

### Overview

HP Integrity Integrated Lights-Out 2 (Integrity iLO 2) is the next generation of Integrated Lights-Out products for HP Integrity Servers. Integrity iLO 2 offers much of the same features and capabilities as ProLiant iLO 2, plus additional features specific to Integrity Servers. Integrity iLO 2 virtualizes system controls to enable server configuration, routine system administration, troubleshooting and maintenance over a management network regardless of the server's state of operation.

HP's Integrated Lights-Out 2 consists of an intelligent processor and firmware that provides standard and advanced levels of lights-out, remote management functionality. Basic system management functions, diagnostics and essential Lights-Out functionality are provided as standard server features known as iLO Standard.

Integrity iLO 2 Advanced functionality can be licensed for Integrity entry-class systems and server blades with purchase of the optional HP Integrity iLO 2 Advanced Pack. This license enables advanced features built into the management processor's firmware. Integrity c-Class blades currently include a license which has been factory installed. See your blade data sheet for more information. For Integrity cell-based systems, Integrity iLO 2 advanced functionality is enabled per OS hard partition (nPar) with the installation of a Lights Out Advanced / KVM card. This accessory card is a full graphics/USB card plus additional logic to enable the iLO 2 advanced features. The card does not require an iLO 2 Advanced Pack license.

**NOTE:** This QuickSpecs document describes features based on these versions of Integrity iLO 2 management processor firmware:

F.02.17 for entry-class systems

T.02.17 for server blades

4.0 for rx7640, rx8640

8.6d for Superdome sx2000

For more information on Integrity Integrated Lights-Out 2, please visit: <http://www.hp.com/go/integrityessentials>

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## Integrity Integrated Lights-Out 2 Standard

### Virtual Serial Console

Integrity iLO 2 Standard supports the same state-of-the-art virtual serial console technology as found in the HP Integrity high-end servers with MP management processors. Advanced features include browser-based terminal emulation that supports Asian languages and four terminal types, and multiple mirrored console connections which allow several users to simultaneously access the text console enabling collaboration during troubleshooting. Integrity iLO 2 implements the same text-based user interface as found on all Integrity servers, from Superdome to server blades.

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### Virtual Power Button

iLO 2 can be used to remotely operate the power button of a host using a browser, text user interface, or script interface. Using the iLO commands, you can remotely power a server on, turn power off, or reset a system. On cell-based Integrity servers, iLO allows you to select the whole system or just an individual hard partition (nPar) for power on/off/reset.

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### Virtual Indicators

For Integrity entry-class and server blades, Integrity iLO 2 monitors and controls the status of all front panel LEDs as well as the system state, using the Virtual Front Panel feature. The iLO 2 management processor also provides remote control of the cabinet identification lights. On Integrity entry-class systems, iLO 2 can control the blue Unit ID (locator) LED on the front and rear of the server that is used for identifying systems in a rack full of servers. On Integrity cell-based servers, iLO 2 can control the cabinet locator LED. iLO 2 allows you to view the status of these locator LEDs and turn them on or off using iLO 2 Web pages, SSH, and telnet interfaces.

### Overview

#### Power and temperature monitoring

Integrity entry-class and server blades record the current power usage and current server temperature status. On entry-class servers, temperature is reported as a health status (i.e. "normal") On server blades, temperature is reported as a centigrade number. Both entry-class and server blades report power usage in Watts. This information can be read from the iLO management processor's command line interface via the "PS" command. In addition, server blades display current power usage and temperature on the Server Status page of the iLO web GUI – an Advanced Pack license is not required for this basic function. An Advanced Pack license will add the Power Meter feature which provides 24-hour power and temperature graphs.

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#### Power Regulator

The Integrity iLO 2 Power Regulator is enabled on Integrity entry-class systems and server blades with a supporting operating system and selected Intel Itanium 9100 series processors. Integrity iLO 2 Power Regulator provides an easy to use menu to set processor power efficiency modes. Changes to processor power efficiency modes initiated through Integrity iLO 2 or HP Insight Power Manager is enacted by the server operating system. This feature does not require an Advanced Pack license, but does require a power-aware operating system such as HP-UX 11iv3. A supporting operating system must be installed and booted before the Integrity iLO Power Regulator tab will display the choices for power modes. Dynamic Power Savings, Static Low Power, Static High Power, or OS Control modes are the options provided to adjust the server's power and cooling costs. Integrity iLO 2 Power Regulator can be accessed via the iLO web GUI, the Integrity MP text user interface, or scripts.

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#### Embedded System Health

The Integrity iLO 2 management processor monitors fans, temperature sensors, power supply sensors and VRMs without having any System Management Driver loaded. The status of these components is accessible from the iLO 2 browser interface as well as other interfaces, independent of the host operating system. The management processor also reports sensor status to the operating system through an IPMI standard interface.

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#### Browser Accessible

iLO 2's standard features are fully accessible by means of Microsoft Internet Explorer 6.0 SP1 (Windows clients). Integrity entry-class and server blades also support Mozilla 1.7.12.01.00 (HP-UX clients), and Firefox 1.04 (Linux clients), and Mozilla 1.73 (Linux clients) for iLO 2 standard features.

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#### Serial Console Accessible

Integrity iLO 2 supports the HP9000/Integrity management processor text user interface through a serial console. This feature is available in all HP9000/Integrity management processors, from Superdome to the rx1620. In all systems, a menu-driven MP interface is available. Through the text console interfaces, customers can configure, update and control all iLO 2 functions including virtual power (on/off/reset), display logs, and access the remote serial console. The Integrity entry-class and server blades also offer a scriptable -line interface which supports the industry standard command line, DMTF System Management Architecture for Server Hardware, Server Management Command Line Protocol (SM CLP) specification. Early adopters of this specification can switch the text mode of the iLO 2 to this new interface, and access the most common subset of management processor commands.

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#### Auxiliary Power

Because the iLO 2 management processor obtains its power from the auxiliary power plane of the server, it is always on when the server is plugged into a power source. There is no need for an external power source to keep the iLO active when the server is shut down. If the server provides redundant power supplies, then iLO 2 will use redundant power and will continue operation in the event of a power supply failure.

Note that for Integrity cell-based servers, the Advanced Features enabled with the Lights Out Advanced / KVM PCI card, are only available when the PCI slots have power.

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### Overview

#### Auto-Configuration of IP Address using DDNS/DHCP

Integrity iLO 2 provides automatic network configuration in datacenters with DHCP and dynamic DNS. A default network name and Dynamic Host Configuration Protocol (DHCP) client that leases an IP address from the DHCP server on the network are standard with iLO 2. This allows iLO 2 to register the device name with Dynamic Domain Name Services (DDNS) and Windows Internet Naming Service (WINS). For networks that do not use DDNS/DHCP, iLO 2 supports static IP configuration through a serial connection or through the management LAN, or through the Onboard Administrator for BladeSystems. In addition, Integrity entry-class systems allow assignment of a static IP number using the ARP/ping method from a console on the same subnet as the server's iLO management LAN.

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#### Flexible Setup Options

Integrity iLO 2 can be setup via the browser or text user interface over the network. In addition, commands can be sent from HP Systems Insight Manager to configure large numbers of Integrity iLO 2's simultaneously.

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#### Local User Accounts And Logon Records

Integrity iLO 2 Standard supports up to 19 local user accounts with customizable access rights, individual logins and passwords.

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#### Multiple Console Sessions

For entry-class and blade servers, up to 8 simultaneous connections to the management processor are allowed through any port. For cell-based servers, up to 32 simultaneous connections to the management processor are allowed through any port. Each of the following creates one connection: SSH or telnet, iLO browser window, virtual serial console, Integrated Remote Console. For Integrity iLO 2 on cell-based servers with Lights Out Advanced card(s), one Integrated Remote Console (IRC) session can be opened per card, each in a separate iLO browser window.

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#### Security

iLO 2 provides strong security for remote management in distributed IT environments by using industry-standard Secure Sockets Layer (SSL) encryption of HTTP data transmitted across the network. SSL encryption (128-bit) ensures that the HTTP information is secure as it travels across the network. In addition, Integrated Lights-Out 2 uses Secure Shell (SSH) version 2 to provide strong authentication and encryption of commands executed on iLO management processors over a network. PuTTY and OpenSSH clients may be used to access iLO 2 over a Secure Shell connection. The iLO web GUI is accessed through a secure web connection (SSL).

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#### Automated Group Administration & Actions

iLO 2 group administration automates configuring and managing large deployments of Integrated Lights-Out 2 equipped servers. Using HP Systems Insight Manager, you can easily configure all common settings and control all common iLO 2 functions, such as setting user rights, network configurations, and remote power control. In addition to the SIM group actions, the Integrity iLO 2 text user interface supports simple scripting that can be used to automate all features for large groups of iLO 2 installations.

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#### Remote Firmware Update

Integrity iLO 2 firmware on entry-class and server blades can be updated remotely through the browser interface, the text user interface, or using online flash components for Windows, OpenVMS, Linux, and HPUX. Refer to the HP Firmware Manager tools for more information.

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### Overview

#### **Integration with HP Systems Insight Manager and other management applications**

Integrity iLO 2 is integrated with HP and other leading management applications to allow seamless use in lifecycle tasks and processes from deployment to fault management and administration. HP Systems Insight Manager (SIM) intelligently discovers iLO 2 devices and associates them with their host servers for fast access to iLO 2 during fault management activities. Intelligent discovery and launch of iLO 2 browser is supported in HP OpenView Operations for Windows and Network Node Manager, and Microsoft Operations Manager. SIM License Manager does not manage Integrity iLO 2 licensing. Integrity iLO 2 Advanced Pack licenses should be installed manually through the iLO management processor command line interface or through the iLO web GUI interface.

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#### **Dedicated Network Connectivity**

Integrity iLO 2 includes an embedded 10/100 MB Ethernet NIC for remote management of HP Integrity Server. This NIC is dedicated to the iLO 2, so users can choose to place iLO 2 on a management network isolated from the server payload network. The dedicated NIC can auto-select speeds between 10 Mbps and 100 Mbps.

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#### **Virtual Private Network (VPN) support**

iLO 2 functionality is available securely over the Internet around the world when used in conjunction with VPN technology. iLO 2 LAN-based remote management is VPN compatible.

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#### **System Event Log**

Integrity iLO 2 captures and stores the server's System Event Log for access via browser or text interface even when the server is not operational. This capability can be helpful when troubleshooting remote host server problems.

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#### **Forward Progress Log**

The Integrity iLO 2 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.

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#### **System Diagnostics**

Integrity iLO 2 may be used to diagnose systems. The Remote Console options, Integrated Remote Console and Remote Serial Console, may be used to monitor the system for POST error messages. The System Event Log and Forward Progress Log record events useful for diagnostics. iLO 2 Virtual Media (when activated by an iLO 2 Advanced key) may be used to remotely boot and run System Diagnostics.

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#### **Microsoft Emergency Management Service Console Integration**

The Microsoft Emergency Management Service console provides a text-based screen to access the host server. Integrity iLO 2 provides the option to access the EMS console from the iLO 2 browser interface, or from telnet, SSH, or the Serial interface. The Emergency Management Service console option is available on all HP Integrity servers using Windows Server 2003 and Integrity iLO 2 Standard.

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## **Integrity iLO 2 Advanced Features for Entry-Class Systems and Server Blades**

Integrity iLO 2 Advanced features are built into the Integrity iLO 2 firmware and are activated with an Integrity iLO 2 Advanced Pack License (AD301A). Integrity BL860c and BL870c server blades come with an iLO 2 Advanced Pack license key factory installed.

### Overview

#### Power Meter

On Integrity entry-class systems and server blades, the Integrity iLO 2 web GUI Power Meter tab displays a graph of 24 hours worth of power (Watts) or thermal output (Btu/hour) data. Power Meter data is collected independently of the server operating system and works with all Intel Itanium processors.

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#### Power Reporting and integration with HP Insight Power Manager

An Integrity iLO 2 Advanced Pack license key is required to integrate Integrity servers with HP Insight Power Manager (IPM). IPM can manage both ProLiant and Integrity servers and can be used to monitor and regulate groups of servers through manual settings or time-based schedules.

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#### Integrated Remote Console (graphical console with virtual keyboard, video, mouse)

Integrity iLO 2 includes the Java-free Integrated Remote Console for environments with Microsoft Windows host and client operating systems. The Integrated Remote Console provides a complete virtual keyboard, video, and mouse (vKVM) to the server, even pre-OS boot. vKVM works in conjunction with the physical video installed on the server (video is an optional accessory on some Integrity server models.) The IRC runs on an ActiveX control that is a one-time, automatic download to clients running Windows Internet Explorer allowing users to operate without installing any Java clients. No additional software is required on the remote server or client system.

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#### Virtual Media

The USB-based Virtual Media feature allows an IT administrator to attach a CD, DVD, or ISO 9660 image file image to a remote server, and then boot from, run applications, or transfer files from that virtual device. Virtual Media can be used to save time and travel when making a trip to the data center is impractical or inconvenient. Virtual media devices are available before an OS is loaded and may be used to boot the remote server, install updates or applications, or run software directly from the media. After the remote server has booted a USB-capable operating system (e.g., HP-UX 11i, Windows® Server 2003, Linux (Red Hat and SUSE), or OpenVMS 8.3-1H1), the virtual device is available as if it were a local read-only USB device. This feature allows administrators to carry out any of the following functions remotely from an applet user interface, text user interface, or script.

- Install applications or updates on the remote server from a Virtual CD
- Run HP User Diagnostics on remote host servers
- Update firmware using HP Firmware Manager tools
- Perform disaster recovery of failed operating systems'
- Deploy an operating system on remote servers from a Virtual CD network drive (Note that Virtual Media performance varies with network performance. Physical USB media drives generally have faster performance than virtual media drives. This may be especially noticeable when transferring large files or doing OS installation.)

Additional Virtual Media read-only devices for virtual USB-Floppy and virtual USB flash (2GB devices or smaller, FAT file format) are also supported for Windows Server and EFI environments. Virtual floppy eliminates the need for an external USB floppy device. Virtual floppy can be used to remotely boot your server from a 1.44MB floppy diskette or diskette image file, run diagnostics, inject Windows boot drivers, or do a floppy-based Windows ASR recovery boot. Virtual USB flash can be used to conveniently attach a USB flash memory stick to transfer files such as Windows drivers and patches.

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### Overview

#### LDAP and schema-free Directory Integration

Integrity iLO 2 integrates with enterprise-class directory services to provide secure, scalable, and cost effective user management. Directory services, such as Microsoft Active Directory, can be used to authorize directory users with assigned user roles to Integrated Lights-Out processors. With Active Directory, customers have the flexibility to integrate with or without a schema extension. An easy and reliable installation program is available to install a management console snap-in and extend customer's existing directory schema to enable directory support for the HP lights-out management products. A directory migration tool is available to automate setup for both methods of integration.

#### Integrity iLO 2 Advanced Features support for entry-class and server blades

Operating System	Integrated Remote Console	Virtual Media CD/DVD/ISO	Virtual Media Floppy/Flash
EFI	Supported	Supported	Supported
HP-UX 11iv2 and v3	Not supported	Supported	Not supported
Windows Server 2003 and 2008	Supported	Supported	Supported
Linux	Not supported	Supported	Not supported
OpenVMS 8.3-1H1	Not supported	Supported	Not supported

#### Integrity iLO 2 Advanced Features for Cell-Based Servers

Integrity iLO 2 Advanced features on cell-based systems are enabled per OS hard partition (nPar) through installation of the optional the Integrity Lights Out Advanced / KVM card (AD307A). One card should be installed in each nPar where the Lights Out advanced features are desired. This PCI-X mode 1 card is a physical graphics/USB card, and also enables Lights Out advanced features. The LOA card may be used to attach a physical monitor, keyboard, and mouse, and should be used instead of other graphics/USB cards such as A6869A in an nPar. Only one graphics card of any type should be installed in any nPar. An iLO 2 Advanced Pack license key is not required on systems that use the LOA cards. The LOA card is supported on Integrity rx7640, rx8640, and Superdome sx2000 servers.

For Integrity cell-based servers, the iLO 2 web GUI includes pull-down controls to select IRC or vMedia for each individual hard partition (nPar) where LOA cards are installed. Only one IRC session may be opened per iLO 2 web GUI window. In systems where more than one LOA card is installed, additional iLO 2 web GUI windows may be opened to run multiple IRC sessions simultaneously.

Because the card is powered by the PCI slot, the card features will not be available when the I/O slots are not powered on.

#### Integrated Remote Console (graphical console with virtual keyboard, video, mouse)

The Integrity LOA card enables the same Integrated Remote Console feature as found in Integrity iLO 2 for entry-class systems. IRC is supported for environments with Microsoft Windows host and client operating systems. Only one IRC session may be opened per iLO GUI browser session, but multiple IRC sessions may be run by opening multiple iLO GUI session.

#### Virtual Media

The Integrity LOA card enables the same Virtual Media for CD, DVD, or ISO file as found in Integrity iLO 2 for entry-class systems. At first release, LOA Virtual Media is supported by HP-UX 11i, Windows® Server 2003, and OpenVMS 8.3-1H1. Multiple Virtual Media connections to separate partitions can be made from one iLO GUI session.

#### Integrity Lights Out Advanced / KVM card (LOA) p/n AD307A

### Overview

#### Standard Features

RJ45 port for LOA management LAN 10/100Base-T

Two USB 2.0 ports

DB15 VGA port

PCI-X mode 1 card full length

iLO Advanced Features of Integrated Remote Console and Virtual Media (CD, DVD, and ISO file)

(Serial port on this card is for manufacturing use only)

VGA supported resolutions: 75Hz@640x480, 800x600, 1024x768, 1280x1024, 60Hz@1600x1200

#### Card Installation

##### On Superdome sx2000

PCI-X backplanes install in slots 0-4, 7-11

PCI-X/PCIe backplanes install in slots 0-1, 8-11

On Windows partitions, install in slot 0

##### On rx7640 and rx8640

PCI-X or PCI-X/PCIe backplanes install in slots 1, 2, 7, or 8

For all systems, a maximum of one card can be installed in each hard partition (nPar)

Supported platforms: rx7640, rx8640, Superdome sx2000

Windows Support Packs: Windows server environments require Integrity Support Pack or Windows v5.2 or greater

Integrity Lights Out Advanced / KVM card OS support:

Operating System	Integrated Remote Console	Virtual Media CD/DVD/ISO	Physical VGA	Physical USB
EFI	Supported	Supported	Supported	Supported
HP-UX 11iv2 and v3	Not supported	Supported	Not supported	Supported
Windows Server 2003 and 2008	Supported	Supported	Supported	Supported
Linux	Not supported	Not supported	Not supported	Not supported
OpenVMS 8.3-1H1	Not supported	Supported	Not supported	Supported

### Compatibility

#### Integrity Server Family supported platforms

BL860c, BL870c, rx2660, rx3600, rx6600, rx7640, rx8640, Superdome sx2000

#### Integrated Remote Console (IRC)

For rx2660, rx3600, rx6600, IRC requires a Unified Core I/O card with VGA interface, p/n AD044A.

For BL860c and BL870c, IRC is fully supported by the VGA integrated on the blade

For rx7640, rx8640, Superdome sx2000, IRC requires a Lights Out Advanced / KVM card, p/n AD307A.

**IRC, Supported Server Operating Systems:** Microsoft Windows Server 2003 Enterprise Edition for Itanium (full functionality), **EFI**

**IRC, Supported Client Browsers:** Internet Explorer v6.0 with SP1 or higher, Maximum supported video resolution is 1024 x 768 (Up to 85 Hz, 32-bit color)

**Virtual Media, Supported Clients:** 32-bit Windows with Java Plug-in 1.5.0\_08 or above, 32-bit Linux with Mozilla.

**Virtual Media, Supported Server Operating Systems:** HP-UX 11i v2 and v3, Microsoft Windows Server 2003 Enterprise Edition and Data Center for Itanium, Linux (SUSE and Red Hat, BL860c, BL870c, rx2660, rx3600, rx6600 only), and the pre-boot environment of EFI. In EFI, Virtual Media supports the El Torito bootable CD format.

**Virtual Media for OS install using virtual USB CD, Supported Server Operating Systems:** HP-UX 11i v2 and v3, Microsoft Windows Server 2003 Enterprise Edition and Data Center for Itanium, Linux (Red Hat and SUSE)(Linux supports BL860c, BL870c, rx2660, rx3600, rx6600 only)

**Virtual Media for run-time use of virtual USB CD, Supported Server Operating Systems:** HP-UX 11i v2 and v3, Microsoft Windows Server 2003 Enterprise Edition and Data Center for Itanium, Linux (Red Hat and SUSE) (Linux supports BL860c, BL870c, rx2660, rx3600, rx6600 only)

### Options

## License Packs

**Integrity iLO 2 Advanced Pack, AD301A**

**For rx2660, rx3600, and rx6600 servers**

(Included with purchase of BL860c and BL870c)

**Integrity iLO 2 Advanced Pack** AD301A Software Option Kit – 1 Server

AD301A #0D1 Software Option Kit – 1 Server, factory integration

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### Licensing and Packaging

One license is required for every server on which the product is installed and used. Licenses are non-transferable. Full details are contained in the End User License Agreement.

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### Integrity iLO 2 Advanced Pack Evaluation License

A FREE license key is available to temporarily activate Integrity iLO 2 Advanced features on Integrity entry-class systems for evaluation purposes. The evaluation key provides one temporary license to unlock all of the advanced remote management features, for up to 30 days. Evaluation keys are available at: <http://h71028.www7.hp.com/enterprise/cache/279991-0-0-0-121.html>

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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>

## Option Cards

**Integrity Lights Out Advanced / KVM card**

**For rx7640, rx8640, and Superdome sx2000 servers**

LOA card

AD307A

LOA card factory integration

AD307A#0D1

One card is required for each OS hard partition (nPar) where the Lights Out Advanced features for every server on which the product is installed and used. Licenses are non-transferable. Full details are contained in the End User License Agreement.

### Technical Specifications

<b>MP Upgradeability</b>	Firmware remotely upgradeable via MP LAN, offline update via EFI, and OS-initiated firmware updates for all Integrity support OS.
<b>MP Interfaces</b>	One dedicated Ethernet network connection (10/100 Mb/s), one RS-232 serial connection
<b>Client System Support</b>	For Integrated Remote Console: Windows For telnet, SSH, and web interface: HP-UX, Windows, Linux, and OpenVMS
<b>Client Browser Support</b>	For rx2660, rx3600, rx6600, BL860c, and BL870c: Microsoft Internet Explorer 6.0 SP1, Mozilla 1.7.12.01.00 (HP-UX), Mozilla 1.78 (Linux SuSe), Firefox 1.0.7-4.3.ia64 (Linux Redhat ES.RHEL 4) For rx7640, rx8640, and Superdome sx2000: Microsoft Internet Explorer 6.0 SP1
<b>Text Interface Support</b>	Telnet, Secure Shell and serial port access
<b>Security</b>	Secure Socket Layer Secure Shell (SSH) version 2 (Password and certificate), SSL, and integration with enterprise directory services
<b>Directory Support Services</b>	Active Directory V1.0 (Windows 2000, 2003) Novell eDirectory V8.6.2, V8.7 (Novell NetWare 5.X, 6.X, Red Hat 7.1, Windows 2000, Windows Server 2003)
<b>Integrated Remote Console</b> (graphics console for Virtual Keyboard, Video, Mouse)	With optional core I/O video or LOA card, the Integrated Remote Console provides support for remote graphical console for Windows Server systems via Windows Clients and Internet Explorer web browser.
<b>Virtual Media</b>	Connects a CD-ROM/DVD drive or CD-ROM 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 via Windows and Linux clients

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