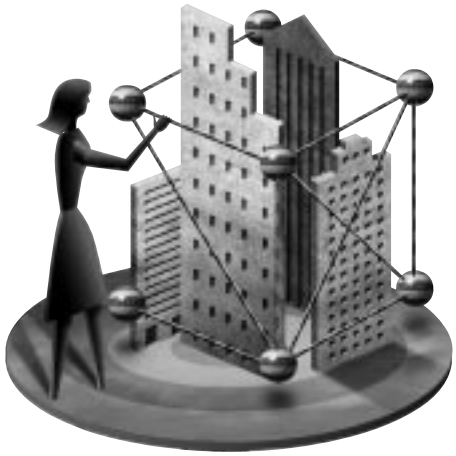
A Thin-Client/Server Approach to Reducing Total Cost of Ownership



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INTRODUCTION

n the past year alone, nearly three thousand articles and press releases have been written about or referred to the concept of total cost of ownership (TCO). In addition, a variety of research studies have been published on the topic. All reflect a common principle—that the true cost of procuring, deploying and maintaining computing applications for an end-user community is significantly more than the initial acquisition cost of a PC and software. How much more? Recent GartnerGroup estimates put the total cost of a networked Windows® 95 PC at $49,915 over its five-year life.[1]

High TCO estimates have been controversial. Lower estimates have often seemed understated. What are the underlying cost elements on which these estimates are based? And more importantly, how can these costs be managed and reduced? This paper explores the components of total cost of ownership and demonstrates how a thin-client/server solution from Citrix Systems, Inc., offers distinct advantages in each area. The net result reduces total cost of ownership by as much as 57 percent, and perhaps even more.[2]

Elements of Total Cost of Ownership (TCO)

"Part of the grand PC illusion is that the up-front costs are a major element of the costs, but they are not. It is in the support costs that the expense lies."
Bloor Research Group[3]

An organization's total cost of ownership encompasses four key areas:

1) Hardware, network and software capital costs for new acquisitions and upgrades

2) System and network management costs

3) Technical support costs

4) IT and related costs shouldered by end users

Recent TCO analyses have also recognized other important categories of costs, including software development expenses, network communications charges and lost opportunity costs resulting from system downtime.

Hardware, Network and Software Capital

Hardware and software capital costs are the most tangible and easily recognized element of TCO. While these costs can be significant, they represent less than a third of the total cost of providing a client desktop over time. Subcomponents include expenditures and lease fees for new client, server, printer and network infrastructure hardware. They also include expenditures for new system, application, utility and connectivity software. Yet, up-front capital costs are only one consideration. Later costs of upgrading processor, memory, storage and connectivity hardware can well exceed the initial acquisition cost. In a study examining the costs of desktop client ownership, Zona Research concluded that, "Over the five-year cycle, the total anticipated hardware upgrade costs of each personal computer in the 15-user network exceeds the initial purchase costs of the PC."[2]

The computing environment of most organizations is comprised of a heterogeneous mix of desktop devices, network connectivity and operating systems. This includes an extensive installed base of 286/386/486-class PCs, Pentium® PCs, Macintosh® systems, UNIX® workstations, OS/2® desktops and X-terminals. The systems may have varying amounts of memory and disk storage and diverse networking and graphics capabilities.

Most TCO analyses assume the purchase of entirely new hardware or systems management solutions to lower costs. Yet wide-scale replacement of computing environments is prohibitively expensive. The ideal solution would leverage the existing investment in client desktop hardware, work with varying client hardware configurations and efficiently leverage the existing network infrastructure.

System and Network Management

The costs of managing and administering a computing environment are a less tangible yet very real element of TCO that can amount to as much as $6,275 for every Windows 95 desktop over a five-year life.[1] Deploying applications on an ongoing basis, including software installation, configuration and management, is often time-consuming and expensive. Not only do administrators have to physically distribute applications to every client, they also have to deal with version control issues, remote administration, multiple system configurations and data replication.

System and network management costs also include the IT labor and outsourcing costs associated with network, system and storage management. These costs span activities such as backups, hardware maintenance, security and anti-virus management, and server and network administration. Despite these challenges, there have been few solutions that address underlying manageability problems. IDC indicates that "only a small portion (7.3 percent) of business PCs are currently under control of PC administration suites."[4] When confronted with thousands of users, the cost of application ownership can quickly spiral out of control.

Technical Support

Like the cost of management, the cost of technical support is less tangible yet very real. Technical support costs include the labor, system and software costs for providing help desks, support contracts, IT staff and end-user training, and IT-related procurement services. Data from the GartnerGroup indicate that the cost of technical support can amount to $8,165 over five years, or approximately 16 percent of TCO.[1]

Challenges relating to providing and controlling the costs of technical support are similar to those associated with system administration—a means of solving the underlying problem has yet to be fully realized. Help desk solutions have automated the process of supporting users, but they have not solved the fundamental problems associated with supporting hundreds or thousands of client desktops dispersed throughout an organization.

End-User IT and Related Costs

Indirect IT costs shouldered by end users have been the most difficult to quantify and often the most controversial element of TCO. They include the costs and inefficiencies of end users supporting themselves and their peers instead of relying on IT support. Such costs are quantified as lost time or reduced productivity that result from activities such as managing files, developing personal applications or macros and self-learning/training.

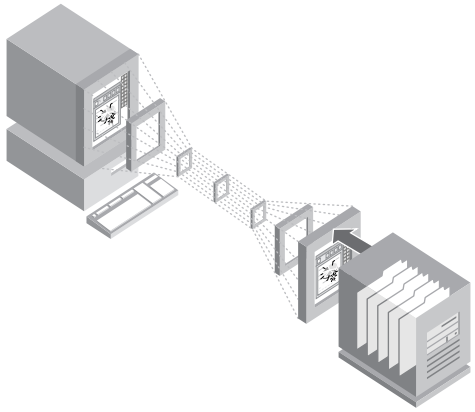
While PC and client/server environments have provided end users with the applications they need, they have also increased the technical burden on the end-user community. And the creation of these environments has come at the expense of control and security. In a traditional client/server architecture, business-critical applications and data live on both the server and the client desktops spread throughout the world. Not only does this increase the risk of unauthorized access, it also increases the risk of lost or stolen information. Combined, these end-user factors comprise as much as 40 percent of an organization's true TCO.

Other TCO Elements

Most recent and forthcoming TCO analyses recognize many other elements driving costs in an organization's computing environment. These include the costs of development, customization and maintenance of new applications, particularly new network-centric or Internet-based applications intended to improve manageability. They include expenses associated with wide area networks (WANs) such as lease-line fees, server access charges and allocated WAN expenses. And, they include the cost of lost productivity or revenue due to network and system unavailability.

Citrix Thin-Client/Server Computing

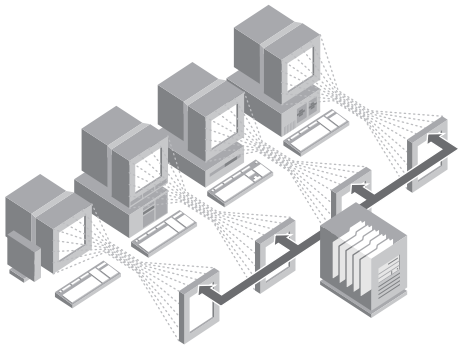
In recent years, new computing models have emerged to help the enterprise reduce TCO. One that has proven to be successful is thin-client/server computing. In this model applications are deployed, managed, supported and executed 100 percent on a server. It employs a multi-user operating system that allows multiple concurrent users to log on and run applications in separate, protected sessions on the server. It also uses a method for separating the application's logic from its user interface and distributing the presentation of an application's interface to a client device. Only keystrokes, mouse clicks and screen updates travel the network, making application performance bandwidth-independent.



A highly efficient, remote presentation services protocol separates an application's logic from its user interface and allows only keystrokes, mouse clicks and screen updates to travel the network.

Total Cost of Ownership Elements	Thin-Client/Server Advantage
Capital: Hardware, network and software capital costs for new acquisitions and upgrades	• Provides 32-bit Windows-based applications to virtually any client device • Leverages existing computing and network infrastructure • Supports cost-effective Windows-based terminal hardware
Management: System and network management costs	• Offers single-point control over applications and data files • Enables deployment, configuration, management and support for applications from one location
Support: Technical support costs	• Enables IT to support, diagnose and train users from a central location • Allows support staff to remotely join or control a user's computing session
End User: IT and related costs shouldered by end users	• Enables remote sites and end users to be supported by headquarters-based staff and systems • Improves control and security without sacrificing end-user applications
Other Areas: Software development costs, wide area networking costs and fees, and system downtime opportunity costs	• Extends today's 16- and 32-bit Windows-based applications • Avoids application rewrites • Minimizes network traffic and WAN upgrades • Minimizes impact of individual server downtime

With thin-client/server computing, client devices, whether "fat" (such as desktop PCs, notebooks, workstations or Java™-based terminals) or "thin" (such as Windows-based terminals or hand-held information devices), have instant access to business-critical applications via the server—without application rewrites or downloads. Thin-client/server computing works within the current computing infrastructure and current computing standards and with the current and future family of Windows-based offerings. This means improved returns on computing investments—desktops, networks, applications and training. Thin-client server computing provides cost savings in all four key areas of TCO.



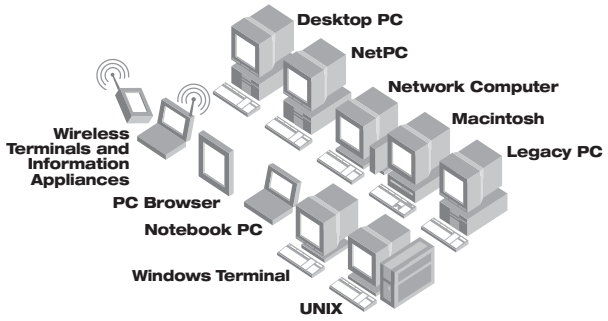
In thin-client/server computing, multi-user capabilities allow applications and data to be deployed, managed, supported and executed 100% on the server.

Hardware, Network and Software Capital

Thin-client/server computing offers a solution based on cost-effective Windows-based terminal hardware that can reduce the average desktop capital cost by 21 percent.[1] For example, deploying a thin-client/server solution using a new generation of thin-client hardware—Wyse® Winterm™ Windows-based terminals—will help the San Francisco YMCA save approximately $1 million over a five-year life cycle.[5]

Even more importantly, thin-client/server computing allows an organization to leverage its existing computing and network infrastructure, while delivering the latest 32-bit Windows-based applications to virtually any client device. Another California organization, the Bank of Walnut Creek, realized a 40 percent savings with a thin-client/server computing solution from Citrix. The Citrix® solution eliminated the need to purchase new servers and hire network administrators at each branch, while providing access to business-critical applications from PCs and older teller terminals across an inexpensive frame-relay WAN.

Because applications reside and execute 100 percent on the server, thin-client/server computing provides a means by which companies can extend application access to existing devices ranging from fat clients to a broad range of new thin-client devices. It does this without rewriting a single line of code, changing client hardware or adjusting client system configurations. And it provides seamless desktop integration of the user's local and remote resources and applications with exceptional performance.



Citrix provides high-performance, thin-client software solutions that allow any client to access 32-bit Windows-based applications.

System and Network Management, Technical Support

Thin-client/server computing solves an organization's underlying manageability and technical support challenges by providing single-point control over applications and data files. It delivers enterprise-class management tools that allow IT professionals to deploy, configure, manage and support applications from single locations. New applications or revisions to existing applications, can be deployed through the server and instantly available to all client desktops. Thin-client/server computing enabled Hewlett-Packard, for example, to deploy human resources software to more than 25,000 employees throughout Europe. A Citrix solution enabled applications and information to be managed centrally, while giving any employee real-time access to critical data for easy updating and tracking.

Technical support specialists can remotely join or take control of another user's session to see the display on the screen or control the mouse and keyboard. This makes remote support, diagnosis and training easy, as users have discovered. Otto Folprecht, systems network manager for Tree Island Industries, a British Columbia-based company with branch offices in California and Washington, noted, "A thin-client/server solution with Windows-based terminals proved to be the most manageable and cost-efficient solution for deploying applications across our heterogeneous enterprise. This combined solution is what 'Zero Administration' means to me."

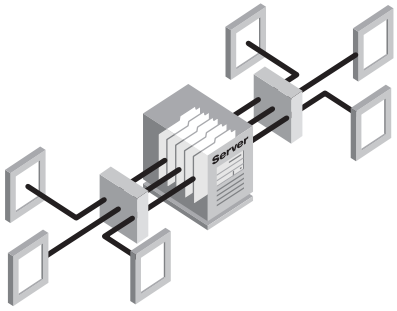
Data from the GartnerGroup indicate that a Citrix-based solution can cut desktop technical support costs by 25 percent and desktop administration costs by nearly 60 percent.[6] A Zona Research study found dramatically increased advantages with a thin-client/server solution, indicating that administration and management costs associated with 15 personal computers in a Windows NT® Server-based network are approximately 500 percent more than administration and management costs associated with 15 Winterm desktops.[2]

End-User IT and Related Costs

With thin-client/server computing, headquarters-based administrators and help-desk employees can support remote branch offices and avoid the need for technical staff in each corporate organization. For example, Kevin Smith, director of corporate technology service

for Pro Staff, a nationwide company with more than 130 branch offices, noted, "Over the long term, we will dramatically reduce the annual cost of application ownership, since all application deployment, user configuration and support occur centrally from servers, located at corporate headquarters."

Because a thin-client/server solution maintains applications and data on the server, users can access the information and applications they need while administrators avoid security exposures resulting from downloaded data and applications. Management of files and applications is put back into the hands of the IT professional. Server-based backups ensure that all vital corporate information assets are being archived. The end result is a one-third reduction of end-user IT costs.



Thin-client/server computing provides secure solutions that let you control user access while keeping all vital information in one location on the server.

Other TCO Elements

Thin-client/server offers many additional TCO advantages. Rather than requiring the development of entirely new, network-centric applications, thin-client/server computing is based upon today's 16- and 32-bit Windows-based applications. It even enables administrators to launch and embed corporate Windows-based applications into HTML pages without rewriting a single line of code. For example, Allen Hewes, enterprise architect, Standard Forms Inc., explained, "A thin-client/server solution has greatly reduced our total cost of ownership for enterprise applications by saving us from having to rewrite five [GB] of code, line for line."[7]

Thin-client/server computing minimizes network traffic, even for modern 32-bit Windows-based applications. This reduces the need for or allows an organization to avoid wide-scale upgrades to a WAN and the increased communications fees that come with it. Thin-client/server computing also provides a highly reliable solution that lowers the costs associated with downtime. By grouping multiple servers into scalable "server farms," it can dynamically route users to the least-busy server to deliver the best application performance while minimizing the impact associated with the downtime of any single server.

Thin-client/server computing reduces the total cost of ownership for organizations which:

- Need to preserve and leverage their investment in Windows-based applications
- Need to provide 32-bit Windows-based applications across a heterogeneous environment
- Have an extensive installed base of 286/386/486-class PCs
- Are facing a significant capital investment to deploy 32-bit Windows-based applications
- Have a growing IT administrative and technical support staff
- Need to deploy and manage applications across hundreds or thousands of client desktops
- Must provide technical support to remote and widely dispersed business locations
- Need to improve control and security in the computing environment without sacrificing the end-user experience
- Are developing or rewriting applications in order to be Intranet-based
- Face an upgrade to a wide area network to provide higher bandwidth and application performance

Conclusion

The GartnerGroup cites a capital, management, support and end-user cost advantage from thin-client/server computing that totals 22 percent. Zona Research cites an advantage of 57 percent. The advantage becomes even greater when leveraging and extending an organization's existing investment in computing and network hardware. Citrix thin-client/server computing is delivering proven and tangible cost savings today and is rapidly becoming the most reliable way to reduce the complexity and total costs associated with enterprise computing.

[1] GartnerGroup, *TCO: New Technologies, New Benchmarks*, Managing Distributed Computing Research Notes TCO-242, December 5, 1997 http://www.gartner.com/webletter/microsoft2/article.html

[2] Zona Research, Inc., Desktop Clients—A Cost of Ownership Study, Spring, 1996

[3] Bloor Research Group, *The Enterprise By Other Means: An Analysis of the Return to Centralised Computing and its Consequences*, 1996

[4] IDC Market Research, *Opportunities in Desktop Administration: Enhancing Manager Productivity*, March, 1998

[5] *InfoWorld*, September 29, 1997

[6] Computing Research Notes TCO-242, December 5, 1997 http://www.gartner.com/webletter/microsoft2/article.html

[7] *MIDRANGE Systems*, May 30, 1997

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