

Thin-Client Computing:

Competitive Edge for Retail and Banking Sectors

A National Semiconductor White Paper



Thin Client

 *National
Semiconductor*
The Sight & Sound of Information

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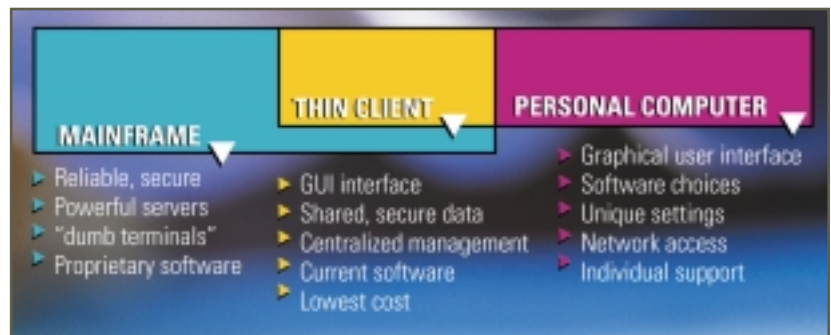
Competitive Edge for Retail and Banking Sectors

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What are the three most important factors for success in the new economy? Connection, connection, and connection: connection to customers, connection to suppliers, and connection between employees. The information-intensive economy demands flexibility and reliability in business practices and a technical infrastructure to match. A smooth flow of information in an easy to use format is both mission critical and a potential competitive advantage in the retail and finance industries.

In the old computing paradigm, IT departments provided a mix of loosely managed PCs that users could configure for themselves or locked down mainframe terminals with little flexibility. The new diversity of hardware options—from handheld devices to thin clients to laptops to desktops—enables IT departments to give each set of users the maximum computing power they need and to centralize software and support on secure, reliable servers. PC users no longer have to configure and troubleshoot their own machines, and mainframe users have access to current productivity applications. An integrated server-based computing environment might include streamlined thin clients, low-end PCs, and high-end, graphic-intensive PCs.

An Integrated Computing Solution



The term "thin client" refers to a growing class of devices that require minimal amount of local computing power and little, if any, local storage or local configuration. They connect over typical TCP/IP networks to application servers for functionality. Depending on application needs, servers may offer Windows NT®, Unix®, Linux™, or any number of terminal emulator environments for the desktop clients. Using load-balancing tools on the servers, IT staff can leverage memory and processing resources to support all desktops at a lower network bandwidth and server overhead than traditional environments.

This approach enables retail and banking businesses to connect their operations into a seamless web. Because applications are centralized on servers, IT staff can rapidly deploy new applications as well as competitive function updates. Robust emulators and software options make a wide range of applications available from a single thin-client device, improving interoperability between users. Thin clients can cost less up front than traditional desktop computers and lower the Total Cost of Ownership (TCO) by reducing maintenance and support, as well as decreasing data and equipment security risks. In banking, this translates into real-time customer information available to tellers, platform officers, and call centers enabling better service and faster response. For retail operations, the right tools on the right desktops increase flexibility with software solutions, improved usability for employees in high-turnover positions, and controlled technology expenses.

Connect Before the Competition Does

In the information economy, competition may come from down the street or around the globe; a successful company will enable customers' access to services when and where they choose with a consistent level of service and response. Whether connecting to customers, suppliers or employees, server-based solutions enable companies to quickly deploy multi-channel selling, improve workflow, control costs, and increase productivity.

Forrester Research, Cambridge, Massachusetts, estimates that one in 10 U.S. households now shops, banks or invests online, and estimates that online retail revenue will jump from \$8 billion in 1998 to more than \$327 billion by 2002. Coordinating and combining old and new data systems presents IT staff with a formidable challenge. They often need to provide access to legacy data and applications, while moving employees to the latest desktop productivity software. When new applications or revisions can improve customer relations, a fast rollout to all clients can mean the difference between days and months of sales opportunities.

"The solution has dramatically enhanced the way employees communicate with each other and with customers," says Ken Pink, CIO of Harmons Supermarkets, a nine-chain grocery chain headquartered in Salt Lake City, Utah. Their computing solution includes thin clients and PCs connected to an intranet-based application server. "The intranet enables managers

and supervisors to route tasks to appropriate employees, and lets all employees send e-mail quickly and easily." The thin-client application also allows the store headquarters to automatically deliver online forms and to develop, deliver and update store manuals containing policies and procedures, operational processes and other information.

Thin-client computing arose to simplify the complexity of enterprise networks, and a more direct information flow results in a more streamlined workflow. The concept is similar to mainframe or timeshare computing: centralize computing power, storage, applications, and data on servers, and provide users with an inexpensive client device that is easy to install and requires no hands-on maintenance. Thin clients connect to the server to process applications, access files, print, and perform services available on traditional desktop computers. Depending on the configuration selected, they can access a full range of applications in multiple platforms or a few targeted applications.



A thin-client solution can help automate processes, synchronize data sets, and set-up electronic checkpoints.

By connecting clients together, companies can control their IT costs and improve productivity of users. According to the GartnerGroup studies of Total Cost of Ownership, the cost of end users to support themselves can top even the capital costs of the hardware over time.

As operating systems and applications become more complex and users reconfigure their machines, these costs will continue to rise and even double in the next five years.

A thin-client solution running primarily office applications can lower the cost of ownership by approximately 20 percent through locked down desktops and centralized application deployment. However, Gartner shows that by employing “best practices” for managing a mixed thin-client and PC environment, businesses can leverage resources and support to achieve a 35 percent savings per client.¹

One organization deploying thin clients reported an 80 percent reduction in support costs.² Retail companies and financial institutions, which choose to untangle the complexity of technology ownership costs, can lower their bottom line costs and compete more effectively.

Thin clients are especially effective for task-oriented users such as bank tellers, call-center operators, and point-of-sale clerks. In high turnover industries, the more quickly employees can effectively use software, the more productive they will be. The benefits of thin clients for users include:

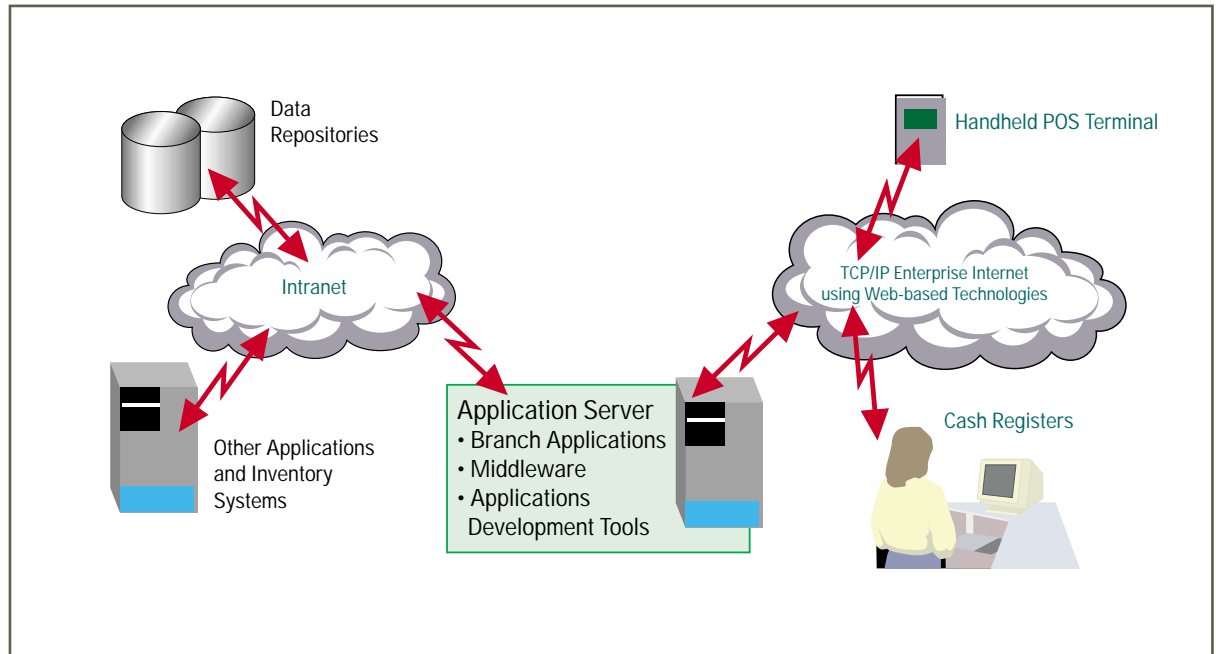
- Remote updates keep applications current and support standardized desktop configurations.
- Centralized processing provides secure transactions and backup of critical data.
- Emulators enable access to mainframe software and remote display protocols allow use of personal productivity software.
- Remote management and plug and play setup require little or no local configuration and troubleshooting.
- The small size fits in limited workspaces.
- The graphical user interface is easy to learn.
- No reboot is necessary for system or application failures.

Former mainframe users benefit from access to Web browsers and productivity software without security risks and additional maintenance. PC users benefit from faster application deployment, multi-platform access to applications, and simplified maintenance.

1) GartnerGroup, Gartner Advisory DataPro, March 2000.

2) GartnerGroup, Gartner Advisory DataPro, 1999.

The New Thin Client



Increasingly, companies are turning to thin clients as a solution to the high cost of loosely managed PCs and mainframe systems. In 1999, shipments of thin clients increased 90 percent according to IDC. They also report that 75 percent of survey respondents described thin clients as an acceptable alternative for some PC users and more than 50 percent of respondents have replaced PCs with thin clients.³ This surge of interest comes from the availability of more software solutions over thin-client hardware and the high cost of implementing Windows® 2000 on individual PCs.

A thin-client computing environment consists of an application server, a network and thin-client devices. The workhorse of the setup is the **application server**, a computer with enough processing power and memory to serve all clients and their application needs. Windows-based terminals require either Microsoft Windows NT 4.0, Terminal Server Edition, and Citrix® MetaFrame™ to run the thin-client protocol based on Independent Computing Architecture (ICA®) or Microsoft Windows 2000, Terminal Server Edition, to support Remote Display Protocol (RDP). AS/400 customers require 5250 emulators on the server. If remote servers are used through corporate headquarters or an application service provider (ASP), a local PC can be installed for booting up the thin clients and as backup DHCP services.

3) "IDC Survey Finds Thin Clients Are Replacing PCs at Some Companies," PR Newswire, August 4, 2000.

The **network infrastructure** is the pipeline between the server and the client. Thin clients generally use standard Ethernet or telephone networks. Wireless models are increasingly available as well. Most organizations hire a systems integrator, consultant, or Value Added Reseller (VAR) with experience in designing and implementing thin-client networks for the initial set up and to provide training. The WAN bandwidth needs will vary depending on the applications, number of concurrent users, and the thin-client devices selected. Thin clients may use less bandwidth than traditional PCs because they transfer only mouse clicks and keystrokes to and screen images from the server. Network reliability is key to enable rapid screen refresh. Some thin clients come with local boot options and limited native applications to make them less network dependent.

Thin-client devices represent a growing class of devices optimized for server-based computing. Smaller than typical desktop computers (about the size of a textbook), the “thinnest” thin clients have no moving parts. They contain a microprocessor capable of processing graphics, network interface capability, a video subsystem, and enough memory (at least 16 MB) to run system software to connect to the server. They do not need a hard drive, floppy drive, or CD-ROM drive. Most thin clients have a sealed case design without open slots for additional security. Some thin clients have integrated display devices, reducing necessary desk space and acquisition cost. Thin clients last longer, use less energy, and upgrades can be downloaded from the manufacturer’s web site. They have a locked down desktop to ease management, and still offer a full range of productivity, web browsing, and specialized mainframe software. Depending on user needs, they come with different processing, memory, and application options.

An alternative to purchasing and supporting the server and applications is to employ the services of an “**Application Service Provider**” (ASP). For an annual fee per user, a business can subscribe to a variety of software applications. The ASP owns, tests, upgrades, and maintains software applications and server equipment. Applications are managed by the service provider and delivered over secure Internet connections to the organization and its remote users. Costs are predictable and lower than more traditional computing environments, and there is less initial investment.



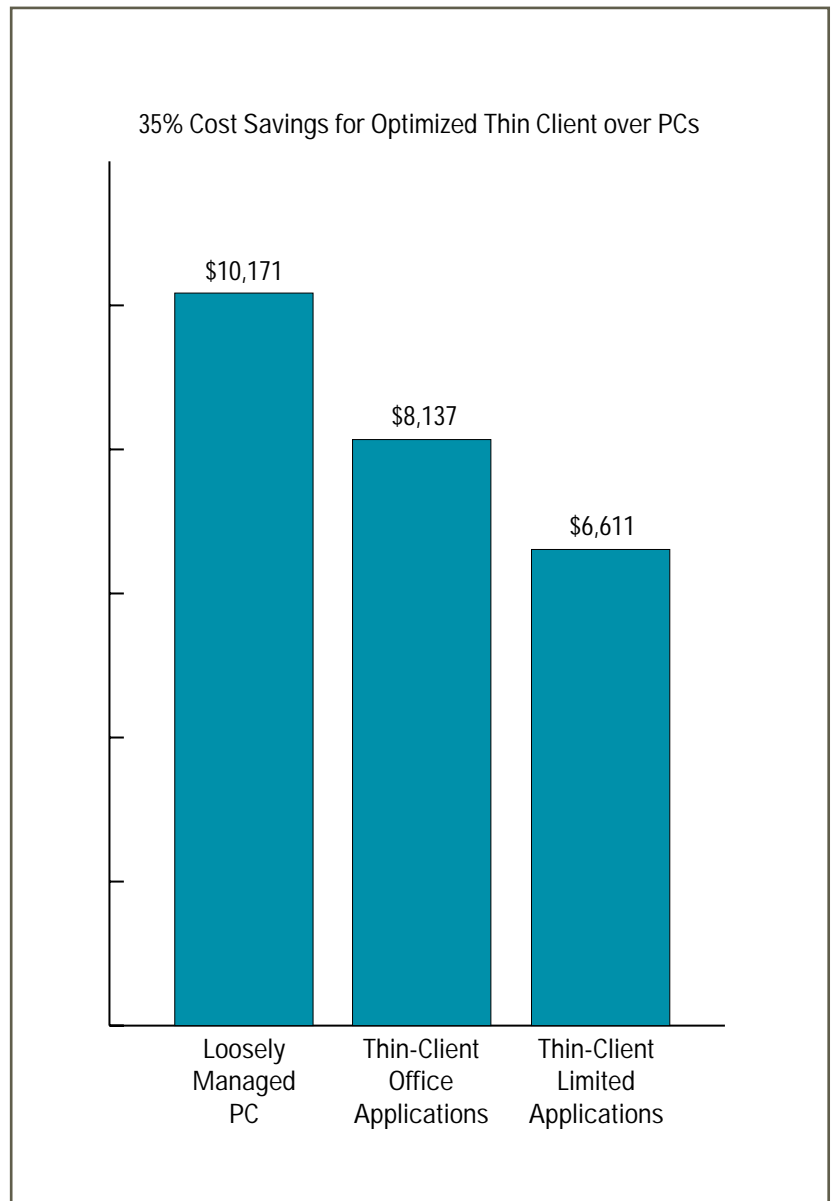
Benefits for the Bottom Line

Companies, which have integrated thin clients into their computing solutions, find real benefits through cost savings, faster deployment, and ease of use. The thin-client solution with centralized computing power and optimized device design translates into competitive advantages for retail and finance companies.

- Centralized storage of data and applications reduces the cost of maintenance, backups, and provides additional security. Mark's Work Wearhouse, a Canadian clothing chain, has saved 20 percent in IT maintenance costs through a thin-client deployment by reducing software installation and upgrade costs, and eliminating the need for backup and recovery at the desktop.
- The latest thin-client designs connect to server applications in various platforms, making it possible to use the same desktop device to access legacy equipment and browse the Internet. Bombardier Capital Mortgage in Jacksonville, Florida, invested in Network Station thin clients with emulators and Remote Display Protocol (RDP). The thin clients enable access from a single device to both the company's AS/400 as well as Internet browsers and personal productivity software. "The biggest advantage we have is our service," says Ron Peace, Vice President and General Manager of Bombardier Capital Mortgage, "and the Network Station helps us deliver better service to our customers while reducing costs."
- Centralized applications also enable rapid application deployment of new competitive functions and simplify software updates. National Semiconductor adopted a thin-client architecture in 1996 at manufacturing sites worldwide and now provides 7,400 employees with access to applications using thin clients. Prior to the conversion, software updates took four months, they had to "touch" every desktop to ensure the desktop PC hardware had enough resources to run the new program. In the thin-client computing environment, updates take just four hours, reducing the time-to-market by improving productivity with no change required for the desktop hardware. National reduced their TCO by 50 percent.
- Because settings and software reside on the central server, users can't change settings, load software, or otherwise tinker with the devices. The machines require little on-site support to fix software conflicts and other problems introduced by users. The standardized setups are tailored to each group's needs, increasing interoperability, real-time data sharing, and decreasing the need for specialized training.
- Some thin-client devices contain no moving parts to break down; the mean failure rate is about twice as long as traditional PCs. A 1999 Mercer Consulting study found that the longer life cycles and lower maintenance costs for thin clients vs. a typical PC environment reduce total cost of ownership by 26 percent. To increase computing power or memory, IT staff can upgrade the server, making the devices far more scaleable and longer lasting.



- Organizations can improve their return on investment in technology with better software license management, legacy equipment, data, and software access, and more efficient network bandwidth use. In Gardner, Kansas, the Operations Officer of a local bank spends about 10 percent of his time managing the 30 thin clients used by tellers and other bank employees. They switched to thin clients from mainframe terminals when the software became available and have found the devices easy to use, reliable, and secure. When they open a second branch of the bank, their integrator will install thin clients there as well.
- Servers storing data and applications can be easily backed up and secured. Because all user data must reside on a file server, this removes the risk of data loss or corruption from equipment theft, desktop hard disk crashes, or floppy disk introduced viruses. Restricted users cannot remove data from thin clients without removable media.



Source: Gartner Group Gartner Advisory DataPro, March 2000



Conclusion

The thin-client market has taken off with commitments from leading high-tech companies including IBM, National Semiconductor, Microsoft, Compaq, Wyse, Citrix, and Dell. In 1999, IDC estimated that the enterprise thin-client market would reach 6 million units by 2003 with 43 percent of shipments to locations outside the U.S.⁴ As the Web proliferates, more and more business functions require both integration and specialization. From the customer to the supplier, a seamless flow of information can make the difference between a success story and a history lesson. Thin clients provide mainframe users the productivity tools they need without losing access to existing software applications, and they offer PC users a simpler, more secure, and up-to-date desktop. When effectively integrated into a complete solution, information appliances enable companies to control costs without sacrificing access or security.



4) "Review and Forecast of the Worldwide Enterprise Thin-Client Market, 1999-2003," Eileen G. O'Brien, International Data Corporation, 1999, pp. 1, 14.



For more information on National's thin-client technology, visit us at:
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