WHITE PAPER

Server Management in the ISP Environment

This White Paper focuses on Compaq and third party solutions that address the systems management challenges that Internet Service Providers (ISPs) face. These solutions include ProLiant servers, SmartStart integration, Compaq Insight Manager, the Remote Insight Board and Microcom's Carbon Copy remote control software. The paper particularly addresses the challenges posed by the exploding demand for web hosting and new services while also addressing the increasing integration of Microsoft Windows NT into ISP environments.

September 1997

Compaq Computer Corporation

Internet Solutions Group

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Executive Summary

Internet Service Providers currently face a complexity of management challenges that include Application and Service, Database, Internet/Web Server, Messaging, Operating System and Hardware. Compaq is committed to offering highly integrated, industry-standard hardware and software solutions for these challenges. Compaq's Internet Solutions exist to create, acquire, leverage and organize technologies to enable Internet Service providers to quickly offer advanced, highly valued services to businesses and consumers. A listing of Compaq's management and integration solutions has grown to include:

- **Compaq SmartStart Server Installation and Configuration**
- **Compaq Insight Manager Server Management**
- **Remote Management**
- **Compaq Remote Insight Board**
- **Remote Control with Carbon Copy**

Compaq is addressing service availability and service performance with web servers, IP services and application management. Because ISPs are under tremendous cost pressure, Compaq is also committed to addressing the cost concerns of its customers and in delivering the lowest total cost of ownership in the industry. Compaq gives ISPs the best price/performance value and the broadest array of possible solutions available for deployment in its Administration Life Cycle Management.

By providing these innovative solutions to ISPs, Compaq is showing its leadership as an industry authority by helping its customers to prosper on the Internet.

The resources used for the information in this paper include materials gathered from various web sites on the Internet, such as press releases and white papers; trade journal articles; and the results of Compaq's own testing and evaluation of the competition's systems.

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OVERVIEW

Internet Service Providers (ISPs) face a market that becomes larger and more complex daily. Subscriber growth continues unabated as ISPs furiously attempt to increase market share and build a base for new services. In the next year, local and regional ISPs alone are expected to more than triple the number of business accounts they service. The average number of non-access servers used by ISPs for hosting is expected to more than double over the next year.

Compaq's highly integrated, industry-standard hardware and software solutions help ISPs optimize Internet services for their customers and reduce operational costs. Compaq delivers products through its own efforts and partnerships with leading Internet software vendors that help ISPs maintain and grow their customer base, while creating new revenue sources through value-added services such as web hosting, IP telephony and group work applications.

And, as technology and introduction of products to the Internet continue at a breakneck speed, Compaq is committed to a smarter approach - industry-standard solutions that simplify the chaos for ISPs.

Operations Managers' Challenge

While a growing customer base ultimately helps the ISP's business, it results in near-term management headaches. Each day there is more to manage: more subscriber accounts (and IP addresses), domains, the network itself, network equipment, servers, and applications. There are several layers of management requirements on servers alone which administrators must address.

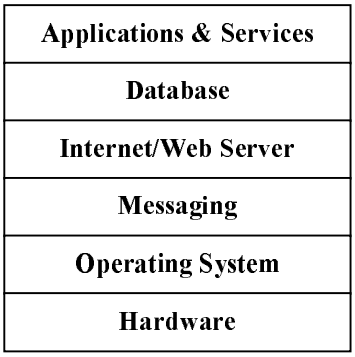


Figure 1: A typical Internet server provides many layers of management complexity.

Today's growth is also widely distributed as ISPs expand their geographic markets and open POPs and data centers in new locations worldwide. Expanding web hosting farms, multiple server operating systems and new applications or services to manage add to the increasing technological complexity of ISP networks. To cap it all off, managers must often make do with the same - or even a reduced - level of management resources.

ISPs must also meet the demand for Value Added Services (VAS) that will represent key revenue sources in the near future. ISPs will offer these services to corporate customers on hosted Internet servers that may be shared or dedicated and may be centralized in a single data center or distributed across the globe.

Customers on hosted servers are demanding access to those servers, to ensure that services are running and to view web site statistics. This creates a quandary for the administrator, who must meet customer expectations without jeopardizing security or increasing administration time and cost.

The challenge for operations managers is to find tools and best practices that will leverage their resources, while increasing customer satisfaction and paving the way for new services. Fortunately, a variety of Compaq management tools available today can meet these challenges.

SERVER INSTALLATION AND CONFIGURATION –

ProLiant Servers for the ISP environment

Compaq's commitment to ISPs is shown with the ProLiant 850R, the first product created exclusively for ISPs. The ProLiant 850R server is designed to take advantage of this high-density environment while providing an affordable entry price. It features a 3U (5.25") form factor allowing up to 14 servers to fit into a Compaq rack taking up only 5.5 square feet of valuable floor space while maintaining expandability and performance. Other features of the ProLiant 850R include a 200MHz Pentium Pro processor upgradeable to dual processors, four expansion slots, and Compaq's Automatic Server Recovery Feature (ASR-2) that returns the server to full operation in the event of a critical failure. This product has the capability to ensure maximum uptime for ISP user customers. The Compaq ProLiant 850R also features built-in manageability, including Compaq Insight Manager and the Integrated Remote Console for remote management. Each of these features is discussed below.

Compaq's family of rack-mountable solutions also includes the ProLiant 2500R and ProLiant 5000R. These highly scalable web servers are designed for disk- and processor-intensive tasks. In fact, the ProLiant 5000 received the highest rating of nine web server systems tested by the *Computer Reseller News (CRN)* Test Center. According to CRN, the #1 ranking was based on Compaq's achievement of the best benchmark performance, combined with its strong channel and support programs.

Compaq SmartStart

The initial challenge of the administrator may seem like the simplest, but in fact can be one of the most time-consuming: installing and configuring new systems. The administrator has several goals in the configuration process:

- Reduce system set-up time (to reduce overall cost and to quickly respond to the need for new systems, such as when a new hosting account is added)
- Ensure software compatibility
- Develop a consistent, repeatable process so that misconfigured servers and the resulting time required to reconfigure them are minimized.

Simplified installation and integration are strengths of Compaq systems. All ProSignia and ProLiant servers include the SmartStart software integration program on a CD-ROM. This tool assists ISPs or their resellers in configuring complex server platforms, such as those demanded for web hosting applications. SmartStart uses a streamlined process, guided by an easy-to-use wizard-style program:

SmartStart automatically installs the correct drivers during the install process. These drivers have been optimized to perform with Compaq hardware.

SmartStart also automatically configures EISA and PCI add-in boards and assists with the configuration of ISA add-in boards. In addition, SmartStart assists administrators in installing leading server operating systems including Microsoft Windows NT Server, SCO Unixware, and Novell IntranetWare and NetWare. SmartStart also allows customers to install and optimize leading Internet applications such as Microsoft Internet Information Server, Netscape Server and Raptor Eagle NT firewall software.

To further simplify the installation of multiple, identical servers, SmartStart's replicated server feature allows the administrator to quickly duplicate their selected configuration.

With SmartStart, administrators have assurance that they are setting up consistent configurations as they install each new server. These configurations are reliable since extensive testing has been performed on different Compaq hardware with the different software applications.

Integration Server for consistent set-up

SmartStart also allows managers to set up an Integration Server. The Integration Server provides a centralized point for installing and maintaining consistent server configurations across an entire installation of Compaq servers, such as a web farm. This provides significant timesavings over manual installations using a CD. The Integration Server administers a repository of software images for firmware, drivers, utilities, operating systems, and applications. Using Compaq Insight Manager (discussed below), the Integration Server can download updated versions of many software applications directly from Compaq's website for distribution across the ISP's network.

SERVER MANAGEMENT- COMPAQ INSIGHT MANAGER

Manageability is a key component of the server platform. This is why every Compaq ProLiant Server shipped includes the Compaq Insight Manager, a tool that monitors and collects information on more than 1,000 server parameters. The Compaq Insight Manager addresses three critical server management needs: configuration (working in conjunction with SmartStart), performance monitoring and fault prediction.

The Compaq Insight Manager consists of two components: agent software which runs on the managed node and a 32-bit Windows console application. The agents deliver alerts (traps) and data via SNMP, so the information can also be accessed through any other SNMP-compliant console.

The agents work in conjunction with the hardware and firmware and act upon data received by sending alarms in the event of faults. The parameters monitored give the manager a level of information well above and beyond that provided by the standard Windows NT SNMP agent.

The Compaq Insight Manager console supports Windows NT and Windows 95 with 32-bit addressing and multi-threaded operation, so it can scale to manage hundreds of systems. Compaq Insight Manager supports the breadth of Compaq servers, workstations, desktops, and portables. In addition, it supports leading network operating systems including Microsoft Windows NT, NetWare, OS/2, SCO OpenServer and Unixware.

Compaq Insight Manager 3.40 New features:

- Support for Compaq ProLiant 6000 servers
- Compaq Power Management (UPS management)
- Support for latest RAID controllers, S.M.A.R.T. SCSI drives and tape backup
- Updated OS support
- Display of storage devices in Explorer Device List

Configuration Management & Version Control

As mentioned earlier, SmartStart is a valuable tool for server and application set-up. Compaq Insight Manager addresses a related problem, one that is particularly important to ISPs: managing configurations. Compaq Insight Manager provides several configuration reporting options, including at-a-glance and detailed configuration reports. Insight Version Control compares the systems' drivers, firmware and utility versions on a server to a reference platform that is constantly upgraded with the most up-to-date version available from Compaq's website. Anything that needs to be upgraded is flagged with a red or yellow indicator based on the urgency of the upgrade. A description of the upgrade and its benefits is included. A green indicator shows up-to-date software. Additionally, information is also made available to Microsoft's Systems Management Server (SMS) for inclusion in the SMS database.

"We are working closely with telephone companies and national and regional ISPs to develop the infrastructure and support systems necessary for Internet communities to thrive, and for commerce to flourish on the Internet."-

John T. Rose,

Compaq Senior Vice-President and Group General Manager, Enterprise

Fault Prediction & Management

Quality of service is becoming a critical measure of performance in the competitive ISP market. ISPs have spent heavily on core infrastructure to minimize downtime in an attempt to guarantee network access. Increasingly, customers of hosted web sites are demanding this same level of reliability. This has led ISPs to mirror customer's servers in different locations to guard against local network congestion or failure, and against server interruptions.

Compaq Insight Manager increases the reliability of Compaq servers by helping prevent failures. Predictive parameters coupled with the Insight Manager's trend analysis capabilities can predict impending failures of many components such as NIC cards, the CPU, memory and SCSI drives. This allows an administrator to schedule preventive maintenance downtime rather than experience a loss of service. Should faults occur, Insight Manger sends alarms to the console, allows programs to be launched on receipt of alarms and forwards alarms to alphanumeric pagers.

Compaq disk drives, NIC cards, memory and CPUs (specifically the Pentium Pro systems) are covered by Pre-Failure Warranties if the Compaq server is monitored via Compaq Insight Manager. Compaq Insight Manager can warn the administrator of an impending component failure (such as the hard drives). If the component is under warranty, Compaq will replace it before the failure actually occurs. This enables "planned" maintenance as opposed to reactive maintenance, minimizing downtime.

Performance Management

Enabling consistent, reliable server performance is a key component to improving overall quality of service. Compaq Insight Manager provides extensive thresholding capabilities for all major subsystems. Examples of real-time performance monitoring and graphing include CPU, PCI, and EISA bus utilization as well as NIC throughput. The Automatic Data Collection facility also allows information to be tracked at predefined polling intervals for historical performance monitoring. An example of this is an alert that drives have filled up.

Service Tool – Compaq Survey Utility

Service tools can be invaluable in bringing about the quick resolution of server problems. Compaq Survey Utility was designed as a service tool in order to deliver enhanced serviceability for Compaq servers and increase overall availability. Survey Utility delivers comprehensive configuration capture, provides a means for automatically identifying and comparing configuration changes and automatically maintains a server configuration history.

Compaq Survey Utility addresses the primary requirements customers have for service tools by including in its key features:

- On-line installation and operation
- Comprehensive configuration capture under a single tool
- Automatic configuration audit trail

These features result in faster problem solution times, minimized administration costs and resources and higher server availability for ISPs.

Integration with Other Management Consoles

Historically, ISPs have created their own Unix-based management tools or utilized a number of popular consoles. The goal of Compaq Systems Management Partnerships is to facilitate the optimum integration and use of Compaq systems event, performance and configuration information into partners' tools. Compaq has integrated agent information into HP OpenView, IBM NetView, Sun NetManager, Microsoft SMS, and Novell ManageWise. New partnerships and solutions include BMC (Patrol), Boole & Babbage (Ensign, Command Post), Cabletron (Spectrum), Seagate (Nervecenter), Net IQ (AppManager) and Tivoli (TME).

REMOTE MANAGEMENT – COMPAQ SERVERS OFFER A VARIETY OF CAPABILITIES

The growth of ISP networks has resulted in network devices and web servers that are geographically dispersed. Good network design practices dictate that server farms be mirrored in other locations. This is done to ensure that a major equipment failure (caused by power failures, natural disasters or other events) or a network outage in one location doesn't cause a prolonged service disruption. Also, traffic bottlenecks occur at different points at different times on the Internet backbone. ISPs are finding that mirrored servers that access the Internet at different Network Access Points (NAPs) can avoid local traffic jams, improving overall application performance.

ISPs often manage their distributed web farms from a central location. This makes the need for built-in remote manageability imperative while reducing total overall costs.

Servers that are geographically dispersed still require the same degree of administration that local systems require. Administrators may need to re-start the web server (Microsoft Internet Information Server or Netscape) or other Internet applications, browse event logs or perform a graceful shutdown of the system. They may also need to perform routine tasks such as creating subdirectories or installing applications on hosted servers. Routine maintenance and troubleshooting become all the more challenging when a server is located thousands of miles away.

ISPs are also discovering the need for "remote" management at local facilities. ISPs are increasingly moving to a data center environment for both access and web hosting equipment. While this approach helps conserve valuable real estate and increase security, it also makes it impractical to use a keyboard and monitor on each system.

In a Unix environment, system administrators rely on built-in utilities like Telnet and XWindows. Although Telnet is also used for remote administration in NT environments, Compaq servers offer capabilities that go beyond this level of functionality.

Compaq NT servers are designed with remote management in mind. Compaq Insight Manager features the ability to view remote diagnostics, configure the system remotely, and restart the system. Servers can be managed in-band or out-of-band, while either on-line or off-line.

If the server is on-line, Compaq Insight Manager can operate on a console anywhere on the network. In addition, both Telnet (IP) and NVT (IPX) connections are supported, allowing administrators to run diagnostics and the system configuration utility across the network.

If the server is off-line (no network support loaded in the system partition), then the system partition utilities can be run via modem to the Compaq Insight Manager console using ANSI terminal emulation. Automatic Server Recovery (ASR) allows the server to be automatically restarted after critical hardware or software errors.

Asynchronous (or out-of-band) management of on-line servers is supported through Point-to-Point Protocol (PPP) over a modem connection. This support is standard for Microsoft Windows NT and SCO UNIX; NetWare support is available with the purchase of Compaq Insight Asynchronous Management for NetWare. Security is provided with multi-level passwords, standard CHAP and PAP authentication, optional dial-back and access logging.

IRC: ENHANCED INTEGRATED MANAGEMENT

In some situations, the built-in asynchronous management capabilities may not allow the administrator to bring the server back up after an automatic shut down. In these cases, the Integrated Remote Console (IRC) extends out-of-band management capabilities by allowing remote console management and remote reset independent of the state of the operating system. IRC uses a combination of hardware and firmware integrated on the server motherboard. In addition to an independent remote console, IRC includes other features:

Remote reset (server reset or complete power cycle).

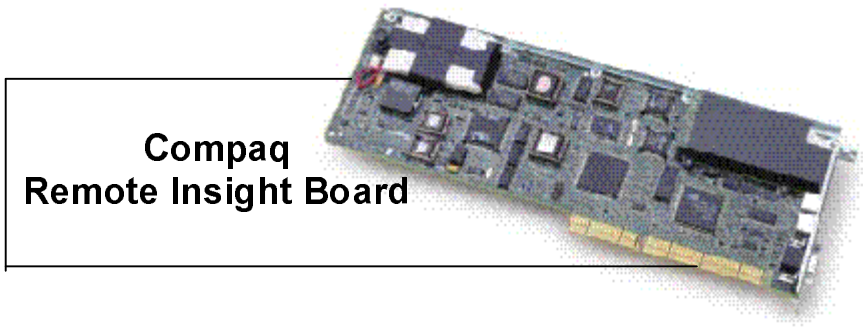
Reset Sequence Replay (native video encoding technology that allows video activity to be recorded for playback. This lets administrators review the reset process.

Security features, including username and password, optional dial-back, and varying levels of access.

MISSION-CRITICAL REMOTE MANAGEMENT- COMPAQ REMOTE INSIGHT BOARD

Many ISPs demand an even higher level of remote manageability especially as companies increasingly view their web presence as strategic.

Compaq offers the Remote Insight Board, a "computer within a computer" that offers complete hardware independence from the server. With its own processor, memory, and battery back up, the board allows access to the server even if there has been a hardware fault or power loss. Alerting features like paging are maintained even if there is a power loss. Remote Insight also offers enhanced video sequence replay, including both the reset and failure sequences. ISPs will be able to identify what happened to the server by its failure codes, blue screen messages, etc. even if the server is without power. The benefits gained from deploying remote insight management tools are substantial. These benefits include a reduction in server management costs by minimizing down time and administration expense.



Remote Insight Board benefits include:

- **Full remote control** – features seamless remote console and remote reboot
- **Reliability** – features hardware-based remote management, out-of-band management and on-board battery backup
- **Effective Troubleshooting** – features reset and failure sequences and Critical Event Log
- **Flexible Access** – features full integration with Compaq Insight Manager and support for standard ANSI Terminal Emulation packages when Compaq Insight Manager is not available
- **Security** – features a support for up to 12 users, customized access rights and password protection

REMOTE CONTROL WITH CARBON COPY

Another type of remote management is available through Carbon Copy, a remote control and file transfer software package that runs under Windows 95 and Windows NT. An administrator can operate a remote server as if it were local, with full graphics capabilities. This allows the administrator to make use of utilities installed on the server, like the Windows NT Performance Monitor. In a data center environment, an administrator can access any server from a central console without a maze of wires connecting monitors and keyboards.

ISPs also use remote control as a customer support and administration tool. ISPs can offer Carbon Copy to customers, allowing those customers to access their hosted web sites. Carbon Copy has comprehensive security features, including user passwords and optional callback. Enhanced security features include the ability to hide selected directories from users during file transfer. By making use of different levels of access, administrators can grant customers access to but not full control of host servers. Carbon Copy supports in-band connections and asynchronous connections via PPP.

Carbon Copy is also a valuable customer support tool. Carbon Copy allows multiple clients to connect to one server. With Carbon Copy installed on the server, the administrator's PC and the customer's PC, an administrator can walk through server administration processes while the customer watches.

WEB SERVER, IP SERVICES, AND APPLICATION MANAGEMENT

As Internet applications proliferate and add new functionality, administrators find that managing the software running on servers to be an increasingly complex task. As with server management, the focus can be divided into two broad categories: service availability and service performance.

Ensuring Service Availability

A smoothly running server platform does little good if the software services running on top of it are unavailable. At a basic level, administrators must be sure that IP socket-layer services like DNS, FTP, POP3, and HTTP are available. Often this type of service checking is accomplished through homegrown scripts that might periodically attempt to open a particular socket or try to send an HTTP request. Due to a lack of tools, some administrators even resort to manual checking of services. This approach quickly becomes unworkable as more servers - and more services - are added. Traditional SNMP-based event monitoring and alerting typically doesn't address IP Layer services.

Monitoring Service Performance

In addition to monitoring core services, administrators are faced with monitoring the availability and performance of the web server itself and other applications. This is increasingly important both for ensuring quality of service and for planning purposes. One approach for Windows NT servers is to access logs, from which performance trends can be extrapolated for Microsoft Internet Information Server (IIS) and other services. This type of data is commonly requested by customers to judge both usage and performance of hosted web sites.

To analyze service performance, administrators should utilize tools that can track variables such as:

- What is the resource (CPU, memory, etc.) consumption of the server software, databases and/or applications? Which processes are consuming the most resources?
- How many connection attempts (HTTP, FTP) are being made over specified time intervals, and at different times of the day and week?
- Are there unauthorized connection attempts?
- What is the average size of FTP transfers? Who are the heaviest users?

These are just some of the metrics that should be part of an overall performance monitoring plan. Regular performance monitoring can provide the intelligence for decisions to optimize quality of service. It can also help administrators identify users in a hosting environment who are using a disproportionate amount of resources. The data can then be used to help assign costs and support billing decisions.

Commercial products are available to help monitor service availability and performance. In assessing 3rd party tools, administrators should consider factors such as:

- Which processes are monitored and how easy is it to customize the tool to monitor other processes?
- If the tool utilizes polling to check the health of distributed servers, how much network overhead is that activity likely to add?
- Does the tool integrate with other management suites?

- Is it standards-based?
- What types of alerts are supported?
- Does the system utilize agents that can take corrective actions based on thresholds?
- Is a web-based interface available, or planned for release?

Many tools that monitor Unix-based services also use a Unix workstation as the console. These tend to fall into two broad categories:

- Tools that are highly customized or developed completely in-house. These tend to be "point" solutions, which serve a particular purpose well but may have difficulty scaling vertically or horizontally.
- Tools that are part of a larger enterprise management. These tools tend to be extremely robust, expensive and can be complex to learn and use.

One of the characteristics driving the broad adoption of Microsoft Windows NT is number of applications available, their relatively low cost and the ease of use associated with them. This trend holds true for Internet service and application monitoring tools. There are several packages available for monitoring Windows NT-based services and applications, including:

The PATROL Knowledge Module for Internet Servers from BMC

The PATROL Knowledge Module (KM) for Internet Servers allows administrators to manage all major Internet services such as Web, News, Proxy, Mail and ftp. The KM supports all major Web and Internet servers from Microsoft and Netscape as well as popular freeware products such as Apache. This KM allows customers to know whether or not one of their key services is up and running as well as take corrective action to ensure it stays up and running. It also analyzes server performance and usage by providing detailed current and historical information on system activity. The PATROL KM is a loadable library that works in conjunction with the Patrol Agent to monitor a variety of Internet servers, including Web, FTP, Proxy, News and Mail. Information can be viewed through the Patrol Console, all major third party consoles or a web browser. Information from Compaq Insight Manager agents can be viewed in the Patrol Console using the PATROL KM for Compaq Insight Manager.

The AppManager Suite from NetIQ

NetIQ provides a scalable set of applications for monitoring Windows NT, Internet Information Server, SQL Server, Exchange Server, Systems Management Server, and Microsoft Commercial Internet System News Server. AppManager supports alerts such as sending an e-mail or a page, generating an SNMP trap, or launching a "fix" program. AppManager uses a multi-tier architecture that utilizes VBA for scripting and reusable software components (OLE). It is also customizable, so those users can build their own functions to manage in-house developed applications.

ManageX from NuView

ManageX is an enterprise systems management solution for ensuring the uptime and performance or distributed NT systems and applications. For ISP environments, it monitors I/O traffic, number of connections, restart services and provides automated management of NT event logs and applications such as IIS, SLQ Server, Exchange and Windows NT. It implements Microsoft's Management Console (MMC) standard and is built on DCOM, ActiveX, web and push technologies for automated network set-up. It includes over 100 pre-defined performance views, alerts, policies and web-page reports for complete out-of-the box management. Administrators can easily set thresholds and customize policies in Java or VB scripting for lights-out management of ISP sites.

SiteScope from Freshwater Software

SiteScope is a Java server application designed specifically to monitor Web servers and their peripheral IP devices. SiteScope monitors NT services, disk, CPU, secure and unsecure URLs, URL content, CGI scripts, virtual memory, FTP, DNS, e-mail, News and Web server software. SiteScope monitors these attributes of NT servers locally and remotely, and can handle hundreds of servers in an NT server farm. SiteScope supports alerts such as sending an e-mail or a page to one or more system administrators, generating SNMP traps and automatically executing recovery scripts. SiteScope's API is published so that users can write custom monitors that leverage SiteScope's graphical management reports and alarm notification mechanisms. The UI for SiteScope is browser-based, so it can be accessed from any desktop or from home, with password protection for read-write vs. read-only access.

COMPAQ INTERNET INITIATIVES

Compaq is committed to addressing the cost concerns of its ISPs and to delivering the lowest total cost of ownership (TCO) in the industry. Compaq innovations such as Compaq SmartStart and Compaq Insight Manager lower the overall cost of ownership for Compaq platforms by making them easier-to-own, easier-to-deploy and easier-to-manage. Insight Manager reduces administrative costs and increases up time by providing in-depth insight into server functions, allowing efficient and effective management of Compaq Internet servers. The Standby and On-Line Recover options give ISPs high-availability platforms at very aggressive prices.

Other initiatives that Compaq has as its strategy to enable ISPs to transform Internet technology into a business advantage at the lowest total cost of ownership include:

- Compaq's support for NetCentric Corporation's Metered Services Information Exchange (MSIX) protocol that will enable ISPs to effectively meter and invoice the use of Internet applications and services such as video conferencing, fax, IP telephony, messaging, collaboration and gaming. This will foster a better infrastructure for business.
- Compaq's Rainmaker Development Program to assist Independent Software Vendors in optimizing their applications to take advantage of the price/performance benefits of Compaq's industry-standard Internet platforms, also fostering a better infrastructure for business.
- Compaq's relationships with leading Internet companies including Microsoft, Netscape, Novell, PointCast and Raptor.
- New products such as the ProLiant 850R from Compaq's labs designed specifically for the ISP's unique business requirements and opportunities. The ProLiant 850R is the industry's

first low-profile server to combine affordability and a unique space saving design tailored exclusively for rack environments. Its features include up to two 200 MHz Pentium Pro processors with Integrated 256KB of secondary cache. Its 3U design enables 14 servers to fit in a compact rack. The ProLiant 850R also provides ISPs with hot plug hard drive capability to offer improved data protection capability, facilitate ease of management and service and maximize "up time" for ISP user customers.

- Compaq, along with other industry leaders, organizing an industry standards effort that allows administrators to use any Web browser to manage disparate systems, networks and applications. This effort has enabled the development of tools that reduced the complexity and costs of enterprise management.

CONCLUSION

Growth in customers and demand for new services such as web hosting will continue to fuel demand for servers and other network equipment. In this leveraged environment, manageability becomes the key determinant of quality of service. Compaq server platforms have manageability built into the hardware and firmware. They are designed for easy and consistent set-up, configuration, and manageability. With Compaq's Web-Based Enterprise Management, administrators can use any web browser to manage disparate systems, networks and applications. Tools like the Compaq Insight Manager, Integrated Remote Console and the Remote Insight Board offer a scalable method to monitor and manage server availability and performance both locally and remotely. Compaq platforms and management tools also integrate with leading third-party-management environments. And as technology and introduction of products to the Internet continue at a breakneck speed, Compaq will continue to develop and enhance its manageable solutions for the ISP environment.

For More Information

Compaq ISP Home Page

http://www.compaq.com/ISP

Compaq Product Information

Compaq rack-mountable ProLiant servers
http://www.compaq.com/products/servers/index.html

Compaq SmartStart
http://www.compaq.com/products/servers/management/index.html

Compaq Insight Manager
http://www.compaq.com/products/servers/management/index.html

Compaq Remote Insight Board
http://www.compaq.com/products/servers/management/index.html

Carbon Copy
http://www.microcom.com

3rd Party Solutions

NetIQ

http://www.netiq.com

NuView
http://nuview.com

BMC Software
http://www.bmc.com

Freshwater Software
http://www.freshtech.com