

# PRODUCT OVERVIEW

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## Compaq Remote Insight Product Overview

### EXECUTIVE SUMMARY

In today's business environment, more companies are distributing their computing resources throughout the enterprise. In addition, businesses must continually find ways to work more efficiently. These trends have resulted in an increased need for effective remote server management tools. This paper discusses one Compaq solution to effective remote server management, the Compaq Remote Insight board. Key features, including remote reset, graphical remote console, web browser access, alerting capabilities, and full integration with Compaq Insight Manager are identified and described.

**COMPAQ**

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### Compaq Remote Insight Product Overview

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*Distributed enterprise trends are the driving force behind the need for effective server management, and especially the need for remote server management tools.*

### **DISTRIBUTED ENTERPRISE TRENDS**

Today's businesses are using larger, more complicated server and local network systems than ever before. As server prices drop and performance levels rise, it is easier for companies to justify placing servers at branch offices and other remote sites. A business that distributes its computing resources to end-user locations in this way is known as a *distributed enterprise*.

Several trends are associated with the distributed enterprise business model. First, the focal points for computing, namely servers, are located at both end-user sites and within data centers, rather than being concentrated within the computing facility of a single mainframe computer. An administrator is required to manage many computers instead of just one. In the distributed case, the administrator must travel to each site for system management purposes. In the data center case, numerous management consoles are required. Second, software applications are becoming more complex, placing higher demands on server performance. Third, the data on servers is often critical to the business and must be available at all times. Finally, industry analysis shows that while the number of servers per company is increasing, administration budgets are often shrinking, leaving administrators with less support staff to perform more work. These factors are the driving force behind the need for effective server management, and especially the need for remote server management tools.

### **REMOTE SERVER MANAGEMENT NEEDS**

Effective remote server management includes these elements:

- Seamless remote access and control at all times, regardless of server location, server condition, or administrator location.
- Information capture and storage that provide vital troubleshooting information to an administrator.
- Immediate alerting capabilities, independent of server hardware or operating system, to support mission-critical environments.
- Security features that provide flexibility for the administrator and protection of mission-critical data and applications.

*Compaq has developed a cost-effective hardware solution, the Compaq Remote Insight board, to complement the robust software management provided by Compaq Insight Manager.*

To meet all these needs, a blend of hardware and software components must be used. Compaq developed a cost-effective solution, Compaq Remote Insight, to complement the robust system management provided by Compaq Insight Manager. Compaq Remote Insight provides remote server management, whether the server is half a mile or half a world away. It is independent of the host server operating system (OS), server hardware, or network connection, allowing complete access and control at all times. In addition to answering the need for effective remote server management, Compaq goes one step further with full integration of Compaq Insight Manager. Together, Remote Insight and Insight Manager software provide a comprehensive solution to remote server management needs.

### **COMPAQ SOLUTION**

Compaq Remote Insight provides seamless remote access and control, fulfilling the requirements for effective server management with the following features:

- Hardware independence from the managed server, including battery backed-up processing and an on-board modem that provides out-of-band network communication.

- Remote Insight Console Application, a software application that runs on the Compaq Remote Insight board and provides access to and control of the managed server at all times, regardless of server location, server condition, or administrator location. Remote Insight Console Application is accessed by a Web browser, or alternating via direct point-to-point protocol (PPP) connection using simple text-based terminal access
- Remote Console and Remote Reset, features within the Remote Insight Console Application that provide viewing and control of all phases of server operation and full capability to reset the server remotely without any loss of connection. Third-party graphical remote control software can also be used to provide a remote graphical user interface (GUI) for Windows NT servers.

Remote Insight captures critical information and provides troubleshooting information by means of these features:

- Full integration with Compaq Insight Manager, Compaq's full-function Simple Network Management Protocol (SNMP)-based server management application.
- Video Sequence Replay, which allows storage and replay of reset and failure sequences, giving the administrator vital information (Windows NT "blue screen" or NetWare ABEND messages) to solve problems efficiently and reduce server downtime.
- Event Log, which provides information that is stored on the Remote Insight Board (RIB) and is available for review at all times. This includes the Critical Error Log, the Integrated Management Log, and the Survey Utility's latest server configuration file. (For more information on the Integrated Management Log, refer to Compaq document number 352A/0597ECG).

Immediate alerting is provided through:

- Enhanced alerting capabilities; such as alphanumeric paging and Compaq Insight Manager-generated alerts, to enable quick response times for protection of mission-critical applications and data.
- Full battery backup on the board, ensuring alerts are delivered even in the case of server power outage.

Finally, Remote Insight features security capabilities such as variable user access rights, unauthorized user detection, and communications security that provide flexibility and an extra measure of protection for mission-critical data.

The following section describes these features in more detail.

## KEY FEATURES

### Hardware Independence/Out-of-Band Connection

Remote Insight is an expansion board with its own microprocessor, internal modem, serial port, memory, battery, keyboard port, and video controller, to provide complete hardware independence from the server in which it is installed. It is essentially a "computer within a computer," capable of monitoring the managed server 24 hours a day.

Remote Insight also has resident PPP capability. PPP is an internetworking protocol that allows the remote server and management PC to communicate using network protocols and standards over an out-of-band connection. An out-of-band connection refers to a connection that is established through a telephone line or direct serial connection, rather than through a standard network medium, such as twisted pair 10Base-T. The out-of-band connection is also referred to as an asynchronous connection.

*Remote Insight is essentially a "computer within a computer," capable of monitoring the managed server 24 hours a day.*

By dialing in through the modem and establishing an asynchronous connection, the administrator has total access to the server at any time. For instance, if the server is running but the OS fails, the administrator, through the asynchronous connection, can still access the server and issue commands to regain control of the server OS.

Because of the hardware independence, there are three primary functions that can always be performed by Remote Insight regardless of the state of the server. These are Remote Console, Remote Reset, and Alerts. Remote Insight brings an unprecedented level of control and management with the availability of these functions at all times.

### **Remote Insight Console Application**

Remote Insight comes with an independent software control program that provides access to its features. The Remote Insight Console Application is a program that provides access to features the following: Remote Console, Remote Reset, Video Sequence Replay, Event Log, Alert information, and User Login information. The program resides in the Remote Insight board's firmware, so that it is always present and available for use.

The Remote Insight Console Application can be accessed either through PPP or American National Standards Institute (ANSI) terminal emulation protocols. Using the PPP link, multiple, simultaneous connections take place. Connections such as sharing SNMP data with Compaq Insight Manager, and Web browser access to the Remote Insight Console Application.

When a terminal emulation connection is made, the Remote Insight Console Application is activated. This allows Compaq Remote Insight to be accessed using any standard ANSI terminal emulation software. Therefore, the administrator is not tied to the management PC and could, for example, access Remote Insight from a laptop computer running Microcom Carbon Copy or other third-party remote control applications, such as Symantec pcANYWHERE or DataStorm Technology ProComm software, by using their ANSI connection features.

### **Remote Console**

When Remote Console is selected from the Remote Insight Console Application, the administrator has "virtual on-site" management capabilities, an invaluable feature to the offsite administrator. Using Microcom Carbon Copy (or other remote control applications), an administrator accesses the managed server's console and directly issues keyboard commands.

### **Remote Reset**

Remote Reset is one of the most important options that the administrator has through the Remote Insight Console Application. If the OS is not functioning, the administrator can issue a command for the Remote Insight hardware to reset the server, circumventing the OS. Once the server is reset, the administrator can observe the videotext of the startup (reset) process, from memory count through the OS load. Compaq Remote Insight provides a significant advantage over strictly software-based solutions that do not allow viewing of any startup sequences before the OS load. The startup sequences, as described in a following section, can reveal important clues to the health of the server.

Because remote control is fully active during the startup process, the remote user may invoke the server's system partition utilities by pressing the F10 key. These utilities are used remotely to perform system diagnostics or system configuration.

*Remote Insight comes with an independent software control program that may be used to access its features.*

*Remote Insight provides "virtual on-site" management of remote servers. The administrator is able to issue keyboard commands and view monitor content directly.*

*The administrator can reset the server and bring the OS back up remotely, without depending on OS functionality and without losing the remote connection to the server.*

The high level of integration between Remote Insight and Compaq Insight Manager creates a framework within which a wealth of server data and functions can be accessed.

### Full Integration with Compaq Insight Manager

The high level of integration between Remote Insight and Compaq Insight Manager creates a framework within which a wealth of server data and functions can be accessed. Compaq Insight Manager allows intelligent monitoring and data collection from all hardware subsystems in the server, such as environmental systems, disk storage, and system memory. While Compaq Insight Manager can provide this data and functionality as a stand-alone server management software package, it can also function as the software component of the Remote Insight hardware.

Insight Manager provides data collection and reporting tools. These tools include SNMP alarm forwarding to an Insight Manager console or a pager.

An example of the integration of Remote Insight and Compaq Insight Manager is the recovery feature. Figure 1 shows the Recovery sub-menu from Insight Manager (the name of the managed server is YOUR\_SERVER). Notice the Remote Insight icon available on this menu; selecting this option provides status information on the Remote Insight board.

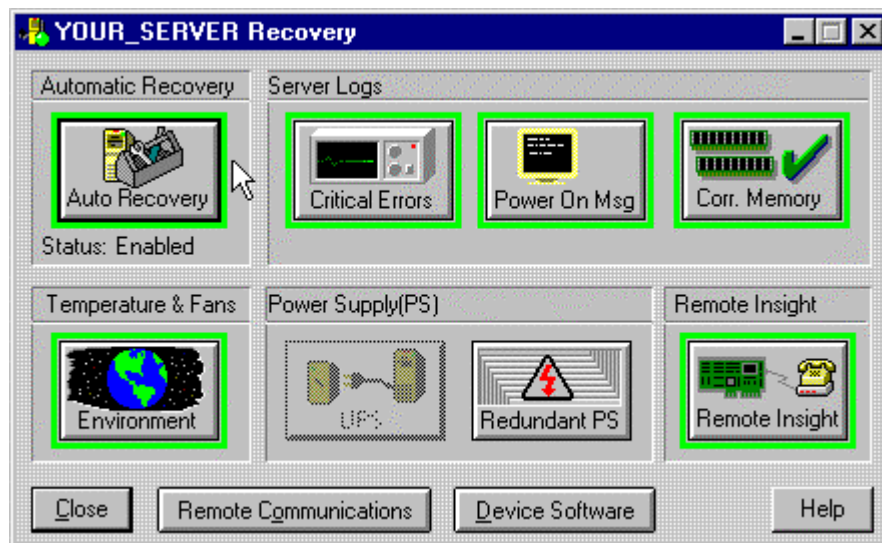


Figure 1: Insight Manager GUI

OS support is needed only for the integration of software management functions. Compaq Insight Manager agents support the following major network operating systems: Microsoft Windows NT 4.0 and 3.51, Novell NetWare/IntranetWare, Santa Cruz Operation, Inc. (SCO) OpenServer, UnixWare, and International Business Machines (IBM) OS/2. Since Remote Insight is hardware-based and OS-independent, even servers that use unsupported operating systems will be able to access Remote Insight and its critical hardware functions, such as Remote Console, Remote Reset, Video Sequence Replay, and Alerting.

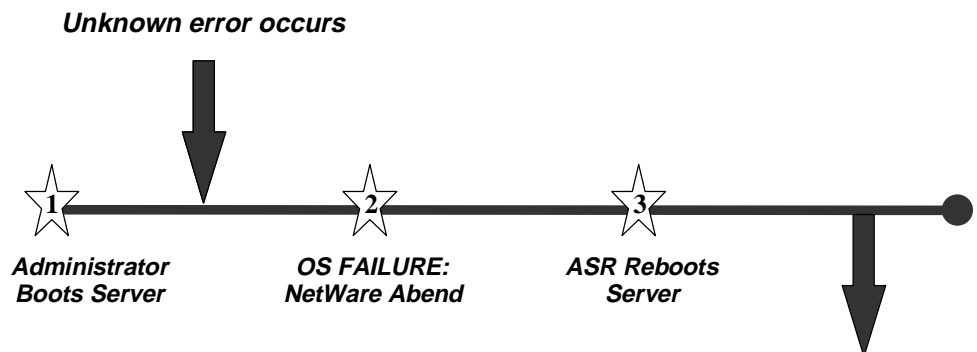
Remote Insight introduces the ability to view previous reset and failure sequences

### Video Sequence Replay

Remote Insight provides the ability to view previous reset and failure sequences. The board automatically stores the startup and OS initialization sequences from the most recent reset sequence and the prior reset sequence, giving two generations of captured videotext.

In addition to the reset sequences, Remote Insight stores multiple screens of videotext prior to a server reset. One generation of failure sequence data is available for review. This information, such as NetWare ABEND information or Windows NT "blue screens," captures the state of the server leading up to the failure and server reset.

Figure 2 shows a timeline of typical reset events. The previous reset sequence (1), failure sequence (2), and current reset sequence (3) are stored in memory for replay as needed. The administrator can define viewing speed of the replayed sequences and can pause to allow viewing as slowly or as quickly as desired. The administrator can review these sequences to gain vital troubleshooting information, identify and resolve problems, and reduce server downtime.



- Remote Insight Paging alerts administrator(s) and sends alerts to Insight Manager Console(s)
- Administrator dials in to determine status and review video captures:
  1. Previous Reset Sequence
  2. Failure Sequence
  3. Current Reset Sequence

Figure 2: Timeline of Reset Sequences

### Event Log

In the on-board memory, Remote Insight maintains a log of Remote Insight events. This log holds information such as Remote Insight login attempts, Automatic Server Recovery (ASR) resets, and server power losses. Up to 50 critical events such as server resets are stored in non-volatile random access memory (RAM). This information is available even when the server is in a down state (board still operational).

### Critical Error Log and Integrated Management Log

Compaq servers feature a 16-entry Critical Error Log or Integrated Management Log. Each log records the most recent system errors and events for post-diagnosis review. The Remote Insight board has the most recent copy of these logs, so even if the server OS or hardware is down, the administrator can access the copy provided by Remote Insight. (For more information on the Integrated Management Log, refer to Compaq document number 352A/0597ECG).

*Remote Insight provides alerts by alphanumeric or numeric paging and through delivery of in-band or out-of-band SNMP traps to the management site PC.*

### **Compaq Survey Utility's Server Configuration Log**

The Compaq Survey Utility runs periodically to record snapshots of the current server configuration. When doing so, it updates a copy of the log maintained on the Remote Insight board. So, even if the server OS or hardware fails, the user can download the latest Survey file from Remote Insight by using a Web browser, then view, print, or save the configuration of the server as an aid to understanding how recent changes may influence the server's behavior.

### **Alerting**

To reduce downtime on mission-critical servers, a server management tool must be able to alert the administrator of faults. Remote Insight provides alerts by alphanumeric or numeric paging and through delivery of in-band or out-of-band SNMP traps to the management site PC.

Alphanumeric paging overcomes the restrictions of numeric-only support. It allows customized alerts to be sent. For example, in the following sample user alert, the first three digits describe the type of alert, the remaining digits are the server's ID, and YOUR\_SERVER is the server name.

95242579 Server YOUR\_SERVER: Server power outage

Asynchronous forwarding of SNMP traps allows the administrator to obtain information for in-band and out-of-band servers at one management PC using Compaq Insight Manager. The SNMP trap delivery feature is made possible by the resident PPP capability. By providing a means for out-of-band connection using network protocols, Remote Insight permits true network communication between a remote server and a management site PC. Therefore, network-dependent communication such as SNMP is possible, just as if the two devices were connected on a local network.

All alert messages are time-stamped and included in the event log. Remote Insight automatically alerts the administrator of events such as:

- Server power outage. The rechargeable battery on Remote Insight provides full power to the board for at least 30 minutes, enough time to alert pagers and management site PCs that the server is down, or to allow a remote administrator dialing in to review the various logs and replay the video capture sequences.
- Server resets, including those generated by ASR.
- Compaq Insight Manager-generated alarms. All SNMP traps generated by Compaq Insight Manager can be forwarded to the administrator by the Remote Insight hardware.

These alerts allow the administrator to react immediately to any fault notification, so that any service interruption for mission-critical server environments is reduced or eliminated.

### **SECURITY FEATURES**

The security features of Remote Insight provide protection of mission-critical data and an extra measure of control for the administrator. Security features include user access rights, password protection, support for optional dial-back, and communications security.

### **User Access Rights**

Remote Insight offers the ability to define up to 12 separate users and vary the server access rights of each user. The administrator can customize access rights that vary according to the roles and responsibilities of each user. For example, a user could be denied access to the remote console,

*Remote Insight offers the ability to define 12 separate users and vary the server access rights of each user.*



but still receive alerts on host failure conditions. Ability to access the Remote Insight board and the remote console, to control the server resets, or to receive alerts can be set in an individual user profile. As a security measure, supervisor-level rights are required to change any user rights.

### Unauthorized User Detection

Two levels of protection are available to identify unauthorized users. First, Remote Insight uses password and username recognition to detect and reject access by any unauthorized user. Remote Insight will generate an alert to the administrator after several attempts at unauthorized access have occurred. The administrator can define the number of unauthorized attempts that occur before an automatic alert is generated.

Second, to protect against an unauthorized user who somehow obtains a legal password and username, the administrator can activate an optional dial-back feature. With this option, pre-defined telephone numbers are configured into user profiles. When a user initiates contact, Remote Insight verifies the username and password, disconnects, then re-dials the user at the predetermined (actual user) telephone number. For an authorized user, remote access can proceed as usual; however, the unauthorized user will lose the connection to the server at this point. This feature can be enforced globally or on an individual user basis.

### Communications Security

Finally, access to Remote Insight, using any standard terminal emulation communication package, can also be controlled. The support can be globally disabled during board configuration. This provides a further level of protection by ensuring that only users with fully authenticated PPP connections have access to Remote Insight.

## HARDWARE SUMMARY

Remote Insight is compatible with the following Compaq server families: Compaq ProLiant servers, Compaq ProSignia servers, Compaq ProSignia VS servers, and Compaq Systempro/XL servers.

It is an Extended Industry Standard Architecture (EISA)-based expansion board, compatible with the installed base of server products as well as new products. As detailed in Table 1, the board includes an Intel i386EX processor, 1 Megabyte (MB) flash read-only memory (ROM), 1 MB RAM, a 14.4 Kilobits per second (Kbps) modem, and a rechargeable Nickel Cadmium (NiCad) battery.

HARDWARE DETAILS	
Processor	Intel i386EX embedded processor
Upgradability	Board firmware upgradable via flash ROM
Video Support	On-board VGA, 640x480x256, 1024x768x16
Standard Interfaces	One keyboard input/output, one serial port, one video output
Integrated Modem	14.4 Kbps, v.42bis, MNP5
Memory	1MB flash ROM, 1MB RAM, 512kB video RAM
Battery System	Rechargeable NiCad, user replaceable

TABLE 1 – REMOTE INSIGHT HARDWARE

*Remote Insight is compatible with most Compaq server families.*

The network administrator can access the board via the internal modem and a localized Data Access Arrangement, or through an external modem connected to the serial port.

### Connection and Configuration

When Remote Insight is installed in the managed server, the server keyboard and monitor cables are directly connected to the Remote Insight Board. The network administrator has access to the board via the internal modem and a localized Data Access Arrangement (DAA), or through an external modem connected to the serial port. The DAA provides the modem interface for specific regional telephone requirements (France, Germany, Japan, Netherlands, North America, and the United Kingdom). Figure 3 illustrates the hardware connections.

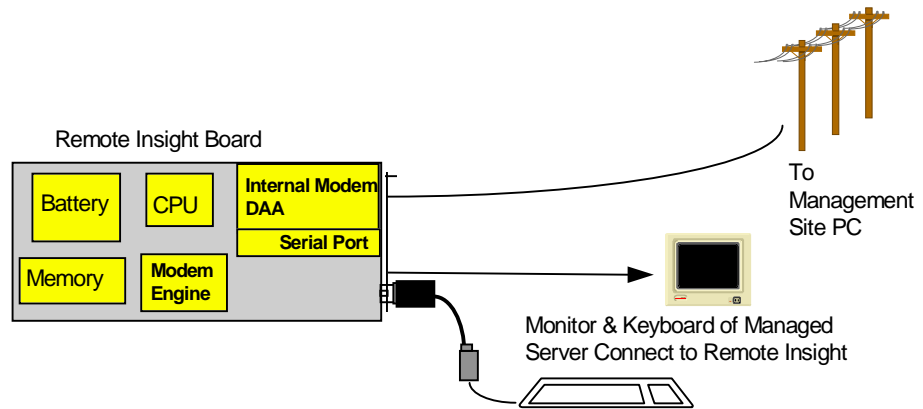


Figure 3: Remote Insight Connections

The serial communications (COM) port can also be used to connect a third party modem or modem-sharing device to Remote Insight. By connecting a modem-sharing device to Remote Insight, a single telephone line can connect multiple servers in one room. This reduces the need to add telephone lines.

To ensure complete flexibility and ease-of-use, full configuration of Remote Insight is available through an easy Compaq SmartStart interview process. Remote Insight can also be configured using the Compaq System Configuration utility.

Full configuration of Remote Insight is available through Compaq SmartStart.

### COMPARISON OF COMPAQ REMOTE MANAGEMENT FEATURES

Figure 4 represents the three levels of out-of-band management Compaq provides for its servers.

- Level 1 – Via modem, all servers provide server management, even when the network fails.
  - a) Remote monitoring of an operational server using asynchronous CIM
  - b) Numerical paging on server restarts using ASR paging following server reset
- Level 2 – Via modem, Integrated Remote Console (IRC) provides server remote control, even when both the server OS and network are unavailable for ProLiant 800, 850, 2500, and 6000 models. (For more information on IRC, refer to Compaq document number 582A/1096). All Level 1 tools can be used, with the addition of:
  - a) Remote control of failed server
  - b) Unattended failed server reset
  - c) Deferred diagnosis on server reboot sequence and screen failure snapshot

# ProLiant Manageability

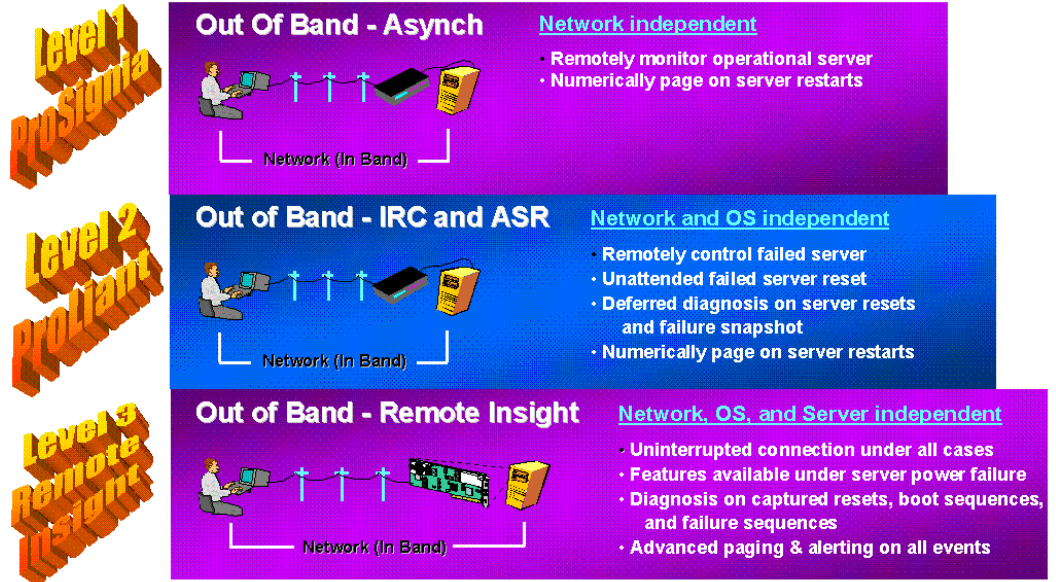


Figure 4: Out-of-Band Management

- Level 3 – At the highest level, Remote Insight provides comprehensive server management that is available regardless of the state of the server, its OS, and the network. All Level 1 and Level 2 tools can be used, with the addition of:
  - a) Uninterrupted connection at all times
  - b) All features available during server power failure
    - Dual integration with CIM
    - Web browser access
  - c) Immediate analysis possible using captured resets, boot sequences, failure sequences, and latest Survey server configuration snapshots
  - d) Advanced, alphanumeric paging and alerting on all server events
  - e) Seamless Windows NT graphical remote control (enhanced with third-party software)

The following chart further differentiates the benefits provided by IRC (Level 2) and RI (Level 3).

## COMPAQ REMOTE INSIGHT PRODUCT OVERVIEW *(cont.)*

Benefit	IRC - Level 2	RI - Level 3
<b>Management</b>	<ul style="list-style-type: none"> <li>Integrated remote control and remote reboot solution for Compaq ProLiant 800, 850, 2500, and 6000</li> </ul>	<ul style="list-style-type: none"> <li>Comprehensive remote management solution for Compaq servers except ProLiant 800/850 and ProSignia 200 (PCI/ISA only)</li> </ul>
<b>Key Differentiators</b>	<ul style="list-style-type: none"> <li>Integrated with motherboard</li> <li>Completely host-OS independent</li> <li>Enabled by user-provided, ISA-based modem (can be shared by IRC with other server operations) and third-party modem support</li> </ul>	<ul style="list-style-type: none"> <li>Comprehensive troubleshooting and notification provided via paging and SNMP alerts</li> <li>Completely independent from host hardware (including power requirements) enabling complete access and alert delivery</li> </ul>
<b>Remote Control</b>	<ul style="list-style-type: none"> <li>Yes – text based (graphics-based remote control available through modem sharing and use of third-party software)</li> </ul>	<ul style="list-style-type: none"> <li>Yes – text based and seamlessly supports graphics-based remote control for Windows NT servers enabled by pcANYWHERE or Microcom Carbon Copy</li> </ul>
<b>Host OS Independent</b>	<ul style="list-style-type: none"> <li>Yes</li> </ul>	<ul style="list-style-type: none"> <li>Yes</li> </ul>
<b>Problem Notification</b>	<ul style="list-style-type: none"> <li>None (Page on ASR event)</li> </ul>	<ul style="list-style-type: none"> <li>SNMP trapping and alerting</li> <li>Numerical and alphanumeric paging</li> </ul>
<b>Troubleshooting System</b>	<ul style="list-style-type: none"> <li>Most recent video reboot sequence and screen snapshot captured</li> </ul>	<ul style="list-style-type: none"> <li>Video failure sequence captured</li> <li>Two most recent successful video reboot sequences captured</li> <li>Critical Error Log/Integrated Management Log</li> <li>Event Log – timestamps key events</li> <li>Survey: latest snapshot</li> </ul>
<b>Compaq Insight Manager Coordination</b>	<ul style="list-style-type: none"> <li>Launches Remote Console</li> </ul>	<ul style="list-style-type: none"> <li>Fully integrated with Compaq Insight Manger</li> <li>Launches Remote Console</li> <li>Generates/delivers SNMP traps for remote server problems to Insight Manager console</li> <li>Delivers Insight Manager SNMP traps and alerts generated by Insight Agents</li> </ul>

## COMPAQ REMOTE INSIGHT PRODUCT OVERVIEW *(cont.)*

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In summary, the Integrated Remote Console provides powerful, integrated remote control and remote console features. Remote Insight provides these features, as well as troubleshooting and notification capabilities that are not provided by the IRC.

Most important, all these Remote Insight features are independent of the host server's hardware/operating system status and the availability of the network.

### **CONCLUSION**

The Compaq Remote Insight board provides a cost-effective solution to the problem of managing servers in remote locations or servers in mission-critical environments. Remote Insight is essentially an independent computer, using an asynchronous telephone connection to provide complete autonomy from the host server OS. Remote Insight delivers access to and remote control over the managed server, captures critical information needed for troubleshooting, SNMP alerts the management console, pages the system/network administrator, and provides security and flexibility.

Features incorporated into this server management board include Windows NT graphical remote control, viewing reset/failure sequences, enhanced user administration/security features, alphanumeric paging support, and full integration with Compaq Insight Manager. The features of Remote Insight combined with the capabilities of Compaq Insight Manager provide the ability to manage a remote server at any time and any place, regardless of the state of server OS, server hardware, or network connection.