



# HP Compaq Thin Clients : Benefit Analysis

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## Abstract

This paper examines the benefits associated with implementing a thin client server computing solution.

## Executive Summary

Today's information technology administrators must get as much value for their dollar as possible. They require rapid deployment, easier management of PCs, and uniformity of products. IT professionals also demand easy access to technology and more services and solutions that free up their resources from managing PCs to managing their business. Quality, reliability, compatibility, and value are especially important attributes in the commercial market place. From these general requirements, customer needs become more refined and highly differentiated as they branch out to specific areas of usage.

## Thin Clients Save Money

The unique advantages of thin client server computing (TCSC) over traditional desktop computing clearly represent a significant opportunity to reduce the annual hard and soft costs for managing a network. Thin clients simplify IT management for the enterprise. Highly consistent and stable, thin clients connect to a server where all processing and storage occurs. Thin clients are positioned according to customer requirements and benefits, rather than by specific product features. These features significantly differentiate thin client server computing from traditional desktop computing solutions.

## Thin Client Server Computing versus Unmanaged Desktops

The typical computing solution for most enterprises is an unmanaged network. Unmanaged PC computing has its advantages: user autonomy, the ability to work independent of a network, and the ability to utilize graphics-intensive applications. However, unmanaged computing has significant drawbacks that lead to higher costs: lower security, increased downtime, and increased soft costs. Users are able to add, delete and modify programs and data. Floppy drives allow for users to remove confidential data and load (intentionally or unintentionally) harmful viruses.

Companies that are able to utilize a thin client server computing solution are able to reap substantial savings and benefits versus companies that use traditional PC-based computing solutions. Consider some of the traditional pitfalls that commonly occur in an unmanaged computing network:

- n Hard drive crashes resulting in data loss and user downtime
- n Costly service calls to repair hardware and solve software problems
- n Multiple images on different PCs leading to different sets of problems on each user's machine
- n Theft of equipment
- n Theft of data

Companies are forced to spend thousands of dollars every year on technical support, hardware replacements, and service calls. Industry standard estimates place such costs as high as \$8000 per PC per year. The costs associated with maintaining a thin client network are significantly lower than that of a PC network.

Four-Year Thin Client  
Total Cost of  
Ownership (Hard  
Costs)

The following table provides a four year total cost of ownership comparison for hard costs only: formatting of table is off a bit. Add reference here

Hard Cost	Year 1		Year 2		Year 3		Year 4	
	PC	TCSC	PC	TCSC	PC	TCSC	PC	TCSC
Acquisition	\$740	\$1,964	\$0	\$0	\$0	\$0	\$0	\$0
Support								
Training	\$64	\$38	\$64	\$38	\$64	\$38	\$64	\$38
Break/Fix	\$386	\$39	\$386	\$39	\$386	\$39	\$386	\$39
How-to	\$134	\$80	\$134	\$80	\$134	\$80	\$134	\$80
IMAC	\$191	\$19	\$191	\$19	\$191	\$19	\$191	\$19
Sys. Mgt.	\$626	\$188	\$626	\$188	\$626	\$188	\$626	\$188
Gen Ops.	\$17	\$15	\$17	\$15	\$17	\$15	\$17	\$15
Help Desk	\$317	\$159	\$317	\$159	\$317	\$159	\$317	\$159
Power	\$24	\$7	\$24	\$7	\$24	\$7	\$24	\$7
Subtotal	\$1,759	\$545	\$1,759	\$545	\$1,759	\$545	\$1,759	\$545
Total Costs	\$2,499	\$2,509	\$1,759	\$545	\$1,759	\$545	\$1,759	\$545
4-Year Total	\$7,778	\$4,144	<-- 47% Savings					

Typical thin client lifecycles are on the order of five to seven years, further increasing the opportunity for savings.

Four-Year Thin Client  
Total Cost of  
Ownership (Soft  
Costs)

The following table provides a four year total cost of ownership comparison for soft costs only:

Soft Cost	Year 1		Year 2		Year 3		Year 4	
	PC	TCSC	PC	TCSC	PC	TCSC	PC	TCSC
Soft Costs	Remove	this row						
Data Loss	\$153	\$15	\$153	\$15	\$153	\$15	\$153	\$15
"Futz" Factor	\$1,129	\$113	\$1,129	\$113	\$1,129	\$113	\$1,129	\$113
Other End User	\$2,580	\$1,290	\$2,580	\$1,290	\$2,580	\$1,290	\$2,580	\$1,290
Total Costs	\$3,862	\$1,418	\$3,862	\$1,418	\$3,862	\$1,418	\$3,862	\$1,418
4-Year Total	\$15,448	\$5,673	<-- 63% Savings					

These costs can be compounded by a loss of revenue associated with the theft or damage of business-critical data, worker downtime and even compromised data security. In a worst-case scenario, an unmanaged network allows for the possibility of sensitive and confidential information to be leaked, resulting in incalculable losses for a company or organization.

## Best Practices

A best practice is a group of tasks that optimizes the efficiency or effectiveness of the business discipline or process to which it contributes. In "Best Practice Descriptions: 6 Major Process Categories TCO Distributed Computing Assessment" the Gartner Group classifies these best practices into six major process categories: Change Management, Operational Management, Asset Administration, Technology Planning and Process, Customer Service, and Training. The functionality and structure of server based computing forces compliance with software and hardware related Process Categories. This simplifies many decisions, allowing network administrators to focus on procedural and non-technological Best Practice processes.

## How Thin Clients Conform to Best Practices

The following table illustrates how thin clients adhere to these best practices:

Change Management	
Change management is defined as technical support for installs, moves, adds, changes and removals of networks, systems, and system components. These activities are planned and scheduled, and are done on a proactive basis	
Best Practice Process Category	Thin Client Solution
<p>Deployment (installs/adds/changes)</p> <p>Deployment includes installing new or upgraded hardware and software, and introducing these devices and applications into service.</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Use technology to minimize labor</li> <li>n Communicate the impact of change to end-users and business management</li> <li>n Consolidate repetitive functions</li> <li>n Minimize the impact of deployment on the end-user</li> </ul>	<p>Thin clients allow a network administrator to deploy images and software to multiple users by upgrading the software on the servers rather than on individual client devices. This can all be accomplished remotely via standard tools for managing servers, This can dramatically reduce time spent delivering upgrades and decrease end user downtime.</p>
<p>Retirement and Moves</p> <p>Retirement involves the decommissioning and disposal of outdated, redundant or non-standard hardware and software. Moves involve the physical relocation of equipment from one location to another. Moves may also involve the transfer of individuals or assets from one organization to another.</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Integrate these functions with an asset management process</li> <li>n Ensure minimal disruption to end</li> </ul>	<p>Because thin client devices have no moving parts, they rarely need to be replaced. If a device is to be replaced or upgraded, replacement can be performed quickly and with little disruptions to end users. Moves of the end user's client are no longer necessary, as all end user preferences and data reside on the network.</p>

<p>users n Have and follow formal procedures</p>	
<p>Change Management Technology &amp; Process</p> <p>Tools that automate and minimize the labor involved in making changes to hardware and software.</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Minimize IS and end-user labor</li> <li>n Ensure quality and reliability of the change management process</li> </ul>	<p>With Thin Client deployment this is accomplished in two ways:</p> <p>On the server side: Because software can be deployed remotely to servers, there is little to no disruption to the end user for application changes.</p> <p>On the client side: In the event it is necessary to work on the client device, the administrator is able to configure user and network settings remotely using the included remote management software.</p>
<p><b>Operational Management</b></p> <p>Operational management is defined as technical support for the recurring, day-to-day activities that are required to keep networks, applications, systems and system components functional and operational.</p>	
<p>Virus Protection</p> <p>Tools, processes, and procedures that prevent virus attacks and/or ensure recovery after virus attacks.</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Eliminate manual intervention in the virus detection process</li> <li>n Protect both the desktop and server from viruses</li> <li>n Have good follow-up activities once a virus is found</li> </ul>	<p>Because thin clients have no removable media drives, there is no place for users to load viruses. System administrators can also monitor Internet activity and prevent users from downloading dangerous viruses.</p>
<p>Data Management</p> <p>Involves back-up, restore, and repository services for client and server data.</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Centralize data management</li> <li>n Use automated tools</li> <li>n Minimize labor for the user</li> <li>n Integrate the backup, restore and storage management processes</li> </ul>	<p>In server based computing with thin clients, critical information is stored on network storage, ensuring reliable backup and redundancy.</p>
<p>Performance Monitoring and Event Management</p> <p>Processes and activities that allow IS personnel to either prevent problems or to detect them at an early stage.</p>	<p>Thin client networks allow network administrators to respond to common help desk requests and maintain a detailed system inventory. Thin clients feature remote control and chat, which</p>

<p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Deploy problem detection technology</li> <li>n Integrate problem detection tools with other systems management schemes</li> <li>n Use redundant systems</li> </ul>	<p>help simplify a diagnosis. Network administrators are able to remotely browse, diagnose, and repair problems without leaving their desks.</p>
<p><b>Security</b></p> <p>Policies and procedures that ensure the protection of data and assets</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Use tools and procedures that ensure proper access to data</li> <li>n Use tools and procedures that prevent asset removal or tampering</li> </ul>	<p>Administrators can enable or disable serial or parallel ports.</p> <p>Unlike traditional PCs, thin clients cannot operate unless they are attached to a host server. Since the units cannot be used in a typical home environment, there is little temptation to steal these units.</p>
<p><b>Standards Compliance</b></p> <p>Methods used by IS organizations to ensure that all clients conform to the standard configuration.</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Manage diversity in client configurations, while providing flexibility for users.</li> </ul>	<p>Thin clients allow administrators to choose what images and software can be deployed. This ensures that clients all conform to standard set out by company or organization.</p>
<p><b>Repair and Maintenance</b></p> <p>The day-to-day maintenance of equipment and the restoration of equipment to a functioning state.</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Exploit warranty repairs</li> <li>n Reduce user downtime from equipment failure</li> </ul>	<p>Because thin clients have no moving parts, they rarely break down or require a service call. If a client becomes inoperable for some reason, it can be quickly and easily replaced. Keep in mind, since all data and user settings reside on the network, a user can be up and running in minutes with no loss of data and no need to reconfigure their system settings.</p>
<p><b>Asset Administration</b></p> <p>Asset administration is defined as administrative support for acquiring and tracking systems and system components, and for managing relationships with external service providers.</p>	
<p><b>Hardware Inventory Management</b></p> <p>The creation and maintenance of an up-to-date record of hardware installs, moves, adds, changes, removals and final disposal. The record contains information for locating, assessing,</p>	<p>Network administrators can track hardware inventory including:</p> <ul style="list-style-type: none"> <li>n CPU type/speed/serial number</li> <li>n RAM</li> <li>n Asset tag</li> <li>n Model ID</li> <li>n Video card</li> </ul>

<p>auditing, troubleshooting, counting, and assigning equipment, or performing other technical and business functions, without the need to repeatedly visit the hardware location or reassemble data records.</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Have an up-to-date hardware inventory</li> <li>n Integrate hardware inventory data into other IT and corporate systems</li> </ul>	
<p><b>Software Inventory Management</b></p> <p>The creation and maintenance of an up-to-date record of software installations, upgrades, removals and final disposal, as well as the terms, conditions and status of software license agreements. The record contains information for locating, assessing, auditing, troubleshooting, and counting, or performing other technical and business functions, without the need to repeatedly visit the software location or reassemble data records.</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Have an up-to-date software inventory</li> <li>n Integrate software inventory data into other IT and corporate systems</li> <li>n Use software inventory records to make purchasing/upgrade decisions</li> </ul>	<p>Network administrators can track software inventory including:</p> <ul style="list-style-type: none"> <li>n System information: name, contact, location, OS type</li> <li>n MAC/IP/DNS/WINS addresses, Domain name, network speed</li> <li>n Applications, including name, version, vendor</li> </ul>
<p><b>Life-cycle Management</b></p> <p>The determination of an asset's useful life, including planning for the installation, upgrade, and removal/disposal of the asset, and executing on the plan. An asset may be a piece of hardware (to the level of granularity that the hardware inventory is maintained) or software (to the degree that discrete license inventory is maintained).</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Minimize variability in configurations</li> </ul>	<p>Administrators can easily create and distribute software update packages and using drag &amp; drop GUI. Administrators can also change configuration settings (system name, domain association, network settings) ensuring that all users are using the same configurations. In this way, a company minimizes variability from desktop to desktop.</p>

<p>by putting policies and procedures in place to retire older assets.</p>	
<p>Procurement The buying of hardware, software and services. Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Determine requirements</li> <li>n Automate repetitive tasks</li> <li>n Prevent unauthorized purchases</li> <li>n Leverage the purchasing process</li> </ul>	<p>Procedural decision to be followed by IT department.</p>
<p>Vendor Management The practice of selecting and contracting with hardware, software and service providers, and establishing and managing vendor relationships, including defining the criteria for vendor selection and determining the service levels required. Vendor management typically involves negotiating and defining terms and conditions, service levels, points of contact, rules of engagement, problem resolution, escalation procedures, and discount structures. Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Consider their vendors' strategic partners</li> <li>n Maximize their use of service level agreements (SLA)</li> </ul>	<p>Procedural decision to be followed by IT department.</p>
<p style="text-align: center;"><b>Customer Service</b></p> <p>Customer service is defined as customer-facing activities that help manage customer relationships and provide assistance with service issues. Dispatched technical support for troubleshooting and other problem resolution activities is not included in this category.</p> <p>For the customer service process, the scope is always reflected as the percentage of the user population that is covered by each response. Within customer service, the percentage of the user population covered by service desk-related practices is generally associated with the number of service desks in the organization. For example, if you have a single service desk, the scope of the user population covered by each response is typically either 0% or 100%.</p>	
<p>Service Desk Technology &amp; Process The technologies deployed by your IT service desk(s) to increase efficiency and</p>	<p>By nature, thin clients highly streamline your service desk.</p>

<p>improve service levels.</p> <p>The processes used by your IT service desk(s) to increase efficiency and improve service levels.</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Minimize IS and end-user labor</li> <li>n Ensure quality and reliability of the problem management process</li> </ul>	
<p>Marketing and Relationship Management</p> <p>Processes, techniques, and methods used to improve the relationship between the IS organization and the business areas, provide an IT-face to the user community, and increase customer satisfaction with IT services and systems.</p> <p>Enterprises who implement best practices in this area:</p> <ul style="list-style-type: none"> <li>n Increase customer satisfaction</li> <li>n Improve alignment of business and technology goals and objectives</li> </ul>	<p>Procedural decision to be followed by IT department.</p>
<p><b>Training</b></p> <p>Training is defined as the formal learning required to equip both end-users and IS personnel with the technical skills they need to perform their jobs.</p>	
<p>End User Training</p> <p>End user training improves users' ability to understand and utilize IT resources, including systems, processes and applications.</p> <p>Enterprises with best practices in this area:</p> <ul style="list-style-type: none"> <li>n Track and understand user skills</li> <li>n Institutionalize end-user training to ensure that it always happens</li> <li>n Offer a variety of training mechanisms</li> </ul>	<p>End users will require little training to operate thin clients. The user experience is the same as a traditional PC for typical applications.</p>
<p>IS Training</p> <p>IS training improves the skills and knowledge of IS personnel, enabling more effective support of the IT infrastructure and end user community.</p> <p>Enterprises with best practices in this area:</p> <ul style="list-style-type: none"> <li>n Track and understand IS staff skills</li> </ul>	<p>Altiris Deployment Solution uses wizard-based, drag and drop interface minimizes training time without sacrificing functionality and power.</p>

<ul style="list-style-type: none"> <li>n Institutionalize IS staff training to ensure that it always happens</li> <li>n Link training to professional development</li> <li>n Provide opportunities for skills certification</li> </ul>	
<p>Technology Planning and Process Management</p> <p>Technology planning and process management is defined as activities related to the planning for and management of current and future technology needs, and the establishment of policies and processes relating to technology.</p>	
<p>Technology Planning and Process Management</p> <p>Enterprises with best practices in this area:</p> <ul style="list-style-type: none"> <li>n Deal with business change effectively</li> <li>n Focus on proactive planning that includes customer input</li> <li>n Develop good standards</li> <li>n Employ an effective chargeback mechanism</li> </ul>	<p>Procedural decision to be followed by IT department.</p>

Best Practices Summary

Thin client computing forces a company to conform to all of the above best practices. Because thin clients inherently use and apply these best practices set out for desktops, they inherently save money. Thin client computing forces a company to conform to all of the above best practices. Because thin clients inherently use and apply these best practices set out for desktops, they reduce costs associated with unmanaged PCs to save money. Administration and application deployment are simplified because they thin client management and applications are centralized. Security and backup are enhanced due to the use of network storage resources, and the total cost of application ownership is reduced. In addition, a Thin Client Server Computing solution deployed enterprise-wide can further ensure rapid application availability. To deploy an application to a large number of users it is no longer necessary to load it onto each client. Instead, the application is loaded onto the servers! Since each server manages 35 clients there is a tremendous reduction in number of machines to update. TCSC solutions optimize server utilization through load-balancing features that automatically route user sessions to the server with the lightest load, making the entire enterprise more effective. HP's key partnerships with Microsoft and Citrix ensure a complete array of processes, methodologies, tools, and software to create, support, and expand TCSC solutions.

The Thin Client Advantage

TCSC solutions provide highly simplified global integration that significantly lowers cost of ownership to customers looking for mission-critical, centralized server-based computing with maximum security, standardized desktop deployment, and 100% remote client management tools. The following is a list of the major benefits offered by thin clients:

- n Increased reliability and security
  - q Fewer maintenance events and less down time due to no moving parts to fail
  - q Fewer conflicts and configuration issues and reduced threat of viruses or data theft as a result of no removable media

- q Because data is stored on network storage, the potential of data loss due to a hard drive crash is virtual eliminated
- n Simplified IT management
  - q Easier deployment of the latest applications versions since upgrades can be completed from a centralized server
  - q Data automatically backed up for users
  - q Users cannot access or corrupt system file
  - q Network administrator can manage clients remotely
- n Rapid device / application deployment
  - q Because individual thin clients can be configured from a central location, it takes minutes instead of hours to deploy a new client
  - q Simplified application upgrades completed once from the server for all systems

## Who Can Use Thin Clients

- n Firms that require a highly reliable network of computers connected to a centralized server running mission critical applications can greatly benefit from thin clients due to their highly reliable nature. Hospitals, insurance agencies, airline reservation centers, and hotels are typical businesses that fall into this category.
- n Companies with departments that utilize highly standardized computing tasks, like sales or service call centers, data entry departments, or technical support desks can realize substantial cost savings from thin clients. The computing power and flexibility of a PC is often unnecessary and potentially undesirable as end-users can reconfigure, loads local applications or otherwise tamper with the PCs settings.
- n Educational institutions are examples of a typical concern that requires more computing resources and an ever-shrinking budget. Universities and schools with under-funded IT departments must keep hundreds or thousands of computing devices up and running with the latest software despite multiple users per machine.
- n Fortune 1000 firms with aggressive cost cutting agendas. IT managers are challenged daily to do more with less. Thin clients enable most firms to realize tremendous cost savings by reducing the amount of support staff per 100 client computers from 5 to 1. Thin clients enable network administrators to deploy a new system in rapidly because a thin client can be set up and functional in under 15 minutes. Finally, since thin clients are managed 100% remotely, network administrators can update software the server instead of deploying it over and over again at the client site.
- n Firms that have green screen or "dumb" terminals and would like to upgrade to a more robust GUI platform that can handle email programs like Outlook 2000 and common business applications (Microsoft Word, Excel), while still retaining access to legacy database information (via terminal emulation).

## Thin Client Limitations

It is important to evaluate your IT needs before implementing a thin client computing solution. The following table presents a list of reasons not to use thin client technology.

Limitation	Description
User reluctance	Users accustomed to working in an unmanaged computing environment may perceive the inability to configure their desktops as a loss of autonomy.

<p>Legacy applications conflicts</p>	<p>With the advent of terminal services, several users will be using the same PC (i.e. the terminal server) simultaneously to access the same application. Software certified for Windows 2000 will adequately resolve the potential problems associated with this, by tracking registry keys and ensuring that individual user settings do not overwrite system settings. Legacy software generally does not do this tracking and so the scope for conflicts between settings is greatly increased. These conflicts can normally be resolved, but it is crucial that adequate testing and redesign takes place.</p>
<p>Limited Graphics</p>	<p>High-end graphics or moving environments are difficult to translate into thin client protocols. Thin clients are not an optimal solution for users that work with and develop such applications.</p> <p>HP Thin Clients utilize ATI Rage XC graphics and faster processors to improve the performance of graphic-intensive applications for the best user experience available.</p>
<p>Limited local device support</p>	<p>Without the addition of add-on software, many local devices and ports will not work in a thin-client computing environment.</p> <p>HP has a generous selection of options that allow for increased local device support, with driver support built into the image for easy deployment.</p>
<p>LAN/WAN dependence</p>	<p>Thin-client computing relies on constant connectivity between the server and the client. If that connectivity is broken, clients cannot continue working, although their current session will remain in the state it was in at the time the link was lost.</p> <p>Although there is increased dependence to the server, thin client servers are typically load-balanced among a number of redundant servers for a highly reliable network.</p>

HP Advantage	Thin Client Server Computing can provide enterprises with valuable business-critical benefits and substantial savings. HP thin client exceeds the thin client standards by offering affordable server-based computing solutions and options that deliver desktop-like performance and increased flexibility. Now, HP brings the best of the PC to thin clients using knowledge gained as the #1 PC manufacturer in the world. The following is a list of just some of the advantages offered by HP Compaq Thin Clients t5000 Series.
Increased Security	Options such as SmartCard Readers or biometrics provide an extra, more sophisticated level of user authenticity.
Increased Performance	Local applications run faster with up to 1 GB of DDRAM, a 1GHz processor, and ATI Rage XC graphics. HP has brought more than twenty years of experience in PC design and testing to the new HP Compaq Thin Clients t5000 Series, choosing the most reliable features of the PC to increase the performance and stability of thin clients. HP thin clients with Windows XP embedded use the default XP interface and the most highly-tested, reliable drivers. The new t5000 series is run through rigorous hardware and software tests honed by decades of industry leading experience.
Management Software	HP Compaq Thin Clients t5000 Series come with Altiris Deployment Solution software, allowing administrators sophisticated client management and deployment capabilities using an industry standard software package. IT administrators with current HP PCs deployed are likely to be comfortable and familiar with Altiris since it is the standard client management software installed on HP Business Desktops. Altiris Deployment Solution supports Thin Clients, PCs, handhelds and servers, so you can manage your entire organization with the same management software package. No other thin client manufacturer in the world offers you this level of flexibility!
Wireless Connectivity	HP thin clients support wireless connectivity, allowing you to operate wherever your needs take you. Wireless options are especially great for areas where it isn't feasible to run wires for network access. Additional options, such as a SmartCard reader, biometrics, 1394 Firewire, and Disk-on-Key provide greater flexibility and share commonality with select desktops and notebooks, thereby reducing inventory and management costs.
Superior Software Image	<p>HP Compaq Thin Clients t5000 Series images come with several features not common to the industry:</p> <ul style="list-style-type: none"><li>n HP Compaq Thin Clients t5000 Series with the Windows XP embedded operating system use the same factory image, regardless of flash size. Similarly, all HP Compaq Thin Clients t5000 Series with CE.NET will have a common factory image. This dramatically reduces your IT administration efforts.</li><li>n HP has taken a very conservative approach in our image development process, leaving a more full-featured standard image for the customer. Examples of this are the use of the default "Luna" GUI to maintain a familiar look and feel and the inclusion of NetMeeting and Windows Messenger for real-time, collaborative workplaces.</li><li>n Screensaver with user password for increased workplace security</li><li>n First Boot Agent: HP Compaq Thin Clients t5000 Series run through an agent that assigns each client a unique security identifier (SID) that identifies each operating system and user, which is crucial for adding your clients to a secure domain. Other</li></ul>

manufacturers' clients have identical SIDs, requiring additional efforts to deploy.

- n Flash image in multiple ways:
  - q PXE: HP Compaq Thin Clients t5000 Series fully compliant with Microsoft Wired for Management (WFM)
  - q USB: Disk on Key, ISO image on CD-ROM, floppy boot to support "ghosting" or FTP. HP Compaq Thin Clients t5000 Series are the only thin clients that can be re-imaged easily in a remote deployment via a USB device.
  - q RIS – Remote Installation Service support
  - q Altiris Deployment Solution

#### BIOS on DISCRETE ROM

With the BIOS on discrete ROM, the new HP thin clients offer a unique advantage over the competition. Most thin clients have their BIOS in Flash memory. With the BIOS on discrete ROM, you can manipulate, modify or flash the image without risk of modifying or deleting the BIOS, leading to much higher reliability.

#### PCI Expansion Module

HP now offers a PCI Expansion Module for the HP Compaq Thin Clients t5000 Series. The PCI Expansion Module offers superior expansion capabilities and a broader selection of options. The Module allows users to incorporate additional peripherals for increased performance and flexibility. HP thin clients come with drivers preinstalled for our list of qualified peripherals, reducing your deployment effort.

#### Why HP?

- n HP drives innovations and industry standards through close partnerships with industry leaders, maximizing your return on IT investment by reducing the effort to manage your network clients and maximizing client reliability.
- n HP's commitment to R&D means HP is developing tomorrow's technologies today - by the time the larger industry has adopted these technologies, HP already has the experience to integrate them seamlessly into its products.
- n HP has taken a leadership role in establishing some of the industry's most recognized standards - key computer industry innovations that are now industry standards such as PCI, USB, ATA and a host of other inventions.

#### Conclusion

Thin Client Server Computing can provide enterprises with valuable businesscritical benefits and substantial savings. The HP line of thin client products increases these benefits and savings through robust performance and added flexibility.

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