAN administration, this can be restricted to the datacenter, or extended outside the data center to your company's intranet. The iLO 3 has a separate LAN port from the system LAN port. It requires a separate LAN drop, IP address, and networking information from that of the operating system LAN port.

Determining the iLO 3 MP LAN configuration method

To access iLO 3 through the MP LAN, iLO 3 must acquire an IP address. The way iLO 3 acquires an IP address is dependent upon whether DHCP is enabled or disabled on the server, and if DHCP and DNS services are available to the server (see Table 4).

Once you have determined the iLO 3 access method, you must determine how you will configure the MP LAN in order to acquire an IP address using the following methods:

- DHCP/DNS through the management LAN (dynamically assigns an IP address): use the DNS name on the iLO Network Information Tag located on the front panel.
- Setting up a static IP address using a laptop with DHCP services and the management LAN.
- Local RS-232 serial port and a serial console (assigns a static IP address).

Table 4 provides all the possible IP address acquisition scenarios. Use this table to help you select the appropriate LAN configuration method to obtain an IP address.

Table 4 LAN configuration methods

DHCP	DNS	RS-232 Serial Port (iLO 3 MP LC command)	LAN Configuration Method
Yes	Yes	No	DHCP
Yes	Yes	Yes	DHCP or RS-232 serial port
No	Yes	Yes	RS-232 serial port
Yes	No	Yes	RS-232 serial port
No	No	Yes	RS-232 serial port
Yes	No	No	Cannot set up the LAN; reconsider your criteria

Configuring the iLO 3 MP LAN using DHCP and DNS

DHCP automatically configures all DHCP-enabled servers with IP addresses, subnet masks, and gateway addresses. All HP Integrity entry class servers with iLO 3 are shipped from the factory with DHCP enabled.

HP recommends using the DHCP and DNS method to simplify access to iLO 3.

When you use DHCP and DNS, you can connect to iLO 3 by entering the DNS name in your browser rather than an IP address **only** if the following applies:

- DHCP must be enabled (DHCP is enabled by default).
- You are using a DHCP server that provides the domain name.
- The primary DNS server accepts dynamic DNS (DDNS) updates.
- The primary DNS server IP address was configured through the DHCP server.

ⓘ **IMPORTANT:** You must know the DNS domain name, which is served out by the DHCP server, unless its domain is local or the same domain.

To configure iLO 3 using DHCP and DNS:

1. Obtain the factory-set DNS name from the iLO Network Information Tag located on the front panel. The DNS name is 14 characters long. It consists of the letters `ilo` followed by the 12 characters of the MAC address. For example:

   ```
   ilo0014c39c064f
   ```

   This address is assigned to the iLO 3 MP system board. The system board has a unique MAC address that identifies the hardware on the network.
2. Connect the MP LAN cable from the server to an active network port.
3. Apply AC power to the server.
4. Open a browser, Telnet, or SSH client and enter the fully-qualified DNS name (the full path name ending in the DNS name). The iLO 3 Log In window appears.
5. Log in using the default user name and password.

△ **CAUTION:** When DHCP is enabled, the system is vulnerable to security risks because anyone can access iLO 3 until you change the default user name and password.

HP strongly recommends you assign user groups and rights before proceeding.

Configuring the iLO 3 MP LAN using the console serial port

The terminal emulation device runs software that interfaces with the server. The software emulates console output as it would appear on an ASCII terminal screen and displays it on a console device screen.

To configure the iLO 3 MP LAN using the console serial port (RS-232):

ⓘ **IMPORTANT:** Do not configure duplicate IP addresses on different servers within the same network. The duplicate server IP addresses conflict and the servers cannot connect to the network.

The `LC` command enables you to configure a static IP address, host name, subnet mask, and gateway address.

ⓘ **IMPORTANT:** Ensure you have a console connection through the console serial port (RS-232) or a network connection through the LAN to access the iLO 3 MP CLI and use the `LC` command.

1. Ensure the emulation software is correctly configured:
   a. Verify that the communication settings are configured as follows:
      - 8/none (parity)
      - 9600 baud
      - None (receive)
      - None (transmit)

   b. Verify that the terminal type is configured appropriately. The following are supported terminal types:
      - hpterm
      - vt100
      - vt100+
      - vt-utf8

   ⓘ **IMPORTANT:** Do not mix hpterm and vt100 terminal types at the same time. If there are two users collaborating and viewing console output with different emulation modes set, their clients will see garbled results if the output from the system is terminal specific.

   Consult the help section of the emulation software application for instructions on how to configure the software options.
2. To determine the required connection components and the ports used to connect the server to the console device, use Table 3.
3. Connect the cables.
4. Start the emulation software on the console device.
5. Log in to iLO 3. See “Logging in to iLO 3 using the command-line interface” (page 32).
6. At the MP Main Menu, enter **`CM`** and press **Enter** to select command mode.
7. At the command mode prompt, enter **`LS`** and press **Enter**. The screen displays the current LAN configuration values. Write down the default values or log the information to a file.
8. To disable DHCP, enter the `LC` command.
   a. From the `LC` command menu, enter **`D`** and press **Enter**.
   b. Follow the instructions on the screen to change the DHCP status from enabled to disabled.
9. Use the `LC` command to enter information for the IP address, host, subnet mask, gateway parameters, and so on.
10. Enter **`XD -R -NC`** to reset iLO 3.
11. After iLO 3 resets, log in to iLO 3 again and enter **`CM`** at the `MP>` prompt.
12. To confirm that DHCP is disabled and display a list of updated LAN configuration settings, enter the **`LS`** command.

NOTE: HP ProLiant servers allow you to assign a static IP address at boot time to iLO 3 using a VGA monitor, keyboard, and mouse and HP ProLiant BIOS commands. This feature is not available on HP Integrity servers.

Server blade connection

You do not have to physically connect to the iLO 3 via the SUV cable on a server blade. The iLO 3 on server blades typically use the iLO/OA management connection on the blade enclosure, and are assigned LAN IP addresses by the OA.

Connecting the server blade to iLO 3 using the Onboard Administrator

If the OA/iLO network port on the enclosure is connected to the local network that has a DHCP server, your iLO 3 MP IP address is automatically generated by the DHCP server. The server blade is factory set with DHCP enabled.

To connect to iLO 3 using the OA, click the **iLO** link on the OA iLO GUI page:

1. To connect to iLO 3 using the OA, navigate to the Device Bay Information page for the corresponding blade server from the navigation menu on OA GUI.
2. Click on the **iLO** link on Device Bay Information page and click the **Web Administration** link to launch iLO GUI in a separate browser window.

For HP Integrity server blades, you can use the OA to manually set the IP addresses for all iLO 3s. You can also find the iLO 3 MP address so you can log in to iLO 3 directly.

For more information on using the Onboard administrator, see the following guides on the HP website at HP BladeSystem c-Class Onboard Administrator:

- For CLI, see the *HP BladeSystem Onboard Administrator Command Line Interface User Guide*.
- For web GUI, see the *HP BladeSystem Onboard Administrator User Guide*.

NOTE: No user name/password authentication is required when iLO is accessed from the OA.

DHCP and auxiliary blades

All blades have DHCP enabled by default. If you do not want an auxiliary blade to acquire one of the site DHCP addresses, assign it an address through the OA, using Enclosure Bay IP Addressing (EBIPA).

To enable the OA to connect to the blade for its internal blade management, assign a local IP address and matching gateway. For example, in a BL890c i2 server (four blades), use EBIPA to assign IP Addresses and Gateways of 192.168.2.*x*, where *x* is the Bay ID of each Auxiliary Blade. This is just an example; other similar IP addresses (192.168.x.x) also work. EBIPA requires each assigned IP address to be unique.

IMPORTANT: Invalid IP addresses will disable the ability for the OA to do Single Sign On (SSO) to the AUX blade(s). Alternatively, assigning a valid IP address and Gateway such as 192.168.2.x (local only to the enclosure) will enable the OA for minor blade management without requiring network DHCP addresses.

For more information on assigning IP addresses on auxiliary blades, see the *HP BladeSystem Onboard Administrator User Guide* on the HP website at HP BladeSystem c-Class Onboard Administrator.

Auto login

Auto login provides direct access to iLO 3 from the OA for users who already logged in to the OA. A user who has authenticated the connection to the OA can follow a link to a server blade in the enclosure without an additional login step. Auto login features and usage are as follows:

- A user who has authenticated a connection to the OA is able to establish a connection with iLO 3 without providing the user login and password to iLO 3.
- The OA provides the following auto login connection methods to iLO 3 links to users to launch these connections to iLO 3:

  iLO CLI SSH connection
  : If you logged in to the OA CLI through SSH, enter `connect server <bay number>` to establish an SSH connection with iLO 3.

  iLO web GUI connection
  : If you logged in to the OA web GUI, click the link to launch the iLO web GUI.

- Auto login is implemented using IPMI over Ethernet between the OA and iLO 3 to create and delete user commands.
- Supports a maximum of four simultaneous OA user accounts. The OA keeps track of these users locally. The information maintained for each user is the user name, password, and privilege levels.
- User accounts for the auto login feature are created in the MP database when an auto login session is established. These accounts are deleted when the auto login session is terminated.
- If a maximum number of user accounts has already been reached, and the OA creates another account on iLO 3. The OA sends a request to iLO 3 to delete one of the previously created accounts, before attempting to create a new one.
- If iLO 3 is rebooted or power-cycled, it verifies any previously created OA user accounts in the iLO 3 user database when it boots up. If there are any previously-created OA user accounts, it deletes those accounts.
- View and manage user accounts created in iLO 3 by the OA like any other local user account on iLO 3. To view and manage user accounts, use the TUI `WHO`, `UC` commands; or use the User Administration page in the web GUI.
- View and disconnect user connections established through the auto login feature just like other connections to iLO 3. To view and disconnect user connections, use the TUI `WHO`, `DI` commands, or use the User Administration pages in the web GUI.
- The OA supports three types of users: administrators, operators, and users. These user types map to the following iLO 3 capabilities:

  Administrators — Can perform any function including iLO 3 MP configuration. This level equates to an iLO 3 user with all privilege levels such as, Administer User Accounts, Remote Console Access, Virtual Power and Reset, Virtual Media, and Configure iLO MP settings. It enables access to all aspects of the OA including configuration, firmware updates, user management, and resetting default settings.

  Operators — Provided access to the serial console and vMedia. This level equates to an iLO 3 user with Remote Console Access, Virtual Power and Reset, Virtual Media, and Configure iLO settings. It allows access to all but configuration changes and user management. This account is used for individuals who might be required to periodically change configuration settings.

  Users — Provided read-only login access to iLO 3. This account is used for individuals who need to see the configuration of the OA but do not need the ability to change settings. This level equates to an iLO 3 user with no privileges set.

  NOTE: For information on how to set user roles and privilege levels in the OA, see the *HP BladeSystem Onboard Administrator User Guide* on the HP website at HP BladeSystem c-Class Onboard Administrator.

Initiating an auto login session

1. The OA finds the first available auto login user by finding the first user entry with a time-created value of 0. (OAtmp1...OAtmp5).
2. If there are no available users, the oldest user is deleted.

   NOTE: This might terminate a currently active session.

   The OA sends a request to iLO 3 to delete that user.

3. The OA sends a command to create an OA user.
4. The OA launches an SSH or web GUI connection to iLO 3 and logs in with the created user's credentials.

Terminating an auto login session

When the auto login CLI or web GUI session is terminated, the temporary Auto Login iLO 3 account is deleted.

User account cleanup during IPF blade initialization

The OA and iLO 3 perform the following during an IPF blade initialization:

- When a server blade is inserted, or iLO 3 or the OA is reboot or reset, both the OA and iLO perform cleanup of the accounts that might have been created for auto login before the reset.
- When iLO 3 initializes, the OA marks all four user slots as unused.
- Integrity iLO 3 scans its local user accounts. If there are any OA-created user accounts, they are deleted from the iLO 3 user database.

Auto login troubleshooting

There might be times when auto login fails. The following information provides possible reasons for the failure:

User creation

When the OA sends a request to iLO 3 to create a new user, iLO 3 attempts to create a user in the local iLO 3 user database. Creation of an OA user might fail for a number of reasons:

- The local user database is disabled in iLO 3 and LDAP authentication is being used.
- The iLO 3 user database has reached the maximum number of users (19 users).

User login

After an OA user has been created in the iLO 3 database, the OA user login can still fail for a number of reasons:

- Maximum number of connections for the requested connection type (SSH, Telnet, web GUI) to iLO 3 has been reached.
- Requested connection type (SSH, Telnet, or web) to iLO 3 is currently disabled.

User deletion

When the OA sends a request to iLO 3 to delete a user, iLO 3 attempts to delete that user from the local iLO 3 user database.

Deletion of an OA user might fail when a user with the specified login does not exist (user might have been deleted through other iLO 3 user interface).

Connecting to a server blade iLO 3 using the console serial port

When a physical connection directly to a server blade iLO 3 is necessary, you can connect through the console serial port.

For a server blade, you can connect directly through the SUV cable to the serial console or you can connect using the MP LAN internal connection in the blade enclosure. You do not cable up a separate MP LAN cable to each server blade.

To log in to iLO 3, see Chapter 4 (page 32).

Connecting to iLO 3 using the Onboard Administrator

For instructions on physically connecting a server blade to iLO 3 through the OA, see the HP BladeSystem c7000 Enclosure setup and installation guide on the HP website at http://h20000.www2.hp.com/bizsupport/TechSupport/DocumentIndex.jsp?contentType=SupportManual

Unless SSH is disabled and the local user database is disabled (enabled is default), you can connect from the OA using `connect server n`.

On HP Integrity server blades, you also have access to the console port.

It is not necessary to physically connect to iLO 3 through the console serial port to perform management tasks. Use the OA/iLO LAN port to communicate with any iLO 3 in the enclosure and the OA. You can use the LCD panel and the OA to configure and determine the iLO MP LAN address.

To log in to iLO 3, see Chapter 4 (page 32).

Additional setup

This section provides additional information to set up iLO 3.

Integrity iLO 3 comes preconfigured with an Administrator account and a randomly generated password.

All Rights (Administrator) level user:

login = **`Administrator`**

password = Randomly generated password found on the iLO Network Information Tag

NOTE:

- On server blades, the iLO Network Information Tag is located on the right side of the monarch blade.
- On HP Integrity rx2800 i2/i4 servers, the iLO 3 Network Information Tag is located on a pull-tab on the front panel.

Modifying default account configuration settings

Log in as the Administrator.

Changing the default password

1. Access the MP Main Menu.
2. At the `hpiLO->` prompt, enter **`CM`**.
3. At the `CM:hpiLO->` prompt, enter **`UC`** and follow the prompts.

Setting up user accounts

1. Access the MP Main Menu.
2. At the `hpiLO->` prompt, enter **`CM`**.
3. At the `CM:hpiLO->` prompt, enter **`UC`** and follow the prompts to modify user accounts.

Setting up security

For greater security, HP recommends that only administrators be granted access to modify user account information.

Setting security access

Determine the security access required and what user accounts and privileges are needed. Integrity iLO 3 provides options to control user access. To prevent unauthorized access to iLO 3, select one of the following options:

- Create local accounts. You can store up to 19 user names and passwords to manage iLO 3 access. This is ideal for small environments such as labs and small-to-medium sized businesses.
- Use corporate directory services to manage iLO 3 user access. This is ideal for environments with a large number of frequently changing users. If you plan to use directory services, HP recommends leaving at least one local account enabled as an alternate method of access.

For more information on how to create local accounts and use directory services, see Chapter 8: “Installing and configuring directory services ” (page 113).

Setting iLO MP LAN from UEFI

Integrity iLO 3 supports the UEFI utility to view the iLO LAN parameters.

To view the iLO LAN parameters from UEFI:

1. Boot to the UEFI Front Page. See “Accessing UEFI or the OS from iLO 3” (page 43).

   NOTE: You will only be able to boot to UEFI if the operating system has not yet been booted.

2. To launch the iLO Setup Tool, press **F8** or press **I**.
3. For a list of options, enter **help**. The screen displays the options.
4. Enter **L**. The current iLO LAN configuration appears.

```
Current iLO LAN configuration:
   IP Address : 15.255.99.57
   Gateway    : 15.25.96.1
   Subnet     : 255.255.248.0
```

   NOTE: You are viewing the iLO LAN parameters that have already been configured. To modify the LAN parameters, connect to iLO or the OA for server blades.

5. To exit, enter **Q**.

If the iLO LAN configuration has not been initialized, this setup tool enables you to set a static IP configuration.

IMPORTANT: For all Integrity BL8X0c versions, the recommendation is NOT to use this tool to set the iLO IP addresses because it uses a static IP and will cause iLO to not respond to EBIPA, which is the preferred method for setting iLO addresses in a blades environment. This tool is primarily used for the Integrity rx2800 i2/i4 servers—which lack OA/EBIPA tools. Future updates may not allow users to use the iLO Setup Tool to set the iLO LAN configuration on Integrity BL8X0c versions.

4 Logging in to iLO 3

This chapter provides instructions on how to log in to iLO 3.

Logging in to iLO 3 using the web GUI

1. Obtain the iLO Network Information Tag. The default iLO 3 user name and password is on this tag.

   NOTE:

   - On server blades, the iLO Network Information Tag is located on the right side of the monarch blade.
   - On HP Integrity rx2800 i2/i4 servers, the iLO 3 Network Information Tag is located on a pull-tab on the front panel.

2. Open a web browser, and then enter the DNS name or the IP address for the iLO 3.
3. Log in using the default iLO 3 user name and password.

Logging in to iLO 3 using the command-line interface

1. Obtain the iLO Network Information Tag. The default iLO 3 user name and password is on this tag.

   NOTE:

   - On server blades, the iLO Network Information Tag is located on the right side of the monarch blade.
   - On HP Integrity rx2800 i2/i4 servers, the iLO 3 Network Information Tag is located on a pull-tab on the front panel.

2. Access iLO 3 through the LAN, using Telnet, SSH, or a console emulation method. The iLO 3 MP login prompt appears.
3. Log in using the default the iLO 3 user name and password.

The following is the MP Main Menu:

```
   CO:    Console
  VFP:    Virtual Front Panel
   CM:    Command Menu
   CL:    Console Logs
   SL:    Show Event Logs
   HE:     Main  Help Menu
    X:     Exit Connection
```

For information on the iLO 3 MP menus and commands, see “Text user interface” (page 42).

TIP: When logging in to iLO 3, using the local or remote console serial ports, the login prompt might not appear if another user is logged in through these ports. In this event, use **Ctrl-B** to access the MP Main Menu and the `hpiLO->` prompt.

IMPORTANT: On HP Integrity server blades, user interfaces such as MP TUI and console on the auxiliary blades cannot be used for system control. They are enabled for HP Support. You must enter all system-level commands only on the monarch blade.

Logging in to iLO 3 through the OA

On systems that use the OA, you can log in to the web GUI or the TUI through the OA.

To log in to the OA web GUI, click the iLO link from the OA.

To log in to the OA TUI:

1. To see a list of what is in each bay, use `show server info` from the OA TUI.
2. To log in to that bay, use `connect server n`.

You do not need a username/account; but you do need an empty SSH connect slot. SSH needs to be enabled and there cannot be too many other SSH connections already in use.

5 Accessing the host (operating system) console

This chapter describes several ways to access the host console of an HP Integrity server blade.

Accessing a text host console through iLO 3 virtual serial console

Web browser access is an embedded feature of iLO 3.

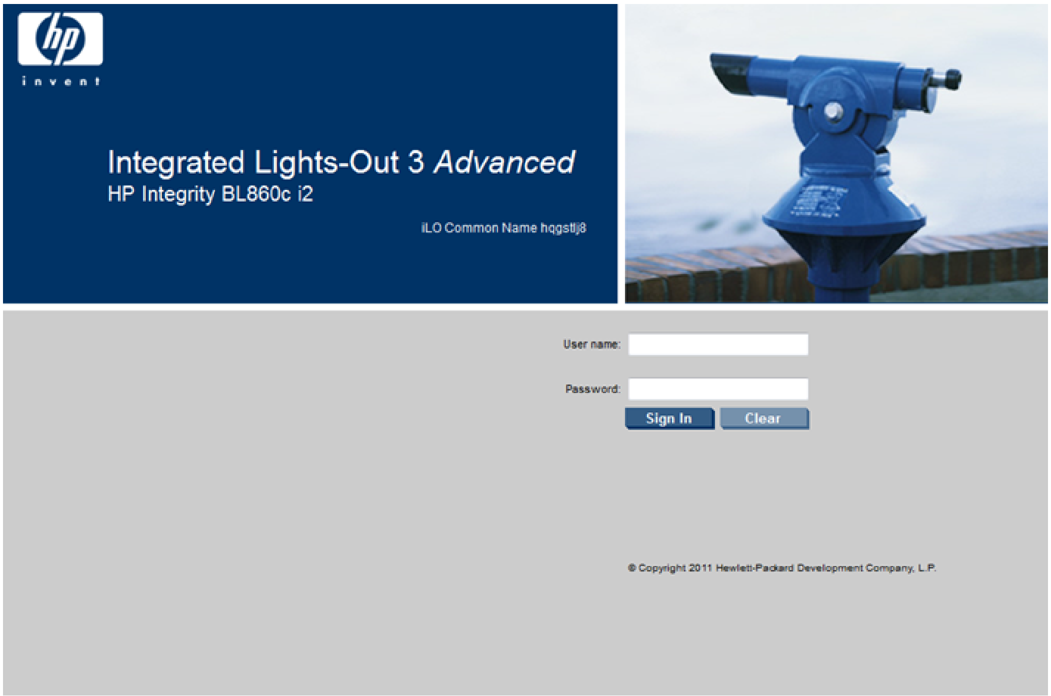
Before starting this procedure, you must have the following information:

- DNS name for the iLO MP LAN
- Host name

To interact with iLO 3 through the web:

1. Open a web browser and enter the DNS name or the IP address for the iLO 3 MP.
2. Log in using your user account name and password at the login page. (Figure 2).

Figure 2 Web Login page

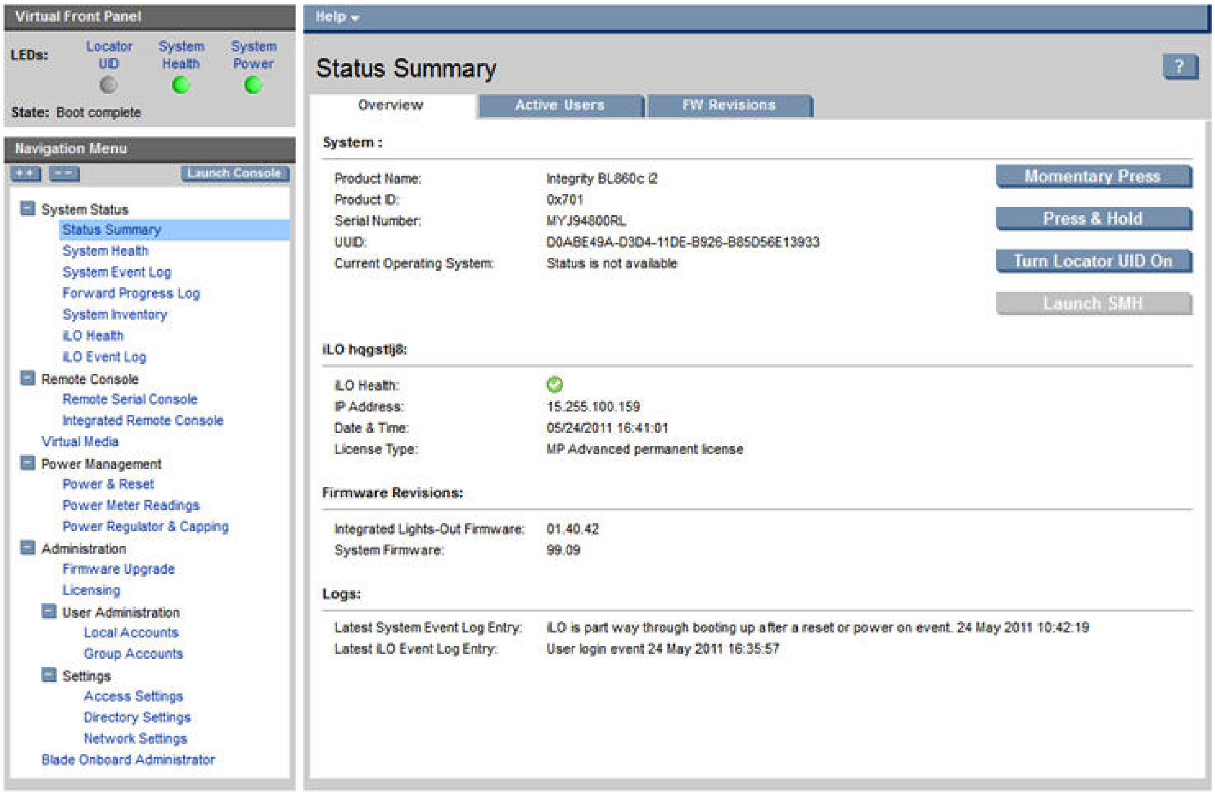


invent
Integrated Lights-Out 3 *Advanced*
HP Integrity BL860c i2
iLO Common Name hqgstlj8
User name:
Password:
Sign In
Clear
© Copyright 2011 Hewlett-Packard Development Company, L.P.

NOTE: The iLO times out in about 15 minutes if there is no activity; but will not timeout if the Remote Serial Console or the Integrated Remote Console is launched. The iLO will also not time out if Virtual Media is connected.

3. Click **Sign In**. The Status Summary page (Figure 3) appears after login.

Figure 3 Status Summary page



State: Boot complete

Status Summary

System :

Product Name: Integrity BL860c i2
Product ID: 0x701
Serial Number: MYJ94800RL
UUID: D0ABE49A-D3D4-11DE-B926-B85D56E13933
Current Operating System: Status is not available

iLO hqgstlj8:

iLO Health: ✓
IP Address: 15.255.100.159
Date & Time: 05/24/2011 16:41:01
License Type: MP Advanced permanent license

Firmware Revisions:

Integrated Lights-Out Firmware: 01.40.42
System Firmware: 99.09

Logs:

Latest System Event Log Entry: iLO is part way through booting up after a reset or power on event. 24 May 2011 10:42:19
Latest iLO Event Log Entry: User login event 24 May 2011 16:35:57

4. Select the web interface functions by clicking the tabs at the top of the page. Each function lists options in the Navigation Control on the left side of the page.

Accessing online help

The iLO 3 web interface has a robust help system. To launch iLO 3 help and display help about that page, click the help **?** at the top right corner of each page.

Accessing a text host console using the TUI

1. Log in using your user account name and password at the login page.
2. To switch the console terminal from the MP Main Menu to mirrored/redirected console mode, enter the `CO` command at the `hpiLO->` login prompt. All mirrored data appears.
3. To return to the iLO 3 MP command interface, enter **Ctrl-B** or **Esc (**.

Help system

Integrity iLO 3 has a robust help system. To access the Help menu from the TUI, enter **`HE`** at the `hpiLO->` prompt. The following is the MP Help Main Menu:

```
==== MP Help: Main Menu ===============================================

Integrated Lights-Out for HP Integrity - Management Processor (MP)

            MP Help System
Enter a command at the help prompt:

           OVerview   : Launch the help overview
           LIst       : Show the list of MP Main Menu commands
           <COMMAND>  : Enter the command name for help on individual command
           TOPics     : Show all MP Help topics and commands
           HElp       : Display this screen
           Q          : Quit help
```

```
====
hpiLO->:HE
```

To display the Main Menu Command List, enter **`LI`** at the `HE:hpiLO->` prompt.

To return to the MP Main Menu, enter **`Q`**.

To access help from the web GUI, click **Help**. You can also click the `?` at the top right corner of each page to display help about that page.

6 Configuring DHCP, DNS, LDAP, and schema-free LDAP

This chapter provides information on how to configure DHCP, DNS, LDAP extended schema, and schema-free LDAP.

Configuring DHCP

DHCP enables you to automatically assign reusable IP addresses to DHCP clients. This section provides information on how to configure DHCP options.

This iLO 3 MP host name will appear at the iLO 3 MP command mode prompt. Its primary purpose is to identify the iLO MP LAN interface in a DNS database.

NOTE: The HP-UX system name displayed by the `uname -a` command is different than the iLO 3 MP host name.

If the IP address, gateway IP address, and subnet mask are obtained through DHCP, you cannot change them without first disabling DHCP. If you change the host name and the IP address was obtained through DHCP and registered with dynamic DNS (DDNS), a "delete old name" request for the old host name and an "add name request" for the new host name are sent to the DDNS server.

If you change the DHCP status between enabled and disabled, the IP address, subnet mask, and gateway IP address are set to default values (0.0.0.0). Also, the DNS parameters are voided. When you change the DHCP status from enabled to disabled, the DNS parameters for using DHCP are set to disabled, and the `Register with DDNS` parameter is set to `No`. When you change the DHCP status from disabled to enabled, the DNS parameters for using DHCP are set to enabled, and the `Register with DDNS` parameter is set to `Yes`.

NOTE: DNS is the comprehensive RFC standard; DDNS provides only a part of the DNS standard functionality.

Use the `LC` command to perform the following actions to configure DHCP:

NOTE: The `LC` command sets the next boot LAN settings. It does not display the current settings. To display the current settings, you must use the `LS` command. When you change settings using the `LC` command, the settings do not take effect until the next boot of the iLO.

- Set all default LAN settings.

  ```
  [hostname] CM:hpiLO-> LC -all DEFAULT -nc
  ```

- Display next LAN settings.

  ```
  [hostname] CM:hpiLO-> LC -nc
  ```

-

- Modify the MP DHCP status.

  ```
  [hostname] CM:hpiLO-> LC -dhcp disabled
  ```

- Modify the MP IP address.

  ```
  [hostname] CM:hpiLO-> LC -ip 192.0.2.1
  ```

- Modify the MP host name.

  ```
  [hostname] CM:hpiLO-> LC -h hostname
  ```

- Modify the MP subnet mask.

  ```
  [hostname] CM:hpiLO-> LC -s 255.255.255.0
  ```

- Modify the MP gateway address.

  `[hostname] CM:hpiLO-> LC -g 192.0.2.1`

- Set the link state to auto negotiate.

  `[hostname] CM:hpiLO-> LC -link auto`

- Set the link state to 10 BaseT.

  `[hostname] CM:hpiLO-> LC -link x` (Other option is -link c (100BaseT))

- Set the remote console serial port address.

  `[hostname] CM:hpiLO-> LC -rsc n`

- Set the SSH console port address.

  `[hostname] CM:hpiLO-> LC -ssh 22`

Configuring DNS

To use the DNS command to display and modify the DNS configuration:

1. From the MP Main Menu, enter command mode.
2. At the `CM:hpiLO->` prompt, enter **`DNS`**. The screen appears **current DNS** data.
3. To select all parameters, enter **`A`** when prompted. The screen displays the current DHCP for DNS server status.
4. When prompted, enter **`Enabled`** or **`Disabled`**. The screen displays the current DHCP for DNS domain name status.
5. When prompted, enter **`Enabled`** or **`Disabled`**. The screen displays the current register with DDNS server value.
6. When prompted, enter **`Yes`** or **`No`**. The screen displays the current DNS domain name.
7. When prompted, enter a new value. The screen displays the primary DNS server IP address.
8. When prompted, enter a new value. The screen displays the optional secondary DNS server IP address.
9. When prompted, enter a new value. The screen displays the optional tertiary DNS server IP address.
10. When prompted, enter a new value.

The DNS configuration is updated as follows:

```
New DNS Configuration (* modified values):

   * S - DHCP for DNS Servers      : Disabled
   * D - DHCP for DNS Domain Name  : Disabled
      R - Register with DDNS Server : Yes
   * N - DNS Domain Name           : mpdns.company.com
   * 1 - Primary DNS Server IP     : 192.0.2.1
      2 - Secondary DNS Server IP   :

Enter parameter(s) to revise, Y to confirm, or [Q] to Quit: Y

-> DNS Configuration has been updated

[mpserver] CM:hpiLO->
```

Configuring LDAP extended schema

The following procedure describes how to configure iLO 3 to use a directory server to authenticate a user login using the iLO 3 MP TUI.

NOTE: The LDAP connection times out after 30 minutes of inactivity in Active Directory. For Novell directory, there is no inactivity timeout.

To configure using the web interface, see "Group Accounts" (page 101).

To configure LDAP extended schema:

1. From the MP Main Menu, enter command mode.
2. At the `CM:hpiLO->` prompt, enter **`LDAP`**.
3. To select **Directory Settings**, enter **`D`**. The current LDAP directory settings appear.
4. To select all parameters enter **`A`**. The current LDAP directory authentication status appears. The local iLO 3 user accounts database status also appears. If enabled, the local iLO 3 user database is used if there is an authentication failure using the LDAP Directory.
5. Enter **`D`** for disabled, or **`E`** for enabled. You must enter **`E`** if LDAP directory authentication is disabled. The current LDAP server IP address appears.
6. Enter the IP address of the LDAP server. The current LDAP server port address appears.
7. Enter a new port number. The screen displays the current object distinguished name. This specifies the full distinguished name of the iLO 3 device object in the directory service. For example, `CN=RILOE2OBJECT, CN=Users, DC=HP, DC=com`. Distinguished names are limited to 255 characters maximum plus one for the `NULL` terminator character.
8. Enter a new name. The **Current User Search Context 1** appears.
9. Enter a new search setting. The **Current User Search Context 2** appears.

   NOTE: The context settings 1, 2, and 3 point to areas in the directory service where users are located, so that users do not have to enter the complete tree structure when logging in. For example, `CN=Users, DC=HP, DC=com`. Directory user contexts are limited to 127 characters maximum plus one for the `NULL` terminator character for each directory user context.

10. Enter a new search setting. The screen displays the Current User Search Context 3.
11. When prompted, enter a new search setting.

The updated LDAP configuration is as follows:

```
New Directory Configuration (* modified values):

* L - LDAP Directory Authentication : Enabled
  M - Local MP User database        : Enabled
* I - Directory Server IP Address   : 192.0.2.1
  P - Directory Server LDAP Port    : 636
  D - Distinguished Name (DN)       : cn=mp,o=demo
  1 - User Search Context 1         : o=mp
  2 - User Search Context 2         : o=demo
  3 - User Search Context 3         : o=test

Enter Parameter(s) to revise, Y to confirm, or [Q] to Quit: y

 -> LDAP Configuration has been updated
```

Login process using directory services with extended LDAP

You can choose to enable directory services to authenticate users and authorize user privileges for groups of iLO 3s. The iLO 3 directory services feature uses the industry-standard LDAP. HP layers LDAP on top of SSL to transmit the directory services information securely to the directory servers..

HP provides tools to extend directory schema and install snap-ins for Microsoft Active Directory and Novell e-directory. Please refer to Chapter 8, *"Installing and configuring directory services"* for more information on installation and configuration of directory services.

When LDAP is enabled with extended schema in iLO 3, after users enter their login and password, the browser sends the cookie to iLO 3. The iLO 3 processor accesses the directory service to determine which roles are available for that user login. The iLO 3 first uses the credentials to access the iLO 3 device object in the directory. The directory service returns only the roles for which the user has rights. If the user credentials allow read access to the iLO 3 device object and the role object, iLO 3 determines the role object distinguished name and the associated user privileges. The iLO 3 then calculates the current user privileges based on those roles and grants them to that user.

Configuring schema-free LDAP

IMPORTANT: Due to command syntax changes in schema-free LDAP, some customer-developed scripts may not run. You must change any scripts you developed to enable them to run with the new schema-free LDAP syntax.

Integrity iLO 3 schema-free directory integration enables you to use the standard directory schema instead of adding HP schema to the directory database. You accomplish this by authenticating users from the directory database and authorizing iLO 3 privileges based on matching groups stored on each iLO 3.

In addition to general directory integration benefits, iLO 3 schema-free integration provides the following advantages:

- Easy implementation without schema extensions.

  iLO 3 schema-free integration is configured from any iLO 3 user interface (browser, command line, or script).

- Minimal administration and maintenance.

  - After initial setup, only groups and permissions require maintenance support on iLO 3; typically group and permission changes occur infrequently.

  - The schema-free approach does not require updating directory databases with new iLO 3 devices objects.

- Reliable security.

  Integrity iLO 3 schema-free integration does not affect standard directory attributes, avoiding conflicting use of attributes that can result over time.

NOTE: If you have already extended your directory with HP schema, there is no need to switch to the schema-free approach. Schema extension provides the lowest maintenance approach for directory integration. When this process has taken place, there is no advantage for the schema-free approach until a schema change is required.

To configure schema-free LDAP:

1. Follow the procedure for "Configuring LDAP extended schema" (page 38), but omit Step 8. It is not necessary to enter a new port number.
2. Set up directory security groups.

Setting up directory security groups

The following procedure describes how to set up directory security groups in schema-free LDAP using the iLO 3 MP TUI. To use the web interface, see "Group Accounts" (page 101).

NOTE: Due to command syntax changes in schema-free LDAP, some customer-developed scripts may not run. You must change any scripts you developed to enable them to run with the new schema-free LDAP syntax.

NOTE: You must select the default schema from the `LDAP` command for the schema-free LDAP settings to work.

To set up directory security groups:

1. At the `CM:hpiLO->` prompt, enter **`LDAP`**. The screen displays the current LDAP options.

```
[hqgstlb3] CM:hpiLO-> ldap

LDAP

Current LDAP options:
     D - Directory settings
     G - Security Group Administration
```

2. Enter **`G`**. The current group configuration appears.

```
Enter menu item or [Q] to Quit:G

Current Group Configuration:

       Group Names        Group Distinguished Names        Access Rights

  --------------------------------------------------------------------------

   1 - Administrator                                       C, P, M, U
   2 - User                                                C, P
   3 - Custom1                                             None
   4 - Custom2                                             None
   5 - Custom3                                             None
   6 - Custom4                                             None

   Only the first 30 characters of the Group Distinguished Names are displayed.

Enter number to view or modify, or [Q] to Quit:
```

3. Enter the number for the group you want to view or modify. The current LDAP group settings appear.
4. Set up a group distinguished name.
5. Select rights for the group.
6. Enter **`Y`** to confirm.

Login process using directory services without schema extensions

You can control access to iLO 3 using directories without schema extensions. Integrity iLO 3 acquires the user name to determine group membership from the directory. The iLO 3 then cross-references the group names with its locally stored names to determine user privilege level. Integrity iLO 3 must be configured with the appropriate group names and their associated privileges. To configure iLO 3, use one of the following methods:

- Web GUI (Administration > Directory Settings > Group Administration page)
- iLO 3 MP TUI (`LDAP` command)

7 Using iLO 3

There are several options for using iLO 3. This chapter provides information and instructions on each available option.

Text user interface

This section provides information on the text user interface (TUI) commands you can run in iLO 3.

NOTE: HP Integrity server blades do not have fans or power supplies. Therefore, the response to certain commands are different than a rackmount server.

MP command interfaces

Table 5 MP command interfaces

MP Command Interface	Description
MP Main Menu	The MP Main Menu appears when you first access the iLO 3 MP. The MP Main Menu supports the basic MP commands for server control and the iLO 3 MP configuration.
Command Menu	The Command menu provides a set of commands that help monitor and manage the server. It switches the console terminal from the MP Main Menu to command interface mode. To access the Command menu, enter `CM` at the MP Main Menu and enter **`HE LI`** at the `[hostname] CM:hpiLO->` prompt.

MP main menu

After logging in to the iLO 3 MP, the MP Main Menu appears. The MP Main Menu runs as a private session. Other iLO 3 users do not see the actions you perform in the private session.

Integrity iLO 3 can support multiple sessions to perform independent tasks:

- Multiple windows logged into iLO 3 to monitor VFP or study event logs in one window while administering the server from another window.
- Resetting a server from one window and monitoring the boot from another window while interacting with the console from a third window.

Table 6 lists the MP Main Menu commands.

Table 6 MP Main Menu commands

Command	Description
`CO`	Selects console mode
`VFP`	Displays the virtual front panel
`CM`	Enters command interface mode
`CL`	Views the console log
`SL`	Shows event logs
`HE`	Displays help for the menu or command
`X`	Exits

TIP: An effective method for using iLO 3 is to log in more than once with different views for each session. For instance, one window logged in viewing the console, and another viewing the virtual front panel.

MP Main Menu commands

The following sections describe the MP Main Menu commands.

`CO` (Console): Leave the MP Main Menu and enter console mode

`CO` switches the console terminal from the MP Main Menu to mirrored/redirected console mode. All console output is mirrored to all users in console mode. Only one of the mirrored users at a time has write access to the console. To get console write access, press **Ctrl-Ecf**.

To return to the MP Main Menu, press either **Ctrl-B** or **Esc** and **(**. Verify that all mirrored consoles are of the same terminal type for proper operation.

To run an ASCII screen-oriented application (SAM) or a file transfer program (`ftp`), the console is not the recommended connection. HP recommends using the LAN and connecting directly with Telnet or the web to the system over the system LAN.

You can also

Accessing UEFI or the OS from iLO 3

The UEFI is an Itanium-based architecture feature that provides an interface between the server blade OS and the server blade firmware. UEFI provides a standard environment for booting an OS and running preboot applications.

To access UEFI or the OS from iLO 3:

- From the MP Main Menu, enter `CO` to access the Console Menu. Depending on how the server blade was configured from the factory, and if the OS is installed at the time of purchase, you should be in one of two places:
  - EFI Boot Manager menu
  - OS login prompt

  If the server blade has a factory-installed OS, you can interrupt the boot process to configure your specific EFI parameters.

`VFP` (Virtual Front Panel): Simulate the display panel

`VFP` simulates the display panel on the front of the server. It gives real-time feedback on the results of system events and user actions. `VFP` works by decoding system events. It provides a live display of major states of the system, the latest system activity, and the state of front panel LEDs.

IMPORTANT: Integrity iLO 3 has no LED that equates to the Blade Health LED located on the front panel of each individual BL8X0c i2 server blade. The Blade Health LED represents the health of the individual server blade. The virtual LEDs in the iLO GUI and TUI reflect system and partition health. The closest equivalency to the Blade Health LED is a field called Bay [x] Health on the System Health page of the iLO GUI.

The VFP is a representation of the system and partition state and the system status in the boot process (running non-OS code, and more).

The following virtual LEDs are located in the VFP:

- Health
- System
- Locator
- Power

`VFP` shows forward progress during boot by indicating how many events have been received since the boot started and whether there have been any errors (events with alert level 3 or greater) since the last boot. To clear the yellow attention indicator on the front of the system, use the `SL` command and access the System Event Log (SEL).

Each user viewing VFP is in private session mode.

See also: `LOC` (locator LED) and, `SL` (show logs).

`CM` (Command Mode): Enter command mode

`CM` switches the console terminal from the MP Main Menu to mirrored command interface mode. The Command menu provides you with a set of standard command-line interface commands that help monitor and manage the server.

To display the list of MP command mode commands:

1. From the MP Main Menu, enter **`CM`**.
2. Enter **`HE LI`** at the `CM: hpiLO->` prompt.

To return to the MP Main Menu, press **Ctrl-B**.

`CL` Display console history

Command access level: Remote Console access for viewing the log. Configure MP Settings access for clearing the log.

The `CL` command displays up to 256KB of logged console data (or about 250 pages of output) sent from the system to the console path and stored for later analysis.

Console data is stored in a buffer in nonvolatile memory. By default, data is displayed from the beginning of the buffer to the end of the buffer. You can control the starting point from which the data displays and navigate through the data.

An image of the console history appears when you enter the `CL` command. Console output continues to be logged while this buffer is read, and nothing is lost in the meantime.

The `CL` command does not support command line usage or scripting.

See Also: SL, VT

`SL` (Show Logs): Display the status logs

`SL` displays the contents of the status logs, System Event Log (SEL), Forward Progress Log (FPL), and iLO Log. You can also run the status in live mode presenting each event as it is received.

NOTE: After entering the `SL` command, any subcommand you enter (such as `SE` log selection, `SL` menu options) does not require entering `<CR>`. The only exception to this is when a log entry number is requested. You must enter < **`CR`**> after entering a log number.

Events communicate system information from the source of the event to other parts of the system, then to the system administrator. Events are produced by intelligent hardware modules, the operating system, and system firmware. Events funnel into iLO 3 from different sources throughout the server. The iLO 3 stores new events in nonvolatile memory.

The `SL` command also displays the contents of the iLO 3 Event Log. The following events are recorded:

- iLO 3 MP login and logout attempts
- Command logging for specific commands
- All entries in the existing history log with more detail

Each time a user logs in or out of iLO 3, an event is logged. In the event of a login failure, an event is logged if the number of continuous login failure attempts equals the password fault value.

The following example shows the event log viewer menu:

```
Event Log Viewer Menu:

       Log Name             Entries    % Full      Latest Timestamped Entry
-------------------------------------------------------------------------------
   E - System Event           51         2 %        27 Mar 2010 02:22:38
   F - Forward Progress     1556         7 %
   I - iLO Event               12        2 %        27 Mar 2010 02:33:26
   C - Clear SEL and FPL
   L - Live Events

Enter menu item or [Ctrl-B] to Quit:
```

The following example shows the display in the `SL` menu `E` system event submenu:

```
#     Location   |Alert | Encoded Field  |  Data Field    | Keyword/Timestamp
-------------------------------------------------------------------------------
10    SFW  3,1,0,0    2  5488006341E10011 0000000000000000 BOOT_START
                                                           27 Mar 2010 20:07:51
9     SFW  4,0,0,0    2  548C006301E1000F 0000000000000000 BOOT_START
                                                           27 Mar 2010 20:07:51

 SL:hpiLO (+,-,<CR?,D,F,L,J,H,K,T,A,U,?,Q or Ctrl-B to Quit)->t
 SL:hpiLO (+,-,<CR?,D,F,L,J,H,K,T,A,U,?,Q or Ctrl-B to Quit)->j


Jump to entry number: 10


Log Entry 10: 27 Mar 2010 20:07:51
Alert Level 2: Informational
Keyword: BOOT_START
CPU starting boot
Logged by: System Firmware   located in  bay 3,socket 1,cpu 0,thread 0
Data: Major change in system state - Boot Start
5488006341E10011 0000000000000000

In this example: the “Alert” has a “*” because all alerts >= 3 have a “*”.

#     Location   |Alert | Encoded Field  |  Data Field    | Keyword/Timestamp
-------------------------------------------------------------------------------
69    ILO  3         *3  608022E620E10086 0000000000000000 ILO_SPECIAL_MODE
                                                           01 Jan 2001 12:32:51
```

- “#” is the entry number. Use this with the “j” menu comment to a particular log (if you don’t want to scroll to it).
- Location: 3,1,0,0 means blade 3, socket 1, cpu 0, thread 0.
- To find out more about these events, use `T` to switch to text mode.

Command logging is run for the following commands: `CA, DC, DI, DNS, FW, ID, IT, LC, LDAP, LM, PC, PM, PR, RS, SA, SO, TC, UC, WOL`

Events are listed as follows:

Table 7 Events

Log Name	Acronym	Log	Description
E - System Event	SEL	System Error Log	Records high-attention events and errors
F - Forward Progress	FPL	Forward Progress Log	Records all events. The Integrity iLO stores a detailed FPL of system operation during boot, crash, and any other abnormal conditions that can be used to extensively troubleshoot the server. This log goes far beyond the capabilities of standard IPMI for fault management. The FPL is available using the text interface only.
I - iLO Event	IEL	iLO Event Log	Records the following: • Events corresponding to iLO 3 MP login and logout actions • Command logging for specific iLO 3 MP commands

Table 7 Events *(continued)*

Log Name	Acronym	Log	Description
C - Clear SEL and FPL	- - -	SEL Log FPL Log	Clears all entries in the System Event and Forward Progress logs
L - Live Events	LIVE	Live Event Viewer	Presents each event as it is received

NOTE: Integrity iLO 3 captures and stores the server System Event Log for access through a browser or text interface even when the server is not operational. This capability can be helpful when troubleshooting remote host server problems.

Reading the SEL is the only way to turn off the attention LED (flashing yellow light).

Table 8 lists the events and actions used to navigate within the logs.

Table 8 Events

Event	Action
+	Displays the next block (forward in time)
-	Displays the previous block (backward in time)
Enter (<CR>)	Continues to the next or previous block
D	Dumps the entire log for capture or analysis
F	Displays the first entry
L	Displays the last entry
J	Jumps to entry number
H	Displays the mode configuration (hex)
K	Displays the mode configuration (keyword)
T	Displays the view mode configuration (text)
A	Displays the alert level filter options
U	Displays the alert level unfiltered
Q	Quits and returns to the Event Log Viewer Menu
?	Displays the Help Menu
Ctrl-B	Exits and returns to the MP Main Menu

Integrity iLO 3 Event Log navigation provides additional filtering options as shown in Table 9.

Table 9 iLO 3 Event Log filter options

Filtering Option	Filter Criteria
N: User Login	Filter by user Login ID
P: Port Name	Filter by port name (Serial, Telnet, SSH, WEB)
I: IP Address	Filter by user IP Address (dotted decimal format)
M: Date	Filter by date stamp of the records entries (MM/DD/YYYY)

If you select more than one filtering option, it acts as an additional filter. For example, if you select the filtering option `N` followed by `P`, the logs displayed are the logs that satisfy the filtering criteria for options `N` and `P`.

NOTE: The iLO 3 Event Logs cannot be cleared.

A finite number of records are stored. The older records are replaced as the log fills up.

Table 10 Alert levels

Severity	Definition
0	Minor forward progress
1	Major forward progress
2	Informational
3	Warning
5	Critical
7	Fatal

See also: DC and VFP

`HE` (Help): Display help for the menu or command in the MP Main Menu

The `HE` command displays the MP hardware and firmware version identity, and the date and time of firmware generation. When issued from the MP Main Menu, `HE` displays general information about iLO 3, and those commands available in the MP Main Menu. When issued in command mode, `HE` displays a list of Command menu commands available. It also displays detailed help information in response to a topic or command at the help prompt.

`X` (Exit): Exit iLO 3

`X` exits you from the MP Main Menu. If the terminal is the local serial port, the login prompt appears. For all other types of terminals, you are disconnected from iLO 3.

Command Menu

The Command menu provides you with a set of standard command-line interface commands that help monitor and manage the server.

Table 11 Command menu commands

Command	Description
`BLADE`	Display enclosure, bay, and Onboard Administrator information **NOTE:** This command is available only on a server blade.
`CA`	Configure serial port parameters
`DATE`	Display the current date
`DC`	Reset all parameters to default configuration
`DF`	Display field replaceable unit information (FRUID)
`DI`	Disconnect users
`DNS`	Configure DNS parameters
`FW`	Update firmware
`HE`	Print the help menu; or display help for the menu or command
`ID`	Display or modify system information
`IT`	Modify the iLO 3 inactivity timers
`LC`	Configure LAN, SSH, and web ports

Table 11 Command menu commands *(continued)*

Command	Description
`LDAP`	Configure LDAP parameters
`LM`	View current license status
`LOC`	Locator LED configuration
LS	Current LAN settings
`PC`	Remote power control
`PM`	Power regulator mode
`PR`	Set the power restore policy
`PS`	Power management module status
`RS`	Reset the system through the RST signal
`SA`	Configure remote, LAN, Telnet, and web access options
`SO`	Configure security options
`SYSREV, SR`	Display all firmware revisions
`SS`	Display system processor status
SYSSET	System settings
`TC`	Transfer of control (TOC) - System reset through the INIT signal
`TE`	Tell - send a message to other users
`UC`	User configuration
`WHO`	Display a list of connected users
`WOL`	Turn the Wake-On-LAN feature On or Off for system LANs
`XD`	Diagnoses or resets iLO 3

The following is a quick reference list that provides MP Command mode activities:

- To access the Command menu, enter **`CM`** at the MP Main Menu.
- To see all the available commands, enter **`HE`** at the `CM:hpiLO->` prompt, and then enter **`LI`**.
- To modify the inactivity timeout, enter the **`IT`** command. The inactivity timer aborts a command if you do not complete it within a certain time period and redirects you back to the command prompt.
- To abort most commands, enter **`Q`** at the point when the iLO 3 MP is asking for input.
- To return to the MP Main Menu from any of these commands, press **Ctrl-B**.

Command-line interface scripting

A command-line interface is provided for all commands to assist you in scripting. This section provides syntax examples used in the iLO 3 MP command-line or scripted interface.

Typically, tools like Expect (see "Expect script example" (page 49)) and (http://expect.nist.gov/) are used to string together several commands to accomplish a task. These scripting tools enable you to write a script for one iLO 3, and use it to apply the same commands to additional iLO 3s. Scripting tools have capabilities that enable you to do the following:

- Write scripts that make decisions based on the output of commands
- Use variables in the script to customize it for each target automatically
- Compensate for delays in output

Scripting tools and the command-line interfaces enable you to carry out commands to multiple iLO 3s such as setting the IP address on 10 iLO 3s pulled from a list of 10 IP addresses read from a file local to your script. To automatically administer any part of the system during any stage of its operation, you can use the scripting tool to log in to iLO 3, access the console, and send and receive commands in UEFI or the operating system.

NOTE: This guide is not meant as a substitute for instruction on various scripting tools that are available for automating command-line interfaces. The iLO 3 MP TUI (when used with command-line arguments) was created with these types of scripting tools in mind to facilitate powerful automation capabilities.

Expect script example

The following provides a simple Expect script example with no timeouts and no error checking using Telnet instead of SSH.

```
#!/usr/local/bin/expect -f
#
# (Portions of) this Expect script (were) was generated by autoexpect on
#     Tue Nov 21 08:45:11 2006
# Expect and autoexpect were both written by Don Libes, NIST.
#
# Note that autoexpect does not guarantee a working script.  It
# necessarily has to guess about certain things.  Two reasons a script
# might fail are:
#
# 1) timing - A surprising number of programs (rn, ksh, zsh, telnet,
# etc.) and devices discard or ignore keystrokes that arrive "too
# quickly" after prompts.  If you find your new script hanging up at
# one spot, try adding a short sleep just before the previous send.
# Setting "force_conservative" to 1 makes Expect do this
# automatically - pausing briefly before sending each character.  This
# pacifies every program I know of.  The -c flag makes the script do
# this in the first place.  The -C flag allows you to define a
# character to toggle this mode off and on.

set force_conservative 0  ;# set to 1 to force conservative mode even if
     ;# script wasn't run conservatively originally
if {$force_conservative} {
        set send_slow {1 .1}
        proc send {ignore arg} {
               sleep .1
               exp_send -s -- $arg
 }
}

#2) differing output - Some programs produce different output each time
# they run.  The "date" command is an obvious example.  Another is
# ftp, if it produces throughput statistics at the end of a file
# transfer.  If this causes a problem, delete these patterns or replace
# them with wildcards.  An alternative is to use the -p flag (for
# "prompt") which makes Expect only look for the last line of output
# (i.e., the prompt).  The -P flag allows you to define a character to
# toggle this mode off and on.
#
# Read the man page for more info.
```

```
#
# -Don
#
# (End of auto-expect generated content)

#######################################################################

# USER
set mp_user "Admin"

# PASSWORD- get password from terminal instead of storing it in the script
stty -echo
send_user "For user $mp_user\n"
send_user "Password: "
expect_user -re "(.*)\n"
set mp_password $expect_out(1,string)
stty echo

# Other Constants
set timeout 20

########################################################################
## BEGIN
##
spawn $env(SHELL)
match_max 100000

#foreach mp_name {puma_mp lion_mp cougar_mp} {
set mp_name "puma_mp"

  send_user "\n\n----- $mp_name -----\n\n"
  # Frequently used Strings
  set MA_PROMPT "$mp_name\] hpiLO-> $"
  set CM_PROMPT "$mp_name\] CM:hpiLO-> $"

  # Expect the UNIX prompt...
  #expect "-> $"

  #### Log into the MP  #####
  send -- "telnet $mp_name\r"
  expect ".*MP login: $"
  send -- "$mp_user\r"
  expect "MP password: $"
  send -- "$mp_password\r"

  expect "$MA_PROMPT"
#Run SL command to dump logs
  #send "sl -forward -view text -nc\r"
  send -- "cm\r"

  expect "$CM_PROMPT"

#Run PC command to power on the system
  send -- "pc -on -nc\r"
  expect "$CM_PROMPT"

  send "ma\r"
  expect "$MA_PROMPT"
  send "x\r"

#}

expect eof
```

Command menu commands and standard command line scripting syntax

The following list of commands is provided to familiarize you with the Command menu commands. Command-line interface scripting syntax for each command is provided to help you accomplish a scripting task. The following rules apply to scripting syntax:

- The `-nc` (no confirmation) is optional. This special keyword designates that no user confirmation is required to run the command. If you enter **`-nc`** at the end of the command line, the command is issued without asking you for user input. Without the `-nc` option, you are asked to confirm the changes. The only exception to this rule is when a password must be entered. In that case, you are prompted for a password separately. However, commands that require a password can have that password entered on the command line (`FW`, `UC`).

  If `-nc` is specified on a command with no other parameters or with only a specific multilevel selector, the command displays all or just the specific multilevel parameters. The absence of a specific multilevel parameter on a command that has multilevels causes *all* the multilevel parameters to display.
- Most commands accept `-all default`. This causes all parameters for that command to be set to the default values.
- In some multilevel commands, you can use `default` to set that level to its default values.
- Further use of `default` on many individual parameters causes that parameter to be set to its default value.
- `-?` (MP command-specific help) is optional. If you enter **`-?`** by itself with the command, a usage display appears. In the event of an incorrect command line usage, in addition to the the error message, the usage display appears.
- Arguments in brackets `[ ]` are optional.
- Without any arguments, commands enter Menu Mode where individual selections can be made or undone before command is confirmed.

`BLADE`: Display enclosure, bay, and Onboard Administrator information

NOTE: This command is available only on a server blade.

Command access level: Login access

The `BLADE` command facilitates the cabling and initial installation of HP Integrity server blades. It also provides a quick view of the enclosure status.

Onboard administrator configuration

OA IP address IP address of the OA.

> **IMPORTANT:** Integrity iLO 3 must have a reachable IP address as the default gateway address. Since the OA is reachable, HP recommends using the OA IP address as the gateway address for Integrity iLO 3. If you use the Enclosure IP mode, this solution works during a failover. In the Enclosure IP mode, a static IP address is assigned to the active OA, and during a failover, the same IP address follows the active OA. If the OA IP address is assigned using DHCP, the solution does not work. In such instances, HP recommends manually changing the iLO 3 gateway address.

OA MAC address MAC address of the OA.

Server blade configuration

Rack name Logically groups together enclosures in a rack. The rack name is shared with the other enclosures in the rack.

Rack UID Rack unique identifier.

Bay number The bay number is used to locate and identify a blade.

Enclosure information

Enclosure name Logically groups together the server blades installed in the same enclosure. The enclosure name is shared with the other server blades in the enclosure.

Health Indicates one of three states of health of this enclosure.

OK Normal operation, any issues have been acknowledged.

Degraded Typically loss of redundancy or partial failure of a component.

Critical Failure with loss or imminent loss of system function.

Command line usage and scripting:

```
    [ -nc ]
  blade -?
```

Example of the command with output

```
[gstlhpg1] CM:hpiLO-> blade



Onboard Administrator Information:
     IP Address               : 192.0.2.1
     MAC Address              : 0x00xxxxxexxbb


Server Blade Information:
    Rack name                 : RACK
    Rack UID                  : 000z00xx0000
    Bay Number                : 3

Enclosure Information:
    Enclosure name            : encl
    Health                    : OK

-> Command successful.

[gstlhpg1] CM:hpiLO->
```

CA: Configure serial port parameters

Command access level: MP configuration access

The CA command sets the parameters for the local serial console. Input and output data rates are the same. The value returned by the stty command on HP-UX is not the local serial port console speed.

Set up the local serial port parameters as follows:

Baud rates Input and output data rates are the same. Possible values are as follows: 300, 1200, 2400, 4800, 9600, 19200, 38400, 115200 bit/sec.

Flow control Xon/Xoff

Mode of operation Aux UART, iLO MP

The iLO 3 mirrors the system console to the iLO 3 MP local and LAN ports. One console output stream is reflected to all connected console users. If several different terminal types are used simultaneously, some users can see unexpected results.

Command line usage and scripting:

```
  CA  [ -local ] [ -bit <n> ] [ -flow >software|hardware> ]
  CA  -?
```

Server blade usage

```
CA  [ -local ] [ -bit <n> ] [ -flow >software|hardware> ]
               [ -mode ,aux|ilo> ] ] [ -nc ]
CA  -?
```

See also: SA

DATE: Display date

Command access level: Login access

The DATE command displays the date of the iLO 3 MP real-time clock.

Command line usage and scripting:

```
DA  |  DATE  [ -nc ]
DA  |  DATE -?
```

DC (Default Configuration): Reset all parameters to default configurations

CAUTION: All user information (logins, passwords, and so on) is erased when you use any of the following reset methods.

Command access level: Configure MP settings access

The DC command restores all MP configurations to the default values. This command also clears SSH key pairs.

To restore specific configurations to the default values, use the following commands:

```
LAN IP Configuration                          : LC -all DEFAULT
Set Access Configuration                      : SA -all DEFAULT
Inactivity Timer Configuration                : IT -all DEFAULT
Security Options                              : SO -option DEFAULT
User Configuration                            : UC -all DEFAULT
LDAP Directory Configuration                  : LDAP -all DEFAULT
DNS Configurations                            : DNS -all DEFAULT
Power Restore Configuration                   : PR -all DEFAULT
Wake-On-LAN Configuration                     : WOL -all DEFAULT
Local Serial Port Configuration               : CA -all DEFAULT

  < MP will be reset if you confirm this request
```

Use any of the following methods to reset passwords in iLO 3:

- In the UC command, change individual users or reset all users to default values.
- Reset passwords by pressing the iLO 3 Physical Presence button on the back panel of your server for longer than 8 seconds. After iLO 3 reboots, the local console terminal displays a message for 5 seconds. Responding to this message in time enables a local user to reset the passwords.

Command line usage and scripting:

```
DC  [ -all default [ -nc ] ]
DC  -?
```

See Also: CA, IT, LC, SA, SO, UC, LDAP, DNS, WOL

DF: Display FRUID information

Command access level: Login access

The DF command displays a formatted list of the Field Replaceable Unit (FRU) information for the modules in the system.

Information provided includes serial number, part number, model designation, name and version number, and manufacturer.

Server blades that occupy multiple bays use a DF command menu organized by bays as follows:

```
CM:hpiLO-> df.
```

```
DF

To dump all available FRU information without any paging, use the command line interface: DF -ALL -NC

Display FRU Information Menu:
      1 - Specific FRU Bay 1
      2 - Specific FRU Bay 2
      A - All available FRUs
      V - Display Mode: Text

  Enter menu item or [Q] to Quit: 1
 1
        FRU IDs (Bay 1):
      ----------------
  00-System Board      01-SAS Backplane     20-Processor 0
  21-Processor 1       24-Processor 0 RAM   25-Processor 1 RAM
  40-Virtual Mezz 1    41-Virtual Mezz 2    82-DIMM CPU0 -   3A
  83-DIMM CPU0 -   4A  CC-SBL

   Select FRU ID:
```

Server blades that occupy a single bay use the traditional `DF` command menu:

```
Display FRU Information Menu:
     S - Specific FRU
     A - All available FRUs
     V - Display Mode: Text

Enter menu item or [Q] to Quit:
```

Command line usage and scripting:

To select the display format, use the `–view` keyword. The default display mode is TEXT. For this command, the `–nc` keyword (if entered), implies that no paging takes place. In other words, when the command is started, no intervention by the user is necessary.

To select FRUs in a specific bay on multi-bay server blades, use the optional `-bay` keyword. If the `–bay` keyword is omitted, FRUs in all bays appear.

```
DF [ -specific[ <fruid> ] | -all ] [ -bay <bay number> ]
   [ -view <text|hex> ] [ -nc ]
DF  -?
```

Rack servers and single-bay server blades do not support the `-bay` keyword:

```
  DF [ -specific[ <fruid> ] | -all ] [ -view <text|hex> ] [ -nc ]
  DF    -?
```

`DI`: Disconnect remote or LAN console

Command access level: MP configuration access

The `DI` command causes web, or SSH connections to close. It does not disable the ports. To disable the ports, see the `SA` command for LAN/web/SSH access. Use the `TE` and `WHO` commands to identify the connected users before running this command.

The number following the Connected status indicates how many user are connected through that access method.

```
  T - Telnet        : Disconnected
  W - Web SSL       : Connected (1)
  H - SSH           : Disconnected
```

Command line usage and scripting:

```
  DI [ —web ] [ -ssh ] [ -nc ]
  DI -?
```

See also: `SA, TE, WHO`

`DNS`: DNS settings

Command access level: MP configuration access

The `DNS` command configures the DNS server settings. You can only use this command with DHCP enabled. It enables you to configure DNS Domain Name and up to two DNS servers manually or automatically using DHCP. You can also perform a DDNS update through the primary DNS server as long as it is authoritative for the zone.

If no DNS server IP addresses are specified, or the DNS domain is undefined, DNS is not used.

If an IP address was obtained through DHCP, an add name request is sent to the DDNS server if it is enabled and registered.

Command line usage and scripting:

```
DNS [ [ -server <e|d> ] [ -domain <text> ] [ -name <e|d> ]
      [ -register <y|n> ] [ -1ip <ipaddr> ] [ -2ip <ipaddr> ]
      [ -all default ] [ -nc ]
DNS -?
```

See also: `LC`

`FW`: Upgrade the MP firmware

The `FW` command upgrades iLO MP or specific system programmable firmware. If you are only upgrading the iLO MP firmware, the iLO MP automatically resets upon successful completion and drops all iLO MP LAN connections. To use this feature, you must have the Configure iLO Settings user right.

This upgrade does not affect server operation if it is for iLO MP only.

If this upgrade is system programmable firmware, the upgrade continues when the system power is off.

NOTE: It can take up to ten minutes before the server begins to boot.

To download and upgrade the firmware package from the HP website, see http://www.hp.com/go/bizsupport.

IMPORTANT: When performing a firmware upgrade that contains system programmable hardware, you must properly shut down any operating system that is running before starting the firmware upgrade process.

Select the download for Integrity firmware and follow the directions provided in the release notes.

CAUTION: If the firmware upgrade process is interrupted at any time, the core I/O will need to be repaired or replaced.

At the end of the upgrade process, the iLO MP is reset. Reconnect and log in.

If a firmware request is pending when you enter the `FW` command, a `SYSREV` table appears. You will be prompted to either cancel the firmware upgrade request or exit. Follow the prompts on the screen.

TIP: Before performing certain iLO 3 functions, verify that you have the supported firmware version required to carry out the task.

Command line usage and scripting:

```
FW [ -url  <http|https>://host/filepath> [-force <e\d>] [ -nc ] ]
   [ -cancel  [ -nc ] ]
FW -?
```

`HE`: Print Help Menu and MP hardware and firmware revision

Command access level: Login access

The `HE` command displays the MP hardware and firmware version and date and time of firmware generation. The MP hardware version is the MP FPGA version that can be read through firmware.

Additional help is available at the help prompt. Given a topic or command, more detailed help is available.

- When issued in command mode, `HE` displays the list of the MP Command Mode commands available according to the level of the MP Command Mode of the requestor (Operator or Administrator) and the MP mode (Normal or Manufacturing).
- `HE` also displays the MP Help: Command Menu List of detailed help information in response to a topic or command at the help prompt.

Command line usage and scripting:

```
HE [ -topic | command ] [ -nc ]
HE -?
```

`ID`: System information settings

Command access level: MP configuration access

The `ID` command displays and modifies the following:

- Host System Configuration
- Asset Tag information

Command line usage and scripting:

```
ID  [ { -host }
    [ -tag <text> } ] [ -nc ]
ID  -?
```

`IT`: Modify MP inactivity timers

Command access level: MP configuration access

The `IT` command prevents sessions on the system from being inadvertently left open. When you initiate an iLO 3 MP command, other users are prohibited from running any commands until the first command has been completed or until it times out. Command interface inactivity timeout specifies that timeout value. This prevents a user from inadvertently keeping iLO 3 locked in a command, preventing other users from running iLO 3 MP commands.

The inactivity timeout effects how long a user can stay inactive within a command in the text user interface before they are placed back at the command prompt. There is no session timeout on the Integrity iLO 3 text interfaces.

NOTE: The iLO 3 MP command interface inactivity timeout cannot be deactivated.

Use the flow control timeout to prevent any user who is using a terminal that does not obey flow control from locking the system out from other users.

The following are `IT` command parameters:

iLO 3 inactivity timeout	1 to 30 minutes (default is 3 minutes).
Flow control timeout	0 to 60 minutes. If the flow control timeout is set to zero, no timeout is applied. A mirroring flow control condition ceases when no flow control condition exists on any port. This timeout prevents mirrored flow control from blocking other ports when inactive.

Command line usage and scripting:

```
IT [ -command <n> ] [ -flow <n> ] [ -nc ]
IT -?
```

See also: `SA`

`LC`: LAN configuration usage

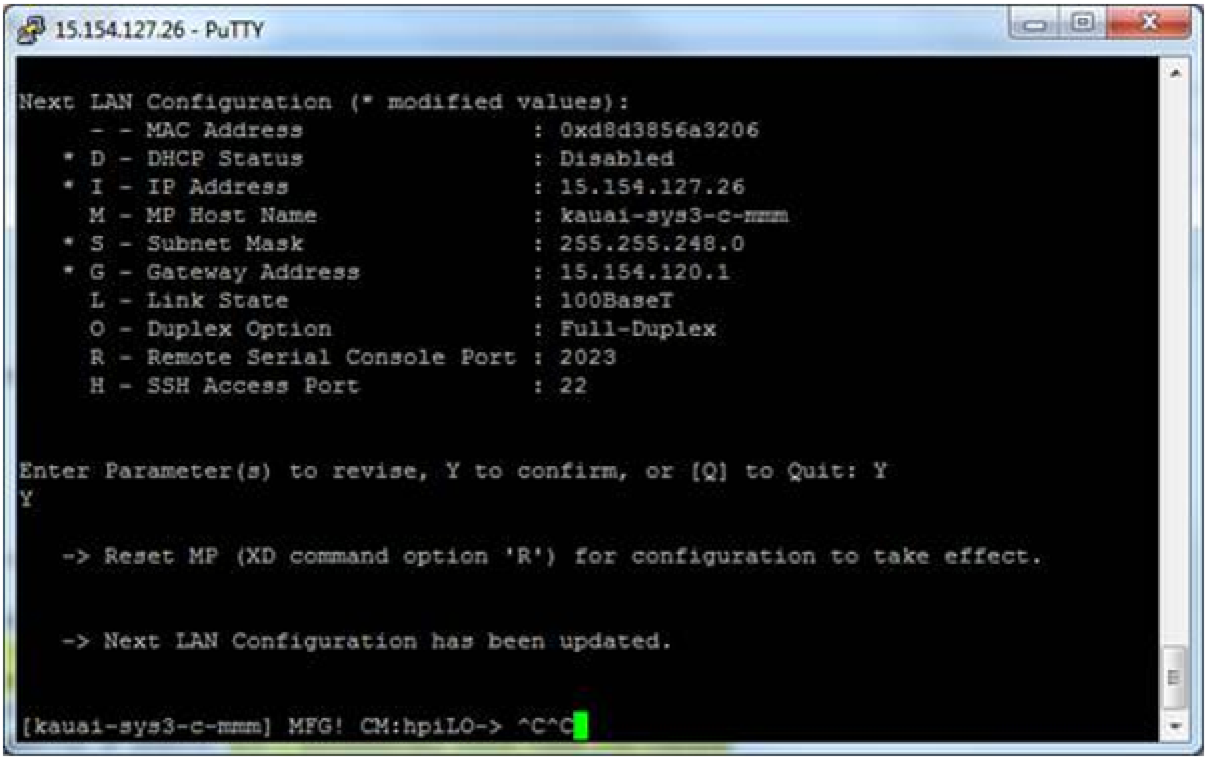
Command access level: MP configuration access

The `LC` command displays and modifies the LAN configuration parameters.

The `LC` command sets next boot LAN settings. It does not display the current settings. Use the `LS` command for that purpose. The `LC` no longer does an automatic reset but advises that a reset is needed to make the changes you performed.

IMPORTANT: If you are connected through a network and you make any changes to DHCP status, IP address, subnet mask, or gateway IP address, iLO 3 alerts you to manually reset iLO 3 when you confirm the change (see below).

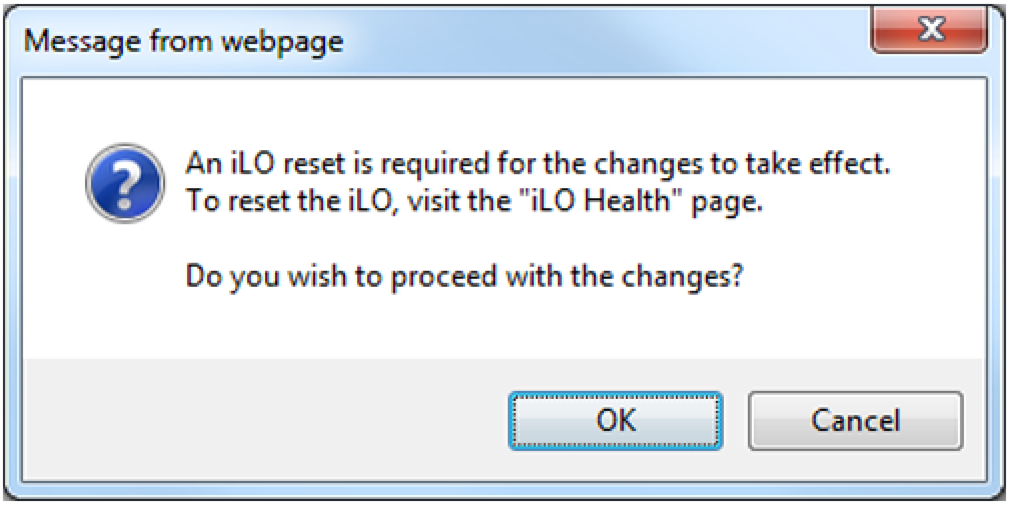
Figure 4 Reset dialogue from TUI (SSH/Telnet/RSC)



```
Next LAN Configuration (* modified values):
     - - MAC Address                 : 0xd8d3856a3206
   * D - DHCP Status                 : Disabled
   * I - IP Address                  : 15.154.127.26
     M - MP Host Name                : kauai-sys3-c-mmm
   * S - Subnet Mask                 : 255.255.248.0
   * G - Gateway Address             : 15.154.120.1
     L - Link State                  : 100BaseT
     O - Duplex Option               : Full-Duplex
     R - Remote Serial Console Port  : 2023
     H - SSH Access Port             : 22


Enter Parameter(s) to revise, Y to confirm, or [Q] to Quit: Y
Y

   -> Reset MP (XD command option 'R') for configuration to take effect.


   -> Next LAN Configuration has been updated.


[kauai-sys3-c-mmm] MFG! CM:hpiLO-> ^C^C
```

If you are connected through a serial console and you make any changes to DHCP status, IP address, subnet mask, or gateway IP address, iLO 3 alerts you to manually reset iLO 3 (see below).

Figure 5 Reset window from web GUI



An iLO reset is required for the changes to take effect.
To reset the iLO, visit the "iLO Health" page.

Do you wish to proceed with the changes?

Configurable parameters include the following:

- iLO 3 MP IP address
- DHCP status (default is enabled)
  - When DHCP is enabled, the IP address, gateway IP address and subnet mask are obtained through DHCP. These parameters cannot be changed manually without first disabling DHCP.
  - If you change the DHCP status to enabled or disabled, the IP address, subnet mask, and gateway address are set to the default values (0.0.0.0), and the DNS parameters are voided.
  - When you change the DHCP status from enabled to disabled, the DNS parameters for DHCP are set to disabled, and the Register with DDNS parameter is set to `No`.
  - When you change the DHCP status from disabled to enabled, the DNS parameters for DHCP are set to enabled, and the Register with DDNS parameter is set to `Yes`.
- iLO 3 MP host name
  - The iLO 3 MP host name set in this command is displayed at the iLO 3 MP command mode prompt. Its primary purpose is to identify the iLO MP LAN interface in a DNS database.
  - If you change the iLO 3 MP host name and the IP address was obtained through DHCP and DDNS is registered, a *delete old name request for the old host name* and an *add name request for the new host name* are sent to the DDNS server.
  - Typically you enter the DNS name for the LAN IP. You can program this field to any useful name or phrase. For clarity, enter **`MPNAME-on-SYSTEM`** as the MP Host name, so both names show up in the prompt. The limit is 31 characters, and no spaces are allowed.
- Subnet mask
- Gateway IP address
- Local console serial port
- Link state

IMPORTANT: On Integrity rx2800 i2/i4 servers, the link state 1000BaseT option (or Duplex Option) is not currently supported.

An Integrity rx2800 i2/i4 server can run at 1000BaseT, but only if the switch it connects to supports auto-negotiate to 1000BaseT, and the rx2800 i2/i4 server is similarly set to auto-negotiate. If you want to set a specific LAN speed (10BaseT or 100BaseT), those are the only options that iLO 3 currently supports.

- SSH access port number

Command line usage and scripting:

```
 LC [ -ip <ipaddr> ] [ -subnet <subnet> ] [ -gateway <ipaddr> ]
    [ -link <auto|x(10BT)|c(100BT)> ] [ -option <full|half> ]
    [ -host <text> ] [ -rsc <n> ] [ -ssh <n> ] [ -dhcp <e|d> ] [ -nc ]
```

See also: `DC, ID, SA, SO`

`LDAP`: LDAP directory settings

Command access level: MP configuration access

The LDAP command displays and modifies the following LDAP directory settings:

- Directory Authentication: Activates or deactivates directory support on iLO 3.
  - Enable with Extended Schema: Selects directory authentication and authorization using directory objects created with the HP schema. Select this option if the directory server is extended with the HP schema and you plan to use it.
  - Enable with Default Schema: Selects directory authentication and authorization using user accounts in the directory which has not been extended with the HP schema. User accounts and group memberships are used to authenticate and authorize users. Data in the Group Administration page must be configured after you select this option. In the Group Administration page, configure one or more directory groups by entering the distinguished name of the group and privileges to be granted to users who are members of that group.
  - Disable: Deactivates directory support on iLO 3.
- Local User Accounts: Includes or excludes access to local iLO 3 user accounts. If local user accounts are enabled, you can log in to iLO 3 using locally stored user credentials. If they are disabled, access is limited to valid directory credentials only.

  NOTE: Locally stored user accounts can be active while directory support is enabled. This enables both local- and directory-based user access. If both directory authentication and local user accounts are enabled, login is attempted using the directory first, then using local accounts.

- Directory Server IP Address: IP address or host name of the directory server.
- Directory Server LDAP Port: Port number for the secure LDAP service on the server. The default value for this port is 636.
- Distinguished Name: Specifies where this iLO 3 instance is listed in the directory tree. For example: `cn=MP Server,ou=Management Devices,o=hp`
- User Search Contexts (1,2,3): User name contexts that are applied to the login name entered to access iLO 3.

  User name contexts are used to locate an object in the tree structure of the directory server and applied to the login name entered to access iLO 3. All objects listed in the directory can be identified using the unique distinguished name. However, distinguished names can be long, users might not know the distinguished names, or they might have accounts in different directory contexts. Search contexts enables users to specify common directory contexts, so that they do not have to enter the full distinguished name at login. The iLO 3 attempts to authenticate a user in the directory first by the login name entered, and then by applying user search contexts to that login name until login succeeds. For example:

  Instead of logging in as `cn=user,ou=engineering,o=hp`, search context of `ou=engineering,o=hp` enables a user to log in as `user`.

  When extended schema is selected and Active Directory is used as a directory server. Microsoft Active Directory has an alternate user credential format. A user can log in as: `user@domain.hp.com`, in which case a search context of `@domain.hp.com` enables the user to login as `user`.

Command line usage and scripting:

```
LDAP [ -directory [ -ldap <d|x|s> ] [ -mp <e|d>]
                  [ -ip <hostname/ipaddr> ] [ -port <n>]
                  [ -dn <text> ] [ -1context <test>]
                  [ -2context <text>] [ -3context <text>]
     | -groups    [ -change <groupNo.> [ -dn <text>]
                  [ rights <e|d>]
                        <console|mp|power|user|virtual|all|none> ]
                        [ -list <groupNo.> ]]
     | -nc ]
LDAP -?
```

See also: `LOGIN, UC`

`LDAP`: LDAP group administration

The `LDAP` command enters one or more directory groups by specifying the distinguished name of the group and privileges to be granted to users who are members of that group.

You must configure group administration information when the directory is enabled with the default schema.

The group administration section of the LDAP command enables users to enter one or more directory groups by specifying the distinguished name of the group and privileges to be granted to users who are members of that group.

When a user attempts to log in to iLO 3, iLO 3 reads that user's directory name in the directory to determine which groups the user is a member of. The iLO 3 compares this information with a list of configured groups. The rights of all the matched groups are combined and assigned to that user.

`LDAP`: Schema-free LDAP

The `Schema-Free LDAP` command enables you to use directory authentication for logging in to iLO 3 without having to do any schema extension on the directory server or snap-in installation on the client.

For information on schema-free LDAP, see "Configuring schema-free LDAP" (page 40).

`LM`: License manager

Command access level: MP configuration access

The `LM` command enables you to view your current license status.

NOTE: An Advanced Pack License key is built into all Integrity servers equipped with Integrity iLO 3. No additional licensing is necessary.

Command line usage and scripting:

```
LM [ -key <license key> ] [ -nc ]
LM -?
```

`LOC`: Locator UID LED configuration

Command access level: Login access

The `LOC` command displays the current status of the Locator LED.

The Locator LED flashes blue if a firmware upgrade is in progress or if the Physical Presence button is pushed.

In HP Integrity server blades, this command also enables you to turn the enclosure Locator LED on or off. The LED physically identifies the blade in a data center environment. It emits a blue light when turned on.

Command line usage and scripting:

```
LOC [ -on | -off  [ -nc ] ]
LOC -?
```

Server blade usage

```
LOC [ -server <on | off> ] [-enclosure <on | -off>]  [ -nc ]
LOC -?
```

LS: LAN status

Command access level: Login access

The LS command .

Command line usage and scripting:

```
LS [ -nc ]
LS   -?
```

PC: Power control

Command access level: Power control access

The PC command is used to obtain an instantaneous power reading and control system power. It provides the following options for remote control of system power:

ON — Turns the system power on. This command has no affect if the power is already on.

OFF — Turns the system power off. This command is equivalent to turning the system power off at the front panel switch. There is no signal sent to the operating system to shut the software down before power is turned off. To turn the system off gracefully, ensure that the operating system is shut down before running this command.

CYCLE — Turns the system power off, then on. The delay between off and on is 6 seconds.

Graceful Shutdown — A signal is sent to the operating system to shut down prior to turning off the system power.

Command line usage and scripting:

```
PC [ -on | -off | -graceful | -cycle ] [ -nc ]
PC -?
```

Example:

```
[gstlhpg1] CM:hpiLO-> pc -on -nc

PC -on -nc

System will be powered on.

   -> System is being powered on.

-> Command successful.

[gstlhpg1] CM:hpiLO->
```

See also: PR, PS

PM: Power regulator mode

Command access level: Power control access

The PM command provides the following options for remote control of the system power regulator:

Dynamic — Enables the system to dynamically change the processor power level when needed based on current operating conditions. The system remains in this mode unless the system is reset or an operating system-hosted application requests a processor state change. In these cases, power management mode changes to operating system Control Mode.

Low — Sets the processor to the lowest supported processor state and forces it to stay in that lowest state until the system is reset. If the processor is reset, the power mode changes to operating system Control Mode.

High Sets the processor to the highest supported processor state and forces it to stay in that highest state unless the system is reset or an operating system-hosted application requests a state change. If the processor is reset, the power mode changes to operating system Control Mode.

OS Sets the control of the power regulator to the operating system.

Command line usage and scripting

Example

```
[gstl0074] CM:hpiLO-> pm
  PM [ -dynamic | -low | -high | -os ] [ -nc ]
  PM -?
```

See also: PC, PR

PR: Set power restore policy

Command access level: MP configuration access

The PR command configures the power restore policy. The power restore policy determines how the system behaves when AC power returns after an AC power loss.

- If PR is set to On or Previous, the system powers on after AC is applied.
- If PR is set to Off, the system stays powered off after AC is applied. To power on the system, push the system power button or run the PC command.
- If PR is set to Previous, the power is restored to the state that was in effect when the AC power was removed or lost.

Command line usage and scripting:

```
  PR [ -policy <on|off|previous> ] [ -nc ]
  PR -?
```

See also: PC

PS: Power status

Command access level: Login access

The PS command displays the system power status.

Command line usage and scripting:

```
  PS [ -nc ]
  PS -?
```

See also PC, SS.

RS: Reset system through the RST signal

Command access level: Power control access

ⓘ **IMPORTANT:** During normal system operation, shut down the operating system before issuing the RS command.

The RS command resets the system (except iLO 3) through the RST signal.

Running this command irrecoverably halts all system processing and I/O activity and restarts the system. The effect of this command is similar to cycling the system power. The operating system is not notified, no dump is taken as the system shuts down, and so on.

Command line usage and scripting:

```
  RS [ -nc ]
  RS -?
```

See also: TC

SA: Set access

Command access level: MP configuration access

The SA command configures the access mode for the LAN and the Command mode. You can set iLO 3 to enable web or SSH access. SSH and web SSL is enabled by default.

If LAN users are connected when a disable from this command runs, they are disconnected. Any future incoming connection request to the corresponding port is rejected. A message appears prior to being rejected.

NOTE: Currently, when an access method is first set to disabled, the message is sent. However, after an iLO reboot, the port is not opened.

Command line usage and scripting:

```
SA [ -telnet <e|d> ] [ -web <e|d> ] [ -ssh <e|d> ]
    [ -nc ]
SA -?
```

See also: DI, LC

SO: Security option help

Command access level: MP configuration access

The SO command enables you to modify the security options of iLO 3.

For user configuration, see the UC command. For SSH enable/disable, see the SA command.

The security options menu is as follows:

O – Security Options	- Login timeouts - Allowed password faults - SSL certificate generation - Generate SSH key pairs - Exit security override mode
L – SSL Certificate	This option is an SSL certificate that is a self generated certificate and is also generated automatically the first time the iLO 3 is booted or if the NVRAM in which it is stored gets corrupted. You might want to regenerate this certificate with your own parameters or regenerate it when it is close to expiring. The initial certificate has a 10-year expiration date from the build date of the MP binary image. A regenerated certificate is only valid for 2 years from the system date. The SSL certificate is used to connect the web GUI to the iLO.
H – SSH Pairs	This option would only be used if the SSH keys need to be changed by choice or the keys which are stored in NVRAM get corrupted. The first time the iLO 3 is booted, these keys are generated automatically. These key pairs are used for SSH connections to the iLO.

The following are SO command parameters:

- Login timeout: 0 to 5 minutes. This is the maximum time allowed to enter login name and password after the connection is established. The connection is interrupted when the timeout value is reached. The local console restarts the login; for all other terminal types, the connection is closed. A timeout value of 0 means there is no timeout set for the login.

  The login timeout and the timeout value is effective on all ports including the local port. However, the local port cannot be disconnected like other ports on login timeout. For example, if a local port user sits at the `hpilo-> Login:` prompt, no action occurs even when a timeout occurs. However, if a local port user enters a login name, sits at the `hpilo-> Password:` prompt, and a timeout occurs, then this login is cancelled and the `hpilo-> Login:` prompt reappears.

- Number of password faults allowed: 1 to 10. This parameter defines the number of times a user can attempt to log in to a console before being rejected and having its connection closed.
- SSL certificate: Enables the generation of SSL certificates.

NOTE: If you specify the certificate using the command line, then you must specify every parameter.

- SSH keys generation: Enables SSH keys authorization.

Command line usage and scripting:

```
 SO   [ { -options [ -login <n> ] [ -number <n> ]
           [ -security_overide disable ]}
      | { -ssl [ -name <text> -organization <text> -unit <text>
                -country <text> -region <text> -locality <text>
                -email <text> ] }
      | { -ssh } ] [-nc ]
  SO  -?
```

SYSREV, SR: Firmware revisions

Command access level: Login access

The `SYSREV, SR` command displays the current firmware and hardware revisions in the system.

Command line usage and scripting:

```
SYSREV [ -nc ]
SYSREV -?
```

NOTE: You can only directly obtain system firmware revision information when the system power is off.

SS: System processor status

Command access level: Login access

The `SS` command displays the status of the system processors in the system and which processor is the monarch.

For both server blades and rackmount servers, use the `SS` command from the MP CLI interface for an instantaneous power reading.

The iLO 3 learns the system configuration through the events it receives from the system. There is usually a delay between any processor configuration change and what is displayed by this command. For the most up-to-date processor configuration information, use the UEFI prompt.

Command line usage and scripting:

```
SS [ -nc ]
SS -?
```

See also: `PS`

SYSSET: Display system settings

Command access level: Login access

The `SYSSET` command displays the following system information: Manufacturer, Product Name, Product Number (primary and secondary), Serial Number (primary and secondary), UUID (primary and secondary), and Product ID.

If primary and secondary parameters do not match, `SYSSET` provides an option to copy one set of parameters to the other

Command line usage and scripting

```
SYSSET [  [ -prodname <text> ] [ -prodnum <text> ]
          [ -serial <text> ] [ -uuid <text> ]
          [ -login <text> ] [ -password <text> ]
        | [-copy]
        | [-magic] [ -nc ]
SYSSET  -?
```

TC: System reset through INIT signal

Command access level: MP configuration access

IMPORTANT: This command is intended to be used only when an operating system is hung.

The action of the TC command depends on the current state of the system. If the system is at UEFI, the TC command behaves just like the RS command. If the system is at an operating system, usually HP-UX, a system crash dump is taken.

The TC command disconnects sessions with the system if some sessions are active. If a session was active prior to this command, the console client returns to the Main Menu with respect to the security rules.

Before issuing this command, the MP queries the power monitor to discover the status of the power on the system. If the power monitor does not respond or the power is OFF, the command is not issued.

Command line usage and scripting:

```
TC [ -nc ]
TC -?
```

See also: RS

TE: Send a message to other mirroring terminals

Command access level: MP configuration access

The TE command treats all displayable characters following the command as a comment. Characters typed are broadcast to the connected console clients when you press **Enter**. The string size is limited to 80 characters. Any extra characters are not broadcast to other console clients.

NOTE: The broadcast message is sent only to Command menu clients, and does not include users connected to MP Main Menu functions.

Command line usage and scripting:

```
TE <text> [ -nc ]
TE -?
```

UC: User Configuration (users, passwords, and so on)

Command access level: User administration access

The UC command adds, modifies, re-enables, or deletes any of the following user parameters:

- User Login ID
- User Password
- User Name
- Workgroup
- Access Rights
- Operating Mode
- User State: Enabled/Disabled

The default user is `Administrator`. The `Administrator` user has all rights `(C, P, M, U, and V)`. You can change the configuration of the `Administrator` with the `UC` command.

All users have the right to log in to iLO 3 and to run Status (read-only) commands (view event logs, check system status, power status, and so on), but not to run any commands that alter the state of iLO 3 or the system.

The following commands are available to all users: `DATE`, `DF`, `HE`, `LOC`, `LS`, `PS`, `SL`, `SS`, `SYSREV`, `TE`, `VFP`, `WHO`, `XD` (LAN status only)

There are two menu items:

- `ping`, can be used by all users
- `reboot`, limited to certain users

An iLO 3 user can also have any or all of the following access rights:

Console access

Right to access the system console (the host operating system). This does not bypass host authentication requirements, if any.

Command: `CO`

Power control access

Right to power on, power off, or reset the server, and to configure the power restore policy.

Commands: `PC`,`PR`, `RS`, `TC`

Local user administration access

Right to configure locally stored user accounts.

Commands: `UC`

MP configuration access

Right to configure all iLO 3 MP settings (and some system settings, such as the power restore policy).

Commands: `CA`, `CL`, `DC`, `DI`, `FW`, `ID`, `IT`, `LC`, `LDAP`, `LOC`, `PG`, `SA`, `SO`, `XD`

Virtual Media access

Right to use the vMedia applet.

Command line usage and scripting:

```
  UC [ -new <login> —user <text> [ -workgroup <text> ]
     [ -rights <e|d> <console|mp|power|user|virtual|all|none> ]
     [ -mode <single|multiple> ] [ -enable <e|d> ]
     [ -password <value> ] ]
     [ -change <login> [-login<newlogin> ] [ -user <text> ]
     [ -rights <e|d> <console|mp|power|user|virtual|all|none> ]
     [ -workgroup <text> ] [ -mode <single|multiple> ]
     [ -enable <e|d> \ [ -password [ <value> ]
     [ -delete <login> ] | [ -list <login> ] ] [ -nc ]
  UC -?
```

Example:

```
[gstlhpg1] CM:hpiLO-> uc -delete Oper -nc

UC -delete Oper -nc


Current User Parameters:
     User Login ID         : Oper
     User Password         : ************
     User Name             : Default Operator
     User Workgroup        :
     User Access Rights    : Console access, Virtual Media
     User Operating Mode   : Multiple
     User Enabled/Disabled : Enabled

   -> Current User will be deleted
```

```
User may be disconnected in this process

   -> User Configuration has been updated.

-> Command successful.

[gstlhpg1] CM:hpiLO->
```

See also: `CA, SO`

`WHO`: Display a list of connected iLO 3 users

Command access level: Login access

The `WHO` command displays the login name of the connected console client users, the ports on which they are connected, and the mode used for the connection.

- Login name
- Login type (LDAP or local authentication)
- User access rights
- Connection port (local, remote, Telnet, web, SSH)
- IP address (for Telnet, web, SSH)
- Current MP mode that user is in (MA-MP Main Menu, CM-Command menu, LIVE-live event viewer, VFP-VFP mode)

For LAN, web, and serial console clients, the command displays the IP address. When DNS is integrated, the host name appears as well.

The local port requires a user to log in. A user must be logged in to the system, or no local port appears.

Command line usage and scripting:

```
WHO [ -nc ]
WHO -?
```

See also: `DI, TE, UC`

`WOL`: Wake-On-LAN

This command enables you to turn the Wake-On-LAN feature On or Off for system LANs.

Wake-On-LAN (WOL) is not supported with Integrity servers running Windows or OpenVMS environments. WOL is supported with Integrity BL860c i2, BL870c i2, and BL890c i2 Server Blades running HP-UX 11i v3. The supported remote power-on solution for Windows and OpenVMS is iLO. For details, see the User Service Guide for your server.

Command line usage and scripting:

```
WOL [ -on | -off [ -nc ] ]
WOL -?
```

See also: `DC`

`XD`: iLO 3 diagnostics and reset

Command access level: Configure MP settings access for resetting the MP, Login access for all other `XD` options

The `XD` command enables you to perform a LAN access test to check the connectivity status of the MP. To perform the LAN connectivity test, use the `ping` command.

You can use the `XD` command plus its `R` command option to reset the MP. You can safely perform an MP reset without affecting the operation of the server. You can also reset the MP by pressing the iLO 3 Physical Presence button.

Command line usage and scripting:

```
XD [ -lan <ipaddr> | -reset ] [ -nc ]
XD -?
```

Web GUI

When using the iLO 3 web GUI, keep the following information in mind:

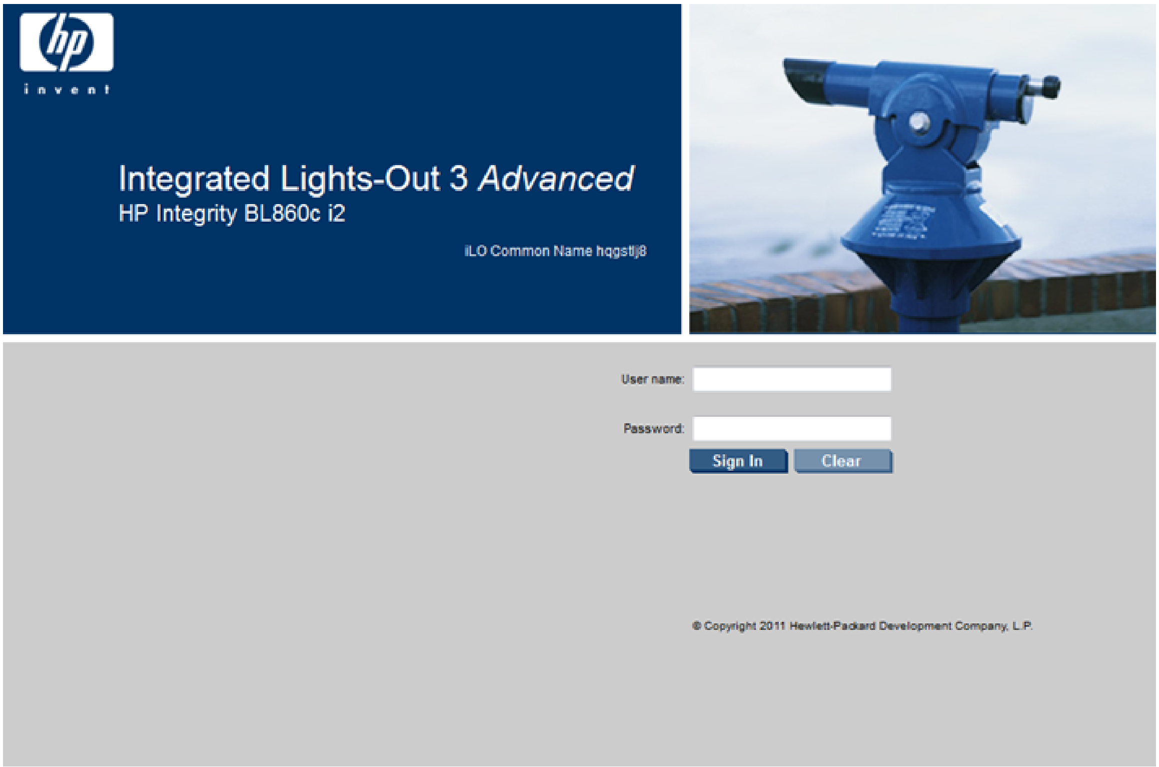
- To successfully log in to the iLO 3 web GUI, you must enable cookies on the web browser.
- The appearance of the web GUI pages might differ depending on your server.
- Different browser applications must be used to perform multiple logins to the same iLO from a single client.

Accessing the iLO 3 web GUI

1. Open a web browser and enter the DNS name or the IP address for the iLO 3.

   The Integrated Lights-Out 3 log in page appears.

   Figure 6 iLO 3 web GUI log in


invent
Integrated Lights-Out 3 *Advanced*
HP Integrity BL860c i2
iLO Common Name hqgstlj8
User name:
Password:
Sign In
Clear
© Copyright 2011 Hewlett-Packard Development Company, L.P.

2. Log in using the default iLO 3 user name and password (Administrator/password found on the iLO Network Information Tag).

   NOTE:

   - On server blades, the iLO Network Information Tag is located on the right side of the monarch blade.
   - On HP Integrity rx2800 i2/i4 servers, the iLO Network Information Tag is located on a pull-tab on the front panel.

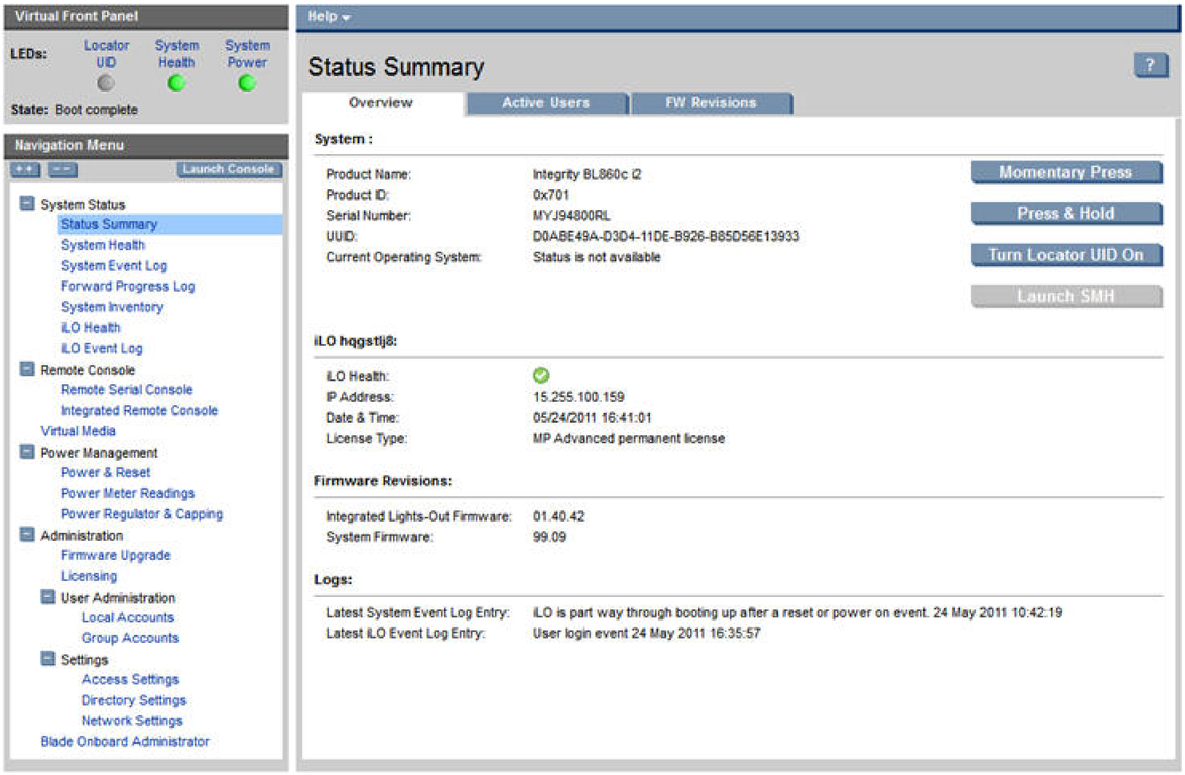
Status Summary

The Status Summary menu provides access to server information and enables you to perform server management tasks.

Status Summary>Overview tab

The Status Summary Overview tab displays a brief status summary of the system.

Figure 7 Overview tab



State: Boot complete

Status Summary

System :

Product Name: Integrity BL860c i2
Product ID: 0x701
Serial Number: MYJ94800RL
UUID: D0ABE49A-D3D4-11DE-B926-B85D56E13933
Current Operating System: Status is not available

iLO hqgstlj8:

iLO Health: ✓
IP Address: 15.255.100.159
Date & Time: 05/24/2011 16:41:01
License Type: MP Advanced permanent license

Firmware Revisions:

Integrated Lights-Out Firmware: 01.40.42
System Firmware: 99.09

Logs:

Latest System Event Log Entry: iLO is part way through booting up after a reset or power on event. 24 May 2011 10:42:19
Latest iLO Event Log Entry: User login event 24 May 2011 16:35:57

Table 12 Overview description

Item	Description
System	Displays system information. When the UUID and serial number are virtualized, they also appear as UUID (logical) and serial number (logical) respectively.
Momentary Press	Causes a graceful power off when the system power is on as well as causes a power on when the system power is off.
Press & Hold	Forces the power off and is only available when system power is on. When system power is off, this button is not visible.
Turn Locator UID On or Off	Enables you to turn the server Locator UID LED on or off.
Launch SMH	Provides a link to the System Management Homepage. When there are no OS agents running, the button is disabled.
iLO	Displays the iLO Health Status, IP Address, Date & Time, and License Type installed on iLO.

Table 12 Overview description *(continued)*

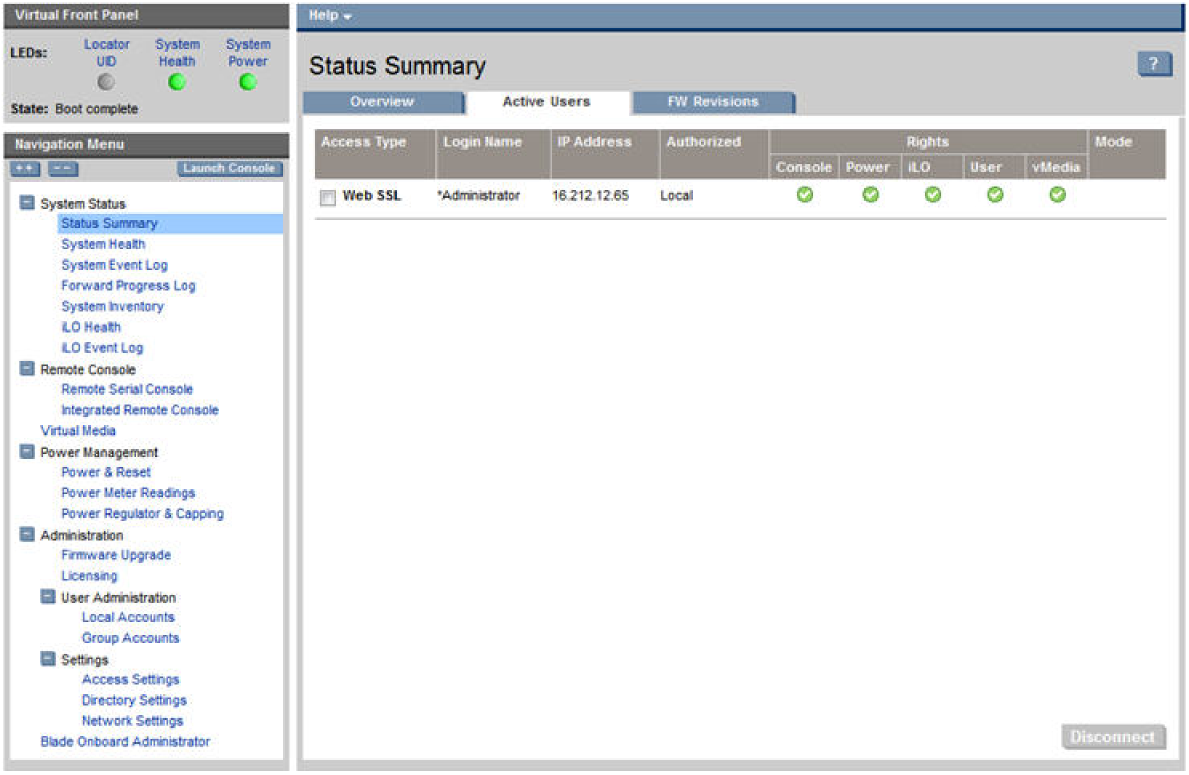
Item	Description
Firmware Revisions	Displays the current firmware revisions for system firmware: • iLO: iLO Management Processor firmware version • System Firmware: System platform firmware version
Logs	Displays the following: • Most recent entry in the System Event Log (SEL) • Most recent entry in the iLO Event Log (IEL)

Relevant iLO MP TUI commands: `DATE, ID, LM, LOC, LS, PC, SL, SYSREV`

Status Summary>Active Users

The Active Users tab displays information about the users currently logged in to the iLO 3.

Figure 8 Active Users



Access Type	Login Name	IP Address	Authorized	Rights					Mode
				Console	Power	iLO	User	vMedia	
□ Web SSL	*Administrator	16.212.12.65	Local	✓	✓	✓	✓	✓	

Table 13 Active Users description

Item	Description
Access Type	There are several access methods: Serial, Telnet, SSH, or web. Virtual Media users are not listed in web GUI sessions. A check in the checkbox indicates which access methods are turned off when you click **Disconnect**. Serial users are not provided with a checkbox so they cannot be disconnected.
Login Name	Displays the user currently logged in.
IP Address	Displays the IP address of the active user.

Table 13 Active Users description *(continued)*

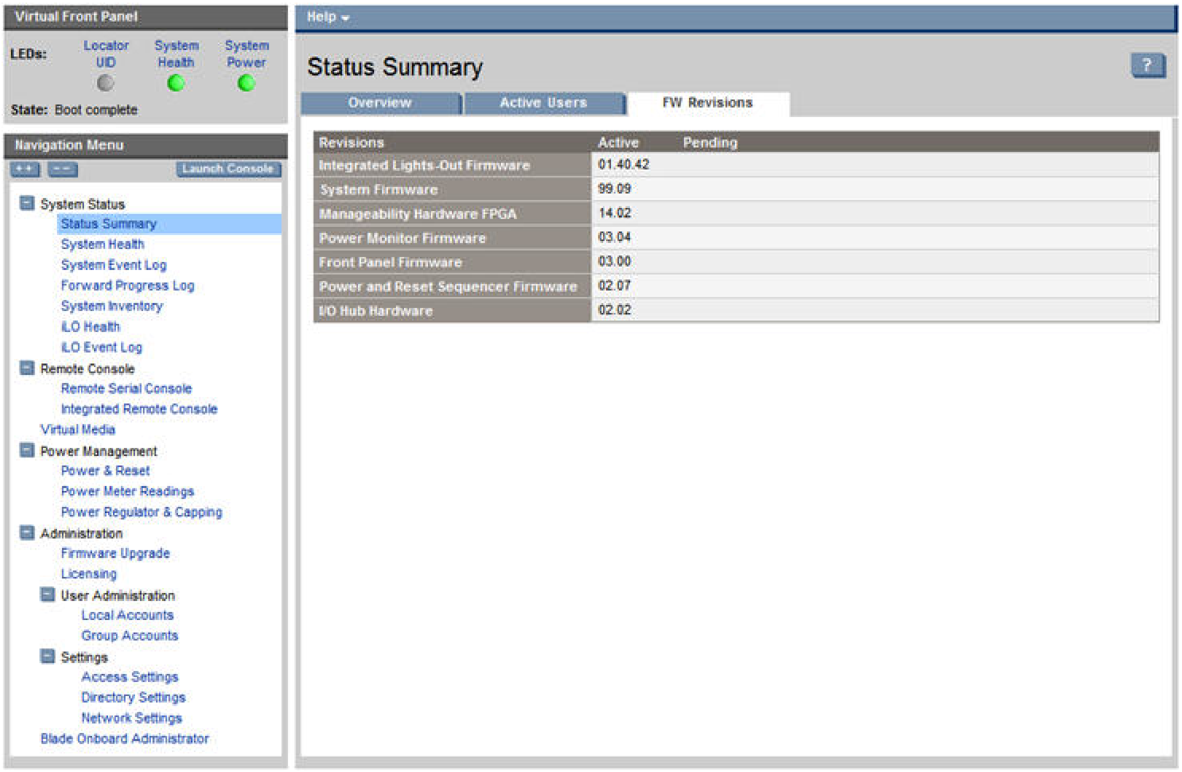
Item	Description
Authorized	Displays the type of authentication: • LDAP directory user authentication (LDAP) • Locally stored iLO 3 user accounts (local) • SecurityOverride
Rights	Displays the rights a user has. The following user access rights are available: • Console: Remote Console Access • Power: Virtual Power & Reset • iLO: Configure iLO Settings • User: Administer User Accounts • vMedia: Virtual Media You can configure a user to have some, none, or all access rights. Every user has default rights unless the user has been disabled. You can enable or disable users on the Administration > User Administration > Local Accounts page.
Mode	Displays the current iLO 3 mode the user is in.
Disconnect	Enables a user with the Configure iLO Settings right to disconnect users of a certain access type.

Relevant iLO MP TUI commands: `DI, WHO`

Status Summary>FW Revisions

The FW Revisions tab displays current revisions of the system firmware and hardware and if any updates are pending.

Figure 9 FW Revisions



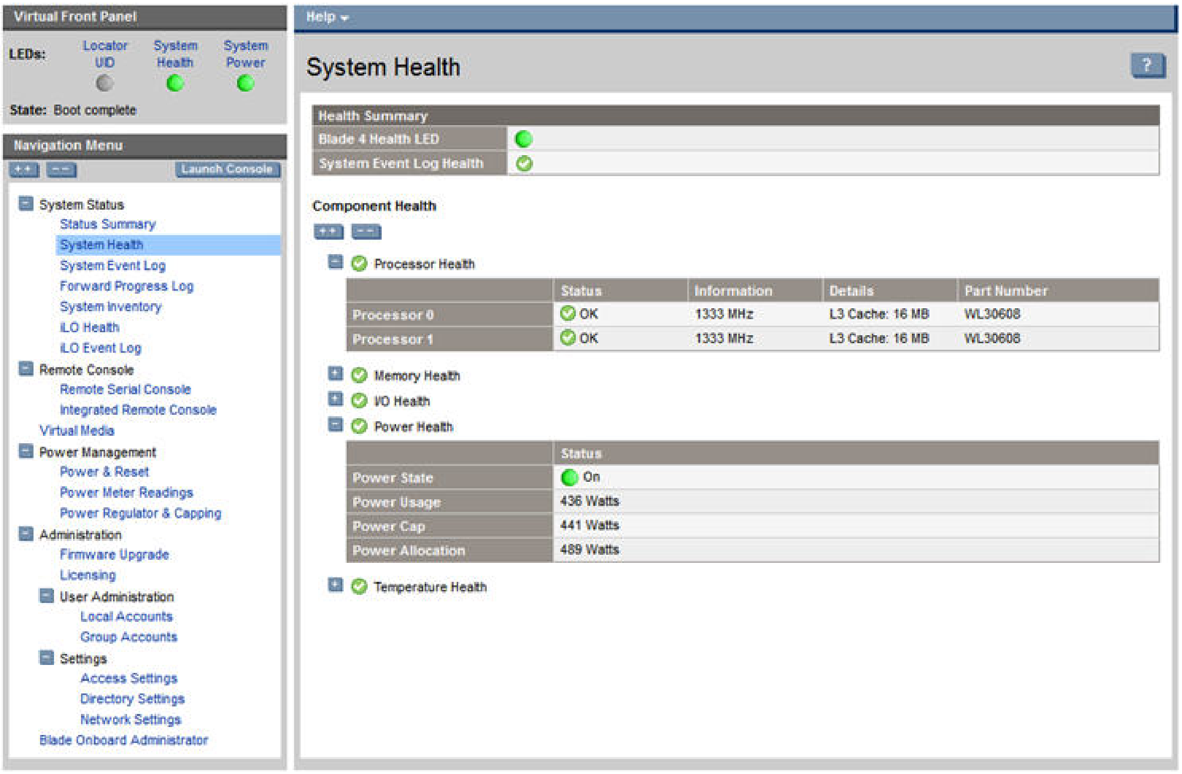
Status Summary

Revisions	Active	Pending
Integrated Lights-Out Firmware	01.40.42	
System Firmware	99.09	
Manageability Hardware FPGA	14.02	
Power Monitor Firmware	03.04	
Front Panel Firmware	03.00	
Power and Reset Sequencer Firmware	02.07	
I/O Hub Hardware	02.02	

System Health

The System Health page displays system health information, as determined by iLO, obtained from iLO sensors, OS events, and system firmware events.

Figure 10 System Health



State: Boot complete

System Health

Health Summary	
Blade 4 Health LED	●
System Event Log Health	✓

Component Health

✓ Processor Health

	Status	Information	Details	Part Number
Processor 0	✓ OK	1333 MHz	L3 Cache: 16 MB	WL30608
Processor 1	✓ OK	1333 MHz	L3 Cache: 16 MB	WL30608

✓ Memory Health

✓ I/O Health

✓ Power Health

	Status
Power State	● On
Power Usage	436 Watts
Power Cap	441 Watts
Power Allocation	489 Watts

✓ Temperature Health

Table 14 System Health description

Item	Description	
Health Summary	Blade Health LED	Only displays for blade servers in the current system. For further details, consult the System Event Log and Component Health.
	System Event Log Health	Displays the SEL health state for both blade and rackmount servers. For further details, see the System Event Log.
Component Health	Displays the overall Component Health state, which is a summary of the Processor, Memory, I/O, Power, and Temperature Health states as they apply to the system. The display differs for server blade versus rackmount servers.	
	Server Blade	Processor, Memory, I/O, Power, Temperature. Clicking a tab displays component health information for that Blade. If only one Blade is in the system, then the Component Health tab does not appear.
	Rackmount	Processor, Memory, Fan, Power, Temperature.
Processor Health	Displays the status of the processors and lists their speed, L3 cache, and part number.	
Memory Health	Displays the status of the memory modules (DIMMs).	
I/O Health	Displays the status of the installed I/O modules, including mezzanine cards. The I/O health only displays for server blades.	
Fan Health	Displays the fan status. The fan health only displays for rackmount servers.	

Table 14 System Health description *(continued)*

Item	Description
Power Health	Lists the power state, power usage in watts, power cap in watts, and power allocations in watts. The display is different for rackmount versus server blades. Blade Power State, Power Usage, Power Cap, Power Allocation Rack Power State, Power Usage, Power Cap, Power Supply 1, Power Supply 2
Temperature Health	Displays the ambient temperature in Celsius and the temperature status. **NOTE:** For BL c-Class servers, you can obtain information on power supplies and fans through the OA.

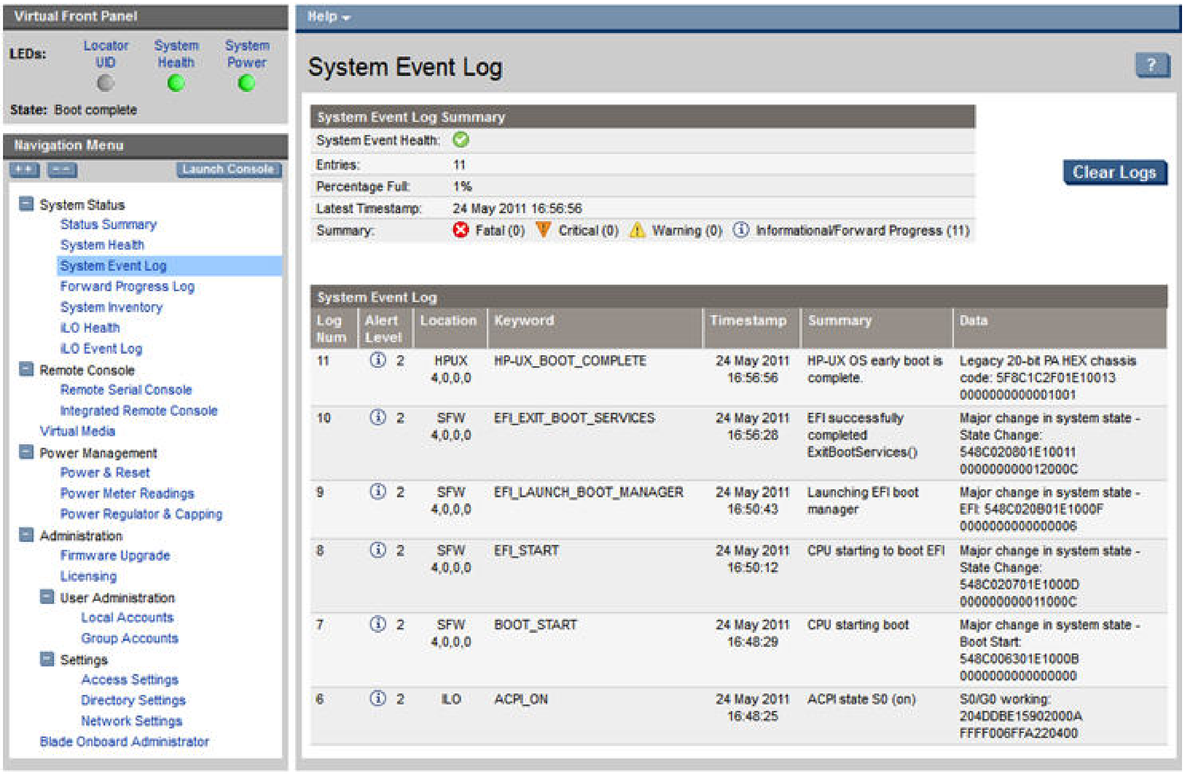
You can expand information for individual items by clicking the **+** button or collapse it by clicking the **-** button to the left of the category. You can expand all the categories or collapse them all at once by clicking the **++** or **--** buttons at the top of the list.

System Event Log

The System Event Log page enables you to view the contents of the System Event Log stored in nonvolatile memory. Only a user with the Configure iLO Settings right can clear the log.

NOTE: Integrity iLO captures and stores the server System Event Log for access through a browser or text interface even when the server is not operational. This capability can be helpful when troubleshooting remote host server problems.

Figure 11 System Event Log



State: Boot complete

System Event Log

System Event Log Summary

System Event Health:	✓
Entries:	11
Percentage Full:	1%
Latest Timestamp:	24 May 2011 16:56:56
Summary:	Fatal (0) Critical (0) Warning (0) Informational/Forward Progress (11)

System Event Log

Log Num	Alert Level	Location	Keyword	Timestamp	Summary	Data
11	ⓘ 2	HPUX 4,0,0,0	HP-UX_BOOT_COMPLETE	24 May 2011 16:56:56	HP-UX OS early boot is complete.	Legacy 20-bit PA HEX chassis code: 5F8C1C2F01E10013 0000000000001001
10	ⓘ 2	SFW 4,0,0,0	EFI_EXIT_BOOT_SERVICES	24 May 2011 16:56:28	EFI successfully completed ExitBootServices()	Major change in system state - State Change: 548C020801E10011 000000000012000C
9	ⓘ 2	SFW 4,0,0,0	EFI_LAUNCH_BOOT_MANAGER	24 May 2011 16:50:43	Launching EFI boot manager	Major change in system state - EFI: 548C020B01E1000F 0000000000000006
8	ⓘ 2	SFW 4,0,0,0	EFI_START	24 May 2011 16:50:12	CPU starting to boot EFI	Major change in system state - State Change: 548C020701E1000D 000000000011000C
7	ⓘ 2	SFW 4,0,0,0	BOOT_START	24 May 2011 16:48:29	CPU starting boot	Major change in system state - Boot Start: 548C006301E1000B 0000000000000000
6	ⓘ 2	iLO	ACPI_ON	24 May 2011 16:48:25	ACPI state S0 (on)	S0/G0 working: 204DDBE15902000A FFFF006FFA220400

Table 15 System Event Log description

Item	Description
System Event Log Summary	Lists log status and error summary.
Clear Logs	Clears all entries in the System Event and Forward Progress logs.

Relevant iLO MP TUI command: `SL`

NOTE: You can view only the most pertinent fields for each event on the web. For a more complete decoding of the events, use the TUI CLI by logging in to iLO 3 through Telnet or SSH.

Events

Events can be a result of a failure or an error (such as fan failure, Machine-Check Abort, and so on). They can indicate a major change in system state (such as, firmware boot start or, system power on or off), or they can be forward progress markers (such as CPU self-test complete).

Events are produced by intelligent hardware modules, the operating system, and system firmware. Events funnel into the BMC from different sources throughout the server. The iLO 3 polls the BMC for new events and stores them in nonvolatile memory. Events communicate system information from the source of the event to other parts of the system, and ultimately to the system administrator.

The log viewer contains an event decoder to help you interpret events.

The following event severity (or alert) levels are defined:

0: Minor forward progress

1: Major forward progress

2: Informational

3: Warning

5: Critical

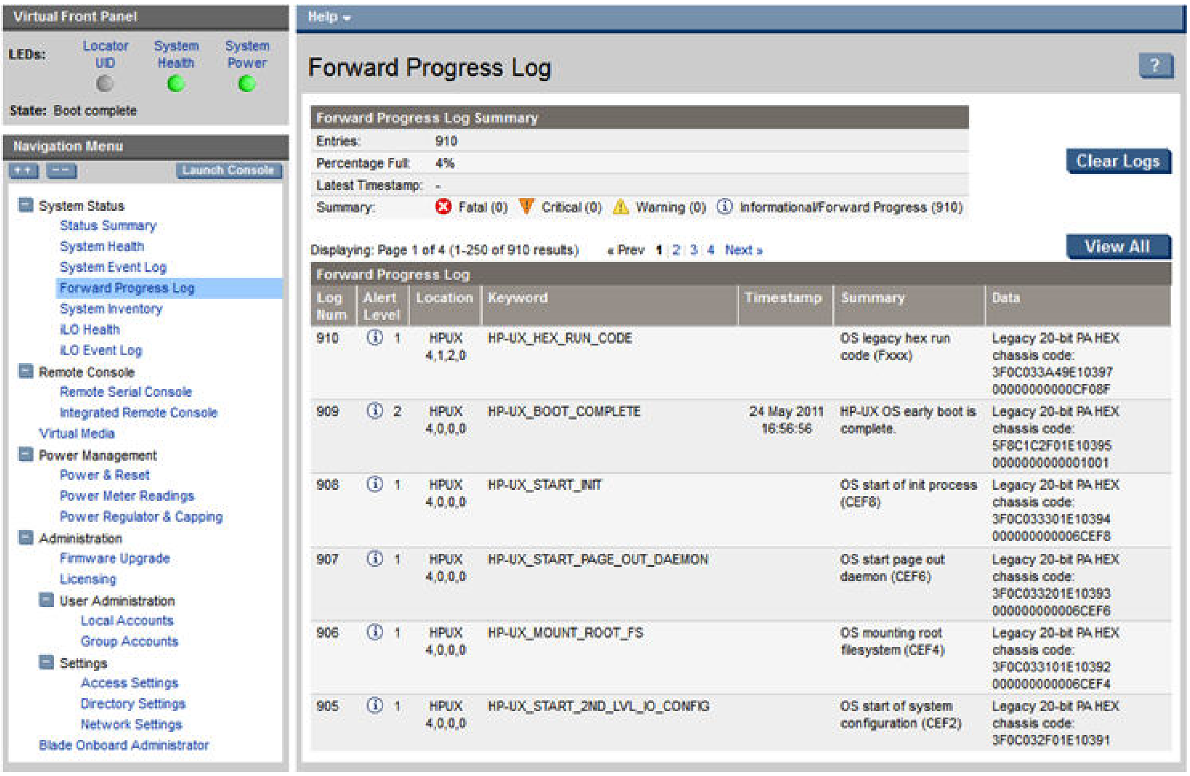
7: Fatal

Forward Progress Log

The log viewer enables you to view the contents of the Forward Progress Log stored in nonvolatile memory. To clear the log, you must have the Configure iLO Settings user right.

The Integrity iLO stores a detailed Forward Progress Log of system operation during boot, crash, and any other abnormal conditions that can be used to extensively troubleshoot the server. This log goes far beyond the capabilities of standard IPMI for fault management.

Figure 12 Forward Progress Log



Forward Progress Log Summary

Entries:	910
Percentage Full:	4%
Latest Timestamp:	-
Summary:	☒ Fatal (0) ▼ Critical (0) ⚠ Warning (0) ⓘ Informational/Forward Progress (910)

Displaying: Page 1 of 4 (1-250 of 910 results) « Prev 1 | 2 | 3 | 4 Next »

Forward Progress Log

Log Num	Alert Level	Location	Keyword	Timestamp	Summary	Data
910	ⓘ 1	HPUX 4,1,2,0	HP-UX_HEX_RUN_CODE		OS legacy hex run code (Fxxx)	Legacy 20-bit PA HEX chassis code: 3F0C033A49E10397 00000000000CF08F
909	ⓘ 2	HPUX 4,0,0,0	HP-UX_BOOT_COMPLETE	24 May 2011 16:56:56	HP-UX OS early boot is complete.	Legacy 20-bit PA HEX chassis code: 5F8C1C2F01E10395 0000000000001001
908	ⓘ 1	HPUX 4,0,0,0	HP-UX_START_INIT		OS start of init process (CEF8)	Legacy 20-bit PA HEX chassis code: 3F0C033301E10394 000000000006CEF8
907	ⓘ 1	HPUX 4,0,0,0	HP-UX_START_PAGE_OUT_DAEMON		OS start page out daemon (CEF6)	Legacy 20-bit PA HEX chassis code: 3F0C033201E10393 000000000006CEF6
906	ⓘ 1	HPUX 4,0,0,0	HP-UX_MOUNT_ROOT_FS		OS mounting root filesystem (CEF4)	Legacy 20-bit PA HEX chassis code: 3F0C033101E10392 000000000006CEF4
905	ⓘ 1	HPUX 4,0,0,0	HP-UX_START_2ND_LVL_IO_CONFIG		OS start of system configuration (CEF2)	Legacy 20-bit PA HEX chassis code: 3F0C032F01E10391

Table 16 Forward Progress Log descriptions

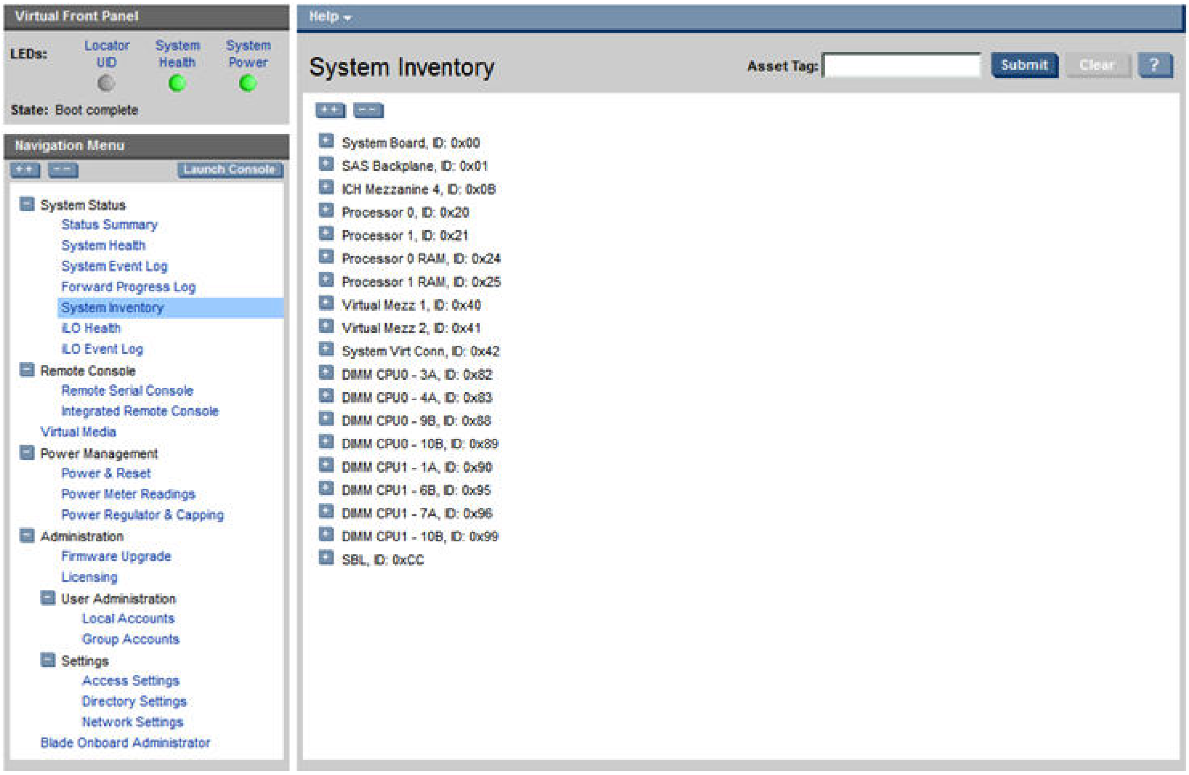
Item	Description
Forward Progress Log Summary	Lists log status and event summary.
Forward Progress Log	Lists all events.
Clear Logs	Clears all entries in the System Event and Forward Progress logs.

Relevant iLO MP TUI command: `SL`

System Inventory

The System Inventory page enables you to view data on all FRUs in the system. It also enables any user to view the asset tag for the system. To change the asset tag for the system, you must have the Configure iLO Settings user right.

Figure 13 System Inventory



System Inventory

- System Board, ID: 0x00
- SAS Backplane, ID: 0x01
- ICH Mezzanine 4, ID: 0x0B
- Processor 0, ID: 0x20
- Processor 1, ID: 0x21
- Processor 0 RAM, ID: 0x24
- Processor 1 RAM, ID: 0x25
- Virtual Mezz 1, ID: 0x40
- Virtual Mezz 2, ID: 0x41
- System Virt Conn, ID: 0x42
- DIMM CPU0 - 3A, ID: 0x82
- DIMM CPU0 - 4A, ID: 0x83
- DIMM CPU0 - 9B, ID: 0x88
- DIMM CPU0 - 10B, ID: 0x89
- DIMM CPU1 - 1A, ID: 0x90
- DIMM CPU1 - 6B, ID: 0x95
- DIMM CPU1 - 7A, ID: 0x96
- DIMM CPU1 - 10B, ID: 0x99
- SBL, ID: 0xCC

You can expand information for individual FRUs by clicking **+**, or collapse by clicking **-** to the left of the FRU name. You can expand or collapse all the FRUs at once by clicking **++** or **--** at the top of the list. If there are multiple bays in the partition, FRUs for each bay appear separately in tabs. You can access each bay by clicking its corresponding tab.

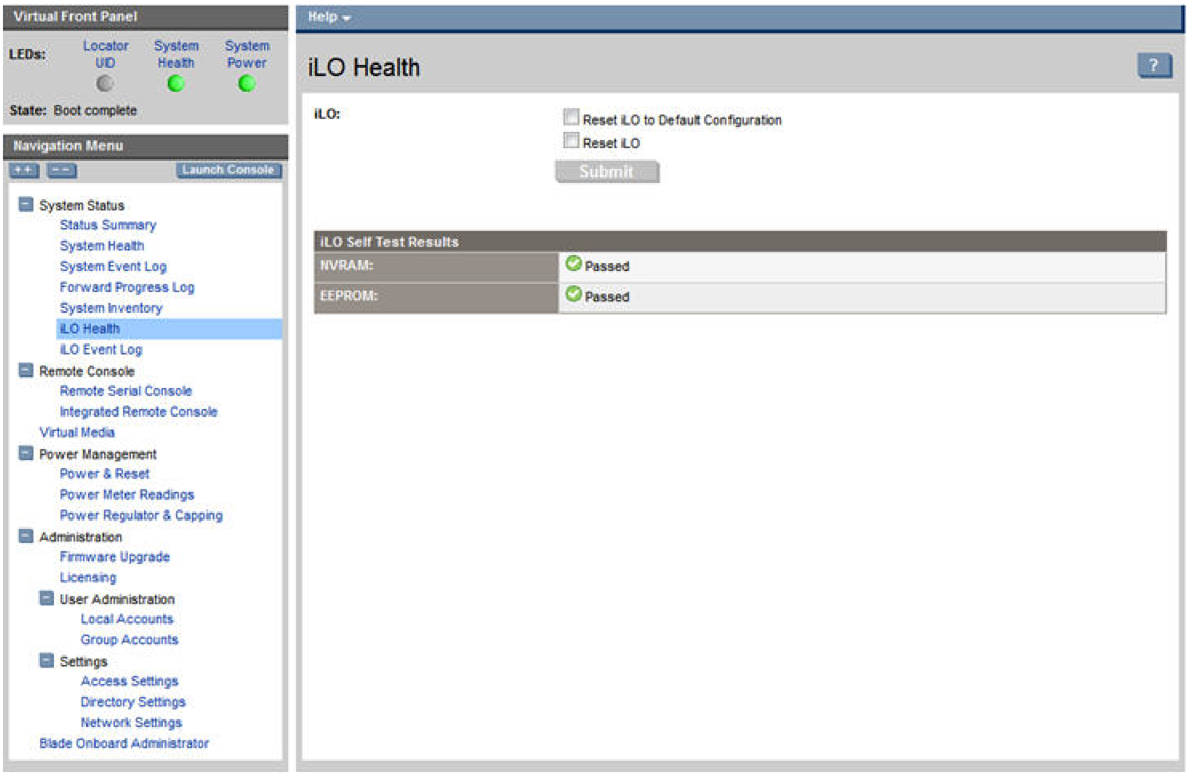
Table 17 System Inventory descriptions

Item	Description
Asset Tag	Displays the asset tag for the system. Asset tags can consist of any alpha-numeric string 1 to 31 characters long.
Submit	To change the current value, enter a new value in the text field and click **Submit**. If you do not have sufficient rights, the **Submit** button is disabled and the text field is read only.
Clear	To reset a modified value to the current one before submitting, click **Clear**.

iLO Health

The iLO Health page enables you to reset the iLO or reset iLO to the default configuration and view the iLO Self Test Results. To issue either of the two reset iLO options, you must have the Configure iLO settings user right. You can safely perform an iLO reset without affecting server operation.

Figure 14 iLO Health



iLO Health

iLO:

□ Reset iLO to Default Configuration

□ Reset iLO

iLO Self Test Results	
NVRAM:	✓ Passed
EEPROM:	✓ Passed

Table 18 iLO Health descriptions

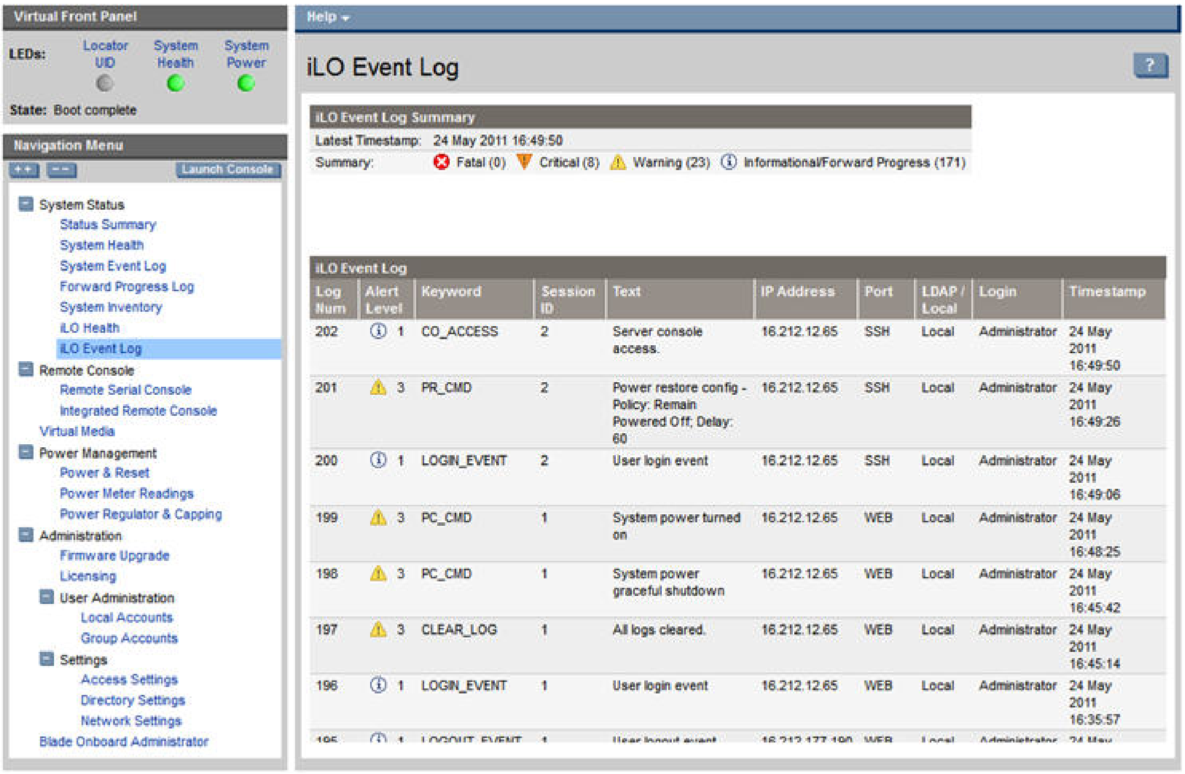
Item	Description
Reset the iLO to Default Configuration	Resets sets all iLO parameters to the default values.
Reset iLO	All iLO parameters retain their current values. Note: iLO reset is disabled during a firmware upgrade.
Submit	Submits your request to the system
iLO Self Test Results	
NVRAM	The status of non-volatile RAM.
EEPROM	The status of the EEPROM.

Relevant iLO MP TUI commands: `DC, XD -R`

iLO Event Log

The log viewer enables you to view the contents of the iLO Event Log stored in nonvolatile memory.

Figure 15 iLO Event Log



iLO Event Log

iLO Event Log Summary

Latest Timestamp: 24 May 2011 16:49:50

Summary: Fatal (0) Critical (8) Warning (23) Informational/Forward Progress (171)

iLO Event Log

Log Num	Alert Level	Keyword	Session ID	Text	IP Address	Port	LDAP / Local	Login	Timestamp
202	1	CO_ACCESS	2	Server console access.	16.212.12.65	SSH	Local	Administrator	24 May 2011 16:49:50
201	3	PR_CMD	2	Power restore config - Policy: Remain Powered Off; Delay: 60	16.212.12.65	SSH	Local	Administrator	24 May 2011 16:49:26
200	1	LOGIN_EVENT	2	User login event	16.212.12.65	SSH	Local	Administrator	24 May 2011 16:49:06
199	3	PC_CMD	1	System power turned on	16.212.12.65	WEB	Local	Administrator	24 May 2011 16:48:25
198	3	PC_CMD	1	System power graceful shutdown	16.212.12.65	WEB	Local	Administrator	24 May 2011 16:45:42
197	3	CLEAR_LOG	1	All logs cleared.	16.212.12.65	WEB	Local	Administrator	24 May 2011 16:45:14
196	1	LOGIN_EVENT	1	User login event	16.212.12.65	WEB	Local	Administrator	24 May 2011 16:35:57
195	1	LOGOUT_EVENT	1	User logout event	16.212.177.190	WEB	Local	Administrator	24 May

Table 19 iLO 3 Event Log descriptions

Item	Description
iLO 3 Event Log Summary	Displays alert level information.
iLO 3 Event Log	Displays all the events corresponding to iLO 3 MP login/logout actions and running of iLO 3 MP commands.

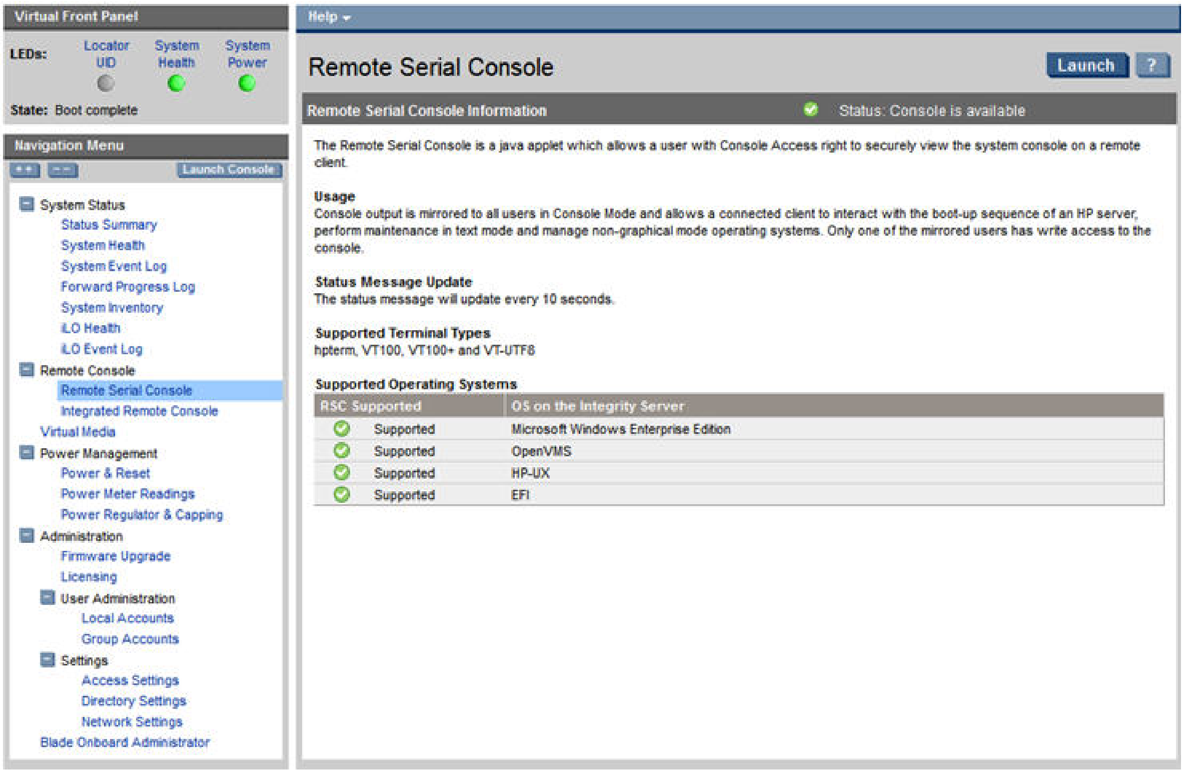
Relevant iLO MP TUI command: `SL`

Remote Serial Console

The Remote Serial Console enables you to securely view and manage a remote server. You can view and interact with the boot-up sequence of an HP server, perform maintenance activities in text mode, and manage non-graphical mode operating systems.

To use this feature, you must have the Remote Console Access user right. To assign privileges to this right, use the Administration>User Administration page.

Figure 16 Remote Serial Console



State: Boot complete

Remote Serial Console

Remote Serial Console Information ✓ Status: Console is available

The Remote Serial Console is a java applet which allows a user with Console Access right to securely view the system console on a remote client.

Usage
Console output is mirrored to all users in Console Mode and allows a connected client to interact with the boot-up sequence of an HP server, perform maintenance in text mode and manage non-graphical mode operating systems. Only one of the mirrored users has write access to the console.

Status Message Update
The status message will update every 10 seconds.

Supported Terminal Types
hpterm, VT100, VT100+ and VT-UTF8

Supported Operating Systems

RSC Supported	OS on the Integrity Server
✓ Supported	Microsoft Windows Enterprise Edition
✓ Supported	OpenVMS
✓ Supported	HP-UX
✓ Supported	EFI

Remote Serial Console requires prior installation of Java Plug-in to be installed on the client system.

NOTE: Pop-up blocking applications prevent Remote Serial Console from running. Before starting the Remote Serial Console, disable any pop-up blocking applications.

The iLO 3 mirrors the system console to the iLO 3 MP local, remote, and LAN ports. One console output stream is reflected to all the connected console users. If several different terminal types are used simultaneously by the users, some users may see unexpected results. Only one mirrored user at a time has write access to the console. Write access is retained until another user requests console write access. To obtain console write access, press **Ctrl-Ecf**.

To ensure proper operation of the remote serial console, verify the following conditions:

- Your emulator can run the supported terminal type.
- The iLO 3 terminal setting in the applet is a supported setting.
- The operating system environment settings and your client terminal type are set properly.
- All mirrored consoles are of the same terminal type for proper operation.

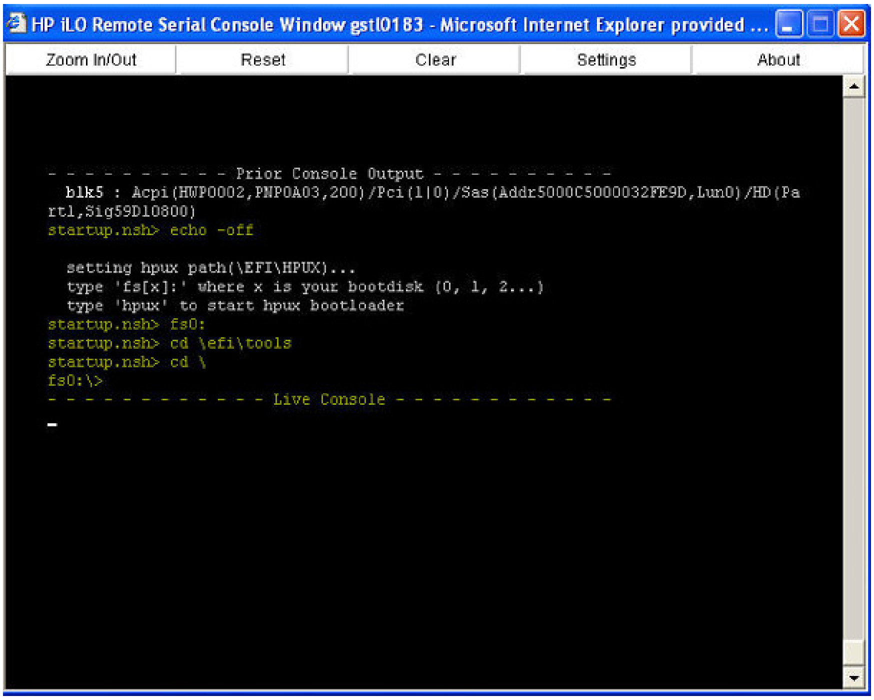
  The setting in the Java applet (for example, HPterm, VT100, and so on) must match the console type of the OS you are connecting to. A similar issue occurs when using `CO` (or `CL`) from the TUI menu. You must make sure your terminal emulator matches what is in the console log so that terminal-specific output does not garble the display.

IMPORTANT: Do not mix hpterm and vt100 terminal types at the same time. If two collaborating users view console output with different emulation modes set, clients see garbled results when the output from the system is terminal specific.

To launch the applet and connect to the system serial console (Figure 17), click **Launch**. After connecting to the console, you might have to log in to the operating system to perform administration functions.

NOTE: If **Launch** is disabled, you do not have the Remote Console Access user right. To add the user right, see User Administration.

Figure 17 Remote Serial Console window


HP iLO Remote Serial Console Window gstl0183 - Microsoft Internet Explorer provided ...
Zoom In/Out
Reset
Clear
Settings
About

```
- - - - - - - - - - - Prior Console Output - - - - - - - - - - -
  blk5 : Acpi(HWP0002,PNP0A03,200)/Pci(1|0)/Sas(Addr5000C5000032FE9D,Lun0)/HD(Pa
rtl,Sig59D10800)
startup.nsh> echo -off

  setting hpux path(\EFI\HPUX)...
  type 'fs[x]:' where x is your bootdisk (0, 1, 2...)
  type 'hpux' to start hpux bootloader
startup.nsh> fs0:
startup.nsh> cd \efi\tools
startup.nsh> cd \
fs0:\>
- - - - - - - - - - - - Live Console - - - - - - - - - - - -
_
```

Using this feature, you can do the following:

- View and interact with the boot sequence of your server.
- Perform maintenance activities in text mode.
- Manage nongraphical mode operating systems.

The console window remains open until you sign out of the iLO 3 interface using the provided link in the banner, leave the iLO 3 site, or refresh the entire page.

The remote serial console provides the console, and the GUI provides the iLO 3 MP Main Menu functionality.

Output from the console is stored in nonvolatile memory in the console log, regardless of whether or not any users are connected to a console.

TIP: In Internet Explorer, the Tab key might cause the browser to change focus away from the applet. To regain focus, click the applet window. If you want to use the Tab key, use the Zoom Out feature, available by clicking the **Zoom In/Out** button at the top of the applet window.

HP-UX example: Applications which care about the terminal type (install, SAM, vi, and so on) running on HP-UX use two methods to determine the terminal type: The $TERM shell environment variable. The application directly queries the terminal (in this case, the write enabled terminal establishes the terminal type).

Remote Serial Console

Integrity iLO 3 contains a remote serial console that enables it to actually be the console hardware device for the operating system. This console is a serial interface between the host system and iLO 3. Integrity iLO 3 converts the serial data stream to be available remotely through the remote serial console (a VT320 Java applet). The remote serial console must be correctly enabled and configured in the host.

The remote serial console function is a bidirectional data flow of the data stream appearing on the server serial port. Using the remote console paradigm, a remote user can operate as if a physical serial connection is present on the server serial port.

With the remote serial console, an administrator can access a console application such as Windows EMS remotely over the network. Integrity iLO 3 contains the functional equivalent of the standard serial port (16550 UART) register set, and the iLO 3 firmware provides a Java applet that connects to the server serial port. If the serial redirection feature is enabled on the host server, iLO 3 intercepts the data coming from the serial port, encrypts it, and sends it to the web browser applet.

For Linux users, the iLO remote serial console provides an important function for remote access to the Linux server. By configuring a Linux login process attached to the server serial port, you can use the iLO remote serial console to remotely log in to the Linux operating system over the network.

Integrated Remote Console

The Integrated Remote Console (IRC) is a signed Direct X application which enables a user to securely manage HP Integrity Servers with Integrated Lights-Out. The IRC integrates keyboard, video, and mouse into a virtual interface providing an experience similar to that of the remote server graphics console. With the IRC, you can view the server graphics display to directly interact with the server and perform maintenance activities as well as open and run applications on the server using the keyboard and mouse control. The console makes use of the hardware acceleration and advanced graphics features in .NET Framework. The console is launched using Microsoft ClickOnce technology.

The IRC window remains open until one of the following events occurs:

- You sign out of the iLO interface using the provided link in the banner
- The IRC does not detect keyboard or mouse activity for 15 minutes
- Another user disconnects IRC

IRC requirements

- The host operating system needs to supports IRC.
- The client operating system needs to be Microsoft Windows.
- Microsoft .NET Framework 3.5 needs to be installed. (available through Windows Update)
- Firefox needs an Add-on to allow it to launch ClickOnce applications. Visit the Firefox Add-on site to find the latest version of the Microsoft .NET Framework Assistant.
- iLO Advanced Pack license needs to be installed.
- The user needs iLO Remote Console Access and Virtual Power & Reset rights. These rights can be enabled from the iLO User Administration pages.
- The URL used to log into iLO needs to use the iLO certificate's Common Name (for example, `https://<iLO Common Name>`)
- The iLO certificate needs to be imported. (see detailed instructions below)

Instructions for importing the iLO certificate

If the IRC application download did not succeed, it is likely that the iLO certificate needs to be imported. This allows for a secure console session.

1. **First**, login to the iLO web interface using Internet Explorer.
   a. **If IE7 or IE8**

      Click the **Certificate Error** located after the URL in the pink box.

      If IE 6.0

      Click the **yellow padlock** in the bottom right hand corner.
   b. Click `View certificates`.
   c. Click `Install Certificate…`.
   d. Click `Next`.
   e. Select `Place all certificates in the following store`.
   f. Click `Browse`.
   g. Select `Trusted Root Certification Authorities`.
   h. Click `OK`.
   i. Click `Next`.
   j. Click `Finish`.
   k. Click `Yes`.
2. **Second**, use the Common Name in the iLO certificate to log in to iLO using either Internet Explorer or Firefox.
   - The “Common Name” is displayed on the login screen and also on the Access Settings page. The Common Name can be set to the iLO IP address, hostname, or fully-qualified hostname. If the desired access method to iLO is not the current value in the iLO certificate's Common Name, go to the Access Settings page and generate a new certificate with the desired Common Name. You will need to reset the iLO and import the new certificate following the steps outlined above.

Configuration and usage suggestions

- For better responsiveness, select plain wallpaper on the host server system.
- Do not use an animated mouse pointer or enable “mouse trails” on the host server.
- For best remote console performance, set the client screen resolution higher than the host server.
- For security reasons, if you log into a host server through the IRC, you must log out before closing the IRC.

IRC features

- IRC maximum supported resolution is 1024 X 768 pixels.
- IRC data is encrypted with the RC4 encryption algorithm.
- IRC uses encryption and compression providing a secure, reduced bandwidth connection.

IRC limitations

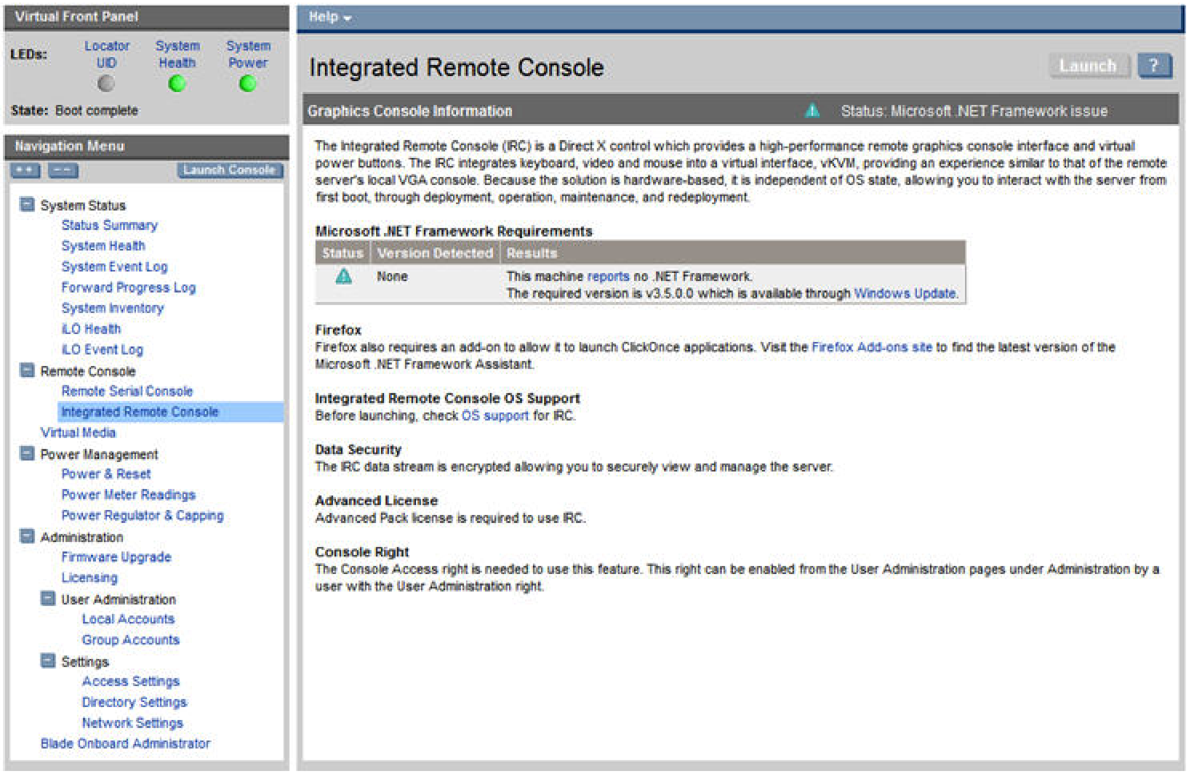
- IRC supports only a single user connection.
- IRC does not yet provide identical virtualization of a Windows keyboard. Known issues are:
  - No support for system level commands such as (ctrl) + (esc), (print screen).
  - No support for simultaneous mouse click and keystroke combinations.
- IRC application closes after 15 minutes of no detected keyboard or mouse activity.
- IRC attempts to pick the best client display settings for that resolution, however some monitors may have trouble with the highest screen refresh rates supported by the clients video adapter.

Use **`Control Panel/ Display/ Settings/ Advanced/ Monitor`** and select a lower screen refresh rate.

Using the IRC

1. Click the Launch button on the Integrated Remote Console page.

Figure 18 Integrated Remote Console



Integrated Remote Console

Graphics Console Information — Status: Microsoft .NET Framework issue

The Integrated Remote Console (IRC) is a Direct X control which provides a high-performance remote graphics console interface and virtual power buttons. The IRC integrates keyboard, video and mouse into a virtual interface, vKVM, providing an experience similar to that of the remote server's local VGA console. Because the solution is hardware-based, it is independent of OS state, allowing you to interact with the server from first boot, through deployment, operation, maintenance, and redeployment.

Microsoft .NET Framework Requirements

Status	Version Detected	Results
⚠	None	This machine reports no .NET Framework. The required version is v3.5.0.0 which is available through Windows Update.

Firefox
Firefox also requires an add-on to allow it to launch ClickOnce applications. Visit the Firefox Add-ons site to find the latest version of the Microsoft .NET Framework Assistant.

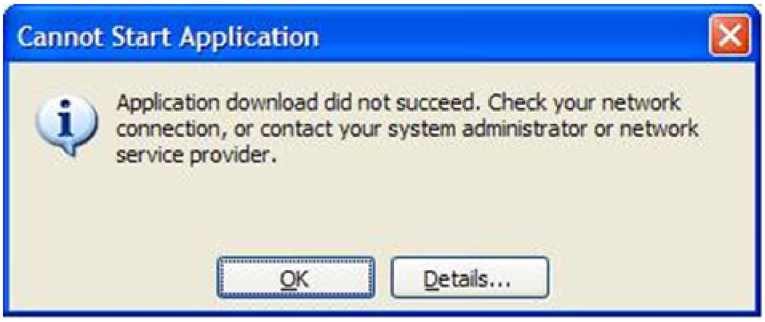
Integrated Remote Console OS Support
Before launching, check OS support for IRC.

Data Security
The IRC data stream is encrypted allowing you to securely view and manage the server.

Advanced License
Advanced Pack license is required to use IRC.

Console Right
The Console Access right is needed to use this feature. This right can be enabled from the User Administration pages under Administration by a user with the User Administration right.

The following message appears when the IRC fails to launch:



Application download did not succeed. Check your network connection, or contact your system administrator or network service provider.

2. To view the Error Summary, click **`Details...`**.

   If the following error message appears in the IRC log Error Summary section, then the certificate has not been imported:

   ```
   The underlying connection was closed: Could not establish trust
   relationship for the SSL/TLS secure channel. + The remote certificate
   is invalid according to the validation procedure.
   ```

3. At the present time, connecting to the IRC requires several additional steps. To complete connection, see "Instructions for importing the iLO certificate" (page 81).

Once you successfully access the IRC, you will have full functionality to use the IRC.

Virtual Media

Virtual Media (vMedia) enables connections of a CD/DVD-ROM physical device or image file from the local client system to the remote server. The virtual device or image file can be used to boot the server with an operating system that supports USB devices. Virtual Media depends on a reliable network with good bandwidth. This is especially important when you perform tasks such as large file transfers or operating system installations.

The vMedia device can be a physical CD/DVD-ROM drive on the management workstation, or it can be an image file stored on a local disk drive or network drive.

Booting from the iLO 3 CD/DVD-ROM enables administrators to upgrade the host system ROM, upgrade device drivers, deploy an operating system from the network drives, and perform disaster recovery of failed operating systems, among other tasks.

The iLO 3 device uses a client-server model to perform the vMedia functions. The iLO 3 device streams the vMedia data across a live network connection between the remote management console and the host server. The vMedia Java applet provides data to the iLO 3 as it requests it.

NOTE: The iLO 3 vMedia is automatically disconnected if the iLO 3 MP is reset. HP does not recommend using iLO 3 vMedia with firmware update tools such as HPOFM, which reset the MP midway through the update process.

Using iLO 3 virtual media devices

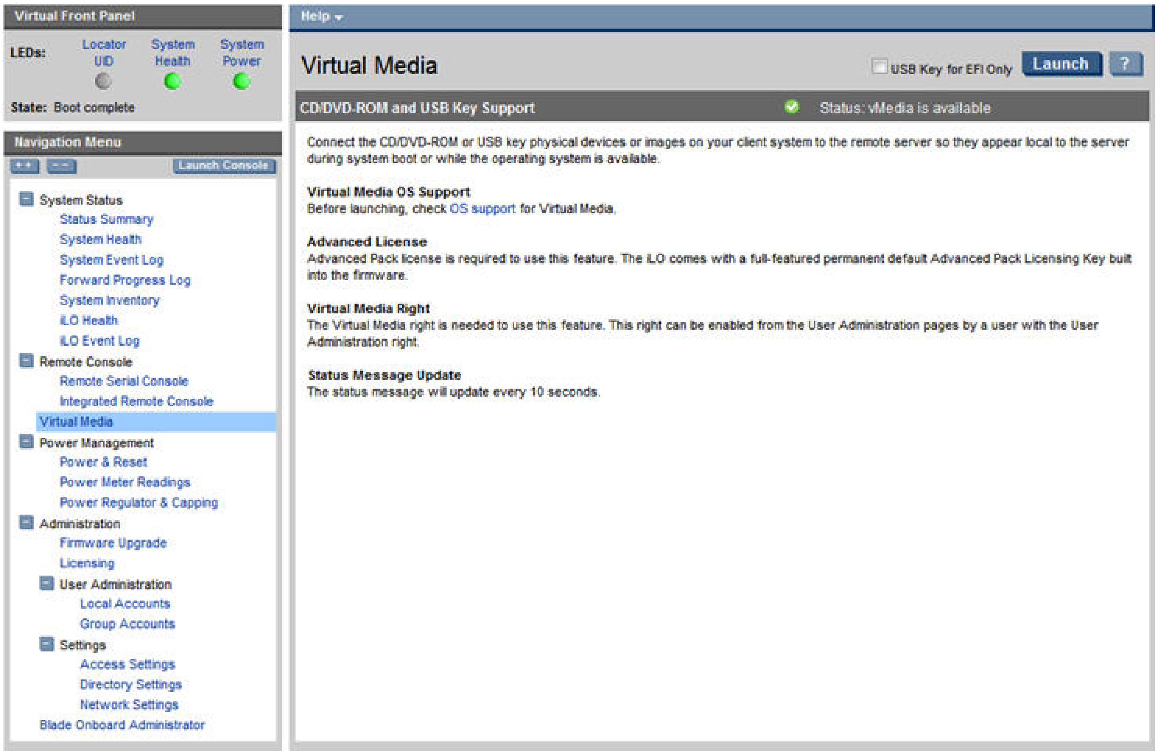
Connect client-based vMedia to a host HP Integrity server blade through a graphical interface using a signed Java applet. Refusing to accept the applet certificate prevents browser-based vMedia from functioning (a red **X** appears). It also prevents the remote console applet from functioning because it is also signed using the same certificate.

NOTE: You can use the vMedia applet only on x86 clients.

To access the iLO 3 vMedia devices using the graphical interface:

1. Select **Virtual Media**. The Virtual Media page appears (Figure 19)

Figure 19 Virtual Media



State: Boot complete

✓ Status: vMedia is available

Connect the CD/DVD-ROM or USB key physical devices or images on your client system to the remote server so they appear local to the server during system boot or while the operating system is available.

Virtual Media OS Support
Before launching, check OS support for Virtual Media.

Advanced License
Advanced Pack license is required to use this feature. The iLO comes with a full-featured permanent default Advanced Pack Licensing Key built into the firmware.

Virtual Media Right
The Virtual Media right is needed to use this feature. This right can be enabled from the User Administration pages by a user with the User Administration right.

Status Message Update
The status message will update every 10 seconds.

2. To load the vMedia applet, click **Launch**. The vMedia applet loads in support of the vMedia device.
3. At this point, you can connect to a virtual CD/DVD-ROM or USB key device or create an iLO 3 disk image file.
   a. Check the **USB Key for EFI Only** box.
   b. Click **Launch**.
   c. Select **Local Media Drive** in the correct virtual media section.
   d. Select the drive letter of the desired USB key drive on your client PC from the menu. To ensure the source diskette or image file is not modified during use, select the **Force read-only access** option.
   e. Click **Connect**. The connected drive icon and LED change state to reflect the current status of the virtual Drive.

NOTE: When you disconnect the iLO 3 vMedia, you might receive a warning message from the host operating system regarding unsafe removal of a device. To avoid this warning, use the operating system stop-device function before disconnecting it from the vMedia.

Virtual CD/DVD-ROM

The iLO 3 virtual CD/DVD-ROM is available during server boot for operating systems specified on the HP website at http://www.hp.com/go/integrityilo.

Booting from the iLO 3 virtual CD/DVD-ROM enables you to deploy an operating system from network drives with DVDs or CDs that contain data in the El Torito Bootable CD format, as well as perform other tasks.

If the host server operating system supports USB mass storage devices, the iLO 3 virtual CD/DVD-ROM is also available after the host server operating system loads. Use the iLO 3 virtual CD/DVD-ROM when the host server operating system is running to upgrade device drivers, install software, and perform other tasks. Having the virtual CD/DVD-ROM available when the server is running can be especially useful if you must diagnose and repair a problem with the NIC driver.

The virtual CD/DVD-ROM can be the physical CD/DVD-ROM drive on the client system (which you are running on the web browser), or an image file stored on the client or network drive. For maximum performance, HP recommends using local image files stored either on the hard drive of your client system or on a network drive accessible through a high-speed network link.

The iLO 3 vMedia CD/DVD-ROM appears to your operating system just like any other CD/DVD-ROM. When using the iLO 3 for the first time, the host operating system might prompt you to complete a **New Hardware Found** wizard.

NOTE: This feature requires that the Java Plug-in 1.4.2 or 1.5 is installed.

This feature requires the Virtual Media right. If a user does not have the vMedia right, it can be granted from the User Administration page under the Administration tab by a user with Admin privileges.

To use a physical CD/DVD-ROM drive in your client system:

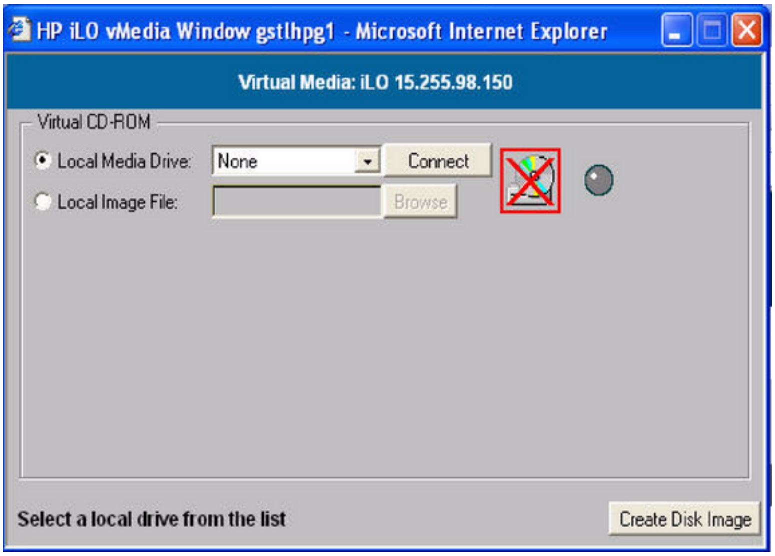
1. Select **Virtual Media**. The Virtual Media content page appears.
2. To load the applet and connect to USB CD/DVD-ROM devices and disk image files available on the client as virtual devices on the server, click **Launch**. The vMedia applet appears (Figure 20).

   NOTE: Only one user and one device can be connected at a time.

IMPORTANT: Only CD and DVD-ROM image files are supported.

If you use a USB key image file, you must select the Floppy/USB Key option. The USB key image file is not interchangeable with the CD or DVD-ROM and vice versa.

Figure 20 Virtual Media dialog box (before connection)



HP iLO vMedia Window gstlhpg1 - Microsoft Internet Explorer

Virtual Media: iLO 15.255.98.150

Virtual CD-ROM

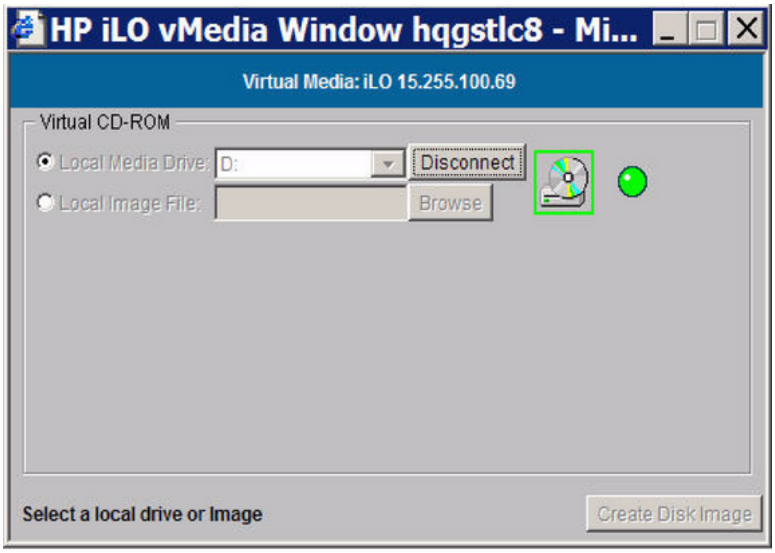
● Local Media Drive: None [Connect]

○ Local Image File: [Browse]

Select a local drive from the list [Create Disk Image]

3. Select **Local Media Drive**.
4. Select the drive letter of the desired physical CD/DVD-ROM drive on your client system from the list.
5. Click **Connect**. The connected drive icon and LED changes states to reflect the current status of the virtual CD/DVD-ROM.

Figure 21 Virtual Media dialog box (after connection)



HP iLO vMedia Window hqgstlc8 - Mi...

Virtual Media: iLO 15.255.100.69

Virtual CD-ROM

● Local Media Drive: D: [Disconnect]

○ Local Image File: [Browse]

Select a local drive or Image [Create Disk Image]

After you are connected, virtual devices are available to the host server until you close the vMedia applet or sign out from a web session.

6. When you are finished using the virtual CD/DVD-ROM, disconnect the device from the host server or close the applet.

NOTE: The vMedia applet must remain open when using a vMedia device.

Virtual Media CD/DVD-ROM operating system

You can view the list of supported browser and operating systems in the **Quickspec** document on the HP website at http://www.hp.com/go/integrityilo.

The vMedia CD/DVD-ROM supports the following operating systems:

- UEFI console currently supports only El Torito bootable CD format media.
- Windows Server 2003 or 2008:

  The virtual CD/DVD-ROM displays automatically after the Windows operating system has recognized the mounting of the USB device. Use it as a locally attached CD/DVD-ROM device.
- Linux (Red Hat and SUSE)

  On servers with a locally attached IDE CD/DVD-ROM, the virtual CD/DVD-ROM device is accessible at `/dev/cdrom1`. However, on servers without a locally attached CD/DVD-ROM (such as the HP Integrity server blades) the virtual CD/DVD-ROM is the first CD/DVD-ROM accessible at`/dev/cdrom`. The virtual CD/DVD-ROM can be mounted as a normal CD/DVD-ROM device using: `mount /mnt/cdrom1`.
- HP-UX 11i

  To recognize the hardware path and special files, run the `ioscan -kfnC disk` command.

  To mount the virtual CD/DVD-ROM/image file on a directory, run the `# mount <special files path> /<dir-name>` command.
- OpenVMS 8.3-1H1 and 8.4

NOTE: Post operating system boot data format is dependent on the operating system.

Creating the iLO 3 disk image files

The iLO 3 vMedia feature enables you to create CD and DVD image files within the same applet. The image files created are ISO-9660 file system images and El Torito bootable CD images. The performance of the iLO 3 vMedia is faster when image files are used. The utility to create the iLO 3 CD/DVD-ROM disk image files is integrated into the vMedia applet.

Store image files on your client computer or on a network drive that you can access from the client using a fast network segment. A disk image file produces better performance than using a physical CD in your client computer.

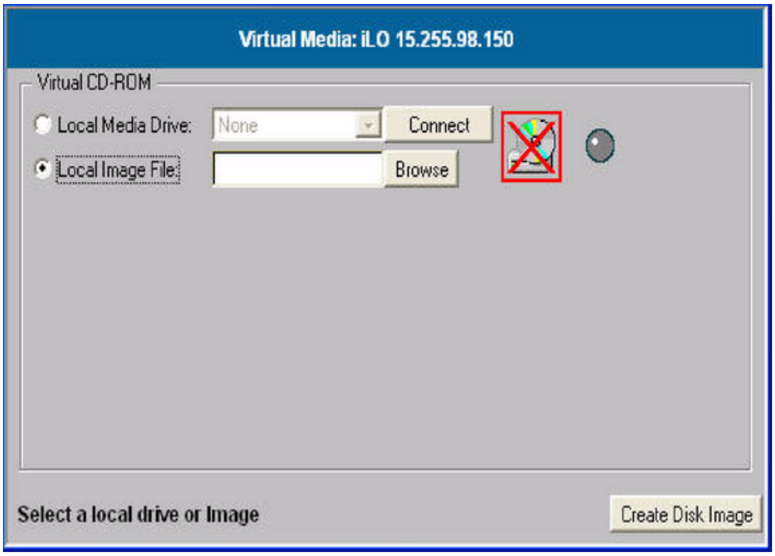
To create image files from physical diskettes, CDs, or DVDs, use the Disk>Image option. The Disk>Image button changes to Image>Disk when clicked. The Image>Disk option is not valid for a virtual CD/DVD-ROM image.

NOTE: The iLO 3 Create Media Image utility does not currently support USB devices in Linux or NetWare.

To create an iLO 3 disk image file:

1. In the Virtual CD-ROM section of the vMedia applet, select **Local Image File**.
2. Select **Local Media Drive**.

Figure 22 Local image file dialog box



Virtual Media: iLO 15.255.98.150

Virtual CD-ROM

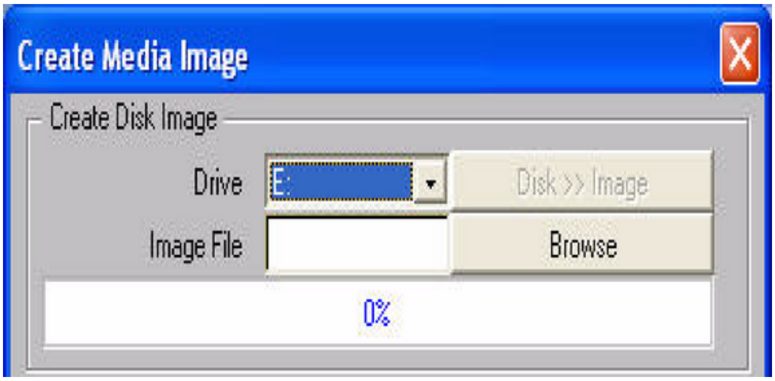
○ Local Media Drive: None

● Local Image File:

Select a local drive or Image

3. To open the Create Media Image dialog box and locate the image file, enter the path or file name of the image in the text box or click **Browse**.

Figure 23 Create media image dialog box



Create Media Image

Create Disk Image

Drive E:

Image File

0%

4. Click **Create Disk Image**. The vMedia applet begins the process of creating the image file. This process creates a file that emulates a CD/DVD-ROM on the local system. The process is complete when the progress bar reaches 100%. To cancel the creation of an image file, click **Cancel**.

To insert the next CD during an operating system installation or any application installation with multiple image files:

1. To select the next image file or to replace the CD/DVD-ROM with the next CD/DVD-ROM, click **Browse**
2. To continue the installation, click **OK** on the host server.

IMPORTANT: Do not click **Disconnect** to select the next CD/DVD-ROM image file.

The connected drive icon and LED change states to reflect the current status of the virtual CD/DVD-ROM. After you are connected, virtual devices are available to the host server until you close the vMedia applet. When you are finished using the virtual CD/DVD-ROM, you can disconnect the device from the host server or close the applet. The vMedia applet must remain open when you use a vMedia device.

The iLO 3 vMedia CD/DVD-ROM appears like any other CD/DVD-ROM to your operating system. When you use iLO 3 for the first time, the host operating system might prompt you to complete a New Hardware Found wizard.

Virtual USB key

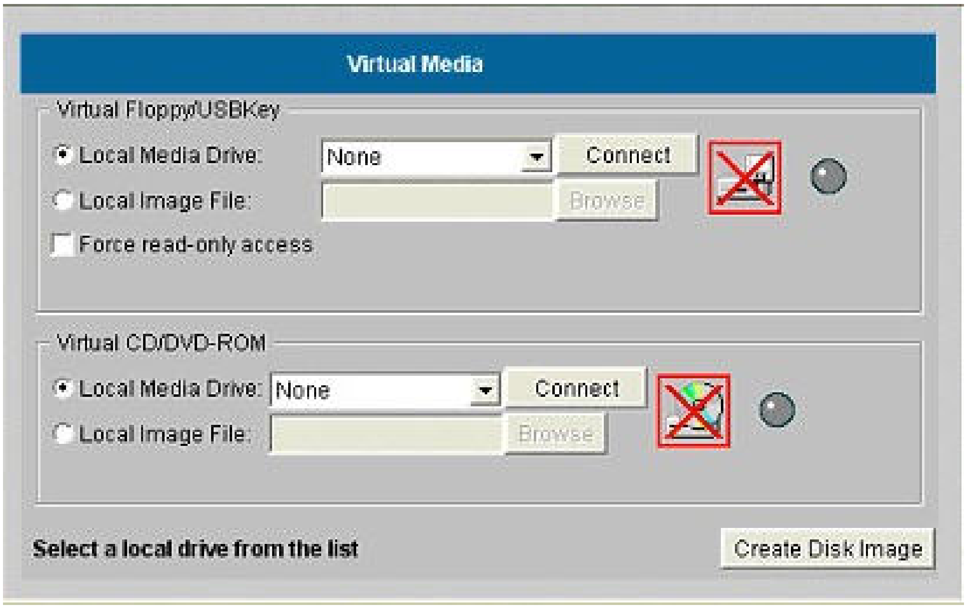
The iLO 3 vMedia devices connect to the host server using USB technology. Using USB also enables new capabilities for the iLO 3 vMedia devices when connected to USB-supported operating systems. Integrity iLO 3 v1.00 supports Virtual USB flash as a read-only device for use only with EFI, not with a client operating system.

The USB key can be the physical USB key drive on which you are running the web browser, or an image file stored on your local hard drive or network drive. For maximum performance, HP recommends using the local image files stored either on the hard drive of your client PC or on a network drive accessible through a high-speed network link.

To use the USB key drive in your client PC:

1. Click **Launch**.
2. Select **Local Media Drive** in the correct virtual media section.
3. Check the USB box on the right-hand side of the window.
4. Select the drive letter of the desired USB key drive on your client PC from the menu. To ensure the source diskette or image file is not modified during use, select the **Force read-only access** option.
5. Click **Connect**. The connected drive icon and LED change state to reflect the current status of the virtual Drive.

Figure 24 Virtual USB key



Select a local drive from the list

To use an image file:

1. Click **Launch**.
2. Within the virtual USB key section of the vMedia applet, select **Local Image File**.
3. In the text-box, enter the path or file name of the image, or to locate the image file by using the Choose Disk Image File dialog, click **Browse**. To ensure the source diskette or image file is not modified during use, select **Force read-only access**.

IMPORTANT: You must select the USB key image file with this option.

If you use CD or DVD-ROM image files, you must select the CD/DVD-ROM option. The CD or DVD-ROM option is not interchangeable with the USB key image file and vice versa.

4. Click **Connect**. The connected drive icon and LED change state to reflect the current status of the virtual USB key drive. When connected, the virtual devices are available to the host server until you close the vMedia applet.

5. When you are finished using the virtual USB key, disconnect the device from the host server or close the applet.

Performance

- A disk image file results in better performance than a physical drive.
- Store the image files on the client or on a network drive accessed using a fast network segment.
- The drive-connected icon and LED change state to reflect the connection status of the virtual drive.
- The connected drive appears with data on the host while the nonconnected device appears as an empty drive.
- To ensure that the source diskette or image file is not modified during use, you can use the force read-only access.
- The vMedia applet connects to iLO 3 using port number 17988.

Server blade Onboard Administrator DVD

The following requirements apply for all server blades:

- The USB key is only available through the applet in the iLO 3 web GUI.
- You can connect vMedia using either the BladeSystem Onboard Administrator DVD or the applet in iLO web GUI. You cannot use both connection methods at the same time.
- If you need to install operating systems using both CD and USB key, you must connect both from the applet in the iLO 3 web GUI.

Virtual Media applet timeout

The vMedia applet does not timeout when it is connected to a host server. The vMedia applet must remain open when using a vMedia device. The vMedia applet closes when you sign out of the iLO interface using the provided link in the banner, leave the iLO site, or refresh the entire page.

Supported operating systems and USB support for virtual Media

To use vMedia devices, your operating system must support USB mass storage devices.

Different operating systems provide different levels of USB support. Integrity iLO 3 uses the built-in USB drivers of the operating server. The level of USB support in the operating system affects the level of support for iLO 3 vMedia. In general, any operating system issues that affect a USB CD/DVD-ROM drive also affect iLO 3 vMedia.

The HP server ROM provides support during server boot for vMedia with the El Torito bootable CD format.

You can view the list of supported operating systems on the HP website at http://www.hp.com/go/integrityilo. The browser and OS information is located in the **Quickspec** document located on this website.

Java Plug-in version

The vMedia feature requires prior installation of Java Plug-in 1.4.2_10.

Client operating system and browser support for virtual media

You can view the list of supported client operating systems and browser support on the HP website at http://www.hp.com/go/integrityilo. The browser and OS information is located in the **Quickspec** document located on this website.

Power Management

The iLO 3 power management feature enables you to view and control the power state of the server, monitor power usage, and monitor the processor. You must have the Virtual Power & Reset user right to choose options on the power pages except where stated that the Configure iLO Settings user right is required.

The Power Management menu has the following options:

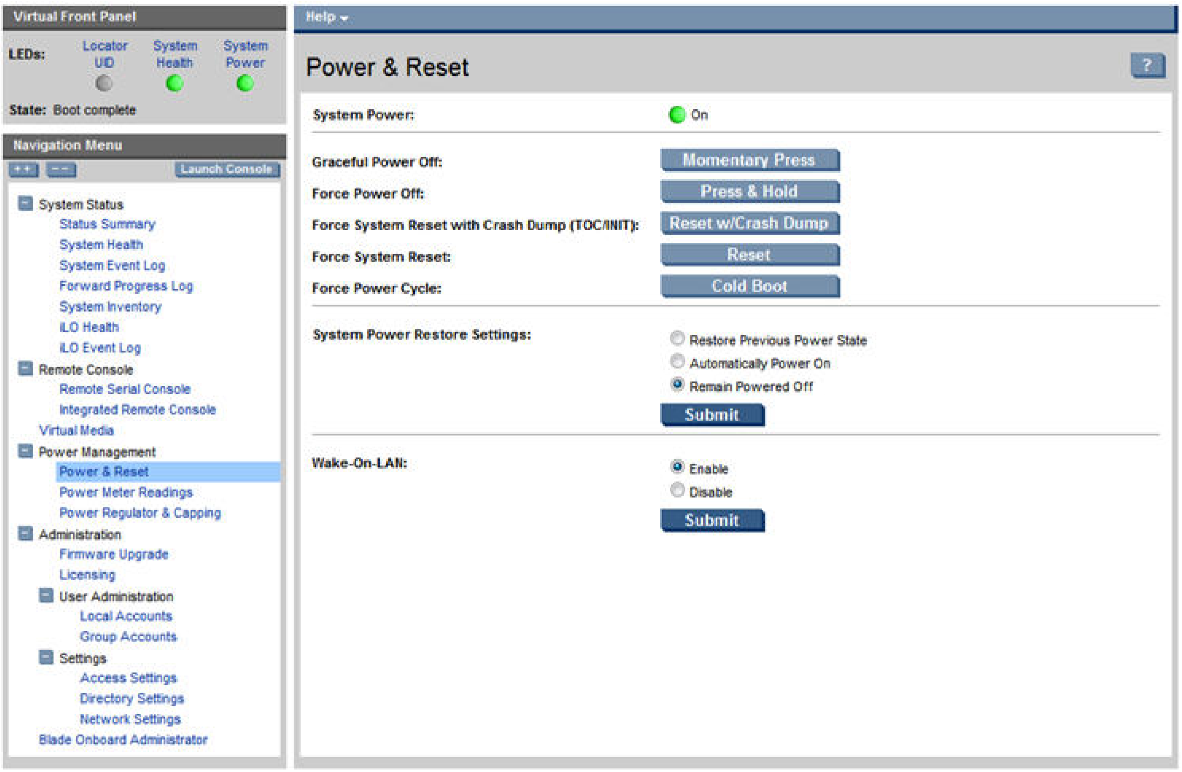
- Power & Reset
- Power Meter Readings
- Power Regulator & Capping

The pages are automatically refreshed every 10 seconds.

Power & Reset

The Power & Reset page enables you to view and control the power state and power options of the server. To choose options on this page, except where stated that the Configure iLO Settings right is required, you must have the Virtual Power & Reset right.

Figure 25 Power & Reset



State: Boot complete

System Power: On

Graceful Power Off: Momentary Press

Force Power Off: Press & Hold

Force System Reset with Crash Dump (TOC/INIT): Reset w/Crash Dump

Force System Reset: Reset

Force Power Cycle: Cold Boot

System Power Restore Settings:
○ Restore Previous Power State
○ Automatically Power On
● Remain Powered Off

Wake-On-LAN:
● Enable
○ Disable

For information on how to set the power management options in the OA, see the *HP BladeSystem Onboard Administrator User Guide* on the HP website.

Table 20 Power & Reset description

Item	Description
System Power	The current power state of the system.
System Power Control	Power control access enables you to issue the following options for remote control of the system power: Graceful Power Off — The iLO 3 sends a signal to the operating system to shutdown before turning off system power. Supported by IPF operating systems.

Table 20 Power & Reset description *(continued)*

Item	Description	
	Force Power Off	Turns system power off. This action is equivalent to forcing the system power off with the front panel power switch. No signal is sent to the operating system to bring the software down before power is turned off. To power off the system properly, shut down the operating system before issuing this command.
	Force System Reset with Crash Dump (TOC/INIT)	Causes the system to be reset through the INIT or TOC signal. All system processing and I/O activity is irrecoverably halted. The processors are signaled to dump state on the way down.
	Force System Reset	Causes the system to reset through the RST signal. All system processing and I/O activity is irrecoverably halted. The effect of this command is very similar to cycling the system power. The operating system is not notified, no crash dump is taken on the way down, and so on.
	Force Power Cycle	Turns system power off, waits 30 seconds, then turns the system power back on.
System Power Restore Settings	The power restore policy determines how the system behaves when AC power returns after an AC power loss. To issue these options, you must have the Configure iLO Settings user right.	
	Restore Previous Power State	The power is restored to the state that was in effect when AC power was removed or lost.
	Automatically Power On	The system is powered on after AC power is applied.
	Remain Powered Off	The system remains powered off after AC power is applied. To power on the system, you must push the system power switch or choose the Power On option under System Power Control.
Power On Delay	**NOTE:** The power on delay feature is only available on rackmount servers. For server blades, the OA handles the power on delay feature. The power on delay specifies how many seconds the system will delay power on after AC power is applied. The power on delay is applicable when the power restore policy is set to Restore Previous Power State or Automatically Power On. The default power on delay is 0 seconds.	
Wake-On-LAN	Enables or disables Wake-On-LAN for the system LANs. **NOTE:** Wake-On-LAN (WOL) is not supported with Integrity servers running Windows or OpenVMS environments. WOL is supported with Integrity BL860c i2, BL870c i2, and BL890c i2 Server Blades running HP-UX 11i v3. The supported remote power-on solution for Windows and OpenVMS is iLO. For details, see the User Service Guide for your server.	

Relevant iLO MP TUI commands: `PC, PR, PS, WOL`

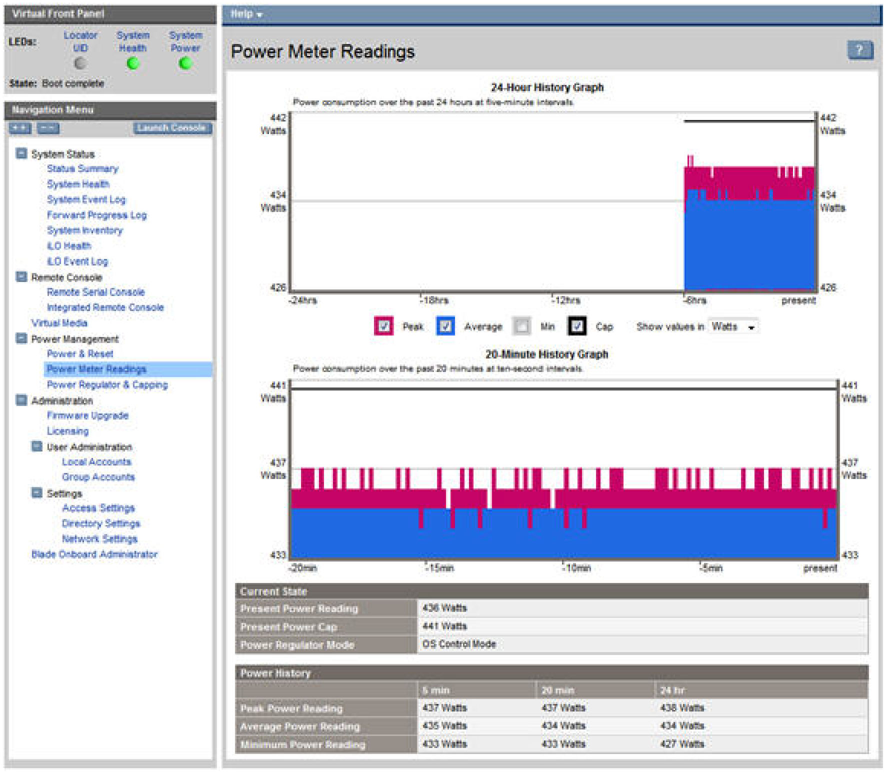
Power Meter Readings

The Power Meter Readings page enables you to view the Power Meter Readings over time.

Power meter readings shares information with Insight Power Manager.

The Power Meter Readings page has two graphs: a 24-Hour History Graph and a 20-Minute History Graph.

Figure 26 Power Meter Readings



Power Meter Readings

Current State

Present Power Reading	436 Watts
Present Power Cap	441 Watts
Power Regulator Mode	OS Control Mode

Power History

	5 min	20 min	24 hr
Peak Power Reading	437 Watts	437 Watts	438 Watts
Average Power Reading	435 Watts	434 Watts	434 Watts
Minimum Power Reading	433 Watts	433 Watts	427 Watts

IMPORTANT: Power consumption data readings are dependent on the configuration, architecture, components, and levels of activity of the server at any given time.

Table 21 Power Meter Readings description

Item	Description
History Graphs	The graphs display recent server power usage. The graph data is reset whenever the iLO MP is reset. Samples are taken in 5 minute and 10 second time increments. 24-Hour History Graph — 24-hour display with samples taken every 5 minutes. 20-Minute History Graph — 20-minute display with samples taken every 10 seconds. Each sample includes the power usage, power regulator mode, temperature, and time stamp of when the sample was taken. You can display this information by positioning the mouse over a sample on each graph. The peak, average, and cap samples display by default. You can display or hide peak, average, and cap samples on the graphs by toggling the appropriate checkbox. Peak — Samples are red and appear in the background. Average — Samples are blue. Minimum — Samples are gray and appear in the foreground. Cap — Samples are black.
Power Units	You can display the samples in either watts or Btu/hr by selecting the appropriate units in the **Show values in** menu.
Current State	Displays the current power readings. • Present Power Reading • Present Power Cap • Power Regulator Mode
Power History	Displays power history collected in 5 minute, 20 minute, and 24 hour increments. Peak — Displays the highest power usage of the samples collected.

Table 21 Power Meter Readings description *(continued)*

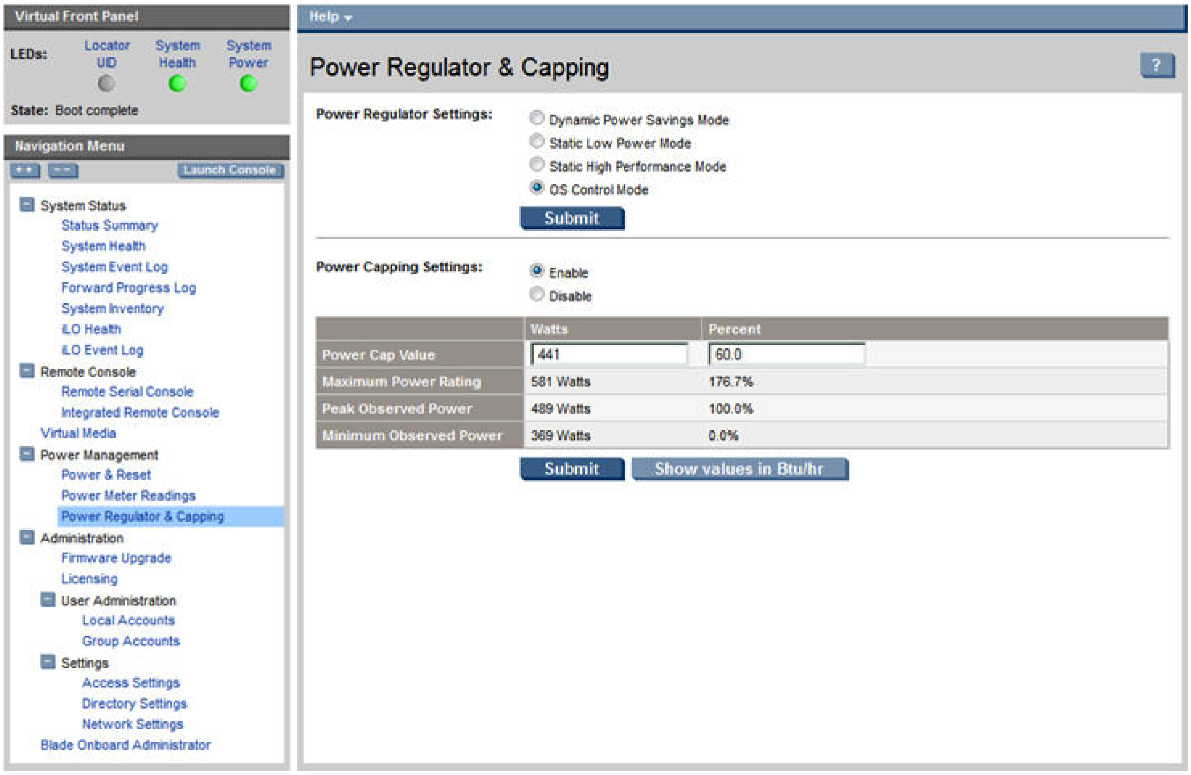
Item	Description	
	Average	Displays the average power usage of all the samples collected.
	Minimum	Displays the lowest power usage of the samples collected.

Power Regulator & Capping

The Power Regulator & Capping page enables you to view and control the power regulator and power capping settings for the server. To change this setting, you must have the Configure iLO Settings user right.

The Power Regulator feature is available on systems where support is provided by the operating system, processors, PDH (processor dependant hardware), SFW (System Firmware), and iLO firmware. For more information on power regulation support, see your server model Quickspecs document.

Figure 27 Power Regulator & Capping



Power Regulator & Capping

Power Regulator Settings:
○ Dynamic Power Savings Mode
○ Static Low Power Mode
○ Static High Performance Mode
● OS Control Mode

Submit

Power Capping Settings:
● Enable
○ Disable

	Watts	Percent
Power Cap Value	441	60.0
Maximum Power Rating	581 Watts	176.7%
Peak Observed Power	489 Watts	100.0%
Minimum Observed Power	369 Watts	0.0%

Submit Show values in Btu/hr

Table 22 Power Regulator & Capping description

Item	Description	
Power Regulator Settings	Dynamic Power Savings Mode	This mode enables the system to dynamically change processor p-states when needed based on current operating conditions. The implementation of this mode is operating system specific. For details, see your operating system documentation.
	Static Low Power Mode	This mode sets the processor to the lowest supported power consumption state and forces it to stay in this lowest state.
	Static High Performance Mode	This mode sets the processor to the highest supported performance processor state and forces it to stay in this highest state.

Table 22 Power Regulator & Capping description *(continued)*

Item	Description	
	OS Control Mode	This mode configures the server to enable the operating system to control the processor p-states. Use this setting to put the Operating System (including OS-hosted applications) in charge of power management.
Power Capping Settings	Power Cap Value	The power cap value in watts or Btu/hr and percentage.
	Maximum Power Rating	Maximum power cap allowed.
	Peak Observed Power	A power cap at or above this value should have no impact on server performance.
	Minimum Observed Power	Idle power consumption and lowest possible power cap. A power cap near minimum power might have significant impact on server performance.
Show values in Btu/hr or Show values in watts	Select how you want the values to display.	

NOTE: Power caps set to less than 50% of the difference between peak observed power and minimum observed power might become unreachable due to changes in the server. Power caps set to less than 20% are not recommended, and might cause the server to reboot or the server OS to stop responding.

Relevant iLO MP TUI command: `PM`

Administration

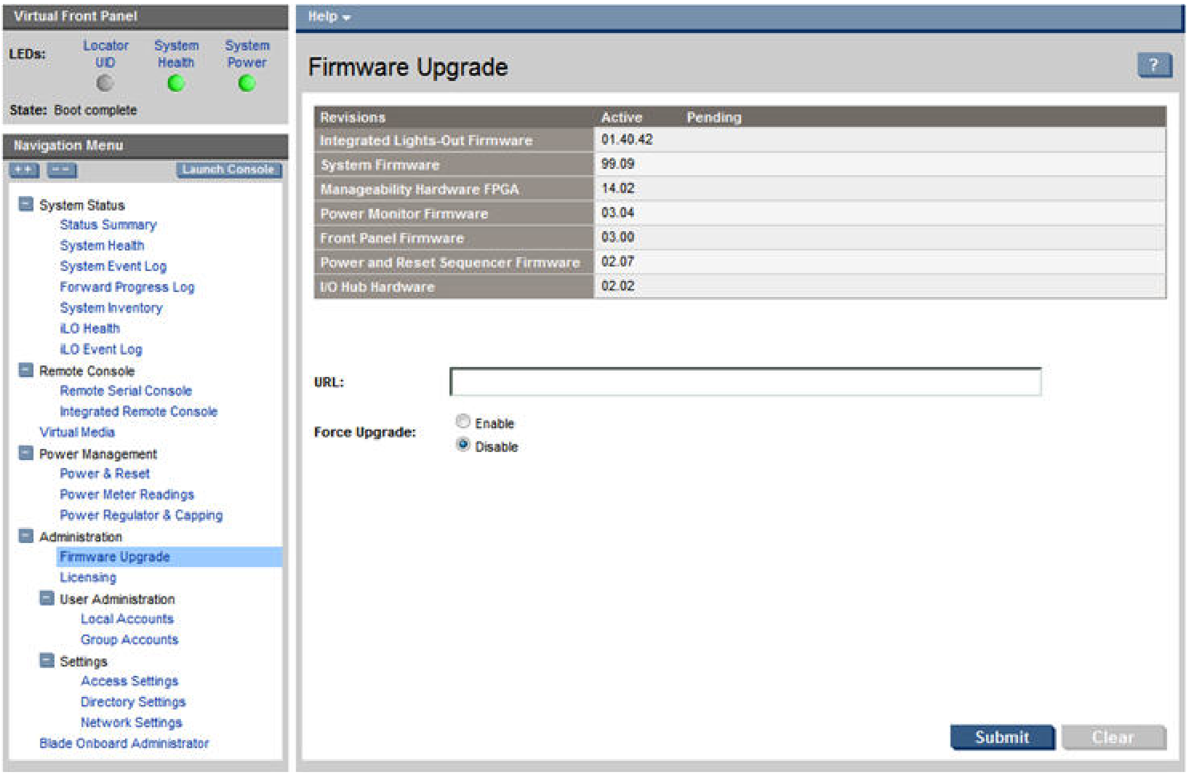
The Administration menu enables you to access the following pages:

- Firmware Upgrade
- Licensing
- Local Accounts
- Group Accounts
- Access Settings
- Directory Settings
- Network Settings
- BladeSystem Onboard Administrator (OA) (Available only for server blade)

Firmware Upgrade

The Firmware Upgrade page enables you to upgrade the iLO 3 and system programmable firmware. To use this feature, you must have the Configure iLO Settings user right.

Figure 28 Firmware Upgrade



Firmware Upgrade

Revisions	Active	Pending
Integrated Lights-Out Firmware	01.40.42	
System Firmware	99.09	
Manageability Hardware FPGA	14.02	
Power Monitor Firmware	03.04	
Front Panel Firmware	03.00	
Power and Reset Sequencer Firmware	02.07	
I/O Hub Hardware	02.02	

URL:

Force Upgrade: ○ Enable ● Disable

NOTE: Bundles containing firmware (iLO firmware, System firmware, and/or System programmable hardware) that may be installed using this Firmware Upgrade page are available for download. It is important to check the compatibility of the firmware revisions in the bundle with the current revisions on the system prior to updating. Use of the HP SUM firmware upgrade tool will automatically perform compatibility checking.

To find appropriate bundles for this system:

1. On the http://www.hp.com website, go to **Support & Drivers**.
2. Search for this server product, for **download drivers and software**.
3. Choose your operating system, if you want to get a bundle that can be installed from the operating system; or, choose **Cross operating system (BIOS, Firmware, Diagnostics, etc.**), if you want to get a bundle to install using this Firmware Upgrade page, a CD, or using UEFI with the system down.
4. Locate **Firmware - System** or **Firmware - Management** in the list of offerings. To perform the upgrade, follow the instructions under the description for the bundle.

Perform the upgrade through the MP LAN by http(s). Enter the information required for the upgrade through the `FW` command interface.

To download and upgrade the firmware package from the HP website, see http://www.hp.com/go/bizsupport.

IMPORTANT: When performing a firmware upgrade that contains system programmable hardware, you must properly shut down any operating system that is running before starting the firmware upgrade process.

CAUTION: If the firmware upgrade process is interrupted at any time, you must repair or replace the core I/O.

At the end of the upgrade process, the MP is reset. Reconnect and log in.

If a firmware request is pending when you enter the `FW` command, a `SYSREV` table appears. You will be prompted to either cancel the firmware upgrade request or exit. Follow the prompts on the screen.

The `FW` command upgrades iLO MP or specific system programmable firmware.

- If only upgrading the iLO MP firmware, the iLO MP automatically resets upon successful completion dropping all iLO MP LAN connections. This upgrade will not affect server operation if it is for iLO MP only.
- If this upgrade is system programmable firmware, the upgrade can be completed without resetting iLO, however, the server needs to be reset for the pending system programmable firmware revisions to become active. Resetting the server to activate pending firmware can take up to 10 minutes before the server begins to boot.

After the upgrade, reconnect and log in.

TIP: Before performing certain iLO 3 functions, verify that you have the supported firmware version required to carry out the task.

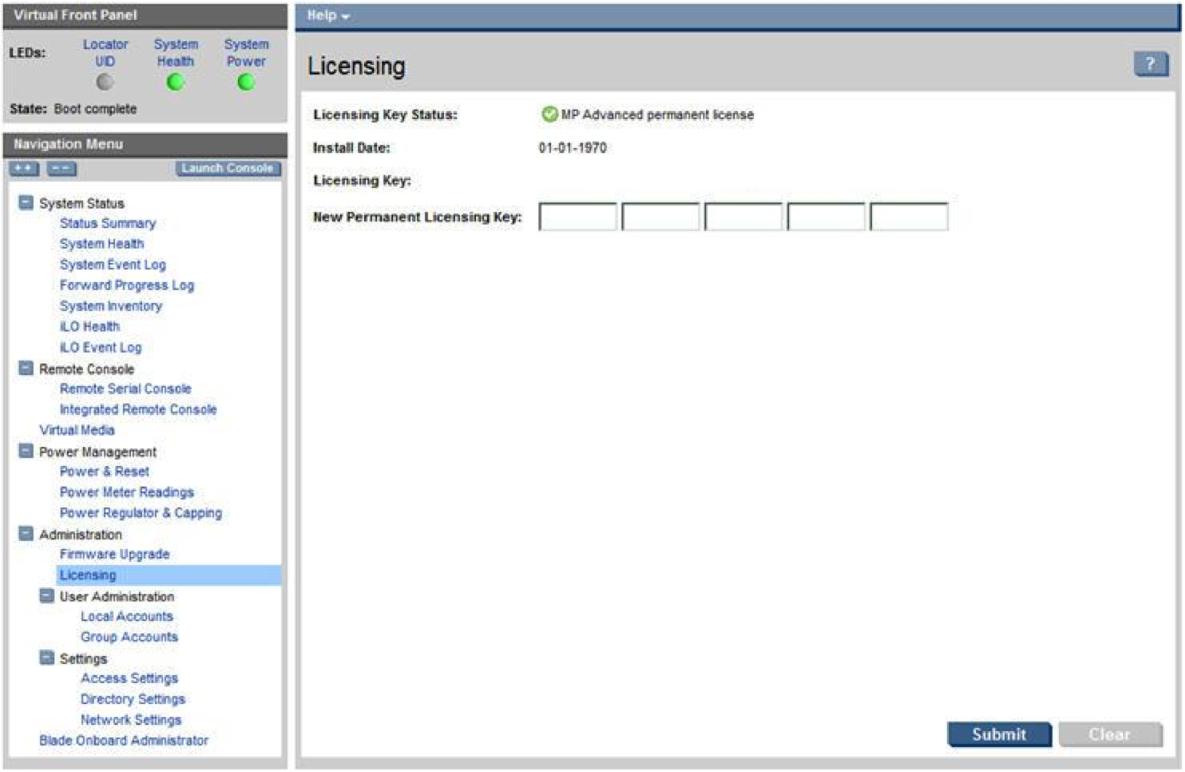
Licensing

The Licensing page displays the factory-installed iLO 3 Advanced Pack License Key.

The iLO 3 firmware comes with a full-featured permanent default Advanced Pack Licensing Key built in. No additional licensing is necessary. The **New Permanent Licensing Key** field is reserved for future use. This field is unused in Integrity iLO 3 v1.00.

IMPORTANT: The HP ProLiant iLO 3 Advanced Pack Licensing Key will not work on an HP Integrity server blade and vice versa.

Figure 29 Licensing



Licensing

Licensing Key Status: ✓ MP Advanced permanent license

Install Date: 01-01-1970

Licensing Key:

New Permanent Licensing Key: □ □ □ □ □

The following Advanced Pack features are available in this firmware release:

- Virtual Media
- Directory Services Integration for iLO 3 user management using LDAP-based directory services
- Schema-free LDAP based directory services (LDAP-lite)
- Power Meter Readings
- Integration with Insight Power Management

These features can change without notice. Not all features are supported by all operating systems. Not all features are supported by all platforms. Some features require configuration and additional support.

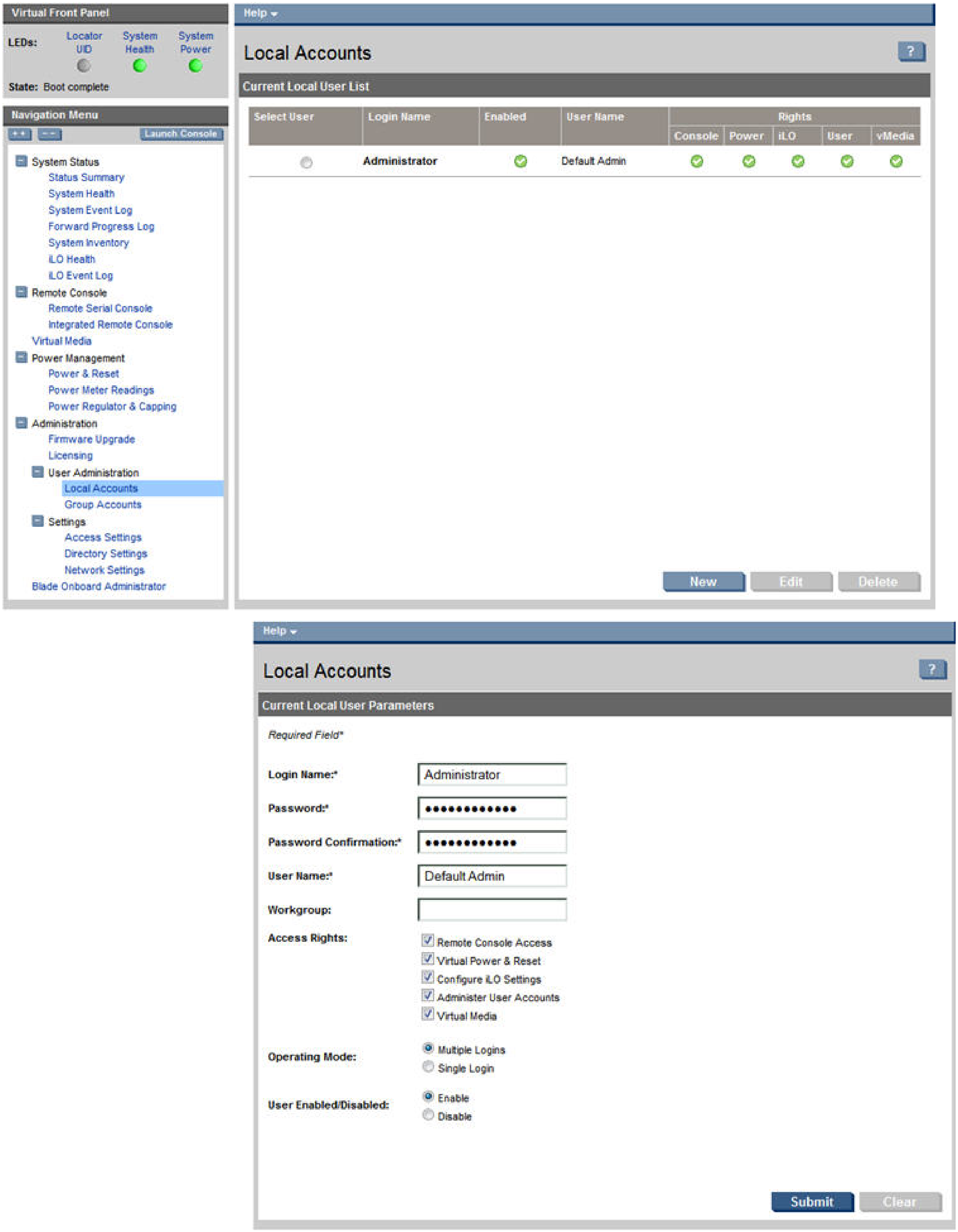
Table 23 Licensing description

Item	Description
Licensing Key Status	Displays the status of the license.
Install Date	Displays the date the license was installed.
Licensing Key	Displays the license key.
New Permanent Licensing Key	Optional field reserved for future use. This field is unused in Integrity iLO 3 v1.00.
Submit	Submits the key for activation.
Cancel	Cancels the action.

User Administration>Local Accounts

The Local Accounts page displays the current list of local users, their privilege rights and whether those rights are enabled or disabled. This page enables you to modify the user configuration of iLO 3. To use this feature, you must have the Administer User Accounts user right.

Figure 30 Local Accounts



Local Accounts

Current Local User List

Select User	Login Name	Enabled	User Name	Rights				
				Console	Power	iLO	User	vMedia
○	Administrator	✓	Default Admin	✓	✓	✓	✓	✓

Local Accounts

Current Local User Parameters

*Required Field**

Login Name:*	Administrator
Password:*	••••••••••••
Password Confirmation:*	••••••••••••
User Name:*	Default Admin
Workgroup:	
Access Rights:	☑ Remote Console Access ☑ Virtual Power & Reset ☑ Configure iLO Settings ☑ Administer User Accounts ☑ Virtual Media
Operating Mode:	● Multiple Logins ○ Single Login
User Enabled/Disabled:	● Enable ○ Disable

The default user is Administrator. The Administrator user has all access rights.

Table 24 Local Accounts description

<table>
<tr><th>Item</th><th>Description</th></tr>
<tr><td>Select User</td><td>To edit or delete a user account, select an existing user from the list of user names and click <b>Edit</b> or <b>Delete</b> to either edit or delete that user account.</td></tr>
<tr><td>New</td><td>To create a new user account, click <b>New</b>. This opens a page that enables you to enter account information for the new user. By default, a new user is granted the Remote Console Access and Virtual Media rights. The operating mode is set to multiple logins, and the user is enabled.</td></tr>
<tr><td>Edit</td><td>Click this button after selecting the user account to modify or to add a new account. For an existing account, you can modify any of the parameters shown, provided the user has sufficient privileges.</td></tr>
<tr><td></td><td>Clicking <b>Edit</b> or <b>New</b> brings up a page that enables a user to enter the following user account information:
<table>
<tr><td>Login ID</td><td>This field is required. This is the name that must be used when logging in to the iLO MP. The Login ID must be unique. The maximum length is 24 characters.</td></tr>
<tr><td>Password</td><td>This field is required. The password must be provided when logging in to iLO 3. The password must be a minimum of 5 characters and can contain a maximum of 24 characters.</td></tr>
<tr><td>Password Confirmation</td><td>This field is required. The password must be provided a second time for verification.</td></tr>
<tr><td>User Name</td><td>This field is required. This name appears in the user list and on the home page. It is not necessarily the same as the Login ID. The User Name must be unique. The maximum allowed length is 24 characters.</td></tr>
<tr><td>Workgroup</td><td>This field is optional, and can be initialized to an intuitive name.</td></tr>
<tr><td>Access Rights</td><td>iLO MP user privileges control user access to the iLO MP functions that a user can perform. You can configure iLO 3 users to have any (or all) of the following privileges: Remote Console Access, Virtual Power & Reset, Configure iLO Settings, Administer User Accounts, and Virtual Media.
For more information on access rights, see the User Rights page located under the Help tab.</td></tr>
<tr><td>Operating Mode</td><td>Multiple logins allow a user to log in more than once. If the mode is Single, the state is changed to disabled after the first login.</td></tr>
<tr><td>User Enabled/Disabled</td><td>Enabled allows a user to log in to the iLO MP. If disabled is selected, the user will not be able to log in to the iLO MP.</td></tr>
</table></td></tr>
<tr><td>Delete</td><td>Click this button after selecting the user account to delete. If you do not have the User Administration Access right, this button is disabled.</td></tr>
</table>

NOTE: You must configure the HP System Insight Manager group actions feature for iLO 3 to use an existing iLO user name.

To configure, manually edit the `MpTools.xml` file and replace the <execute-as-user> attribute with an existing user name on the iLOs. This new user name must have all access rights. To find the `MpTools.xml` file, look in the tools directory on the Central Management Server.

Additionally, iLO 3 supports user accounts created for login from the BladeSystem Onboard Administrator. These user accounts appear as OAtmp#, where # is a number from 1-5. Removing the BladeSystem Onboard Administrator user accounts is not recommended.

Relevant iLO MP TUI command: `UC`

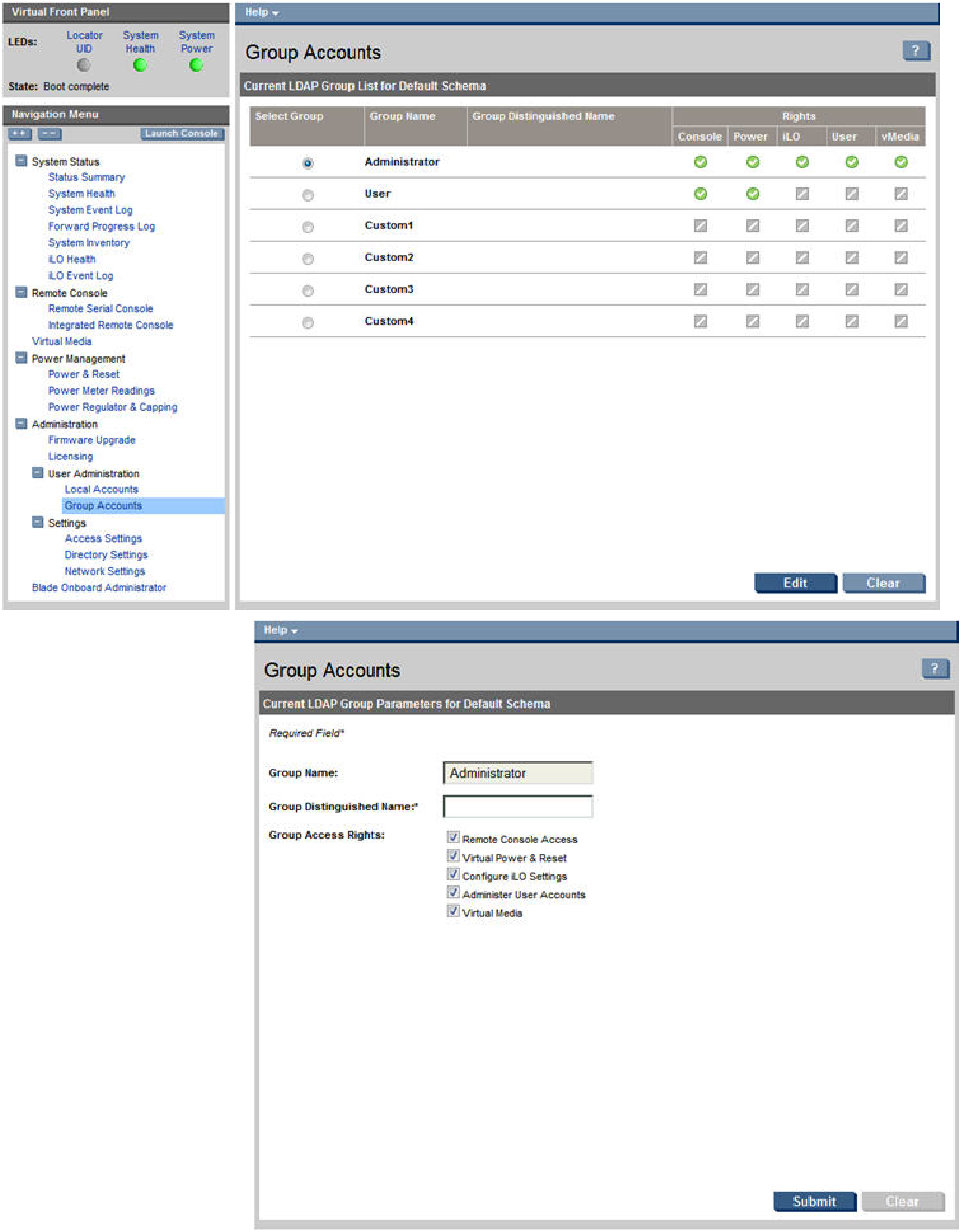
Group Accounts

The Group Accounts page enables you to enter one or more directory groups by specifying the distinguished name of the group and privileges that can be granted to users who are members of that group. To use this feature, you must have the Configure iLO Settings user right.

Group administration information must be configured when the directory is enabled with the default schema.

When a user attempts to log in to iLO 3, iLO 3 reads that user's directory name in the directory to determine the groups that include the user as a member. The iLO 3 compares this information with a list of groups configured by the user. The rights of all the matched groups are combined and assigned to that user.

Figure 31 Group Accounts



Group Accounts

Current LDAP Group List for Default Schema

Select Group	Group Name	Group Distinguished Name	Rights				
			Console	Power	iLO	User	vMedia
●	Administrator		✓	✓	✓	✓	✓
○	User		✓	✓	▨	▨	▨
○	Custom1		▨	▨	▨	▨	▨
○	Custom2		▨	▨	▨	▨	▨
○	Custom3		▨	▨	▨	▨	▨
○	Custom4		▨	▨	▨	▨	▨

Group Accounts

Current LDAP Group Parameters for Default Schema

*Required Field**

Group Name: Administrator

Group Distinguished Name:*

Group Access Rights:
☑ Remote Console Access
☑ Virtual Power & Reset
☑ Configure iLO Settings
☑ Administer User Accounts
☑ Virtual Media

Table 25 Group Accounts description

Item	Description
Administrator	Click this radio button and click **Edit** to open a page that enables you to change settings for the Administrator group.
User	Click this radio button and click **Edit** to open a page that enables you to change settings for the User group.

Table 25 Group Accounts description *(continued)*

Item	Description
Custom (1,2,3,4)	Click one of these radio buttons and click **Edit** to open a page that enables you to change settings for the chosen Custom group.
Cancel	Cancels the action.

Relevant iLO MP TUI command: `LDAP`

Access Settings

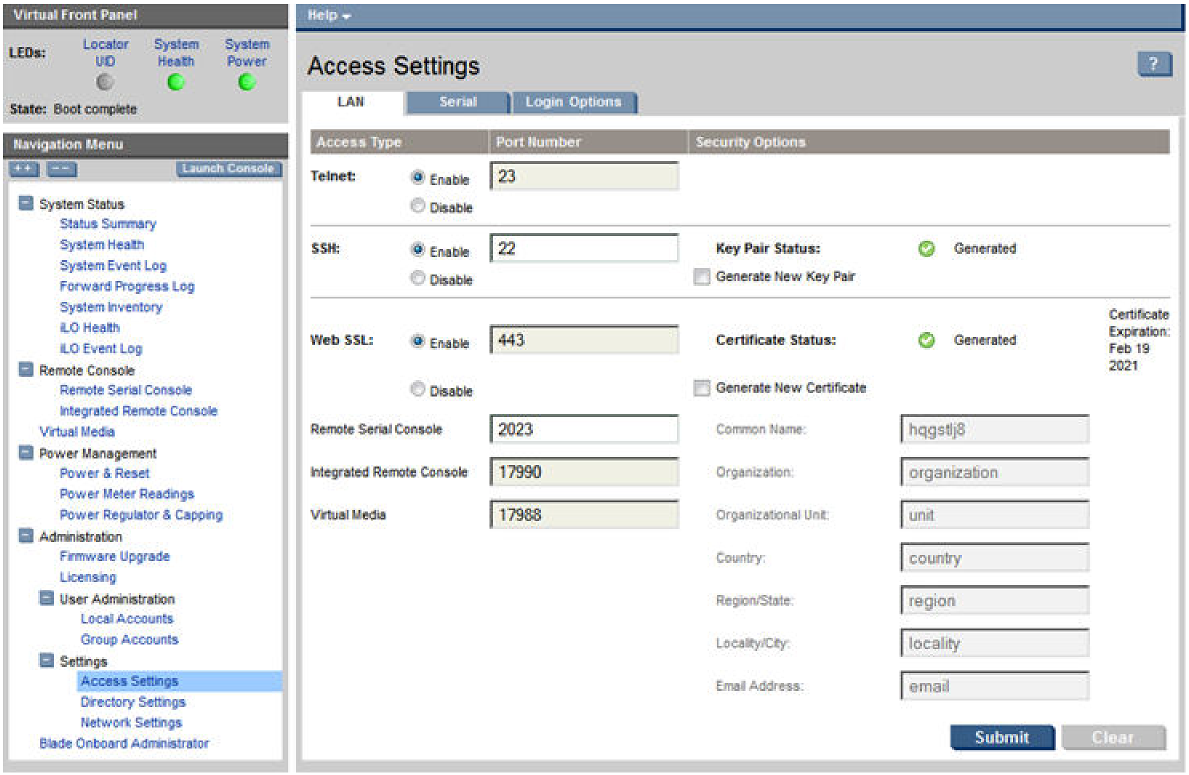
The Access Settings page enables you to access the following tabs:

- LAN
- Serial
- Login Options

LAN

The LAN tab enables you to modify LAN settings. To use this feature, you must have the Configure iLO Settings user right.

Figure 32 LAN



Access Settings

Access Type	Port Number	Security Options		
Telnet: ● Enable ○ Disable	23			
SSH: ● Enable ○ Disable	22	Key Pair Status: □ Generate New Key Pair	✓ Generated	
Web SSL: ● Enable ○ Disable	443	Certificate Status: □ Generate New Certificate	✓ Generated	Certificate Expiration: Feb 19 2021
Remote Serial Console	2023	Common Name:	hqgstlj8	
Integrated Remote Console	17990	Organization:	organization	
Virtual Media	17988	Organizational Unit:	unit	
		Country:	country	
		Region/State:	region	
		Locality/City:	locality	
		Email Address:	email	

Table 26 LAN description

Item	Description
Telnet	You can enable or disable Telnet access to iLO 3 using the enable or disable option. This does not affect the IP configuration or the ability of iLO 3 to perform upgrades over the LAN. The Telnet port number is 23. You cannot change it. **NOTE:** Integrity iLO 3 ships with Telnet disabled by default.
SSH	You can enable or disable SSH access to the iLO 3 using the enable or disable option.

Table 26 LAN description *(continued)*

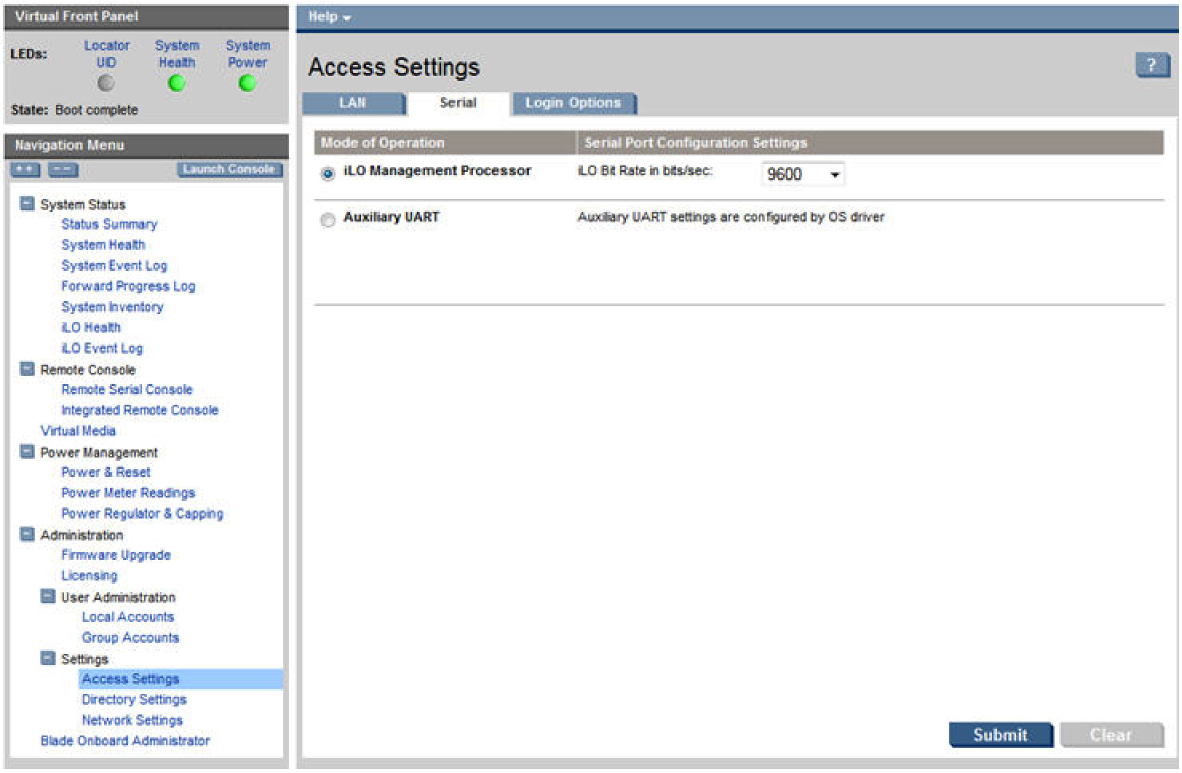
Item	Description
	The default SSH port number is 22. You can configure this port number to a value in the range 2000-2400. If the port number is modified, it takes effect the next time iLO 3 is rebooted. To secure an SSH connection, select **Enable** and ensure that an SSH key pair has been generated. SSH is an industry-standard client-server connectivity protocol that provides a secure remote connection. The iLO 3 firmware supports: • SSH2 implementation • Authentication algorithms RSA and DSA • Encryption algorithms 3DES-CBC and AES128-CBC • Integrity algorithms HMAC-SHA1 and MD5
Key Pair Status	Indicates if a key pair has been generated previously. To generate a new SSH key pair, check **Generate New Key Pair** and click **Submit**.
Web SSL	You can enable or disable the web SSL access to iLO 3 using the enable or disable option. To make an SSL connection, you must generate a certificate. The certificate status indicates if a certificate has been generated previously. The port value is 443. You cannot change it. To generate a new certificate, fill in the fields shown and select **Generate New Certificate**. The system alerts you when the certificate is about to expire or if it has already expired. You will need to generate a new certificate before you can continue. You must reset the iLO MP after you generate a new certificate.
Certificate Status	The iLO MP auto generates an SSL certificate when it is first powered on at initial installation. It is expected that you will generate a new certificate with valid information when you log in. The certificate status indicates if a certificate has been generated previously. To generate a new certificate, select **Generate New Certificate**, fill in the fields, and click **Submit**.
Remote Serial Console	The Remote Serial Console default port value is 2023. You can configure it to a value in the range 2000-2400. If the port number is modified, it takes effect the next time iLO 3 is rebooted.
Integrated Remote Console	The Integrated Remote Console feature will be available in a future firmware release.
Virtual Media	The Virtual Media default port value is 17988. You cannot change it.
Submit	Submits the information.
Cancel	Cancels the action.

Relevant iLO MP TUI commands: `LC, SA, SO`

Serial

The Serial tab enables you to set the serial port parameters. To change the external serial port mode, the iLO baud rate, and the iLO flow control settings, you must have the Configure iLO Settings user right.

Figure 33 Serial



State: Boot complete

Access Settings

Mode of Operation	Serial Port Configuration Settings
● iLO Management Processor	iLO Bit Rate in bits/sec: 9600
○ Auxiliary UART	Auxiliary UART settings are configured by OS driver

Table 27 Serial description

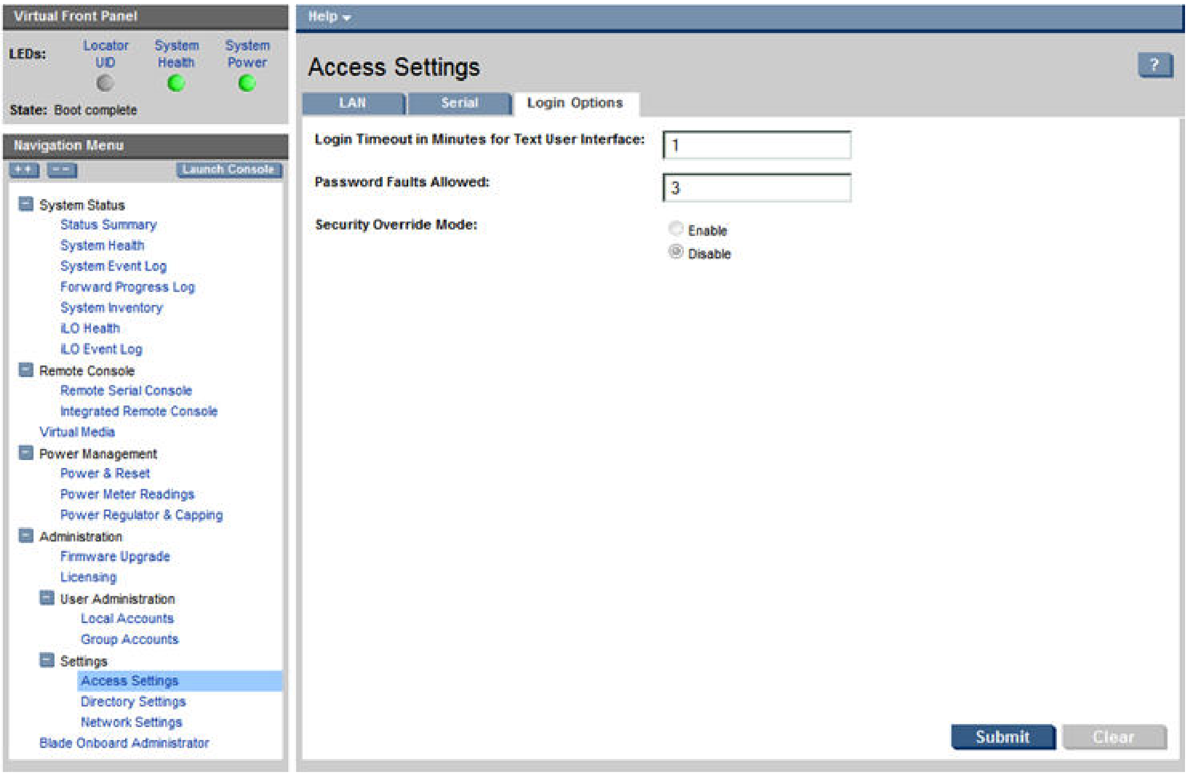
Item	Description
Mode of Operation	Enables you to set the local serial mode of operation to either the iLO MP or Auxiliary UART mode. Switching to AUX UART mode when MP LAN access is disabled requires a push-button reset of the iLO 3 Physical Presence button to return to iLO 3 mode. If baud rate settings are not consistent between the serial port and the attached serial device, communication issues occur.
iLO Bit Rate in Bits per Second	Enables you to set the iLO 3 baud rate. Input and output data rates are the same. The iLO 3 default baud rate is 9600 bps, 8 bits, 1 stop, no parity.
Flow Control	Enables you to set the iLO 3 flow control. Flow control can be through hardware or software. Hardware uses RTS/CTS. Software uses Xon or Xoff.
Submit	Submits the information.
Cancel	Cancels the action.

Relevant iLO MP TUI command: `CA`

Login Options

The Login Option tab enables you to modify the security options of iLO 3. To use this feature, you must have the Configure iLO Settings user right.

Figure 34 Login Options



Login Timeout in Minutes for Text User Interface: 1

Password Faults Allowed: 3

Security Override Mode: ○ Enable ● Disable

Table 28 Login Options description

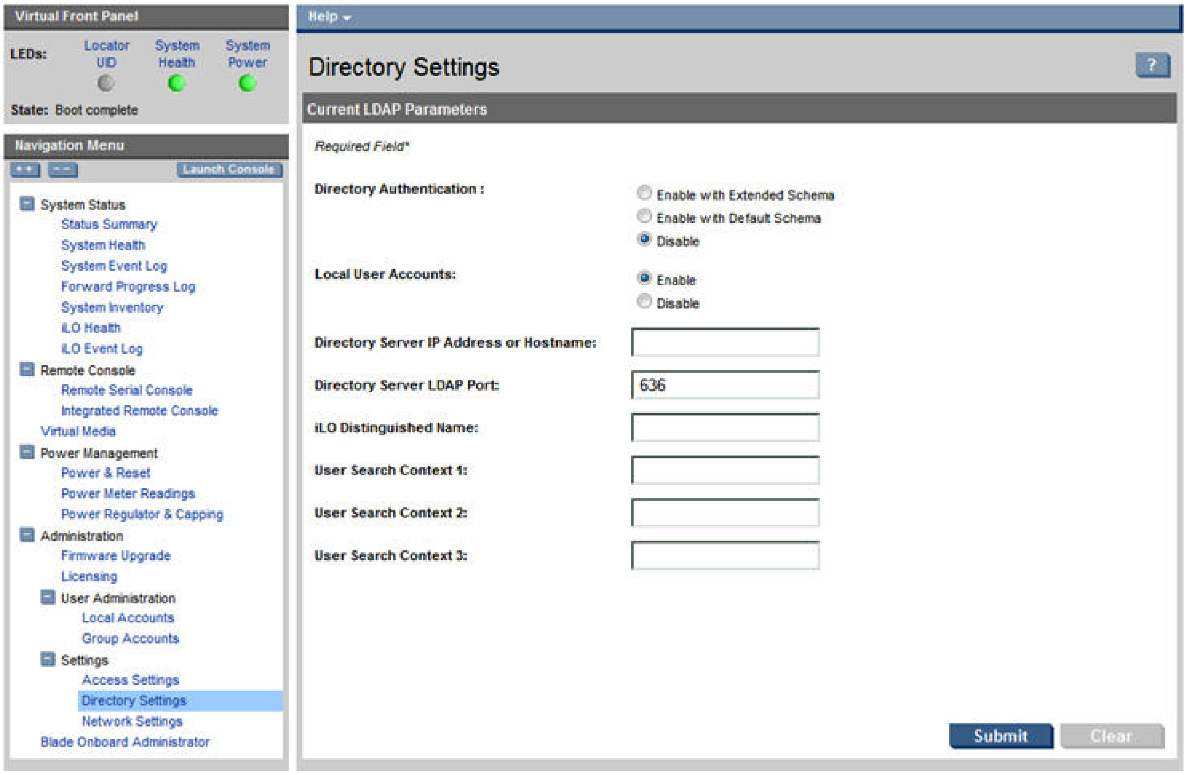
Item	Description
Login Timeout in Minutes	If a user remains at the MP login: prompt for longer than the timeout, iLO 3 disconnects the user from SSH or Telnet. The default value is 1 minute; it can be configured to a value in the range of 1 to 5 minutes. This timeout does not apply to users who have successfully logged in to iLO 3. The timeout value in minutes is effective on all ports, including local ports.
Password Faults Allowed	Sets a limit on the number of password faults allowed when logging in to iLO 3. The default number of password faults allowed is three. If a greater number of faults is detected, the user is disconnected. It can be configured to a value in the range of 1 to 10.
Security Override Mode	Can be used to disable Security Override mode at any time before the 15-minute override timeout. Security Override mode can be disabled only when set by a Physical Presence button push, not when the Security Override switch is set. You cannot use this field to enable Security Override mode. The enable/disable buttons are gray unless security override is in effect.
Submit	Submits the information.
Cancel	Cancels the action.

Relevant iLO MP TUI command: `SO`

Directory Settings>Current LDAP Parameters

The Current LDAP Parameters page enables you to edit the directory parameters. To use this feature, you must have the Configure iLO Settings user right.

Figure 35 Current LDAP Parameters



Directory Settings

Current LDAP Parameters

*Required Field**

Directory Authentication : ○ Enable with Extended Schema ○ Enable with Default Schema ● Disable

Local User Accounts: ● Enable ○ Disable

Directory Server IP Address or Hostname:

Directory Server LDAP Port: 636

iLO Distinguished Name:

User Search Context 1:

User Search Context 2:

User Search Context 3:

Table 29 Current LDAP Parameters description

Item	Description	
Directory Authentication	Choosing enable or disable, activates or deactivates directory support on iLO 3:	
	Enable with Extended Schema	Selects directory authentication and authorization using directory objects created with HP schema. Select this option if the directory server has been extended with the HP schema.
	Enable with Default Schema	Selects directory authentication and authorization using user accounts in the directory which has not been extended with the HP schema. User accounts and group memberships are used to authenticate and authorize users. In the Administration>User Administration>Group Accounts page, configure one or more directory groups by entering the Group Distinguished Name of the group and the rights granted to users who are members of that group. You must configure data in the Group Administration page after you select this.
	Disable	Deactivates directory support on this iLO 3.
Local User Accounts	Includes or excludes access to local iLO 3 user accounts. Locally-stored user accounts can be active while LDAP directory support is enabled. If local user accounts are enabled, you may log in to the iLO 3 using locally-stored user credentials. If they are disabled, access is limited to valid directory credentials only.	
Directory Server IP Address	Displays the IP address or hostname of the directory server.	
Directory Server LDAP Port	Displays the port number for the secure LDAP service on the server. The default value for this port is 636. It can be configured to a value in the range 2000-2400.	
iLO Distinguished Name	Displays the Distinguished Name of iLO 3, specifies where this iLO 3 instance is listed in the directory tree. Example: cn=MP Server,ou=Management Devices,o=hp	

Table 29 Current LDAP Parameters description *(continued)*

Item	Description
User Search Contexts (1,2,3)	User search contexts locate an object in the tree structure of the directory server and are applied to the login name entered to access the iLO MP. All objects listed in the directory can be identified using the unique distinguished name. However, distinguished names can be long, or users might not know the distinguished usernames, or they may have accounts in different directory contexts. Search contexts enable the user to specify common directory contexts, so that users do not have to enter the full distinguished name at login. The iLO 3 attempts to authenticate a user in the directory first by the login name entered, and then by applying user search contexts to that login name until successful. For example: Example 1: Instead of logging in as `cn=user,ou=engineering,o=hp`, A search context of `ou=engineering,o=hp` allows the user to login as `user`. Example 2: (This format can be used only when extended schema is selected and Active Directory is used as a directory server). Microsoft Active Directory has an alternate user credential format. A user may login as: `user@domain.hp.com`, in which case a search context of `@domain.hp.com` allows the user to login as `user`.
Submit	Submits the information.
Cancel	Cancels the action.

Relevant iLO MP TUI command: `LDAP`

Network Settings

The Network Settings page enables you to access the following tabs:

- Standard
- Domain Name Server

IMPORTANT: If you are connected through a network and you make any changes to DHCP status, IP address, subnet mask, or gateway IP address, iLO 3 automatically resets after you confirm the change. The automatic reset occurs only after a warning appears before you save the changes. If you enter `-nc`, no warning appears and iLO 3 reboots.

If you are connected through a serial console and you make any changes to DHCP status, IP address, subnet mask, or gateway IP address, iLO 3 alerts you to manually reset iLO 3. A warning about dropped network connections is sent prior to committing the change. The warning does not appear if you enter `-nc`.

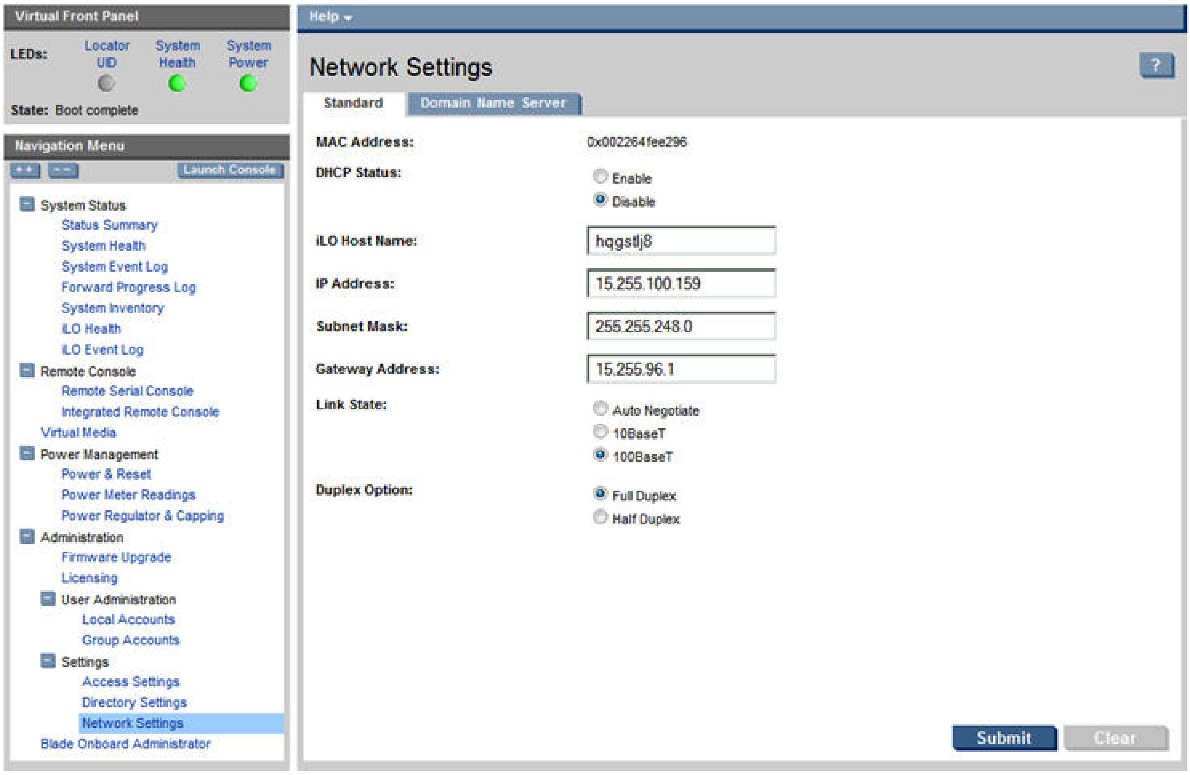
If a firmware upgrade is in progress, the commitment phase to the `LC` command fails and indicates that an upgrade or reset is in progress, and changes to the `LC` parameters are not made.

Network Settings>Standard

The Standard tab enables you to configure the network settings and LAN configuration. To configure the network settings, you must have the Configure iLO Settings user right.

NOTE: If valid changes are made to the DHCP Status, IP Address, Subnet Mask, or Gateway Address, and the changes are submitted, a reset of iLO 3 is required for the changes to take effect.

Figure 36 Standard network settings



Network Settings

MAC Address: 0x002264fee296

DHCP Status: ○ Enable ● Disable

iLO Host Name: hqgstlj8

IP Address: 15.255.100.159

Subnet Mask: 255.255.248.0

Gateway Address: 15.255.96.1

Link State: ○ Auto Negotiate ○ 10BaseT ● 100BaseT

Duplex Option: ● Full Duplex ○ Half Duplex

Table 30 Standard network settings description

Item	Description
MAC Address	Displays the 12-digit (hexadecimal) MAC address.
DHCP Status	To enable iLO 3 to obtain an IP address, Subnet Mask, and Gateway Address from a DHCP server, select **Enable**. Changes to those three network settings are not allowed while the DHCP Status is enabled. To manually assign those three network settings to iLO 3, select **Disable**. If the DHCP status is changed and submitted, a reset of iLO 3 is required for the changes to take effect.
iLO 3 MP Host Name	Displays the host name set at the iLO 3 TUI prompt. Typically, the DNS name for the LAN IP is entered. This field can be programmed to any useful name or phrase.
IP Address	Displays the iLO 3 MP IP address. If DHCP is being used, the IP address is automatically supplied. If not, enter a static IP address here. If the IP address is changed to a valid address and submitted, a reset of iLO 3 is required for the changes to take effect.
Subnet Mask	Displays the subnet mask for the iLO 3 IP network. If DHCP is being used, the subnet mask is automatically supplied. If not, enter the subnet mask for the network. If the subnet mask is changed to a valid mask and submitted, a reset of iLO 3 is required for the changes to take effect.
Gateway Address	Displays the IP address of the network gateway. If DHCP is being used, the gateway IP address is automatically supplied. If not, enter the network gateway address. If the gateway address is changed to a valid address and submitted, a reset of iLO 3 is required for the changes to take effect.
Link State	Select Auto Negotiate, 10BaseT, or 100BaseT.

Table 30 Standard network settings description *(continued)*

Item	Description
	IMPORTANT: On Integrity rx2800 i2/i4 systems, the link state 1000BaseT option (or Duplex Option) is not currently supported. Integrity rx2800 i2/i4 systems can run at 1000BaseT, but only if the switch it connects to supports auto negotiate to 1000BaseT and the rx2800 i2/i4 is similarly set to auto negotiate. If you want to set a specific LAN speed (10BaseT or 100BaseT) those are the only options that iLO 3 currently supports.
Submit	Submits the information.
Cancel	Cancels the action.

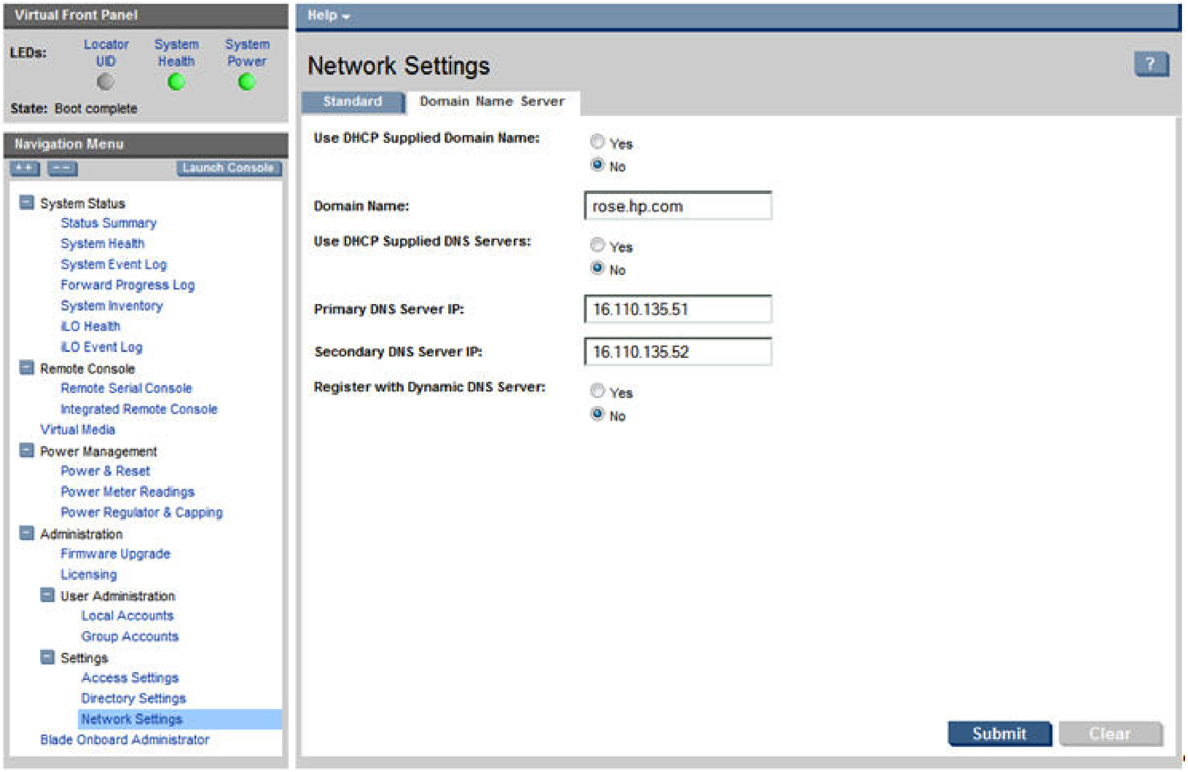
Relevant iLO MP TUI command: `LC`

Domain Name Server

The Domain Name Server (DNS) tab enables you to configure the DNS server settings, domain name, and up to two DNS servers manually or automatically through DHCP. It further enables a DDNS update through the primary DNS server as long as it is authoritative for the zone. It is only meaningful when used with DHCP enabled. To use this feature, you must have the Configure iLO Settings user right.

You can only configure the DNS server if DHCP is enabled.

Figure 37 Domain Name Server



Network Settings

Use DHCP Supplied Domain Name: ○ Yes ● No

Domain Name: rose.hp.com

Use DHCP Supplied DNS Servers: ○ Yes ● No

Primary DNS Server IP: 16.110.135.51

Secondary DNS Server IP: 16.110.135.52

Register with Dynamic DNS Server: ○ Yes ● No

Table 31 DNS description

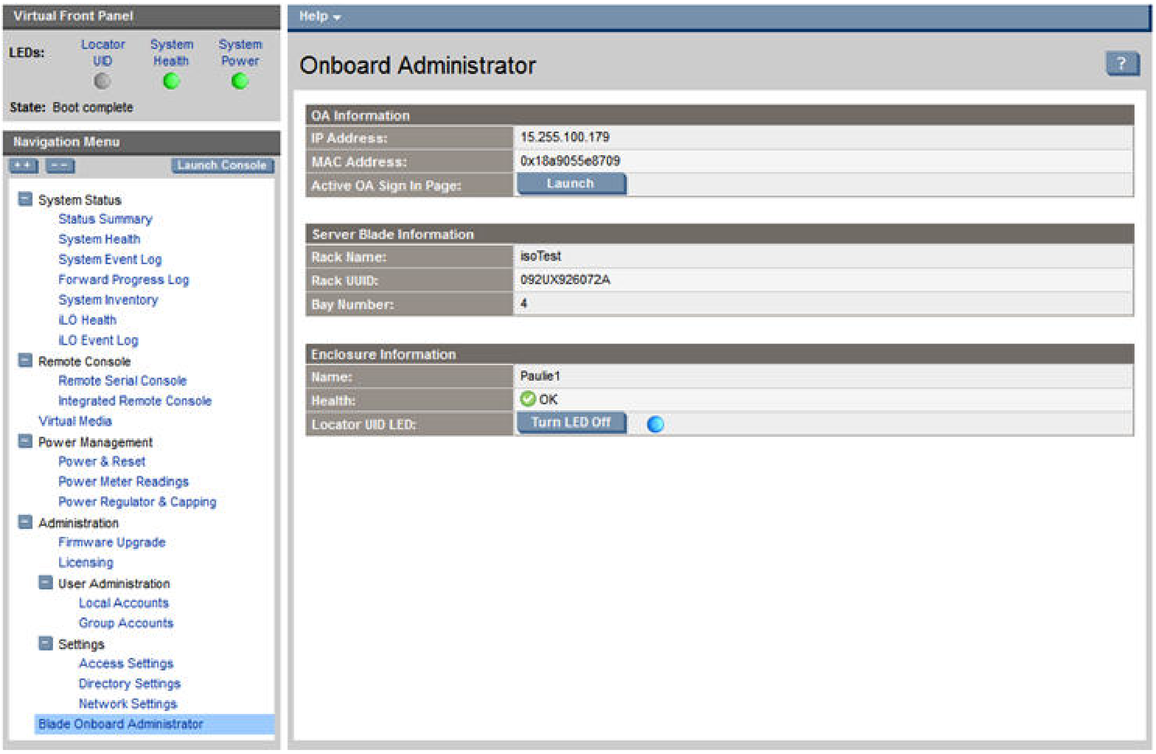
Item	Description
Use DHCP supplied domain name	To use the DHCP server-supplied domain name, select `Yes`. Or enter a domain name in the Domain Name field.
Domain name	Enter the name of the domain where the system resides. This can be entered if DHCP is not being used (No was selected in the previous option), but DNS is wanted. This represents the DNS suffix of the subsystem. For example, hp.com in ilo.hp.com.
Use DHCP supplied DNS servers	To use the DHCP server-supplied DNS server list, select `Yes`. Or, enter one in the Primary / Secondary DNS server IP fields.
Primary / Secondary DNS Server IP	The IP addresses of the DNS servers. If supplied by the DHCP server, these boxes are filled automatically. Otherwise, enter the IP addresses manually.
Register with Dynamic DNS Server	To register the iLO MP Host Name with a DDNS server, select `Yes`.
Submit	Submits the DNS information.
Cancel	Cancels the action.

Relevant iLO MP TUI command: `DNS`

Onboard Administrator

The BladeSystem Onboard Administrator page provides a view of the enclosure status. The Onboard Administrator page only displays for server blades.

Figure 38 Onboard Administrator



State: Boot complete

OA Information

IP Address:	15.255.100.179
MAC Address:	0x18a9055e8709
Active OA Sign In Page:	Launch

Server Blade Information

Rack Name:	isoTest
Rack UUID:	092UX926072A
Bay Number:	4

Enclosure Information

Name:	Paulie1
Health:	✓ OK
Locator UID LED:	Turn LED Off ●

Table 32 Onboard Administrator description

Item	Description
OA IP Address	Displays the IP address of the OA. **IMPORTANT:** Integrity iLO 3 must have a reachable IP address as the default gateway address. Since the OA is reachable, HP recommends using the OA IP address as the gateway address for Integrity iLO 3. If you use the Enclosure IP mode, this solution works during a failover. In the Enclosure IP mode, a static IP address is assigned to the active OA, and during a failover, the same IP address follows the active OA. If the OA IP address is assigned using DHCP, the solution does not work. In such instances, HP recommends manually changing the iLO 3 gateway address.
OA MAC Address	Displays the MAC address of the OA.
Active OA Sign In Page	Click this button to launch the OA Sign In page.
Rack Name	Used to logically group together enclosures in a rack. The rack name is shared with the other enclosures in the rack.
Rack UID	The rack universal unique identifier.
Bay Number	The bay number is used to locate and identify the monarch blade.
Bays Consumed (full height)	Lists bay numbers in the enclosure populated by blades that are part of this server or partition.
Enclosure Name	Used to logically group together the server blades installed in the same enclosure. The enclosure name is shared with the other servers in the enclosure.
Enclosure Health	Displays the health of the enclosure. OK — Normal operation, any issues have been acknowledged. Degraded — Typically loss of redundancy or partial failure of a component. Critical — Failure with loss or imminent loss of system function.
Locator UID LED	Enables you to turn the enclosure Locator UID LED on or off.

Relevant iLO MP TUI commands: `BLADE`, `LOC`

Before setting up the HP BladeSystem OA, HP recommends that you read the *HP BladeSystem Onboard Administrator User Guide* on the HP website at HP BladeSystem c-Class Onboard Administrator. Reading this guide ensures that you obtain an overall understanding of the HP BladeSystem OA and that you properly complete the initial setup to facilitate proper functioning of the OA.

Help

The iLO 3 has a robust help system.

To access iLO 3 help, click the **?** at the top right corner of each page.

Select any of the topics listed in the left navigation bar to access that particular help screen.

8 Installing and configuring directory services

You can install and configure iLO 3 directory services to leverage the benefits of a single point of administration for iLO 3 user accounts.

This chapter provides information on how to install and configure iLO 3 directory services.

Directory services

The following are benefits of directory integration:

Scalability	Leverage the directory to support thousands of users on thousands of iLO 3s.
Security	Robust user password policies are inherited from the directory. User password complexity, rotation frequency, and expiration are policy examples.
Role-based administration	You can create roles (for instance, clerical, remote control of the host, complete control), and associate users or user groups with those roles. When you change a single role, the change applies to all users and the iLO 3 devices associated with that role.
Single point of administration	You can use native administrative tools, like Microsoft Management Console (MMC) and ConsoleOne, to administer the iLO 3 users.
Immediacy	A single change in the directory rolls out immediately to associated iLO 3s, eliminating the need to script this process.
Reuse of user name and password	You can use existing user accounts and passwords in the directory without having to record or remember a new set of credentials for iLO 3.
Flexibility	You can create a single role for a single user on a single iLO 3; you can create a single role for multiple users on multiple iLO 3s; or you can use a combination of roles to best fit your enterprise.
Compatibility	The iLO 3 directory integration applies to the iLO 3 products and supports the popular directories Active Directory and eDirectory.
Standards	The iLO 3 directory support builds on the LDAP 2.0 standard for secure directory access.

Features supported by directory integration

The iLO 3 directory services functionality enables you to do the following:

- Authenticate users from a shared, consolidated, scalable user database.
- Control user privileges (authorization) using the directory service.
- Use roles in the directory service for group-level administration of iLO 3 and iLO 3 users.

To install directory services for the iLO 3, a schema administrator must extend the directory schema.

The local user database is retained. You can choose not to use directories, to use a combination of directories and local accounts, or to use directories exclusively for authentication.

Directory services installation prerequisites

Before installing directory services, you must configure LDAP.

Installing directory services

To successfully enable directory-enabled management on any iLO 3:

1. Plan.

   Review the following sections:

   - "Directory services" (page 113)
   - "Directory services schema (LDAP)" (page 144)
   - "Directory-enabled remote management" (page 139)

2. Install.

   a. Download the HP Lights-Out Directory Package containing the schema installer, the management snap-in installer, and the migrations utilities from the HP website (http://www.hp.com/servers/lights-out).

   b. Run the schema installer once to extend the schema. See "Schema installer" (page 115).

   c. Run the management snap-in installer and install the appropriate snap-in for your directory service on one or more management workstations. See "Management snap-in installer" (page 117).

3. Update.

   a. With the directory-enabled firmware, flash the ROM on iLO 3.

   b. From the Directory Settings in the iLO 3 user interface, set directory server settings and the distinguished name of the iLO 3 objects.

4. Manage.

   a. Create a management device object and a role object using the snap-in. See "Directory services objects" (page 123).

   b. Assign rights to the role object, as necessary, and associate the role with the management device object.

   c. Add users to the role object.

   For more information about managing directory service, see "Directory-enabled remote management" (page 139). Examples are available in: "Directory services for Active Directory" (page 117) and "Directory services for eDirectory" (page 127).

Schema documentation

To assist with the planning and approval process, HP documents the changes made to the schema during the schema setup process. To review the changes made to your existing schema, see "Directory services schema (LDAP)" (page 144).

Directory services support

Integrity iLO 3 supports the following directory services:

- Microsoft Active Directory
- Windows Server 2003 Active Directory
- Novell eDirectory 8.6.2
- Novell eDirectory 8.7

The iLO 3 software is designed to run within the Microsoft Active Directory Users and Computers, and Novell ConsoleOne management tools. This enables you to manage user accounts on Microsoft Active Directory or Novell eDirectory. There is no distinction made between eDirectory running on NetWare, Linux, or Windows operating systems. To spawn an eDirectory schema extension, you must have Java 1.4.2 or later for SSL authentication.

Integrity iLO 3 supports Microsoft Active Directory running on one of the following operating systems:

- Windows 2000 family
- Windows Server 2003 family

Integrity iLO 3 supports eDirectory 8.6.2 and 8.7 running on one of the following operating systems:

- Windows 2000 family
- Windows Server 2003 family
- NetWare 5.x
- NetWare 6.x
- Red Hat Enterprise Linux AS 2.1
- Red Hat Linux 7.3
- Red Hat Linux 8.0

eDirectory installation prerequisites

Directory services for iLO 3 uses LDAP over SSL to communicate with the directory servers. Integrity iLO 3 software is designed to install in eDirectory Version 8.6.1 (and later) tree. HP does not recommend installing this product if you have eDirectory servers with a version earlier than eDirectory 8.6.1. Before installing snap-ins and schema extensions for eDirectory, read and have available the following technical information documents (available at Novell Support at: http://support.novell.com)

- TID10066591 *Novell eDirectory 8.6 or greater NDS compatibility matrix*
- TID10057565 *Unknown objects in a mixed environment*
- TID10059954 *How to test whether LDAP is working properly*
- TID10023209 *How to configure LDAP for SSL (secure) connections*
- TID10075010 *How to test LDAP authentication*

To install directory services for iLO 3, an administrator must extend the eDirectory schema.

Required schema software

The iLO 3 requires specific software to extend the schema and provide snap-ins to manage the iLO 3 network. An HP Smart Component that contains the schema installer and the management snap-in installer is available for download from the HP website at http://www.hp.com/go/integrityiLO.

The two components you need for Integrity iLO 3 directory integration are the Schema Extender Utility and the Snap-in Installer.

Schema installer

One or more `.xml` files are bundled with the schema installer. These files contain the schema that is added to the directory. Typically, one of these files contains core schema that is common to all the supported directory services. Additional files contain only product-specific schema. The schema installer requires the use of the .NET Framework.

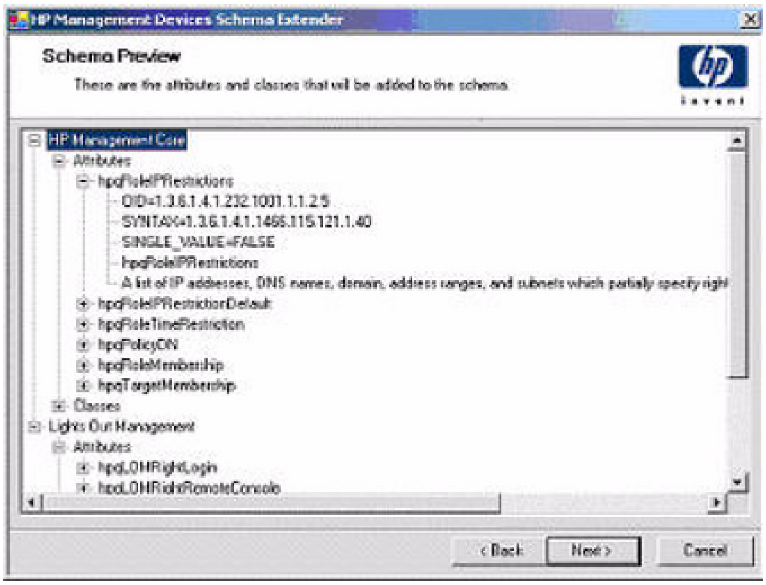
The schema installer includes three important screens:

- Schema Preview
- Setup
- Results

Schema preview

The Schema Preview screen enables you to view proposed extensions to the schema. This application reads the selected schema files, parses the XML, and displays the schema on the screen in a tree view listing all of the details of the attributes and classes that are installed.

Figure 39 Schema Preview screen



Schema Preview

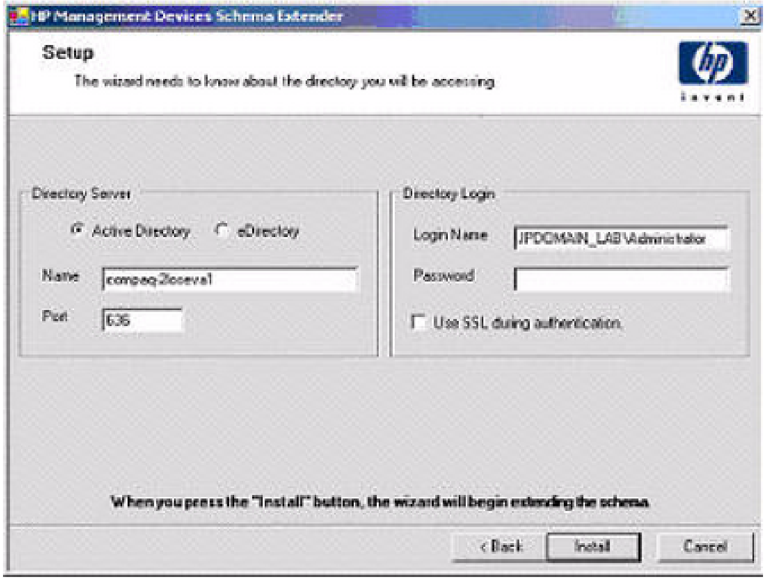
These are the attributes and classes that will be added to the schema.

```
⊟ HP Management Core
   ⊟ Attributes
      ⊟ hpqRoleIPRestrictions
           OID=1.3.6.1.4.1.232.1001.1.1.2.5
           SYNTAX=1.3.6.1.4.1.1466.115.121.1.40
           SINGLE_VALUE=FALSE
           hpqRoleIPRestrictions
           A list of IP addresses, DNS names, domain, address ranges, and subnets which partially specify right
      ⊞ hpqRoleIPRestrictionDefault
      ⊞ hpqRoleTimeRestriction
      ⊞ hpqPolicyDN
      ⊞ hpqRoleMembership
      ⊞ hpqTargetMembership
   ⊞ Classes
⊟ Lights Out Management
   ⊟ Attributes
      ⊞ hpqLOMRightLogin
      ⊞ hpqLOMRightRemoteConsole
```

Schema setup

To enter information before extending the schema, use the Setup screen.

Figure 40 Schema Setup screen



Setup

The wizard needs to know about the directory you will be accessing

Directory Server

● Active Directory ○ eDirectory

Name: compaq2eeval

Port: 636

Directory Login

Login Name: JPDOMAIN_LAB\Administrator

Password:

□ Use SSL during authentication.

When you press the "Install" button, the wizard will begin extending the schema.

The Directory Server section of the Setup screen enables you to select whether to use Active Directory or eDirectory, and to set the computer name and the port to be used for LDAP communications.

IMPORTANT: To extend the schema on Active Directory you must be an authenticated schema administrator, the schema must not be write protected, and the directory must be the flexible single master operation (FSMO) role owner in the tree. The installer attempts to make the target directory server the FSMO schema master.

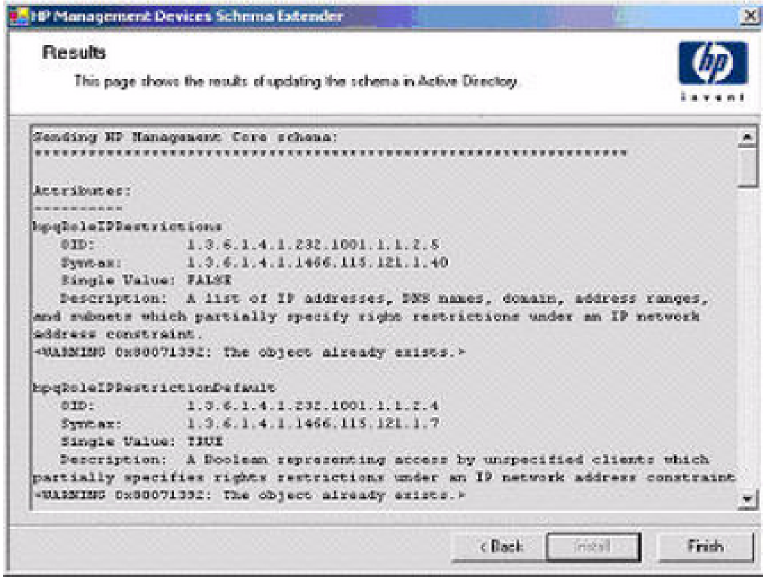
To obtain write access to the schema in Windows 2000, you must change the registry safety interlock. If you select the Active Directory option, the schema extender attempts to change the registry. The schema extender can only change the registry if the administrator who is extending the schema has the appropriate rights. Write access to the schema is automatically enabled on Windows Server 2003.

The Directory Login section of the Setup screen enables you to enter your login name and password, which might be required to complete the schema extension. The Use SSL During Authentication option sets the form of secure authentication to be used. If selected, directory authentication using SSL is used. If not selected and **Active Directory** is selected, Windows NT® authentication is used. If not selected and **eDirectory** is selected, the administrator authentication and the schema extension continues using an unencrypted (clear text) connection.

Results

The Results screen displays the results of the installation, including whether the schema can be extended and what attributes were changed.

Figure 41 Schema Results screen



This page shows the results of updating the schema in Active Directory

```
Sending HP Management Core schema:
**********************************************************************

Attributes:
-----------
hpqRoleIPRestrictions
    OID:          1.3.6.1.4.1.232.1001.1.1.2.5
    Syntax:       1.3.6.1.4.1.1466.115.121.1.40
    Single Value: FALSE
    Description:  A list of IP addresses, DNS names, domain, address ranges,
and subnets which partially specify right restrictions under an IP network
address constraint.
<WARNING 0x80071392: The object already exists.>

hpqRoleIPRestrictionDefault
    OID:          1.3.6.1.4.1.232.1001.1.1.2.4
    Syntax:       1.3.6.1.4.1.1466.115.121.1.7
    Single Value: TRUE
    Description:  A Boolean representing access by unspecified clients which
partially specifies rights restrictions under an IP network address constraint
<WARNING 0x80071392: The object already exists.>
```

Management snap-in installer

The management snap-in installer installs the snap-ins required to manage iLO 3 objects in a Microsoft Active Directory Users and Computers directory or in a Novell ConsoleOne directory.

To create an iLO 3 directory using iLO 3 snap-ins:

1. Create and manage iLO 3 objects and role objects.
2. Make the associations between iLO 3 objects and role objects.

Directory services for Active Directory

HP provides a utility to automate much of the directory setup process. You can download the HP Directories Support for iLO 3 on the HP website at http://h20000.www2.hp.com/bizsupport/TechSupport/.

The following sections provide installation prerequisites, preparation, and a working example of directory services for Active Directory.

Active Directory installation prerequisites

The following are prerequisites for installing Active Directory:

- The Active Directory must have a digital certificate installed to enable iLO 3 to connect securely over the network.
- The Active Directory must have the schema extended to describe iLO 3 object classes and properties.

Directory services for iLO 3 uses LDAP over SSL to communicate with the directory servers. Before installing snap-ins and schema for Active Directory, read and have available the following documentation:

IMPORTANT: To install directory services for iLO 3, an Active Directory schema administrator must extend the schema.

- Extending the schema in the Microsoft Windows Server Resource Kit, available at: http://www.microsoft.com
-
- Installing Active Directory in the Microsoft Windows 2000 Server Resource Kit, available at: http://www.microsoft.com
- Microsoft Knowledge Base articles:
  - 216999 “How to Install the Remote Server Administration Tools in Windows”
  - 314978 “How to Use `Adminpak.msi` to Install a Specific Server Administration Tool in Windows 2000”
  - 247078 “How to Enable SSL Communication over LDAP for Windows 2000 Domain Controllers”
  - 321051 “How to Enable LDAP over SSL with a Third-Party Certification Authority”
  - 299687 MS01-036 “Function Exposed by Using LDAP over SSL Could Enable Passwords to Be Changed”

Integrity iLO 3 requires a secure connection to communicate with the directory service. This secure connection requires the installation of the Microsoft CA. For more information, see the following Microsoft technical references:

- Securing Windows 2000, Appendix D, Configuring Digital Certificates on Domain Controllers for Secure LDAP and SMTP Replication at: http://www.microsoft.com
- Microsoft Knowledge Base Article 321051 “How to Enable LDAP over SSL with a Third-Party Certification Authority”

Preparing directory services for Active Directory

To set up directory services for use with iLO 3:

1. Install Active Directory. For more information, see the resource kit, Installing Active Directory in the Microsoft Windows 2000 Server.
2. Install the Microsoft Admin Pack (the `ADMINPAK.MSI` file, which is located in the i386 subdirectory of the Windows 2000 Server or Advanced Server CD). For more information, see the Microsoft Knowledge Base Article 216999.
3. In Windows 2000, the safety interlock that prevents accidental writes to the schema must be temporarily disabled. The schema extender utility can do this if the remote registry service is

running and you have appropriate rights. You can also do this by setting `HKEY_LOCAL_MACHINE SYSTEM CurrentControlSet Services NTDS Parameters Schema Update Allowed` in the registry to a nonzero value (see the "Order of Processing When Extending the Schema" section of the Installation of Schema Extensions in the Windows 2000 Server Resource Kit), or by doing the following:

△ **CAUTION:** Incorrectly editing the registry can severely damage your system. HP recommends creating a backup of any valued data on the computer before making changes to the registry.

NOTE: This step is not necessary if you are using Windows Server 2003.

a. Start the MMC.
b. In MMC, install the Active Directory schema snap-in.
c. Right-click **Active Directory Schema** and select **Operations Master**.
d. Select **The Schema may be modified on this Domain Controller**.
e. Click **OK**.

The Active Directory schema folder may need to be expanded for the checkbox to be available.

4. Create a certificate or install Certificate Services. This step is necessary because iLO 3 uses SSL to communicate with Active Directory.
5. To specify that a certificate be issued to the server running Active Directory, do the following:
   a. Launch MMC on the server and add the default domain policy snap-in (Group policy and browse to default domain policy object).
   b. Click **Computer Configuration>Windows Settings>Security Settings>Public Key Policies**.
   c. Right-click **Automatic Certificate Requests Settings**, and select **New>Automatic Certificate Request**.
   d. Using the wizard, select the domain controller template and the certificate authority you want to use.
6. Download the Smart Component that contains the installers for the schema extender and the snap-ins. You can download the Smart Component from the HP website at http://www.hp.com/go/integrityiLO.
7. Run the schema installer application to extend the schema, which extends the directory schema with the proper HP objects.

   The schema installer associates the Active Directory snap-ins with the new schema. The snap-in installation setup utility is a Windows MSI setup script and runs anywhere MSI is supported (Windows XP, Windows 2000, Windows 98). However, some parts of the schema extension application require the .NET Framework, which you can download from the Microsoft website at:

   http://www.microsoft.com

Installing and initializing snap-ins for Active Directory

To install the snap-ins and configure the directory service:

1. To install the snap-ins, run the snap-in installation application.

2. Configure the directory service with the appropriate objects and relationships for iLO 3 management:
   a. Use the management snap-ins from HP to create iLO 3 policy, admin, and user role objects.
   b. Use the management snap-ins from HP to build associations between the iLO 3 object, the policy object, and the role object.
   c. Point the iLO 3 object to the admin and user role objects (admin and user roles automatically point back to the iLO 3 object).

   For more information about iLO 3 objects, see "Directory services objects" (page 123).

At a minimum, create:

- One role object that contains one or more users and one or more iLO 3 objects.
- One iLO 3 object corresponding to each iLO 3 using the directory.

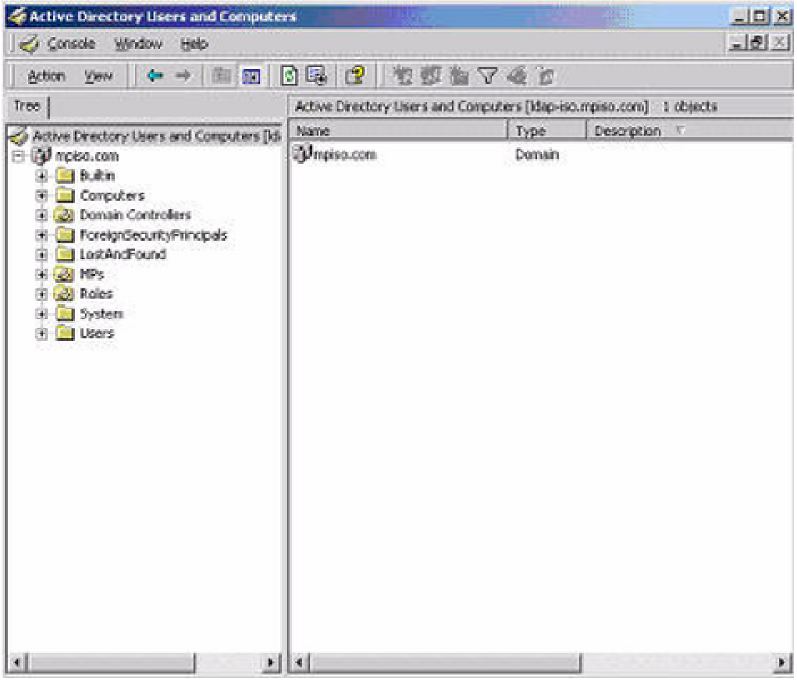
Example: creating and configuring directory objects for use with iLO 3 in Active Directory

The following example shows how to set up roles and HP devices in an enterprise directory with the domain `mpiso.com`, which consists of two organizational units: Roles and MPs.

NOTE: Roles, such as `hpqTargets` and so on, are for extended schema LDAP only. They are not used in schema-free LDAP.

Assume that a company has an enterprise directory including the domain `mpiso.com`, arranged as shown in Figure 42.

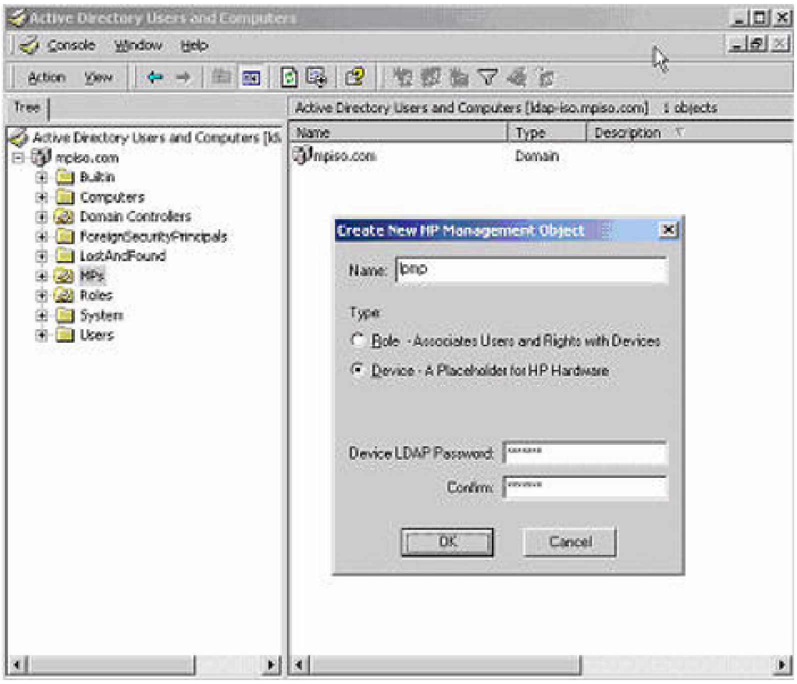
Figure 42 Directory example


Active Directory Users and Computers
Console
Window
Help
Action
View
Tree
Active Directory Users and Computers [ld
mpiso.com
Builtin
Computers
Domain Controllers
ForeignSecurityPrincipals
LostAndFound
MPs
Roles
System
Users
Active Directory Users and Computers [ldap-iso.mpiso.com]   1 objects
Name
Type
Description
mpiso.com
Domain

1. Create an organizational unit to contain the iLO 3 devices managed by the domain. In this example, two organizational units are created, Roles and MPs.
2. Use the Active Directory Users and Computers snap-ins provided by HP to create iLO 3 objects for several iLO 3 devices in the MP organizational unit.
   a. In the `mpiso.com` domain, right-click the **MPs** organizational unit and select **NewHPObject**.

b. In the Create New HP Management Object dialog box, select **Device** for the type.

Figure 43 Create new HP Management Object dialog box



Create New HP Management Object

Name: lpmp

Type:

○ Role - Associates Users and Rights with Devices

● Device - A Placeholder for HP Hardware

Device LDAP Password: ******

Confirm: ******

Active Directory Users and Computers
Console Window Help
Action View
Tree
Active Directory Users and Computers [ld
mpiso.com
Builtin
Computers
Domain Controllers
ForeignSecurityPrincipals
LostAndFound
MPs
Roles
System
Users
Active Directory Users and Computers [ldap-iso.mpiso.com] 1 objects
Name
Type
Description
mpiso.com
Domain
OK
Cancel

c. In the Name field of the dialog box, enter an appropriate name In this example, the DNS host name of the iLO 3 device, `lpmp`, is used as the name of the iLO 3 object, and the surname is iLO 3.

d. Enter and confirm a password in the Device LDAP Password and Confirm fields (this is optional).

e. Click **OK**.

3. Use the HP provided Active Directory Users and Computers snap-ins to create HP role objects in the roles organizational unit.

4. Right-click the **Roles** organizational unit, select **New**, and select **Object**. The Create New HP Management Object dialog box appears.

   a. In the Type field, select **Role**.

   b. In the Name field, enter an appropriate name. In this example, the role contains users trusted for remote server administration and is named remoteAdmins.

   c. Click **OK**

   d. Repeat the process, creating a role for remote server monitors named remoteMonitors.

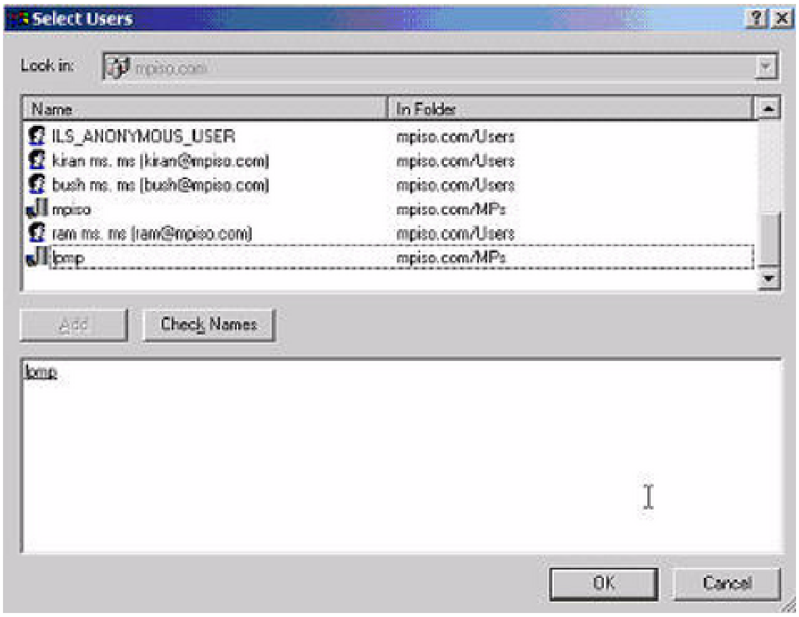
5. Use the Active Directory Users and Computers snap-ins provided by HP to assign the roles rights, and associate the roles with users and devices.

   a. In the Roles organizational unit in the `mpiso.com` domain, right-click the **remoteAdmins** role , and select **Properties**.

   b. Select the HP Devices tab and click **Add**.

c. From the Select Users dialog box, select the iLO 3 object created in step 2: (`lpmp` in folder `mpiso.com/MPs`).

Figure 44 Select Users dialog box



Name	In Folder
ILS_ANONYMOUS_USER	mpiso.com/Users
kiran ms. ms (kiran@mpiso.com)	mpiso.com/Users
bush ms. ms (bush@mpiso.com)	mpiso.com/Users
mpiso	mpiso.com/MPs
ram ms. ms (ram@mpiso.com)	mpiso.com/Users
lpmp	mpiso.com/MPs

lpmp

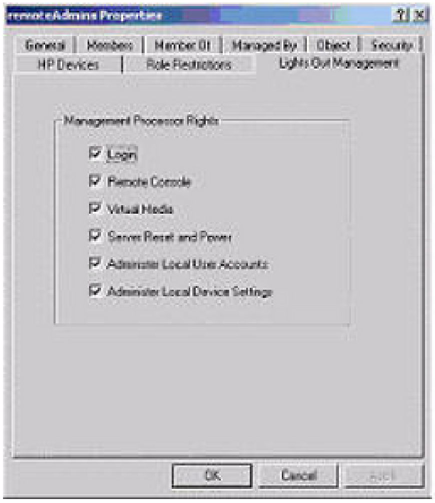
d. Click **OK**.

e. To save the list, click **Apply**.

f. To add users to the role, click the Members tab and use the **Add** button and the Select Users dialog box. Devices and users are now associated.

6. To set the rights for the role, use the Lights-Out Management tab. All users and groups within a role have rights assigned to the role on all of the iLO 3 devices managed by the role. In this example, the users in the remoteAdmins role are given full access to the iLO 3 functionality. Select the appropriate rights and click **Apply**.

Figure 45 Lights-Out Management tab



Management Processor Rights

☑ Login
☑ Remote Console
☑ Virtual Media
☑ Server Reset and Power
☑ Administer Local User Accounts
☑ Administer Local Device Settings

7. Click **OK**.

8. Using the same procedure in step 4, edit the properties of the remoteMonitors role, add the lpmp device to the Managed Devices list on the HP Devices tab, and use the Members tab to add users to the remoteMonitors role.

9. On the Lights-Out Management tab, click the **Login** checkbox.

10. Click **Apply** and **OK**. Members of the remoteMonitors role are able to authenticate and view the server status.

User rights to any iLO 3 are calculated as the sum of all the rights assigned by all the roles in which the user is a member and the iLO 3 is a managed device. Following the preceding examples, if a user is included in both the remoteAdmins and remoteMonitors roles, he or she has all the rights of those roles, because the remoteAdmins role also has those rights.

To configure iLO 3 and associate it with an iLO 3 object, use settings similar to the following (based on the preceding example) in the iLO 3 Directory Settings text user interface:

```
RIB Object DN = cn=lpmp,ou=MPs,dc=mpiso,dc=com
Directory User Context 1 = cn=Users,dc=mpiso,dc=com
```

For example, user Mel Moore (with the unique ID MooreM, located in the Users organizational unit within the `mpiso.com` domain, and a member of one of the remoteAdmins or remoteMonitors roles) can be allowed to log in to the iLO 3. To log in, he can enter **`mpiso moorem`**, or **`moorem@mpiso.com`**, or **`Mel Moore`**, in the Login Name field of the iLO 3 login, and use his Active Directory password in the Password field.

Directory services objects

One of the keys to directory-based management is proper virtualization of the managed devices in the directory service. This virtualization enables the administrator to build relationships between a managed device and user or groups already contained within the directory service. The iLO 3 user management requires the following basic objects in the directory service:

- iLO 3
- Role
- User

Each object represents a device, user, or relationship that is required for directory-based management.

NOTE: After you install the snap-ins, restart ConsoleOne and MMC to display the new entries.

After the snap-in is installed, you can create iLO 3 objects and roles in the directory. Using the Users and Computers tool, you can:

- Create iLO 3 objects and role objects.
- Add users to the role objects.
- Set the rights and restrictions of the role objects.

Active Directory snap-ins

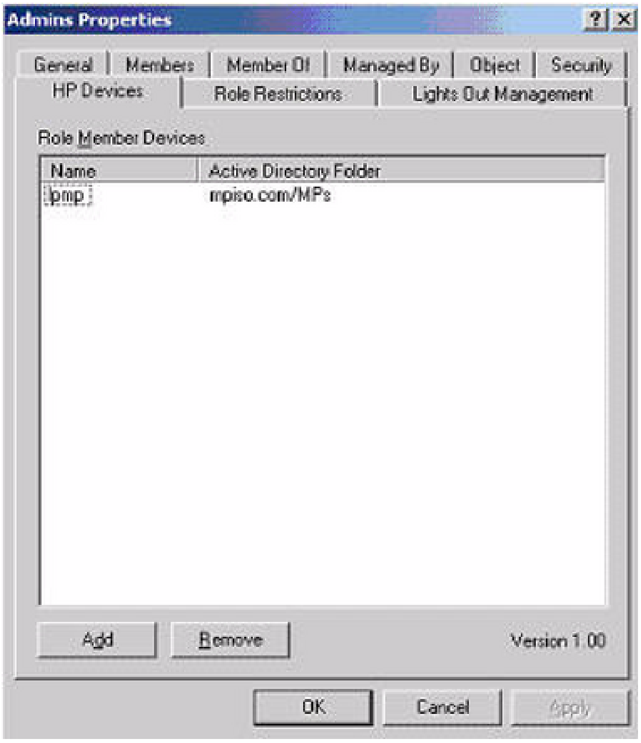
The following sections discuss the additional management options available in Active Directory Users and Computers after you have installed the HP snap-ins.

Managing HP devices in a role

To add HP devices to be managed in a role, use the HP Devices tab.

- To browse to a specific HP device and add it to the list of member devices, click **Add**.
- To browse to a specific HP device and remove it from the list of member devices, click **Remove**.

Figure 46 HP Devices tab



Role Member Devices

Name	Active Directory Folder
pmp	mpiso.com/MPs

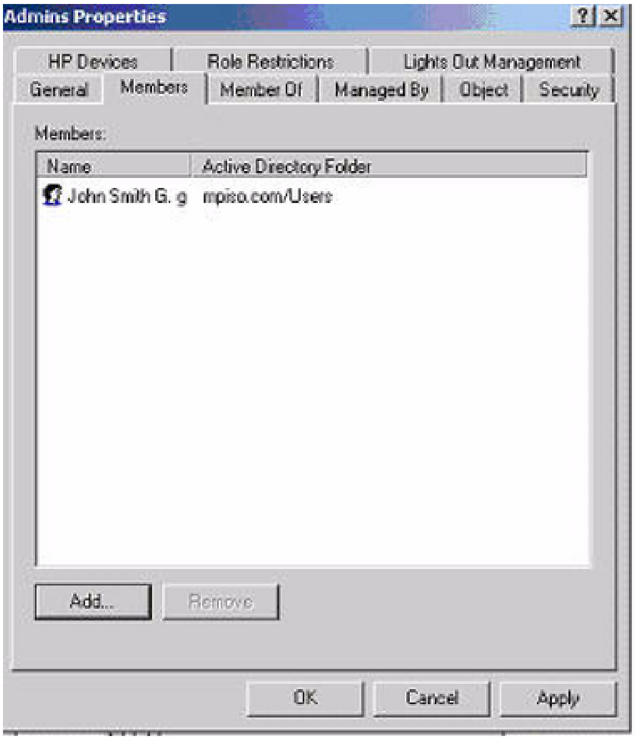
Version 1.00

Managing users in a role

After user objects are created, use the Members tab to manage the users within the role.

- To add a user, browse to the specific user you want to add, and click **Add**.
- To remove a user from the list of valid members, highlight an existing user and click **Remove**.

Figure 47 Members tab



Members:

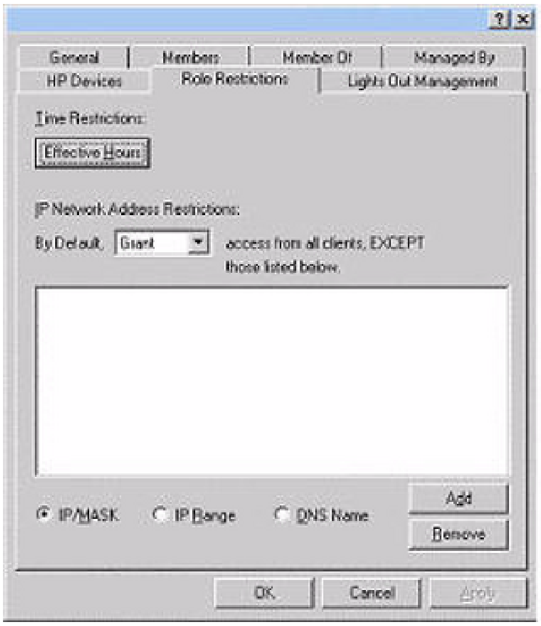
Name	Active Directory Folder
John Smith G. g	mpiso.com/Users

Setting login restrictions

The Role Restrictions tab enables you to set login restrictions for a role. These restrictions include:

- Time Restrictions
- IP Network Address Restrictions
  - IP/Mask
  - IP Range
  - DNS Name

Figure 48 Role Restrictions tab



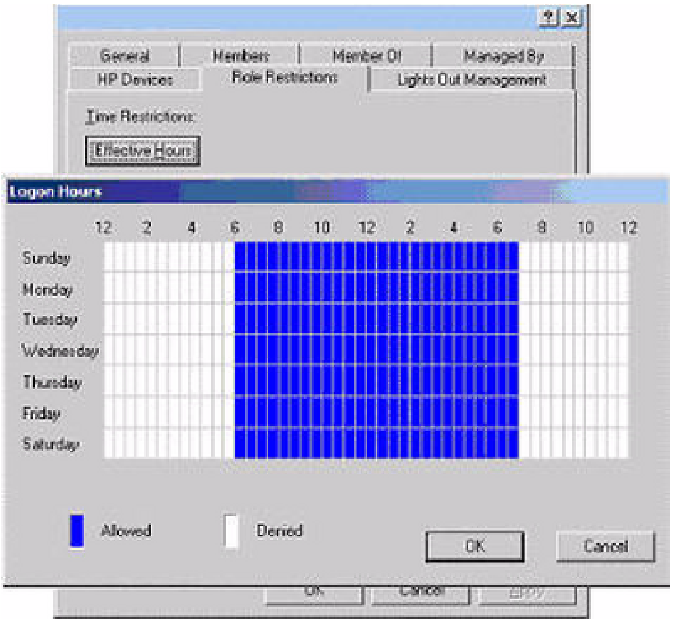
By Default: Grant access from all clients, EXCEPT those listed below.

● IP/MASK ○ IP Range ○ DNS Name

Setting time restrictions

- To manage the hours available for login by members of the role, click the Effective Hours button. The Logon Hours screen appears (Figure 49).
- To select the times available for login each day of the week in half-hour increments, use the Logon Hours screen. You can change a single square by clicking it, or you can change a section of squares by clicking and holding the mouse button, dragging the cursor across the squares to be changed, and releasing the mouse button.
- Use the default setting to allow access at all times.

Figure 49 Logon Hours screen



Defining client IP address or DNS name access

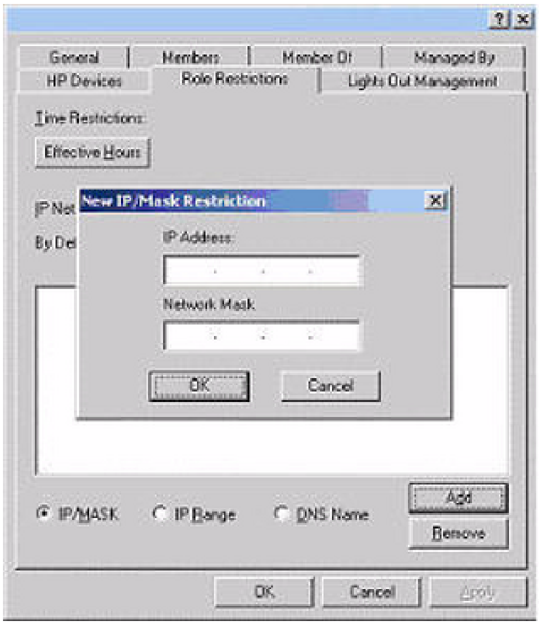
From the Role Restrictions tab, you can grant or deny access to an IP address, IP address range, or DNS names.

In the By Default list, select whether to grant or deny access from all addresses except for specified IP addresses, IP address ranges, and DNS names.

To restrict an IP address:

1. From the Role Restrictions tab, select **IP/MASK** and click **Add**. The New IP/Mask Restriction dialog box appears.

   ### Figure 50 New IP/Mask dialog box

2. In the **New IP/Mask Restriction** dialog box, enter the information and click **OK**.
3. To restrict access based on a DNS, select **DNS Name** and click **Add**. The **New DNS Name Restriction** dialog box appears. The DNS Name option enables you to restrict access based

on a single DNS name or a subdomain, entered in the form of `host.company.com` or `*.domain.company.com`.

4. Enter the information and click **OK.**
5. To save the changes, click **OK**.

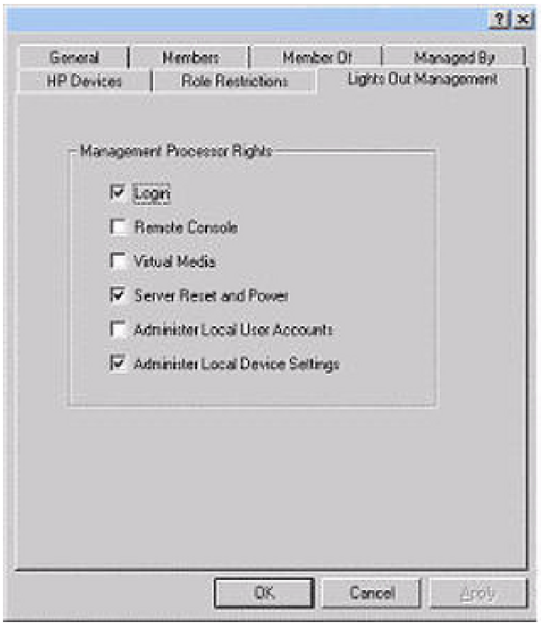
To remove any of the entries, highlight the entry in the display list and click **Remove**.

Setting user or group role rights

After you create a role, you can select rights for that role. You can enable users and group objects to be members of the role, giving each the rights granted by the role.

To manage rights, use the Lights-Out Management tab.

Figure 51 Lights-Out Management tab



Management Processor Rights

☑ Login
☐ Remote Console
☐ Virtual Media
☑ Server Reset and Power
☐ Administer Local User Accounts
☑ Administer Local Device Settings

Table 33 Lights-Out Management rights

MP Rights	Description
Login	Controls whether users can log in to the associated devices and issue `Status` or `Read-only` commands (view event logs and console logs, check system status, power status, and so on) but not issue any commands that might alter the state of iLO 3 or the system.
Remote Console	Enables users to access the system console (the host operating system).
Virtual Media	Enables users to connect devices through the network such as CD, DVD, and network drives as virtual devices.
Server Reset and Power	Enables users to issue iLO 3 power operations to remotely power on, power off, or reset the host platform, as well as configure the system power restore policy.
Administer Local User Accounts	Enables users to administer local iLO 3 user accounts.
Administer Local Device Settings	Enables users to configure all iLO 3 settings, as well as reboot iLO 3.

Directory services for eDirectory

The following sections provide installation prerequisites, preparation, and a working example of directory services for eDirectory.

NOTE: Schema-Free LDAP is not supported with eDirectory.

Installing and initializing snap-ins for eDirectory

For instructions on using the snap-in installation application, see "Installing and initializing snap-ins for Active Directory" (page 119).

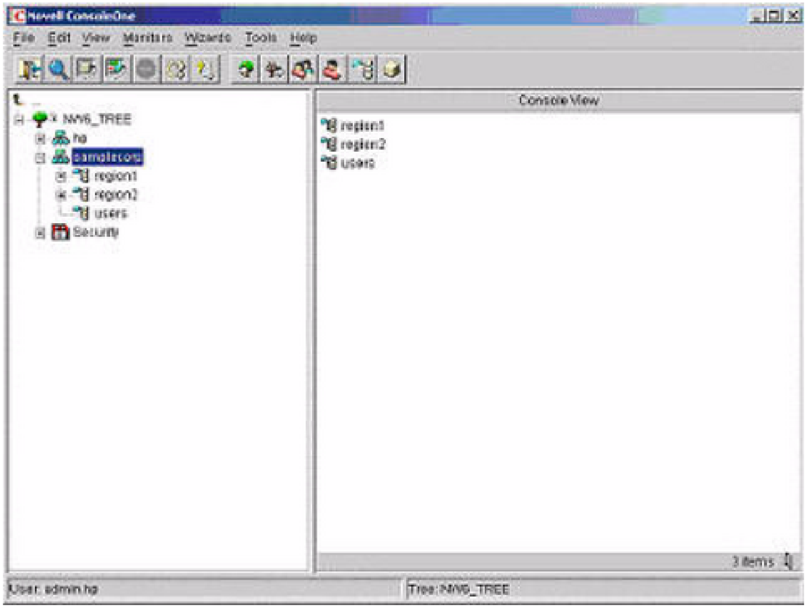
NOTE: After you install snap-ins, restart ConsoleOne and MMC to show the new entries.

Example: creating and configuring directory objects for use with iLO 3 devices in eDirectory

The following example demonstrates how to set up roles and HP devices in a company called samplecorp, which consists of two regions: region1 and region2.

Assume that samplecorp has an enterprise directory arranged according to that in Figure 52.

Figure 52 Roles and Devices example



Begin by creating organizational units in each region to contain iLO 3 devices and roles specific to that region. In this example, two organizational units are created, roles and HP devices, in each organizational unit (region1 and region2).

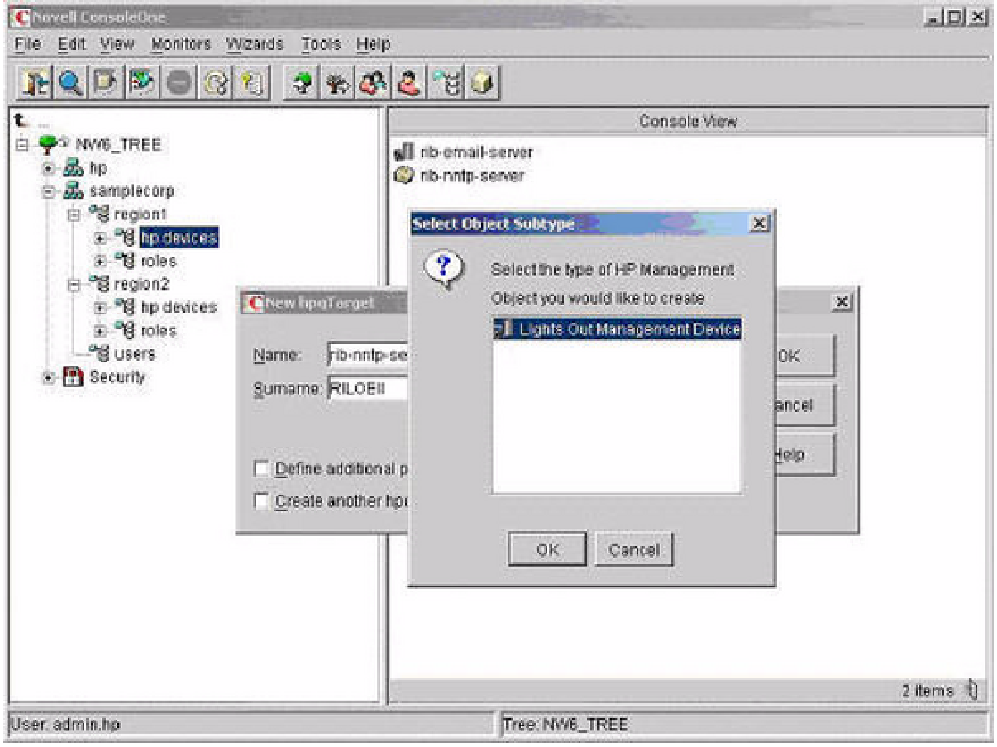
Creating objects

To create iLO 3 objects:

1. Use the ConsoleOne snap-ins provided by HP to create iLO 3 objects in the HP devices organizational unit for several iLO 3 devices.

2. From in the region1 organizational unit, right-click the **HP devices** organizational unit. Select **New**, and select **Object**.
   a. Select **hpqTarget** from the list of classes, and click **OK**.
   b. Enter an appropriate name and surname in the New **hpqTarget** dialog box. In this example, the DNS host name of the iLO 3 device, rib-email-server, is used as the name of the iLO 3 object, and the surname is RILOEII (iLO 3). Click **OK**. The Select Object Subtype dialog box appears.

Figure 53 Select Object Subtype dialog box



Select the type of HP Management Object you would like to create

Lights Out Management Device

Name: rib-nntp-se

Surname: RILOEII

□ Define additional p

□ Create another hp

   c. Select **Lights-Out Management Device** from the list, and click **OK**.
   d. Repeat the process for several more iLO 3 devices with the DNS names rib-nntp-server and rib-file-server-users1 in HP devices under region1, and rib-file-server-users2 and rib-app-server in HP devices under region2.

Creating roles

To create roles:

1. Use the ConsoleOne snap-ins provided by HP to create HP role objects in the roles organizational units.
   a. From the region2 organizational unit, right-click the **roles** organizational unit. Select **New**, and select **Object**.
   b. Select **hpqRole** from the list of classes, and click **OK**.
   c. Enter an appropriate name in the New hpqRole dialog box. In this example, the role contains users trusted for remote server administration and is named remoteAdmins.
   d. Click **OK**. The Select Object Subtype dialog box appears.
   e. Select **Lights-Out Management Devices** from the list, and click **OK**.
2. Repeat the process, creating a role for remote server monitors named remoteMonitors in region1 roles, and a remoteAdmins and remoteMonitors role in region2.
3. Use the ConsoleOne snap-ins provided by HP to assign rights to the role and associate the roles with users and devices.

a. Right-click the **remoteAdmins** role in the roles organizational unit in the region1 organizational unit, and select **Properties**.

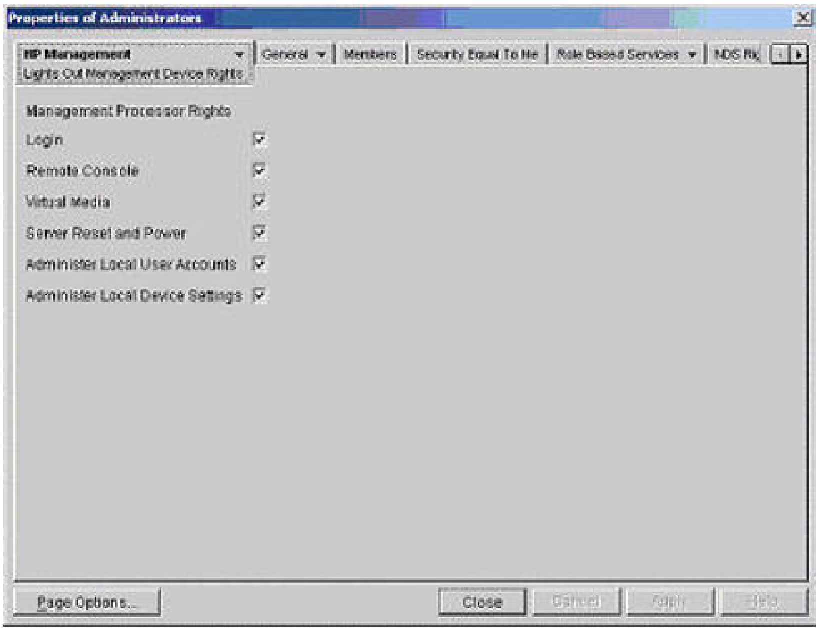
b. Select the Role Managed Devices subtab of the HP Management tab, and click **Add**.

c. Using the Select Objects dialog box, browse to the HP devices organizational unit in the region1 organizational unit. Select the three iLO 3 objects created in step 2. Click **OK** and click **Apply**.

d. Add users to the role. Click the Members tab, and add users using **Add** and the Select Objects dialog box. The devices and users are now associated.

e. To set the rights for the role, use the Lights-Out Management Device Rights subtab of the HP Management tab.

Figure 54 Setting role rights



Management Processor Rights

Login ☑

Remote Console ☑

Virtual Media ☑

Server Reset and Power ☑

Administer Local User Accounts ☑

Administer Local Device Settings ☑

All users within a role will have rights assigned to the role on all he iLO 3 devices managed by the role. In this example, users in the remoteAdmins role are given full access to iLO 3 functionality. Select the boxes next to each user right, and click **Apply**.

f. To close the property sheet, click **Close**.

4. Using the same procedure as in step 3, edit the properties of the remoteMonitors role:

   a. Add the three iLO 3 devices within HP devices under region1 to the Managed Devices list on the Role Managed Devices subtab of the HP Management tab.

   b. Add users to the remoteMonitors role using the Members tab.

   c. Using the Lights-Out Management Device Rights subtab of the HP Management tab, click the **Login** checkbox, and click **Apply** and **Close**. Members of the remoteMonitors role are now able to authenticate and view the server status.

User rights to any iLO 3 device are calculated as the sum of all the rights assigned by all the roles in which the user is a member, and in which the iLO 3 device is a managed device. Using the preceding examples, if a user is in both the remoteAdmins and remoteMonitors roles, he or she has all rights, because the remoteAdmins role has those rights.

To configure an iLO 3 device from the previous example and associate it with an iLO 3 object, use settings similar to the following on the iLO 3 directory settings TUI.

NOTE: In LDAP Distinguished Names, use commas, not periods, to separate each component.

```
RIB Object DN = cn=rib-email-server,ou=hp
```

```
devices,ou=region1,o=samplecorp
Directory User Context 1 = ou=users,o=samplecorp
```

For example, user CSmith (located in the users organizational unit within the samplecorp organization, and is a member of one of the remoteAdmins or remoteMonitors roles) is allowed to log in to iLO 3. To gain access, he enters **`csmith`** (case insensitive) in the Login Name field of the iLO 3 login, and uses his eDirectory password in the Password field.

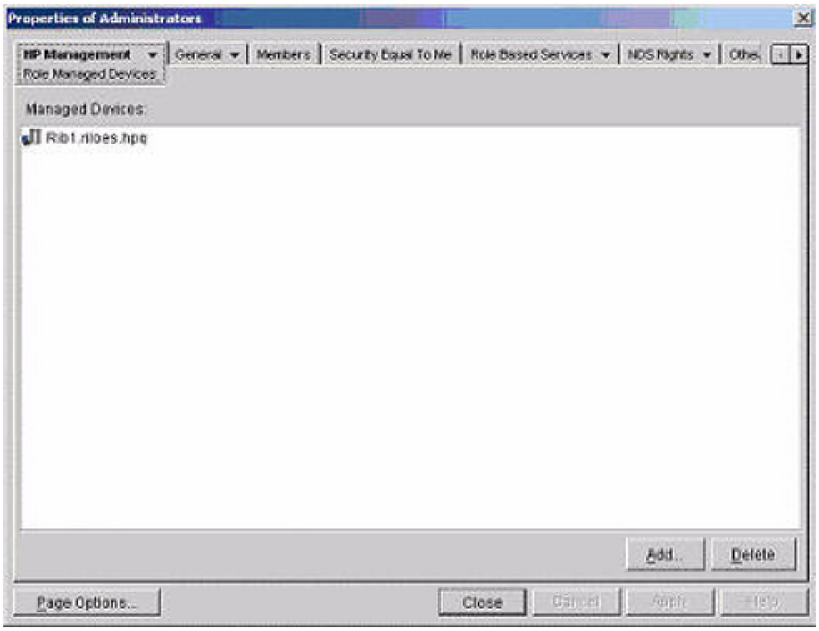
Directory services objects for eDirectory

Directory services objects enable virtualization of managed devices and the relationships between a managed device and a user or groups already contained within the directory service.

Adding role managed devices

Use the Role Managed Devices subtab under the HP Management tab to add HP devices to be managed within a role.

Figure 55 Role Managed Devices subtab

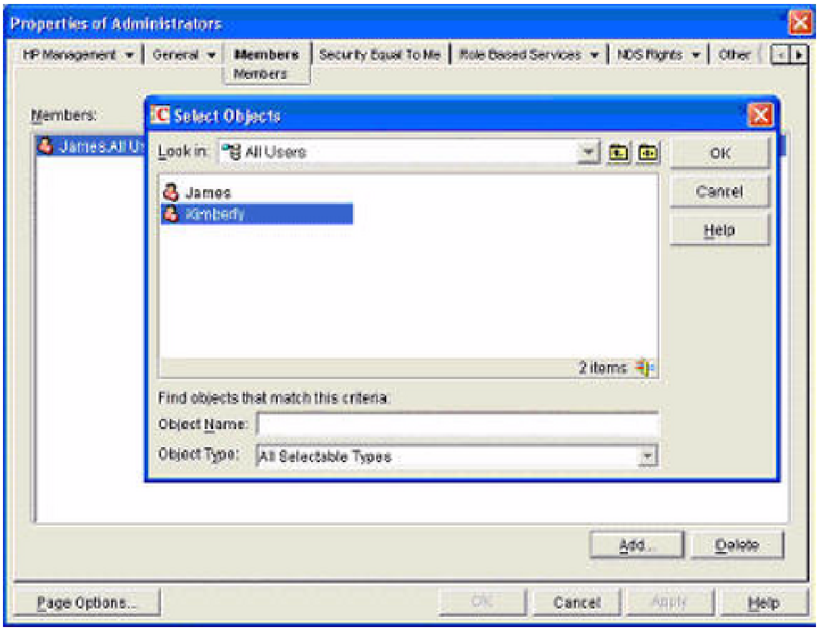


To browse to the specific HP device and add it as a managed device, click **Add**.

Adding members

After you create user objects, use the Members tab to manage users within a role.

Figure 56 Members tab (eDirectory)



Look in: All Users

Object Name:

Object Type: All Selectable Types

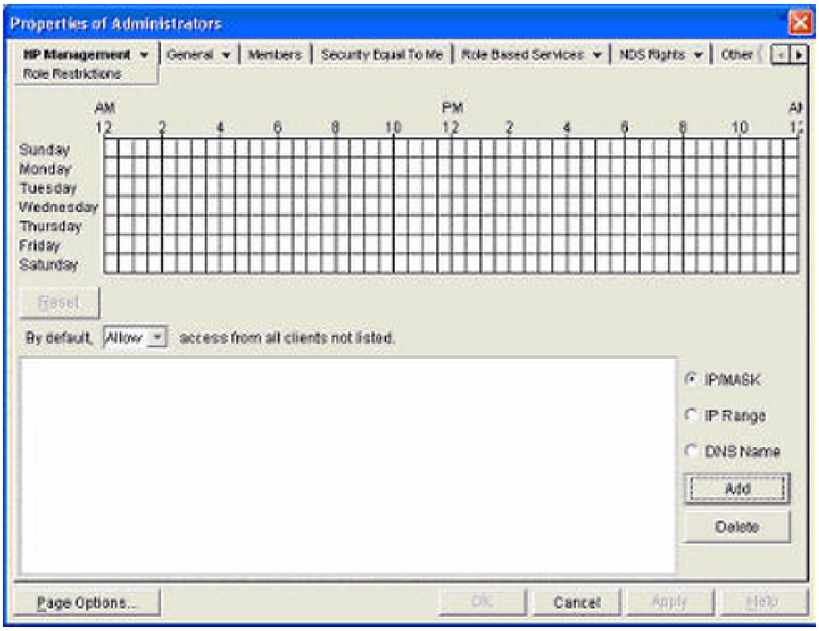
To browse to the specific user you want to add, click **Add**.

To remove a user from the list of valid members, highlight the user name and click **Delete**.

Setting role restrictions

The Role Restrictions subtab enables you to set login restrictions for a role.

Figure 57 Role Restrictions subtab (eDirectory)



By default, Allow access from all clients not listed.

● IP/MASK

These restrictions include the following:

- Time Restrictions
- IP Network Address Restrictions
  - IP/Mask
  - IP Range
- DNS Name

Setting time restrictions

You can manage the hours available for login by members of a role, using the time grid that appears in the Role Restrictions subtab (Figure 57). You can select the times available for login for each day of the week in half-hour increments. You can change a single square by clicking it or change a section of squares by clicking and holding the mouse button, dragging the cursor across the squares to be changed, and releasing the mouse button. The default setting is to allow access at all times.

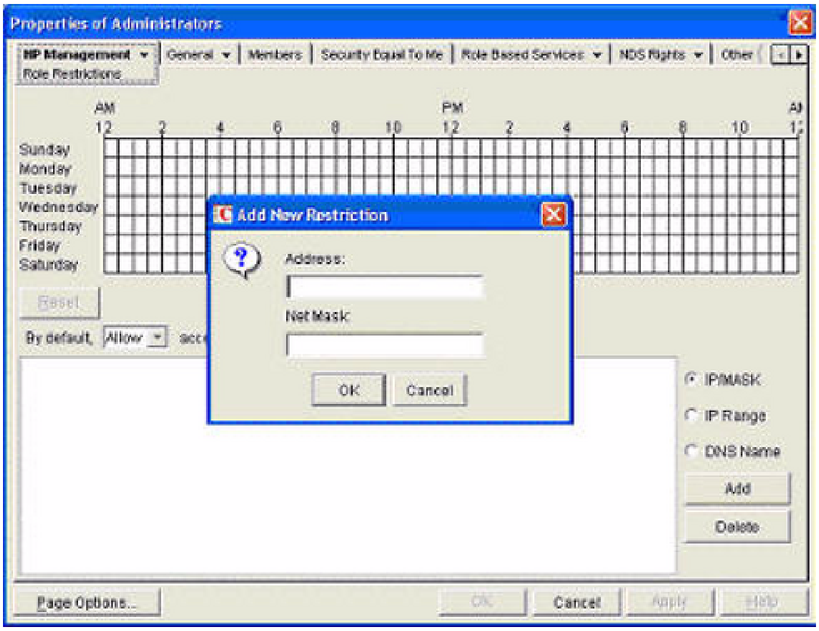
Defining client IP address or DNS name access

You can grant or deny access to an IP address, IP address range, or DNS names.

Using the By Default list, select whether to allow or deny access from all addresses except the specified IP addresses, IP address ranges, and DNS names.

1. To restrict an IP address, select **IP/MASK** in the Role Restrictions subtab and click **Add**. The **Add New Restriction** dialog box for the IP/Mask option appears.
2. In the **Add New Restriction** dialog box (Figure 58), enter the information, and click **OK**.

Figure 58 Add New Restriction dialog box



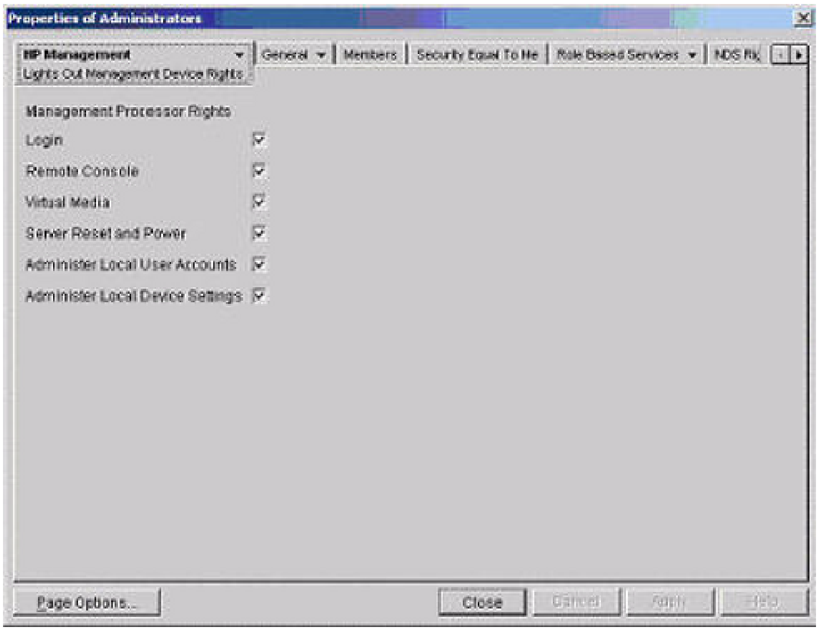
3. In the Role Restrictions subtab, select **DNS Name** and click **Add**. The DNS Name option enables you to restrict access based on a single DNS name or a subdomain, entered in the form of `host.company.com` or `*.domain.company.com`. The **New DNS Name Restriction** dialog box appears.
4. Enter the information and click **OK**.
5. To save the changes, click **Apply**.

To remove any of the entries, highlight the entry in the display field and click **Delete**.

Setting Lights-Out management device rights

After you create a role, you can select rights for the role and make users and group objects members of the role, which gives users or groups of users the rights granted by that role. To manage rights, use the Lights-Out Management Device Rights subtab of the HP Management tab.

Figure 59 Lights-Out management device rights tab



Management Processor Rights

Login ☑

Remote Console ☑

Virtual Media ☑

Server Reset and Power ☑

Administer Local User Accounts ☑

Administer Local Device Settings ☑

Table 34 Management Device Rights

Option	Description
Login	This option controls whether users can log in to the associated devices and issue `status` or `read-only` commands (view event logs and console logs, check system status, power status, and so on) but not issue any commands that might alter the state of iLO 3 or the system.
Remote Console	This option enables users to access the system console (the host operating system).
Virtual Media	This option enables users to connect devices through the network such as CD, DVD, and network drives as virtual devices.
Server Reset and Power	This option enables users to issue iLO 3 power operations to remotely power on, power off, or reset the host platform, as well as configure the system power restore policy.
Administer Local User Accounts	This option enables users to administer local iLO 3 user accounts.
Administer Local Device Settings	This option enables users to configure all iLO 3 settings, as well as reboot iLO 3.

Installing snap-Ins and extending schema for eDirectory on a Linux platform

This section describes a method that does not require a Windows client to install snap-ins and extend schema for eDirectory on a Linux platform.

Schema extension is the addition of new classes to existing classes. You can use these classes to create objects to support a specific utility. New classes are added, such as `hpqTarget`, `hpqPolicy` and `hpq` role. HP has created objects using these classes to support iLO 3 devices (created using the `hpqTarget` class), and iLO 3 administrators and monitors (created using the hpqRole class). These objects support the Login Authentication utility to the iLO 3 device and enable iLO 3 users to run commands based on the assigned roles.

Installing the Java Runtime Environment

As a prerequisite for extending schema, you must have Java Runtime Environment (JRE) 1.4.2 installed.

To ensure you have the correct version of JRE installed on your system:

1. To determine the Java version, run the following command:

   ```
   # java -version
   ```

   The Java version installed on your system is displayed.

2. If Java is not installed on your system, run the following command:

   ```
   # rpm -iv j2re-1_4_2_04-linux-i586.rpm
   ```

   NOTE: You can download this `rpm` file from the Java website.

3. Run the following command if:

   - Java is installed and the version is older than 1.4.2.
   - You want to upgrade the Java version and uninstall an older version.

   ```
   # rpm -Uv j2re-1_4_2_04-linux-i586.rpm
   ```

4. Add the entry **`/usr/java/j2re1.4.2_04/bin`** to the `.bash_profile` file.

Installing snap-Ins

Create the HP directory under the `/usr/ConsoleOne/snapins/` directory, and copy the two `.jar` snap-in files, `hpqLOMv100.jar` and `hpqMgmtCore.jar`, to the HP directory. When the `hpdsse.sh` file is issued, the HP directory is automatically created and the two `.jar` files are copied to it.

NOTE: The `hpdsse.sh` file is obtained when the `Schema.tar` tar file is extracted. This process is explained in the Schema Extension section. You can download schema extensions from the HP website at http://h18013.www1.hp.com/products/servers/management/directorysupp/index.html.

Select **Software and Drivers**, and the operating system for the schema extension you want to install.

Extending schema

To obtain the `hpdsse.sh` file:

1. Download the tar file to the Linux system where eDirectory is installed.
2. Extract the tar file to obtain the `hpdsse.sh` file by running the following command:

   ```
   # tar -xvf Schema. tar
   ```

3. Run this file by issuing the following command:

   ```
   # ./hpdsse.sh
   ```

   This command displays instructions. As indicated in the instructions to extend the schema, provide the server name, admin DN, and admin password as command line arguments.

4. To see the results, view the `schema.log` file, (created after the schema extension is complete).

   The log file lists the created classes and attributes. In addition, it shows the result as `Succeeded`. If the objects already exist, the message `Already Exists` appears in the log file.

The `Already Exists` message appears only when you try to run the same `.sh` file after the schema extension is complete.

The SSL port (636) is used during the schema extension. You can verify this by running the `netstat -nt   grep :636` command while the `hpdsse.sh` file is running.

Verifying snap-in installation and schema extension

To verify the installation of snap-ins and schema extension:

1. Run `ConsoleOne` and log on to the tree.
2. Verify the new classes by opening the **Schema Manager** from the Tools list.

   All the classes related to the HP directory services must be present in the classes list. The classes are `hpqRole`, `hpqTarget`, `hpqPolicy`, and `hpqLOMv100`.

Using the LDAP command to configure directory settings

Use the LDAP Command Menu in the iLO 3 MP TUI to configure iLO 3 LDAP directory settings.

The following is an example of the `LDAP` command output:

```
[mp1] CM:hpiLO-> LDAP

Current LDAP Directory Configuration:
L - LDAP Directory Authentication : Disabled
M - Local MP User database        : Enabled
I - Directory Server IP Address   : 192.0.2.1
P - Directory Server LDAP Port    : 636
D - Distinguished Name (DN)      : cn=mp,o=demo
1 - User Search Context 1        : o=mp
2 - User Search Context 2        : o=demo
3 - User Search Context 3        : o=test
Enter parameter(s) to change, A to modify All, or [Q] to Quit: a

  For each parameter, enter:
  New value, or
  <CR> to retain the current value, or
  DEFAULT to set the default value, or
 Q to Quit

LDAP Directory Authentication:
          E - Enabled
Current > D - Disabled (default)

Enter new value, or Q to Quit: e
 > LDAP Directory Authentication will be updated

Local MP User Accounts:
          D - Disabled  (default)
Current > E - Enabled

Enter new value, or Q to Quit: <CR>
   -> Current Local MP User Accounts has been retained

Directory Server IP Address:
   Current -> 127.0.0.1 (default)

Enter new value, or Q to Quit: 192.0.2.1
 -> Directory Server IP Address will be updated

Directory Server LDAP Port:
   Current -> 636 (default)

Enter new value, or Q to Quit: <CR>
 -> Current Directory Server LDAP Port has been retained

Distinguished Name (DN):
   Current -> cn=mp,o=demo
```

```
Enter new value, or Q to Quit: <CR>
   -> Current Distinguished Name has been retained

User Search Context 1:
   Current -> o=mp

Enter new value, or Q to Quit: <CR>
    -> Current User Search Context 1 has been retained

User Search Context 2:
   Current -> o=demo

Enter new value, or Q to Quit: <CR>
    -> Current User Search Context 2 has been retained

User Search Context 3:
   Current -> o=test

Enter new value, or Q to Quit: <CR>
    -> Current User Search Context 3 has been retained

New Directory Configuration (* modified values):
*L – LDAP Directory Authentication: Enabled
 M – Local MP User database       : Enabled
*I - Directory Server IP Address  : 192.0.2.1
 P - Directory Server LDAP Port   : 636
 D - Distinguished Name (DN)      : cn=mp,o=demo
 1 - User Search Context 1        : o=mp
 2 - User Search Context 2        : o=demo
 3 - User Search Context 3        : o=test

Enter Parameter(s) to revise, Y to confirm, or [Q] to Quit: y
 -> LDAP Configuration has been updated
```

User login using directory services

The MP Login Name field accepts all of the following:

- Directory users
- LDAP Fully Distinguished Names

  Example: CN=John Smith,CN=Users,DC=HP,DC=COM, or @HP.com

  The short form of the login name by itself does not identify which domain you are trying to access. To identify the domain, provide the domain name or use the LDAP Distinguished Name of your account.
- Domain\user name form (Active Directory only)

  Example: HP\jsmith
- username@domain form (Active Directory only)

  Directory users that are specified with the @ searchable form can be located in one of three searchable contexts that are configured within Directory Settings.

  Example: jsmith@hp.com
- User name form

  Example: John Smith

Directory users that are specified with the user name form can be located in one of three searchable contexts that are configured within Directory Settings.

- Local users - Login ID

  For the iLO 3 login, the maximum length of the Login Name is 25 characters for local users. For directory services users, the maximum length of the Login Name is 256 characters.

Certificate services

The following sections provide instructions for installing Certificate Services, verifying directory services, and configuring automatic certificate requests.

Installing certificate services

To install certificate services:

1. Select **Start>Settings>Control Panel**.
2. Double-click **Add/Remove Programs**.
3. Click **Add/Remove Windows Components** to start the Windows Components wizard.
4. Select **Certificate Services** and click **Next**.
5. At the warning that the server cannot be renamed, click **OK**. The Enterprise root CA option is selected because there is no CA registered in the Active Directory.
6. Enter the information appropriate for your site and organization. Accept the default time period of two years in the Valid for field and click **Next**.
7. Accept the default locations of the certificate database and the database log. Click **Next**.
8. Browse to the `c: I386` folder when prompted for the Windows 2000 Advanced Server CD.
9. Click **Finish** to close the wizard.

Verifying directory services

Because iLO 3 communicates with Active Directory using SSL, you must create a certificate or install Certificate Services. Install an enterprise CA because you are issuing certificates to objects within your organizational domain.

To verify that certificate services is installed, select **Start>Programs>Administrative Tools>Certification Authority**. If Certificate Services is not installed, an error message appears.

Configuring an automatic certificate request

To request that a certificate be issued to the server:

1. Select **Start>Run**, and enter **`mmc`**.
2. Click **Add**.
3. Select **Group Policy**, and click **Add** to add the snap-in to the MMC.
4. Click **Browse**, and select the **Default Domain Policy** object. Click **OK**.
5. Select **Finish>Close>OK**.
6. **Expand Computer Configuration>Windows Settings>Security Settings>Public Key Policies**.
7. Right-click **Automatic Certificate Requests Settings**, and select **New>Automatic Certificate Request**.
8. When the Automatic Certificate Request Setup wizard starts, click **Next**.
9. Select the **Domain Controller** template, and click **Next**.
10. Select the certificate authority listed. (the same CA defined during the Certificate Services installation). Click **Next**.
11. Click **Finish** to close the wizard.

Directory-enabled remote management

This section is for administrators who are familiar with directory services and with the iLO 3 product. To familiarize yourself with the product and services, see "Directory services" (page 113). Be sure you understand the examples and are comfortable with setting up the product.

In general, you can use the HP provided snap-ins to create objects. It is useful to give the iLO 3 device objects meaningful names, such as the device network address, DNS name, host server name, or serial number.

Directory-enabled remote management enables you to:

- Create iLO 3 objects:

  Each device object created represents each device that will use the directory service to authenticate and authorize users. For more information, see the following sections:

  "Directory services for Active Directory" (page 117)

  "Directory services for eDirectory" (page 127)

- Configure iLO 3 devices:

  Every iLO 3 device that uses the directory service to authenticate and authorize users must be configured with the appropriate directory settings. For details about the specific directory settings, see "Using the LDAP command to configure directory settings" (page 136). In general, each device is configured with the appropriate directory server address, iLO 3 object distinguished name, and any user contexts. The server address is either the IP address or DNS name of a local directory server, or, for more redundancy, a multihost DNS name.

Using existing groups

Many organizations arrange users and administrators into groups. In many cases, it is convenient to use existing groups and associate these groups with one or more iLO 3 role objects. When the devices are associated with role objects, you can control access to the iLO 3 devices associated with the role by adding or deleting members from the groups.

When using Microsoft Active Directory, you can place one group within another, or create nested groups. Role objects are considered groups and can include other groups directly. To include other groups directly, add the existing nested group directly to the role and assign the appropriate rights and restrictions. Add new users to either the existing group or to the role.

Novell™ eDirectory does not allow nested groups. In eDirectory, any user who can read a role is considered a member of that role. When adding an existing group, organizational unit, or organization to a role, add the object as a read trustee of the role. All the members of the object are considered members of the role. Add new users to either the existing object or to the role.

When you use trustee or directory rights assignments to extend role membership, users must be able to read the iLO 3 object representing the iLO 3 device. Some environments require the trustees of a role to also be read trustees of the iLO 3 object to successfully authenticate users.

Using multiple roles

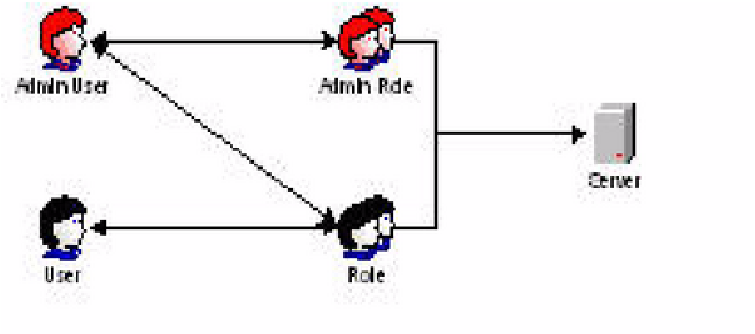
Most deployments do not require that the same user be in multiple roles managing the same device. However, these configurations are useful for building complex rights relationships. When building multiple-role relationships, users receive all the rights assigned by every applicable role. Roles only grant rights, not revoke them. If one role grants a user a right, the user has the right, even if the user is in another role that does not grant that right.

Typically, a directory administrator creates a base role with the minimum number of rights assigned and then creates additional roles to add additional rights. These additional rights are added under specific circumstances or to a specific subset of the base role users.

For example, an organization might have two types of users: administrators of the iLO 3 device or host server, and users of the iLO 3 device. In this situation, it makes sense to create two roles, one for the administrators and one for the users. Both roles include some of the same devices, but grant different rights. Sometimes, it is useful to assign generic rights to the lesser role, and include the iLO 3 administrators in that role, and the administrative role.

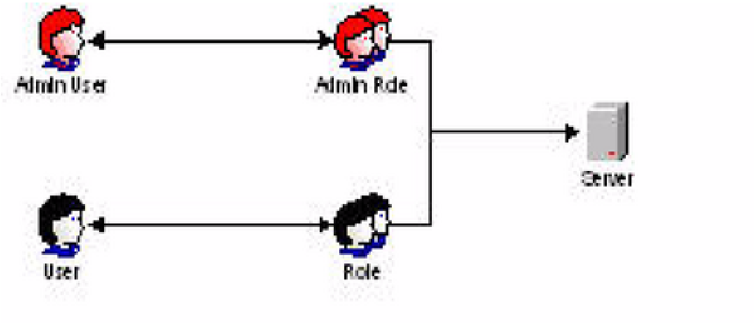
Figure 60 shows one way that an administrative user gains admin role right. The admin user's initial login right is granted through the regular user role. After the initial login, more advanced rights are assigned to the admin user through the admin role such as server reset and remote console.

Figure 60 Admin user gaining admin role right, example 1



In Figure 61, the admin user gains the admin role right in a different way. The admin user initially logs in through the admin role and is immediately assigned admin rights (server reset, remote console, and login).

Figure 61 Admin user gaining admin role right, example 2



Creating roles that follow organizational structure

Often, administrators within an organization are placed into a hierarchy in which subordinate administrators must assign rights independently of ranking administrators. In this case, it is useful to have one role that represents the rights assigned by higher-level administrators, and to enable subordinate administrators to create and manage their own roles.

Restricting roles

Restrictions enable you to limit the scope of a role. A role only grants rights to those users who satisfy the role restrictions. Using restricted roles creates users with dynamic rights that change based on the time of day or network address of the client.

For step-by-step instructions on how to create network and time restrictions for a role, see "Setting role restrictions" (page 132) or "Setting time restrictions" (page 133).

Role time restrictions

You can place time restrictions on iLO 3 roles. Users are only granted rights that are specified for the iLO 3 devices listed in the role if they are members of the role and meet the time restrictions for that role.

The iLO 3 devices use local host time to enforce time restrictions. If the iLO 3 device clock is not set, the role time restriction fails (unless no time restrictions are specified on the role).

Role-based time restrictions can only be enforced if the time is set on the iLO 3 device. The time is normally set when the host is booted and is maintained by running the agents in the host operating system, which enables iLO 3 device to compensate for leap years and minimize clock drift with respect to the host. Events such as unexpected power loss or the flashing of MP firmware can cause the iLO 3 device clock not to be set. Also, the host time must be correct for the iLO 3 device to preserve time across firmware flashes.

IP address range restrictions

IP address range restrictions enable you to specify network addresses that are granted or denied access by the restriction. The address range is typically specified in a low-to-high range format. You can specify an address range to grant or deny access to a single address. Addresses that fall within the low-to-high IP address range meet the IP address restriction.

IP address and subnet mask restrictions

IP address and subnet mask restrictions enable you to specify a range of addresses that are granted or denied access by the restriction. This format has similar capabilities to those in an IP address range but can be more native to your networking environment. An IP address and subnet mask range is typically specified using a subnet address and address bit mask that identifies addresses on the same logical network.

In binary math, if the bits of a client machine address are added to the bits of the subnet mask, and these bits match the restriction subnet address, the client machine meets the restriction.

DNS-based restrictions

DNS-based restrictions use the network naming service to examine the logical name of the client machine by looking up machine names assigned to the client IP addresses. DNS restrictions require a functional name server. If the name service fails or cannot be reached, DNS restrictions cannot be matched and will fail.

DNS-based restrictions can limit access to a single, specific machine name or to machines sharing a common domain suffix. For example, the DNS restriction `www.hp.com` matches hosts that are assigned the domain name `www.hp.com`. However, the DNS restriction `*.hp.com` matches any machine originating from HP.

DNS restrictions can cause some ambiguity because a host can be multi-homed. DNS restrictions do not necessarily match one-to-one with a single system.

△ **CAUTION:** Using DNS-based restrictions can create some security complications. Name service protocols are insecure. Any individual with malicious intent and access to the network can place a rogue DNS service on the network, creating fake address restriction criteria. When implementing DNS-based address restrictions, take organizational security policies into consideration.

Role address restrictions

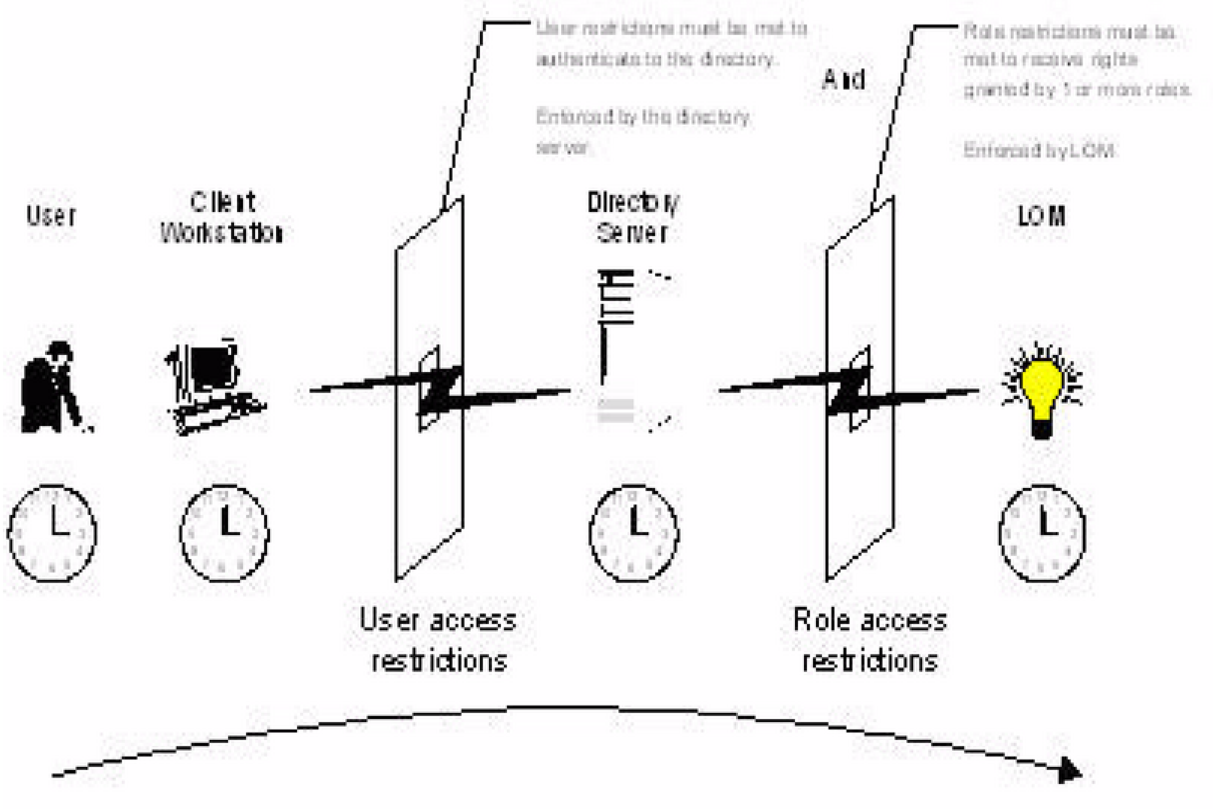
Role address restrictions are enforced by the MP firmware, based on the client IP network address. When the address restrictions are met for a role, the rights granted by the role apply.

Address restrictions can be difficult to manage if access is attempted across firewalls or through network proxies. Either of these mechanisms can change the apparent network address of the client, causing the address restrictions to be enforced in an unexpected manner.

Enforcing directory login restrictions

Figure 62 shows how two sets of restrictions potentially limit a directory user's access to iLO 3 devices. User access restrictions limit a user's access to authenticate to the directory. Role access restrictions limit an authenticated user's ability to receive iLO 3 privileges based on rights specified in one or more roles.

Figure 62 User and role access restrictions



User restrictions must be met to authenticate to the directory.
Enforced by the directory server.
And
Role restrictions must be met to receive rights granted by 1 or more roles.
Enforced by LOM.
User
Client Workstation
Directory Server
LOM
User access restrictions
Role access restrictions

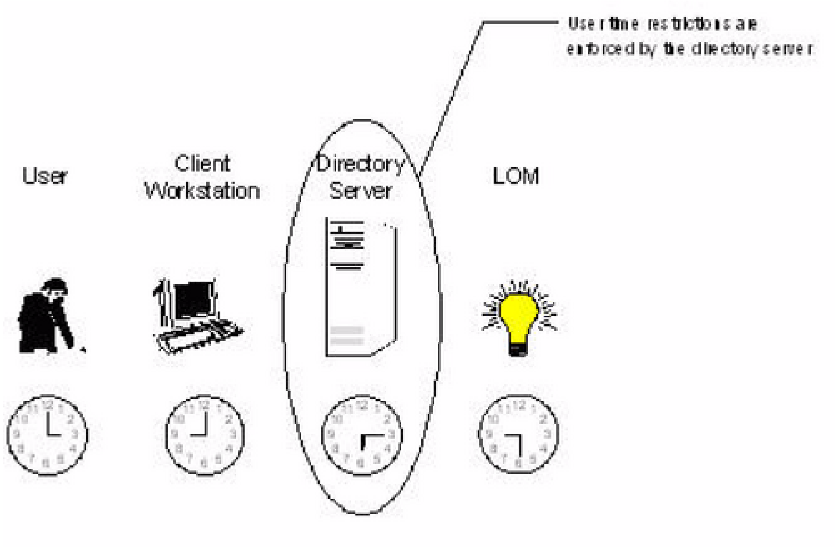
Enforcing user time restrictions

You can place a time restriction on directory user accounts. Time restrictions limit the ability of the user to log in (authenticate) to the directory. Typically, time restrictions are enforced using the time on the directory server, but if the directory server is located in a different time zones or a replica in a different time zone is accessed, time zone information from the managed object can be used to adjust for relative time.

While directory server evaluates user time restrictions, the determination can be complicated by time zone changes or by the authentication mechanism.

Figure 63 shows the user time restrictions.

Figure 63 User time restrictions



User address restrictions

You can place network address restrictions on a directory user account, and the directory server enforces these restrictions. For information about the enforcement of address restrictions on LDAP clients, such as a user logging in to an iLO 3 device, see the directory service documentation.

Network address restrictions placed on the user in the directory may not be enforced in the expected manner if the directory user logs in through a proxy server. When a user logs in to an iLO 3 device as a directory user, the iLO 3 device attempts authentication to the directory as that user, which means that address restrictions placed on the user account apply when accessing the iLO 3 device. However, because the user is proxied at the iLO 3 device, the network address of the authentication attempt is that of the iLO 3 device, not that of the client workstation.

Creating multiple restrictions and roles

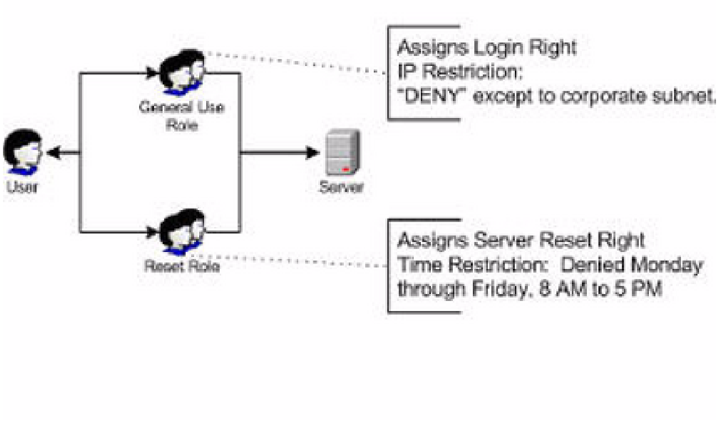
The most useful application of multiple roles includes restricting one or more roles so that rights do not apply in all situations. Other roles provide different rights under different constraints. Using multiple restrictions and roles enables you to create arbitrary, complex rights relationships with a minimum number of roles.

For example, an organization might have a security policy in which iLO 3 administrators are allowed to use the iLO 3 device from within the corporate network but are only able to reset the server outside of regular business hours.

Directory administrators may be tempted to create two roles to address this situation, but extra caution is required. Creating a role that provides the required server reset rights and restricting it to an after-hours application might allow administrators outside the corporate network to reset the server, which is contrary to most security policies.

Figure 64 shows how security policy dictates that general use is restricted to clients within the corporate subnet, and server reset capability is additionally restricted to after hours.

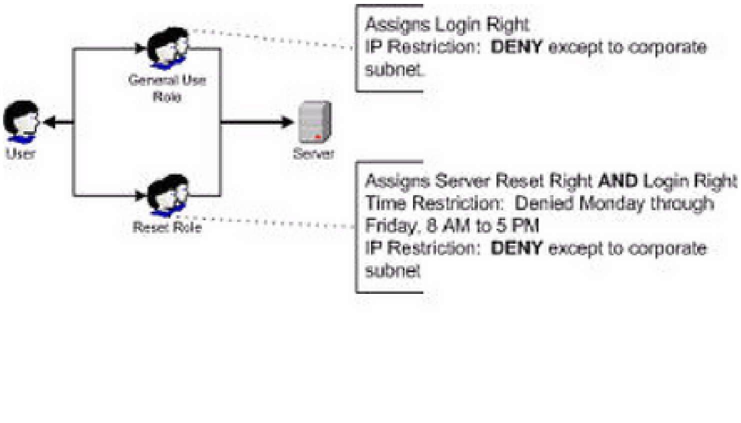
Figure 64 Restricting general use


General Use Role
User
Server
Reset Role
Assigns Login Right
IP Restriction:
"DENY" except to corporate subnet.
Assigns Server Reset Right
Time Restriction: Denied Monday through Friday, 8 AM to 5 PM

Alternatively, the directory administrator can create a role that grants the login right and restrict it to the corporate network, create another role that grants only the server reset right and restrict it to after-hours operation. This configuration is easier to manage but more unsecure because ongoing administration can create another role that grants users from addresses outside the corporate network the login right, which might unintentionally grant the iLO 3 administrators in the server reset role the ability to reset the server from anywhere, provided they satisfy the time constraints of that role.

△ **CAUTION:** The previous configuration satisfies corporate security policy. However, adding another role that grants the login right can inadvertently grant server reset privileges from outside the corporate subnet after hours. A more manageable solution might be to restrict the reset role, as well as the general use role.

Figure 65 Restricting the reset role


General Use Role
User
Server
Reset Role
Assigns Login Right
IP Restriction: DENY except to corporate subnet.
Assigns Server Reset Right AND Login Right
Time Restriction: Denied Monday through Friday, 8 AM to 5 PM
IP Restriction: DENY except to corporate subnet

Directory services schema (LDAP)

A directory schema specifies the types of objects that a directory can have and the mandatory and optional attributes of each object type. The following sections describe both the HP management core, and the LDAP object identifier classes and attributes that are specific to iLO 3.

HP management core LDAP object identifier classes and attributes

Object identifiers (OIDs) are unique numbers that are used by LDAP to identify object class, attribute, syntaxes (data types), matching rules, protocol mechanisms, controls, extended operation and supported features.

Changes made to the schema during the schema setup process include changes to the following:

- Core classes
- Core attributes

NOTE: Roles such as `hpqTargets`, and so on, are for extended schema LDAP only. They are not used in schema-free LDAP.

Core LDAP OID classes

Table 35 Core classes

Class Name	Assigned OID
hpqTarget	1.3.6.1.4.1.232.1001.1.1.1.1
hpqRole	1.3.6.1.4.1.232.1001.1.1.1.2
hpqPolicy	1.3.6.1.4.1.232.1001.1.1.1.3

Core LDAP OID attributes

Table 36 Core attributes

Attribute Name	Assigned OID
hpqPolicyDN	1.3.6.1.4.1.232.1001.1.1.2.1
hpqRoleMembership	1.3.6.1.4.1.232.1001.1.1.2.2
hpqTargetMembership	1.3.6.1.4.1.232.1001.1.1.2.3
hpqRoleIPRestrictionDefault	1.3.6.1.4.1.232.1001.1.1.2.4
hpqRoleIPRestrictions	1.3.6.1.4.1.232.1001.1.1.2.5
hpqRoleTimeRestriction	1.3.6.1.4.1.232.1001.1.1.2.6

Core class definitions

Table 37, Table 38, and Table 39 define the HP management core classes.

hpqTarget

Table 37 hpqTarget

OID	1.3.6.1.4.1.232.1001.1.1.1.1
Description	This class defines target objects, providing the basis for HP products using directory-enabled management.
Class Type	Structural
SuperClasses	User
Attributes	hpqPolicyDN—1.3.6.1.4.1.232.1001.1.1.2.1 hpqRoleMembership—1.3.6.1.4.1.232.1001.1.1.2.2
Remarks	None

hpqRole

Table 38 hpqRole

OID	1.3.6.1.4.1.232.1001.1.1.1.2
Description	This class defines role objects, providing the basis for HP products using directory-enabled management.
Class Type	Structural
SuperClasses	Group
Attributes	hpqRoleIPRestrictions—1.3.6.1.4.1.232.1001.1.1.2.5hpqRoleIPRestrictionDefault—1.3.6.1.4.1.232.1001.1.1.2.4 hpqRoleTimeRestriction—1.3.6.1.4.1.232.1001.1.1.2.6hpqTargetMembership—1.3.6.1.4.1.232.1001.1.1.2.3
Remarks	None

hpqPolicy

Table 39 hpqPolicy

OID	1.3.6.1.4.1.232.1001.1.1.1.3
Description	This class defines policy objects, providing the basis for HP products using directory-enabled management.
Class Type	Structural
SuperClasses	Top
Attributes	hpqPolicyDN—1.3.6.1.4.1.232.1001.1.1.2.1
Remarks	None

Core attribute definitions

Table 40 through Table 45 define the HP management core class attributes.

hpqPolicyDN

Table 40 hpqPolicyDN

OID	1.3.6.1.4.1.232.1001.1.1.2.1
Description	This attribute provides the Distinguished Name of the policy that controls the general configuration of this target.
Syntax	Distinguished Name—1.3.6.1.4.1.1466.115.121.1.12
Options	Single Valued
Remarks	None

hpqRoleMembership

Table 41 hpqRoleMembership

OID	1.3.6.1.4.1.232.1001.1.1.2.2
Description	This attribute provides a list of hpqTarget objects to which this object belongs.
Syntax	Distinguished Name—1.3.6.1.4.1.1466.115.121.1.12
Options	Multi Valued
Remarks	None

hpqTargetMembership

Table 42 hpqTargetMembership

OID	1.3.6.1.4.1.232.1001.1.1.2.3
Description	This attribute provides a list of hpqTarget objects that belong to this object.
Syntax	Distinguished Name—1.3.6.1.4.1.1466.115.121.1.12
Options	Multi Valued
Remarks	None

hpqRoleIPRestrictionDefault

Table 43 hpqRoleIPRestrictionDefault

OID	1.3.6.1.4.1.232.1001.1.1.2.4
Description	This attribute is a Boolean expression representing access by unspecified clients, which partially specifies rights restrictions under an IP network address constraint.
Syntax	Boolean—1.3.6.1.4.1.1466.115.121.1.7
Options	Single Valued
Remarks	If this attribute is TRUE, IP restrictions are satisfied for unexceptional network clients. If this attribute is FALSE, IP restrictions are unsatisfied for unexceptional network clients.

hpqRoleIPRestrictions

Table 44 hpqRoleIPRestrictions

OID	1.3.6.1.4.1.232.1001.1.1.2.5
Description	This attribute provides a list of IP addresses, DNS names, domain, address ranges, and subnets, which partially specify right restrictions under an IP network address constraint.
Syntax	Octet String-1.3.6.1.4.1.1466.115.121.1.40
Options	Multi Valued
Remarks	This attribute is only used on role objects. The IP restrictions are satisfied when the address matches and general access is denied, and unsatisfied when the address matches and general access is allowed. Values are an identifier byte followed by a type-specific number of bytes specifying a network address. For IP subnets, the identifier is <0x01>, followed by the IP network address in network order, followed by the IP network subnet mask in network order. For example, the IP subnet 127.0.0.1/255.0.0.0 can be represented as <0x01 0x7F 0x00 0x00 0x01 0xFF 0x00 0x00 0x00>. For IP ranges, the identifier is <0x02>, followed by the lower bound IP address, followed by the upper bound IP address. Both are inclusive and in network order. For example, the IP range 10.0.0.1 to 10.0.10.255 is represented as <0x02 0x0A 0x00 0x00 0x01 0x0A 0x00 0x0A 0xFF>. For DNS names or domains, the identifier is <0x03>, followed by the ASCII encoded DNS name. DNS names can be prefixed with a * (ASCII 0x2A), to indicate they match names that end with the specified string. For example, match the DNS domain `*.acme.com` is represented as <0x03 0x2A 0x2E 0x61 0x63 0x6D 0x65 0x2E 0x63 0x6F 0x6D>. General access is allowed.

hpqRoleTimeRestriction

Table 45 hpqRoleTimeRestriction

OID	1.3.6.1.4.1.232.1001.1.1.2.6
Description	This attribute represents a 7-day time grid, with 30-minute resolution, which specifies rights restrictions under a time constraint.
Syntax	Octet String {42}-1.3.6.1.4.1.1466.115.121.1.40

Table 45 hpqRoleTimeRestriction *(continued)*

OID	1.3.6.1.4.1.232.1001.1.1.2.6
Options	Single Valued
Remarks	This attribute is only used on role objects. Time restrictions are satisfied when the bit corresponding to the current local side real-time of the device is 1, and unsatisfied when the bit is 0. The least significant bit of the first byte corresponds to Sunday, from 12 midnight, to Sunday 12:30 AM. Each more significant bit and sequential byte corresponds to the next consecutive half-hour blocks within the week. The most significant (8th) bit of the 42nd byte corresponds to Saturday at 11:30 PM, to Sunday at 12 midnight.

iLO 3-secific LDAP OID classes and attributes

The schema attributes and classes in Table 46 and Table 47 might depend on attributes or classes defined in the HP management core classes and attributes.

iLO 3 classes

Table 46 iLO 3 classes

Class Name	Assigned OID
hpqLOMv100	1.3.6.1.4.1.232.1001.1.8.1.1

iLO 3 attributes

Table 47 iLO 3 attributes

Class Name	Assigned OID
hpqLOMRightLogin	1.3.6.1.4.1.232.1001.1.8.2.1
hpqLOMRightRemoteConsole	1.3.6.1.4.1.232.1001.1.8.2.2
hpqLOMRightVirtualMedia	1.3.6.1.4.1.232.1001.1.8.2.3
hpqLOMRightServerReset	1.3.6.1.4.1.232.1001.1.8.2.4
hpqLOMRightLocalUserAdmin	1.3.6.1.4.1.232.1001.1.8.2.5
hpqLOMRightConfigureSettings	1.3.6.1.4.1.232.1001.1.8.2.6

iLO 3 class definitions

hpqLOMv100

Table 48 hpqLOMv100

OID	1.3.6.1.4.1.232.1001.1.8.1.1
Description	This class defines the rights and settings used with HP iLO 3 products.
Class Type	Auxiliary
SuperClasses	None
Attributes	hpqLOMRightConfigureSettings-1.3.6.1.4.1.232.1001.1.8.2.1 hpqLOMRightLocalUserAdmin-1.3.6.1.4.1.232.1001.1. 8.2.2 hpqLOMRightLogin-1.3.6.1.4.1.232.1001.1.8.2.3 hpqLOMRightRemoteConsole-1.3.6.1.4.1.232.1001.1.8.2.4 hpq LOMRightServerReset-1.3.6.1.4.1.232.1001.1.8.2.5 hpqLOMRightVirtualMedia-1.3.6.1.4.1.232.1001.1.8.2.6
Remarks	None

iLO 3 attribute definitions

Table 49 through Table 54 define the iLO 3 core class attributes.

hpqLOMRightLogin

Table 49 hpqLOMRightLogin

OID	1.3.6.1.4.1.232.1001.1.8.2.1
Description	Login right for HP iLO 3 products.
Syntax	Boolean-1.3.6.1.4.1.1466.115.121.1.7
Options	Single Valued
Remarks	The attribute is meaningful only on role objects. If TRUE, members of the role are granted the right.

hpqLOMRightRemoteConsole

Table 50 hpqLOMRightRemoteConsole

OID	1.3.6.1.4.1.232.1001.1.8.2.2
Description	Remote console right for iLO 3 products. Meaningful only on role objects.
Syntax	Boolean-1.3.6.1.4.1.1466.115.121.1.7
Options	Single valued
Remarks	This attribute is only used on role objects. If this attribute is TRUE, members of the role are granted the right.

hpqLOMRightRemoteConsole

Table 51 hpqLOMRightRemoteConsole

OID	1.3.6.1.4.1.232.1001.1.8.2.3
Description	Virtual Media right for HP iLO 3 products.
Syntax	Boolean-1.3.6.1.4.1.1466.115.121.1.7
Options	Single valued
Remarks	This attribute is only used on role objects. If this attribute is TRUE, members of the role are granted the right.

hpqLOMRightServerReset

Table 52 hpqLOMRightServerReset

OID	1.3.6.1.4.1.232.1001.1.8.2.4
Description	Remote server reset and power button right for HP iLO 3 products.
Syntax	Boolean-1.3.6.1.4.1.1466.115.121.1.7
Options	Single valued
Remarks	This attribute is only used on role objects. If this attribute is TRUE, members of the role are granted the right.

hpqLOMRightLocalUserAdmin

Table 53 hpqLOMRightLocalUserAdmin

OID	1.3.6.1.4.1.232.1001.1.8.2.5
Description	Local user database administration right for HP iLO 3 products.
Syntax	Boolean-1.3.6.1.4.1.1466.115.121.1.7
Options	Single valued
Remarks	This attribute is only used on role objects. If this attribute is TRUE, members of the role are granted the right.

hpqLOMRightConfigureSettings

Table 54 hpqLOMRightConfigureSettings

OID	1.3.6.1.4.1.232.1001.1.8.2.6
Description	Configure devices settings right for HP iLO 3 products.
Syntax	Boolean-1.3.6.1.4.1.1466.115.121.1.7
Options	Single valued
Remarks	This attribute is only used on role objects. If this attribute is TRUE, members of the role are granted the right.

9 Support and other resources

Contacting HP

Before you contact HP

Be sure to have the following information available before you contact HP:

- Technical support registration number (if applicable)
- Product serial number
- Product model name and number
- Product identification number
- Applicable error message
- Add-on boards or hardware
- Third-party hardware or software
- Operating system type and revision level

HP contact information

For the name of the nearest HP authorized reseller:

- In the United States, see the HP US service locator webpage (http://welcome.hp.com/country/us/en/wwcontact.html.)
- In other locations, see the Contact HP worldwide (in English) webpage:

  http://welcome.hp.com/country/us/en/wwcontact.html.

For HP technical support:

- In the United States, for contact options see the Contact HP United States webpage: (http://welcome.hp.com/country/us/en/contact_us.html)

  To contact HP by phone:

  ◦ Call 1-800-HP-INVENT (1-800-474-6836). This service is available 24 hours a day, 7 days a week. For continuous quality improvement, calls may be recorded or monitored.

  ◦ If you have purchased a Care Pack (service upgrade), call 1-800-633-3600. For more information about Care Packs, refer to the HP website: (http://www.hp.com/hps).
- In other locations, see the Contact HP worldwide (in English) webpage (http://welcome.hp.com/country/us/en/wwcontact.html).

Subscription service

HP recommends that you register your product at the Subscriber's Choice for Business website:

http://www.hp.com/country/us/en/contact_us.html.

Documentation feedback

HP welcomes your feedback. To make comments and suggestions about product documentation, send a message to **docsfeedback@hp.com**.

Include the document title and manufacturing part number. All submissions become the property of HP.

Related information

You can find other information on HP server hardware management in the following publications.

HP Technical Documentation Website

http://www.hp.com/go/Integrity_Servers-docs for HP Integrity servers

http://www.hp.com/go/Blades-docs for HP Integrity server blades

Typographic conventions

This document uses the following typographical conventions:

`%`, `$`, or `#`	A percent sign represents the C shell system prompt. A dollar sign represents the system prompt for the Bourne, Korn, and POSIX shells. A number sign represents the superuser prompt.
`Command`	A command name or qualified command phrase.
`Computer output`	Text displayed by the computer.
Ctrl+x	A key sequence. A sequence such as **Ctrl+x** indicates that you must hold down the key labeled **Ctrl** while you press another key or mouse button.
`ENVIRONMENT VARIABLE`	The name of an environment variable, for example, `PATH`.
ERROR NAME	The name of an error, usually returned in the `errno` variable.
Key	The name of a keyboard key. **Return** and **Enter** both refer to the same key.
Term	The defined use of an important word or phrase.
`User input`	Commands and other text that you type.
`Variable`	The name of a placeholder in a command, function, or other syntax display that you replace with an actual value.
[]	The contents are optional in syntax. If the contents are a list separated by |, you must choose one of the items.
{}	The contents are required in syntax. If the contents are a list separated by |, you must choose one of the items.
...	The preceding element can be repeated an arbitrary number of times.
□	Indicates the continuation of a code example.
|	Separates items in a list of choices.
WARNING	A warning calls attention to important information that if not understood or followed will result in personal injury or nonrecoverable system problems.
CAUTION	A caution calls attention to important information that if not understood or followed will result in data loss, data corruption, or damage to hardware or software.
IMPORTANT	This alert provides essential information to explain a concept or to complete a task
NOTE	A note contains additional information to emphasize or supplement important points of the main text.

Standard terms, abbreviations, and acronyms

A

address In networking, a unique code that identifies a node in the network. Names such as **host1.hp.com** are translated to dott-quad addresses such as **168.124.3.4** by the Domain Name Service (DNS).

address path An address path is one in which each term has the appropriate intervening addressing association.

administrator A person managing a system through interaction with management clients, transport clients, and other policies and procedures.

authentication The process that verifies the identity of a user in a communication session, or a device or other entity in a computer system, before that user, device, or other entity can access system resources. Session authentication can work in two directions: a server authenticates a client to make access control decisions, and the client can also authenticate the server. With Secure Sockets Layer (SSL), the client always authenticates the server.

authorization The process of granting specific access privileges to a user. Authorization is based on authentication and access control.

B

bind In the Lightweight Directory Access Protocol (LDAP), refers to the authentication process that LDAP requires when users access the LDAP directory. Authentication occurs when the LDAP client binds to the LDAP server.

BIOS Basic Input/Output System. System software that controls the loading of the operating system and testing of hardware when the system is powered on. The BIOS is stored in read-only memory (ROM).

BMC Baseboard Management Controller. A device used to manage chassis environmental, configuration, and service functions, and receive event data from other parts of the system. It receives data through sensor interfaces and interprets this data by using the sensor data record (SDR) for which it provides an interface. The BMC also provides an interface to the SEL. Typical functions of the BMC are measuring processor temperature, power supply values, and cooling fan status. The BMC can take autonomous action to preserve system integrity.

C

CIM See Common Information Model.

Command Line Interface (CLI) A text user interface (TUI) for interacting with a computer operating system or software by typing commands at a command prompt to perform specific tasks.

Common Information Model (CIM) An industry standard that was developed by the DMTF. CIM describes data about applications and devices so that administrators and software management programs can control applications and devices on different platforms in the same way, ensuring interoperability across a network.

CIM provides a common definition of management information for systems, components, networks, applications, and services, and it allows for vendor extensions. CIM common definitions enable vendors to exchange management information between systems.

Using techniques of object-oriented programming, CIM provides a consistent definition and structure of data, including expressions for elements such as object classes, properties, associations, and methods.

For example, if an enterprise purchases four different servers from four different vendors and networks them together, using CIM, the administrator can view the same information about each of the devices, such as manufacturer and serial number, the device's model number, its location on the network, its storage capacity, and its relationship to the applications that run throughout the network.

console The interface between iLO 3 and the server that controls basic functionality. Also known as *host console*.

D

DDNS Dynamic Domain Name System. DDNS is how iLO 3 automatically registers its name with the Domain Name System so that when iLO 3 receives its new IP address from DHCP, users can connect to the new iLO 3 using the host name, rather than the new IP address.

DHCP Dynamic Host Configuration Protocol. A protocol that enables a DHCP server to assign Internet Protocol (IP) addresses dynamically to systems on a Transmission Control Protocol/Internet Protocol (TCP/IP) network. Without DHCP, IP addresses must be entered manually at each computer, and when computers are moved to another location on another part of the network, a new IP address must be entered.

directory server In the Lightweight Directory Access Protocol (LDAP), a server which stores and provides information about people and resources within an organization from a logically centralized location.

distinguished name (DN) In the Lightweight Directory Access Protocol (LDAP), a unique text string that identifies an entry's name and location within the directory. A DN can be a fully qualified domain name (FQDN) that includes the complete path from the root of the tree.

DNS Domain Name Server. The server that typically manages host names in a domain. DNS servers translate host names, such as `www.example.com`, into Internet Protocol (IP) addresses, such as `030.120.000.168`.

Domain Name Service. The data query service that searches domains until a specified host name is found.

Domain Name System. A distributed, name resolution system that enables computers to locate other computers on a network or the Internet by domain name. The system associates standard Internet Protocol (IP) addresses, such as `00.120.000.168`, with host names, such as `www.hp.com`. Machines typically acquire this information from a DNS server.

domain A grouping of hosts that is identified by a name. The hosts usually belong to the same Internet Protocol (IP) network address.

domain name The unique name assigned to a system or group of systems on the Internet. The host names of all the systems in the group have the same domain name suffix. Domain names are interpreted from right to left.

E

ethernet An industry-standard type of local area network (LAN) that enables real-time communication between systems connected directly through cables. Ethernet uses a Carrier Sense Multiple Access/Collision Detection (CSMA/CD) algorithm as its access method, which all nodes listen for, and any node can begin transmitting data. If multiple nodes attempt to transmit at the same time (a collision), the transmitting nodes wait for a random time before attempting to transmit again.

event A change in the state of a managed object. The event-handling subsystem can provide a notification, to which a software system must respond when it occurs, but which the software did not solicit or control.

extended schema A platform-specific schema derived from the common model. An example is the Win32 schema.

F

firmware Software that is typically used to help with the initial booting stage of a system and with system management. Firmware is embedded in read-only memory (ROM) or programmable ROM (PROM).

FPGA Field Programmable Gate Array. A semiconductor device containing programmable logic components and programmable interconnects.

FTP File Transfer Protocol. A basic Internet protocol based on Transmission Control Protocol/Internet Protocol (TCP/IP) that enables the retrieving and storing of files between systems on the Internet without regard for the operating systems or architectures of the systems involved in the file transfer.

G

gateway A computer or program that interconnects two networks and passes data packets between the networks. A gateway has more than one network interface.

gateway address Where the packet needs to be sent. This can be the local network card or a gateway (router) on the local subnet.

GUI Graphical User Interface. An interface that uses graphics, along with a keyboard and mouse, to provide easy-to-use access to an application.

H

host A system, such as a backend server, with an assigned Internet Protocol (IP) address and host name. The host is accessed by other remote systems on the network.

host console The interface between iLO 3 and the server that controls basic functionality. Also known as *console*.

host ID Part of the 32-bit Internet Protocol (IP) address used to identify a host on a network. Host ID is also known as *DNS Name* or *Host Name*.

host name The name of a particular machine within a domain. Host names always map to a specific Internet Protocol (IP) address.

HTTP Hypertext Transfer Protocol. The Internet protocol that retrieves hypertext objects from remote hosts. HTTP messages consist of requests from client to server, and responses from server to client. HTTP is based on Transmission Control Protocol/Internet Protocol (TCP/IP).

I

in-band system management A server management capability that is enabled only when the operating system is initialized and the server is functioning properly.

Integrated Lights-Out (iLO) The iLO functionality offers remote server management through an independent management processor (MP). Integrity iLO was introduced into most HP Integrity entry class servers in late 2004. Prior to that, embedded remote server management was referred to as *MP functionality*. All legacy MP functionality has been carried forward and combined with new features, all under the heading of "iLO". Therefore, "iLO" and "MP" mean the same thing for entry class servers.

IP Internet Protocol. IP specifies the format of packets and the packet addressing scheme. Most networks combine IP with a higher-level protocol called Transmission Control Protocol (TCP), which establishes a virtual connection between a destination and a source. TCP/IP establishes a connection between two hosts so that they can send messages back and forth for a period of time. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255; for example, 1.160.10.240. Within an isolated network, you can assign IP addresses at random as long as each one is unique. However, connecting a private network to the Internet requires using registered IP addresses (called Internet addresses) to avoid duplicates.

IP Address An identifier for a computer or device on a TCP/IP network.

IPMI Intelligent Platform Management Interface. A hardware-level interface specification designed primarily for the out-of-band management of server systems over a number of different physical interconnects. The IPMI specification describes extensive abstractions regarding sensors, enabling a management application running on the operating system or in a remote system to comprehend the environmental makeup of the system and to register with the IPMI subsystem to receive events. IPMI is compatible with management software from heterogeneous vendors. IPMI functionality includes inventory reporting, system monitoring, logging, system recovery (including local and remote system resets, and power on and power off capabilities), and alerting.

K

kernel The core of the operating system that manages the hardware and provides fundamental services that the hardware does not provide, such as filing and resource allocation.

KVM switch Keyboard, Video, Mouse. A hardware device that allows a user, or multiple users, to control multiple computers from a single keyboard, video monitor and mouse.

L

LDAP Lightweight Directory Access Protocol. A directory service protocol used for the storage, retrieval, and distribution of information, including user profiles, distribution lists, and configuration data. LDAP runs over Transmission Control Protocol/Internet Protocol (TCP/IP) across multiple platforms.

M

managed object The actual item in the system environment that is accessed by the provider. For example, a Network Interface Card (NIC).

Management Information Base (MIB) The MIB defines the properties of the managed object within the device to be managed. Every managed device keeps a database of values for each definition written in the MIB. MIB is not the actual database itself and is implementation dependant.

Management Processor (MP) The component that provides a LAN interface to the system console and system management. Prior to iLO 3, embedded remote server management was referred to as MP functionality. All legacy MP functionality has been carried forward and combined with new features, all under the heading of "iLO 3". Therefore, "iLO 3" and "MP" mean the same thing for entry class servers.

MAP Manageability Access Point. A network-accessible interface for managing a computer system. A MAP can be initiated by a management process, a management processor, a service processor, or a service process.

MAP address space This is the hierarchical graph of the UFiTs contained in the MAP’s AdminDomain. Each instance starting at the AdminDomain is a node in the graph. Each supported association forms a link in the graph to another instance node, and so on, until a terminating instance node is encountered.

Media Access Control (MAC) Worldwide unique, 48-bit, hardware address number that is programmed in to each local area network interface card (NIC) at the time of manufacture. In the Ethernet standard, every network connection must support a unique MAC value.

MFW Manageability FirmWare.

Monarch The monarch server blade is always in the lowest numbered enclosure bay, and all communication to the conjoined server blade is done through the monarch server blade.

MP Upgradeability Firmware remotely upgradeable through MP LAN, offline update through EFI, and OS-initiated firmware updates for all Integrity support OS.

N

Network Interface Card (NIC) An internal circuit board or card that connects a workstation or server to a networked device.

network mask A number used by software to separate a local subnet address from the rest of an Internet Protocol (IP) address.

node An addressable point or device on a network. A node can connect a computing system, a terminal, or various peripheral devices to the network.

O

Onboard Administrator The BladeSystem Onboard Administrator (OA) is the enclosure MP, subsystem, and firmware base used to support HP Integrity server blades and all the managed devices contained within the enclosure. The OA provides a single point from which to perform basic management tasks on server blades or switches within the enclosure. Utilizing this hard-wired information, the OA performs initial configuration steps for the enclosure, allows for run-time management and configuration of enclosure components, and informs administrators about problems within the enclosure through email or the Insight Display.

out-of-band system management Server management capability that is enabled when the operating system network drivers or the server are not functioning properly.

P

port The location (socket) where Transmission Control Protocol/Internet Protocol (TCP/IP) connections are made. Web servers traditionally use port 80, the File Transfer Protocol (FTP) uses port 21, and Telnet uses port 23. A port enables a client program to specify a particular server program in a computer on a network. When a server program is started initially, it binds to its designated port number. Any client that wants to use that server must send a request to bind to the designated port number.

port number A number that specifies an individual Transmission Control Protocol/Internet Protocol (TCP/IP) application on a host machine, providing a destination for transmitted data.

POST Power-On Self-Test. The series of steps that the host system CPU performs following power-on. Steps include testing memory, initializing peripherals, and running option ROMs. Following POST, the host ROM passes control to the installed operating system.

properties Properties are attributes that are relevant to a target that are passed as parameters to the command. Property keywords map to properties of CIM class.

protocol A set of rules that describes how systems or devices on a network exchange information.

proxy A mechanism whereby one system acts on behalf of another system in responding to protocol requests.

R

rackmount Electronic equipment and devices designed to fit industry-standard-sized computer racks and cabinets (19" wide). Rackmount devices are also standard 1.75 inch units.

remote system A system other than the one on which the user is working.

S

schema Definitions that describe what type of information can be stored as entries in the directory. When information that does not match the schema is stored in the directory, clients attempting to access the directory may be unable to display the proper results. Schemas come in many forms, such as a text file, information in a repository, or diagrams.

security Secure Socket Layer Secure Shell (SSH) version 2 (Password and certificate), SSL, and integration with enterprise directory services.

serial console A terminal connected to the serial port on the service processor. A serial console is used to configure the system to perform other administrative tasks.

server blade A single circuit board populated with components such as processors, memory, and network connections that are usually found on multiple boards.

SSH Secure Shell. A UNIX shell program and network protocol that enables secure and encrypted log in and running of commands on a remote system over an insecure network.

SSL Secure Sockets Layer. A protocol that enables client-to-server communication on a network to be encrypted for privacy. SSL uses a key exchange method to establish an environment in which all data exchanged is encrypted with a cipher and hashed to protect it from eavesdropping and alteration. SSL creates a secure connection between a web server and a web client. Hypertext Transfer Protocol Secure (HTTPS) uses SSL.

subnet A working scheme that divides a single logical network into smaller physical networks to simplify routing. The subnet is the portion of an Internet Protocol (IP) address that identifies a block of host IDs.

subnet mask A bit mask used to select bits from an Internet address for subnet addressing. The mask is 32 bits long, and selects the network portion of the Internet address and one or more bits of the local portion. Also called an *address mask*.

System Event Log (SEL) A log that provides nonvolatile storage for system events that are logged autonomously by the service processor, or directly with event messages sent from the host.

T

target address The target addressing scheme provides an easy-to-use method to accurately address CIM objects. The target address term of the CLP syntax in this architecture is extensible. The addressing scheme provides a unique target for CLP commands. The scheme is finite for parsing target names, and unique for unambiguous access to associated instance information needed to support association traversal rooted at the MAP AdminDomain instance.

target address scheme resolution service This entity is responsible for discovering and enumerating the managed elements within the local domain, for maintaining the addressing and naming structure of the local domain, and coordinating this information with the operation invocation engine.

Telnet A telecommunications protocol providing specifications for emulating a remote computer terminal so that one can access a distant computer and function online using an interface that appears to be part of the user's local system.

TUI Text User Interface. A command-line interface that enables you to enter and run commands in the MP.

U

Unified Extensible Firmware Interface (UEFI) EFI is an Itanium-based architecture feature that defines the interfaces between the operating system and the system firmware, and between firmware driver and the system firmware. EFI provides a standard environment for booting an OS and running preboot applications. EFI post-1.10 activities is owned by the nonprofit organization named Unified EFI Forum, Inc. The Unified EFI Forum is a non-profit collaborative trade organization formed to promote and manage the UEFI standard. As an evolving standard, the UEFI specification is driven by contributions and support from member companies of the UEFI Forum.

Universal Serial Bus (USB) An external bus standard that supports data transfer rates of 450 Mb/s (USB 2.0). A USB port connects devices such as mouse pointers, keyboards, and printers, to the computer system.

user account A record of essential user information that is stored on the system. Each user who accesses a system has a user account.

User Friendly class Tag (UFcT) A short, user-friendly synonym for a CIM class name. It has the same properties and methods as the CIM class it represents.

User Friendly instance Path (UFiP) A unique path to an instance formed by concatenating the UFiTs of each instance from the root instance to the terminating instance. The intervening '/' between each UFiT represents an address association.

User Friendly instance Tag (UFiT) A unique instance tag within the scope of the target instance's containment class. A UFiT is created by adding an nonzero positive-integer suffix to the target instance's UFcT.

User Friendly Tag (UFT) A short, user-friendly tag for a CIM class name or instance. There are two types of UFTs; UFcT and UFiT.

user name A combination of letters, and possibly numbers, that identifies a user to the system.

UTF-8 Unicode Transformation Format (8-bit). A variable-length character encoding for Unicode.

V

Virtual Media Also, vMedia. Connects a CD/DVD-ROM drive or CD disk image files on client system to the remote server so they appear local to the server during system boot or while the operating system is available. Supports HP-UX, Windows, and Linux server operating environments using Windows and Linux clients.

vKVM Virtual keyboard, video, mouse.

VPN Virtual private network. A network that is constructed using public wires (the Internet) to connect nodes. These systems use encryption and other security mechanisms to ensure only authorized users can access the network and that the data cannot be intercepted.

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