



## Improving the Bottom Line Through the Use of Citrix Access Infrastructure Software

Doculabs Market Focus Report: Citrix Systems, Inc.



Organizations today face the challenge of managing and deploying an array of both older and newer applications within complex distributed infrastructures while implementing cost-cutting and productivity improvement measures. The Citrix® MetaFrame® Access Suite provides a way for organizations to enable on-demand application access at any time, from anywhere, to a wide variety of devices inside and outside the enterprise. In this paper, Doculabs explores the cost-related benefits of the Citrix access infrastructure model, including real-world examples of how several organizations have utilized Citrix solutions to solve their computing challenges.

## What's Inside

### ***Executive Summary***

Provides an overview of common application deployment models, and how the Citrix approach can deliver cost benefits and other advantages to organizations.

### ***Analyzing Costs***

Describes the variables that affect computing costs, and introduces the reader to the Application Computing Environment (ACE) Cost Analyzer, a Web-based tool designed to help organizations determine the cost of solutions without performing complex calculations.

### ***Customer Case Studies***

Provides real-world examples of how organizations have solved their unique computing challenges using Citrix access infrastructure software solutions.

### ***Customer Benefit Analysis***

Summarizes the benefits that the Citrix server-centric approach provides, and includes profiles of actual Citrix customers and their estimated cost savings.

### ***The Final Word***

Provides Doculabs' overall assessment of the Citrix value proposition for organizations considering server-centric and thin-client computing.

## Executive Summary

Organizations continually struggle with reducing costs while improving employee productivity. The management and deployment of applications within their complex distributed IT infrastructures are key targets for cost cutting and productivity improvement measures.

Since 1989, Citrix Systems, Inc. has provided technology solutions that use an access infrastructure software model, commonly referred to as server-based or server-centric computing, to dramatically reduce such costs while providing a number of other benefits. These solutions are powered by the Citrix MetaFrame Access Suite, which provides a means for organizations to enable application access at any time, from anywhere, to a wide variety of devices inside and outside the enterprise.

Doculabs was commissioned to provide an independent analysis of the cost-related benefits of the Citrix access infrastructure model. In addition to studying Citrix's solution in comparison to unmanaged and managed desktop computing environments, Doculabs interviewed Citrix customers around the world to understand the real-world strengths and challenges of implementing and managing a Citrix server-centric computing model, and used Citrix's own cost analyzer tool to generate projected cost savings data. This paper provides the results and analysis from these exercises.

### ***Understanding Application Deployment Models***

In order to understand the benefits of Citrix's approach, it is essential to understand the three primary computing models organizations use today to deploy applications. These models are the *Unmanaged Desktop*, *Managed Desktop*, and *Citrix Access Infrastructure*.

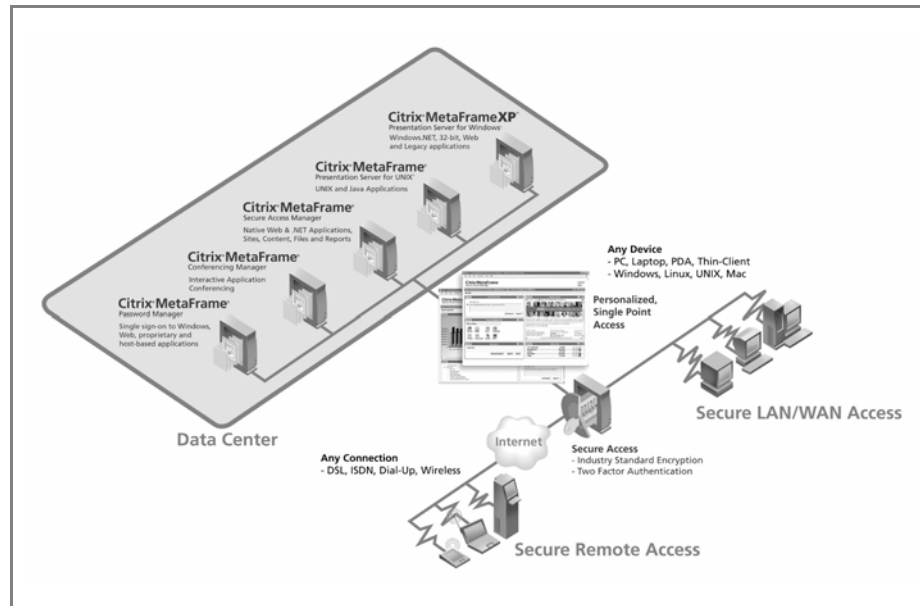
- The *Unmanaged Desktop* computing model defines an environment in which users each have their own desktop systems. System administrators manage each system individually, including the installation and upgrade of operating systems and software.
- The *Managed Desktop* model allows administrators to install and manage applications on desktops remotely and from a centralized (and often remote) location. Most medium and large enterprises today use software distribution and management tools to some degree to automate software deployment and upgrades. However, these same organizations typically find that some applications, user scenarios, or remote locations are unable to be serviced effectively through the use of such tools.
- The *Citrix Access Infrastructure* model centralizes access to applications and information and enables IT staff to deliver, manage, monitor, and measure enterprise resources at will. In this environment, all of the application processing takes place on centralized servers. Users can access these applications, either locally or remotely, via virtually any connection using a standard desktop device, a thin-client appliance, a wireless device, or increasingly, a Web browser.

Each model presents unique cost and support implications. Typically, the unmanaged desktop is the most costly, with server-centric computing offering the lowest desktop management costs. Most organizations employ more than one computing model, increasing overall cost and creating technical challenges for users who need to access applications running under different models. Most organizations also need to support multiple platforms (e.g. Windows®, UNIX®, Linux®, and Macintosh®) and desktop hardware environments, which can dramatically increase costs under some of these models.

This diagram shows how the components of the Citrix MetaFrame Access Suite can be used to deliver applications to clients regardless of device type and device location.

Source: Citrix, 2003

Figure 1 –  
Citrix Access  
Infrastructure



## **The Citrix Solution**

The Citrix MetaFrame Access Suite solution is comprised of several access infrastructure software products. Typically, customers choose a combination of products to meet their needs today, and add on to the solution as their requirements change. The Citrix MetaFrame Access Suite products are:

- ***MetaFrame Presentation Server for Windows***  
The foundation of the Citrix Suite, this presentation server software is certified to run on Microsoft Windows 2000 Server and Windows Server™ 2003. It enables heterogeneous applications to be centrally managed on the server, and securely, instantly and easily accessed by users on any device, over any connection.
- ***MetaFrame Conferencing Manager***  
Citrix® MetaFrame® Conferencing Manager adds intuitive application conferencing to MetaFrame XP™ Presentation Server and eliminates the geographical distance between team members, increases the productivity of meetings, and allows easy collaboration.
- ***MetaFrame Presentation Server for UNIX***  
Enables UNIX and Java applications to be centrally managed on the server and accessed by remote, mobile and local users in heterogeneous environments from any device or connection, without the need for multiple desktops or software emulation packages.
- ***MetaFrame Secure Access Manager***  
Provides secure, single-point access over the Web to any enterprise resource, including client/server, legacy and Web applications, Internet and intranet sites, documents, streaming media, network file services and XML-based Web services.
- ***MetaFrame Password Manager***  
Provides password security and single sign-on access to Windows, Web, proprietary and host-based applications running in the MetaFrame Access Suite environment or a variety of desktop clients.

This report provides an independent analysis of the costs associated with various application computing environments and validates the potential cost savings that the Citrix solution can offer organizations of all types and sizes. This report represents an update to the original Doculabs' whitepaper on the same subject titled, *Improving the Bottom Line Through Server-Based Computing* released in 2001. This paper covers the enhancements that have been made in the Citrix product line and updated assumptions that are made when calculating costs today.

## ***Key Findings***

After conducting an independent analysis, interviewing over a dozen Citrix enterprise customers in North America and Europe, and performing cost benefit calculations, Doculabs concluded that the major cost components associated with deployment and subsequent ongoing maintenance of the various computing models are:

- Desktop (includes hardware, operating system licenses, and support)
- Application maintenance (desktop and client/server applications)
- Network and secure remote access
- Loss of productivity (due to server, desktop, and network downtime)
- Training

The Citrix solution dramatically reduces the costs associated with these key components, particularly application maintenance and desktop costs. In fact, the data shows that typical large organizations can save over 25 percent in hard costs in the first year following deployment.

It is important to note that loss of productivity and training are often categorized as soft costs, which are not directly considered part of IT cost structure. However, the data shows that organizations should consider soft costs when determining how they will deploy applications in the future due to the large impact soft costs have on the bottom line.

Organizations also derive other benefits from the Citrix solution, including:

- Improved, centralized management of their infrastructures
- Unification of disparate and fragmented network infrastructures
- Demonstrated cost benefits for organizations of all sizes that increase with the size of the implementation
- Reduced staffing requirements for mid-sized organizations that are 80 to 90 percent less than those needed to manage non-Citrix-based solutions; this figure may be even higher for large organizations
- Higher worker productivity through always-on access
- Replacement of high-end or specialty workstations in favor of thin-client devices

Customer interviews revealed the top benefits of the Citrix solution to include ease of application deployment and support, centralized management capabilities, and general, across-the-board cost savings through the use of a server-centric computing model.

The following chart shows the top benefits expressed by over a dozen customers that were interviewed for this paper.

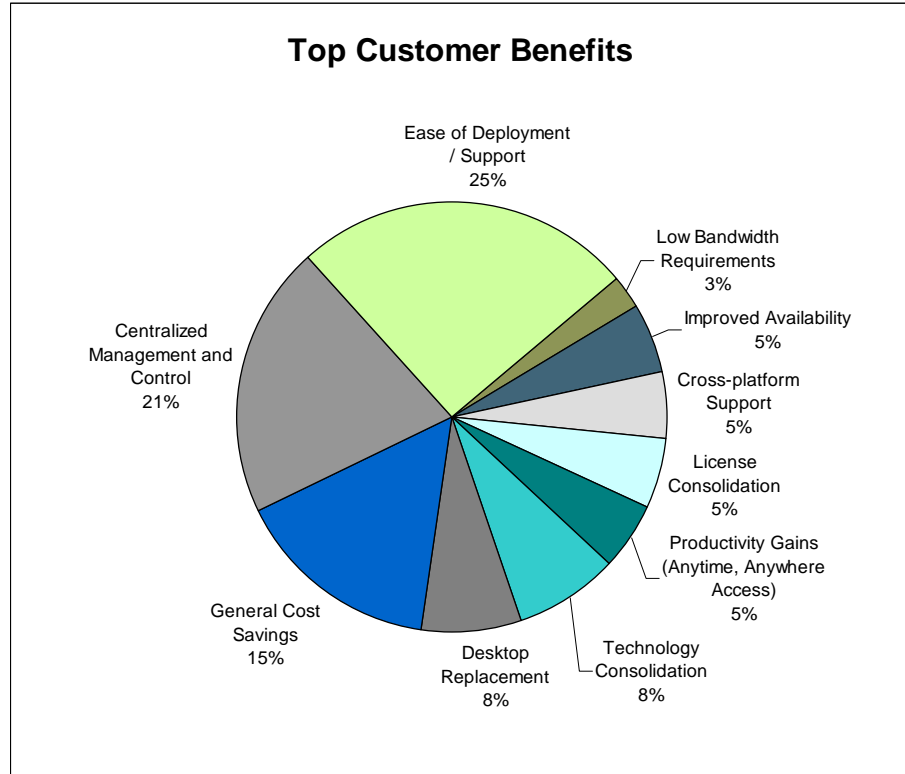


Figure 2 – Top Customer Benefits

## Analyzing Cost

### What's New in the ACE Cost Analyzer?

- Simplified data entry process speeds cost analysis and calculation steps for ACE users.
- Citrix MetaFrame Secure Access Manager and Password Manager are included.
- All the data defaults have been updated to reflect current IT cost structures.
- Hard cost and soft cost categories are more clearly segmented for the user.

It is clear that cost is a key consideration for any organization considering a change in computing environments. Yet although cost is a measurable and well-understood concept, it can be difficult to calculate, especially in light of the number of variables an application infrastructure presents. An accurate assessment of cost is also the key to calculating other key metrics such as return on investment and profitability.

Many variables influence the cost of deploying and managing applications. Some of these elements are hard numbers that are easy to ascertain, such as the number of users and applications and the price of client devices. Other numbers are more difficult to determine, such as the effects of downtime on different user populations.

Other variables, such as the number of remote locations that need to be managed, vary greatly from organization to organization. Though it is difficult to take every element into consideration when calculating cost, it is possible to use a smaller set of variables known to significantly influence cost.

Understanding how all these variables affect cost allows organizations to intelligently and effectively deploy applications. With this in mind, Citrix worked with Kaptronix, Inc. and Infotech Global, Inc. to develop a Web-based tool called the Application Computing Environment (ACE) Cost Analyzer. The tool allows users to determine the cost of various solutions without performing complex calculations. Doculabs used The ACE Cost Analyzer as part of its analysis for this paper.

Incorporating more than 130 customizable cost elements and several hundred calculations, the ACE Cost Analyzer is based on an analytical model that evolved out of an extensive study of customer costs across multiple industry segments. Doculabs reviewed the assumptions made in the ACE Cost Analyzer to ensure that they were realistic and in line with our independent findings. (The ACE Cost Analyzer is available for use at the Citrix Web site at [www.citrix.com](http://www.citrix.com) or at [www.acecostanalyzer.com](http://www.acecostanalyzer.com).)

## Cost Components at a Glance

The following table outlines some of the major elements that the ACE Cost Analyzer uses to calculate cost and the business implications of those elements.

Category	Description	Business Implication
<b>Human Resources</b>	Salary of various employees and number of working days in a year	The loss of productivity affects the bottom line in a way that is directly tied to worker compensation.
<b>Desktop Environment</b>	Number, type, and cost of desktops, notebooks, and thin-client devices used	Management costs increase with the number of desktops, notebooks, and thin-client devices. Multi-platform requirements also drive costs higher, especially in the area of support.
<b>Application Software</b>	Number, type, and platform of application software in use	The types of applications that need to be deployed and managed can drastically affect maintenance and upgrade costs. Client/server applications are more costly to deploy than Web-based applications.
<b>Heterogeneous Cross Platform Applications Access</b>	Number of users who will need access to and from other platforms, like UNIX	Cross-platform access requirements generally require investment in new software to help bridge incompatible technologies.
<b>Network and Secure Remote Access</b>	Requirements for secure access to applications by outside users (including partners and/or remote employees)	There are significant costs associated with remote access software. Bandwidth requirements are also an important consideration.
<b>Help Desk and Support</b>	Time spent supporting users by help desk staff	The complexity of the environment and applications can lead to significant support costs.
<b>Operating System Upgrade and Maintenance</b>	Time to test and upgrade to a new release of an operating system	Operating system upgrades are one of the most costly of maintenance tasks. They usually require extensive upfront testing and even longer deployment cycles.
<b>Desktop Application Upgrade and Maintenance</b>	Time to test and upgrade applications on managed or unmanaged desktops	Although not as extensive as operating system upgrades, the number of updates generally increases, pushing costs higher.
<b>Server Cost</b>	Server hardware pricing, as well as the cost of maintenance	Servers are more costly than desktops, but a single server, deployed properly, can support many users.
<b>Backup and Utilities</b>	Backup software and hardware, backup media, and related utilities	Especially important in server-centric computing environments where backup of application data is critical for disaster recovery. Advanced backup infrastructure can be costly.
<b>Loss of Productivity</b>	Amount of downtime, both on the server side, client side, and network	Users that cannot access applications due to hardware downtime are less productive, leading to a higher cost structure.
<b>Training</b>	Administrator and user training time	Most technology requires user training, which is costly in terms of time away from work and tuition. However, effective training reduces overall support and help desk costs.

Table 1 – Major Cost Elements Used by the ACE Analyzer

The ACE Cost Analyzer leads users through a series of simple data-gathering questions. Once the data is gathered, the tool calculates the cost implications of the various computing models over a period of three years.

The ACE Cost Analyzer does *not* attempt to calculate total cost of ownership; rather, it performs a comparative cost analysis of the various computing models. For more accurate comparison, it eliminates cost factors such as building and maintenance costs, technology procurement costs, and other types of overhead common across all of the compared solutions.

As previously noted, “hard” and “soft” costs must be measured:

- *Hard costs* typically refer to the cost of items such as network hardware, telecommunications, and software licenses. These are budgeted items that are clearly visible on a company’s balance sheet.
- *Soft costs* refer to costs associated with non-tangible items. These include the costs associated with loss of productivity due to downtime or training.

Most calculations discussed in the following sections are described as being “with soft costs”, which is total cost (including both hard and soft costs).

Armed with the ACE Cost Analyzer, customers should be able to derive custom tailored views of the relative costs for a variety of solutions based on the way their organizations operate. The following case studies demonstrate the results Doculabs achieved when it used this tool to perform a cost analysis for three organizations with distinct technology needs.

## Customer Case Studies

*Two Citrix customers volunteered to walk through the ACE Cost Analyzer to see how well their results matched its cost savings calculations.*

In an effort to determine the true significance of the Citrix value proposition, Doculabs interviewed several Citrix customers representing a cross-section of industries, organizational and implementation sizes, technical and business requirements, and Citrix product mix.

Two of these customers volunteered to use the ACE Cost Analyzer with their organization's profile, an exercise which provided a detailed analysis of the major cost benefits associated with the Citrix server-centric computing model. Doculabs also interviewed a number of additional enterprise customers to demonstrate the cost savings that very large and complex organizations can expect to achieve by taking full advantage of the Citrix MetaFrame Access Suite.

The following case studies are real-world examples of how organizations have solved their unique computing challenges using Citrix solutions.

### **Semiconductor Manufacturer**

A leading innovator in the highly competitive semiconductor sector wanted a way to reduce the costs associated with managing client devices, and more importantly, wanted to improve user productivity and reduce the costs of expensive software licenses.

Semiconductor design and simulation products come with high price tags as do the high-end workstations that run them. Through the use of the Citrix MetaFrame Access Suite, the organization was able to deploy these systems centrally, which allowed the company to reduce the total number of high-end workstations deployed worldwide, as well as to consolidate the licenses for the applications that ran on these systems. The net benefit was better utilization of their investment as well as a more secure environment for collaborative semiconductor design (as there were fewer files being transferred from data center to data center).

This customer cites the top three benefits of using a Citrix solution as:

- **Centralized administration** – The solution allows them to deploy applications to 2,500 users nationwide from a centralized location. The benefits of deployment have also led to a dramatic reduction in maintenance and administrative costs.
- **Consolidation of licenses** – It is significantly easier to maintain the proper number of licenses of expensive semiconductor design and simulation software using a server-centric computing model. Being a global organization, the same licenses can be utilized around the clock using this approach.
- **Replacement of hard-to-maintain high-end workstations in the field** – Until recently, management of high-end workstations and the large working documents associated with the applications that ran on them was very difficult and costly. Workstation tuning and high network bandwidth utilization were two major problems that disappeared through use of Citrix.

The following charts show the semiconductor manufacturer's expected annual hard cost savings per year for the first three years following implementation of Citrix

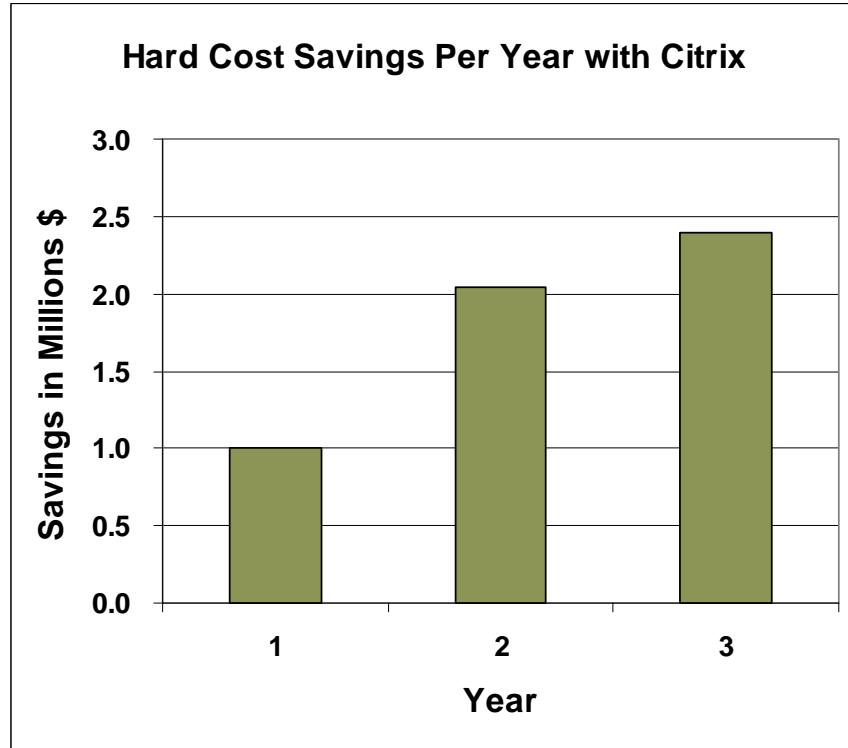


Figure 3 –  
Semiconductor  
Manufacturer:  
Three-Year Hard  
Cost Savings  
with Citrix

The following charts show the percentage of total three-year hard-cost savings the semiconductor manufacturer will realize each year when using Citrix technology.

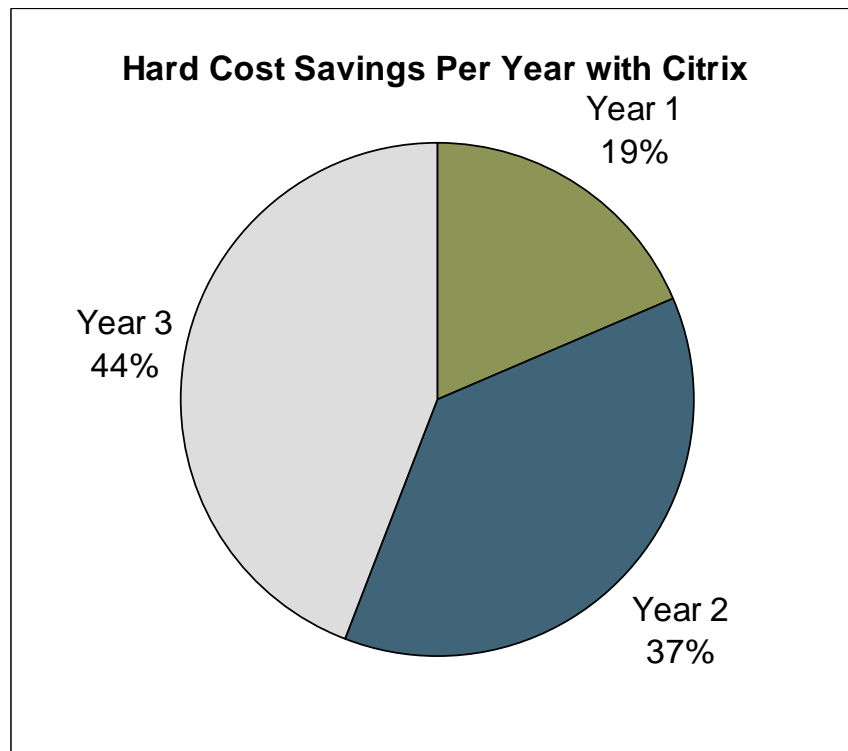


Figure 4 –  
Semiconductor  
Manufacturer:  
Percentage of  
Hard Cost  
Savings Per Year

For the semiconductor manufacturer, the expected total cost savings over three years is \$10.6 million, of which \$5.4 million is hard costs. Nearly 20 percent of the total three-year costs savings actually are realized in the first year following implementation – making an immediate impact even in this relatively small implementation of the Citrix access infrastructure.

The ACE Cost Analyzer breaks down the individual cost elements as follows:

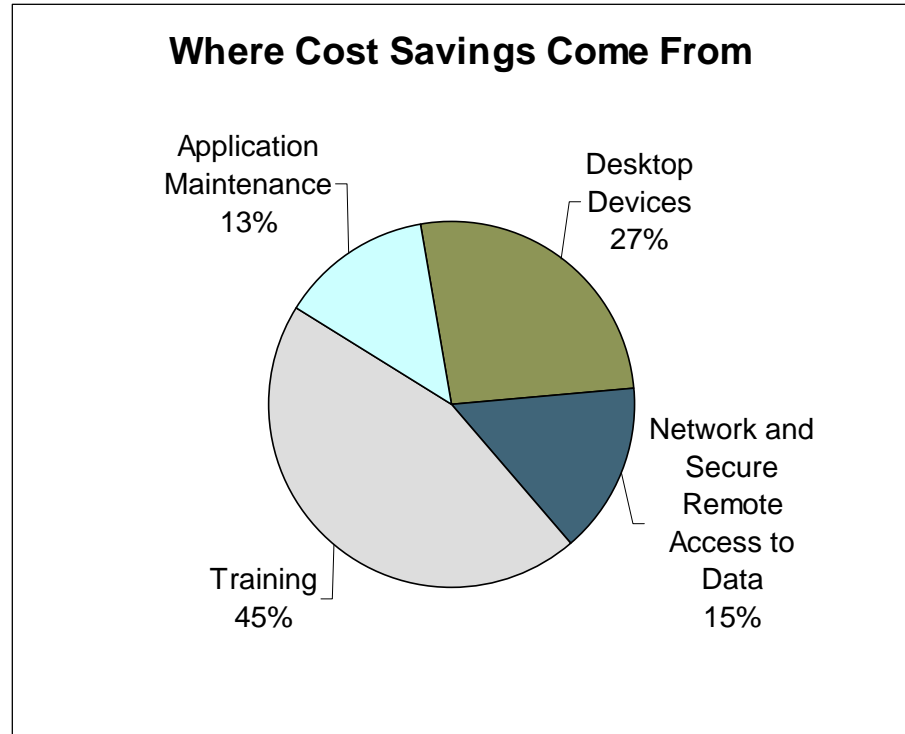
<b>Basic Three-Year Cost Comparison With and Without Citrix</b>				
<b>Cost Factor</b>	<b>Cost without Citrix (in U.S. dollars)</b>	<b>Cost with Citrix (in U.S. dollars)</b>	<b>Savings/ Costs (in U.S. dollars)</b>	<b>Percent of Total Savings</b>
<b>Hard Costs</b>				
Desktop Devices	\$6,171,611	\$3,195,929	\$2,975,682	26.4%
Software License	\$37,830	\$704,548	(\$666,718)	0%
Server	\$109,539	\$140,554	(\$31,015)	0%
Application Maintenance	\$1,532,752	\$43,629	\$1,489,123	13.2%
Network and Secure Remote Access	\$2,710,270	\$1,034,354	\$1,675,916	14.9%
<b>Sub-total</b>	<b>\$10,562,002</b>	<b>\$5,119,014</b>	<b>\$5,443,043</b>	<b>54.6%</b>
<b>Soft Costs</b>				
Loss of Productivity*	\$3,265,990	\$3,220,090	\$45,900	0.41%
Training*	\$18,915,000	\$13,845,780	\$5,069,108	45.0%
<b>Sub-total</b>	<b>\$22,180,990</b>	<b>\$17,065,870</b>	<b>\$5,115,008</b>	<b>45.4%</b>
<b>Totals</b>	<b>\$32,742,992</b>	<b>\$22,184,884</b>	<b>\$10,558,051</b>	<b>100%</b>

Table 2 –  
Semiconductor  
Manufacturer: Three-  
Year Cost Comparison

\* Refers to “soft costs” associated with people, including costs related to loss of productivity and training

The following figure illustrates what percentage of the semiconductor manufacturer's savings are expected to come from different cost components.

Figure 5 –  
Semiconductor  
Manufacturer: Where  
Cost Savings Come  
From



This analysis demonstrates that the majority of the semiconductor manufacturer's expected savings stem from significantly reduced training costs (45%), savings on desktop devices (27%), network and secure remote access savings (15%), and application maintenance (13%). It is likely that the semiconductor manufacturer's strategy to move towards a thin-client computing model will result in even greater savings over the next few years, and thus increase the savings related to desktop devices.

### ***National Research Laboratory***

This national research laboratory has a complex technology infrastructure that needs to support over 12,000 users across the enterprise. The users are spread across a number of geographically dispersed facilities that have different access infrastructure capabilities. The Citrix MetaFrame Access Suite was the only option that allowed the research lab to leverage its systems and applications as they exist today. Over the past several years, the user demand for the technology has grown significantly, but the ease of Citrix's centralized administration has allowed the administrative staffing model to remain the same.

The company employs Citrix access infrastructure software to deliver diverse custom and off-the-shelf applications to its users on Windows, UNIX, and Apple systems.

The customer cites the top three benefits of using a Citrix solution as:

- ***Ease of deployment*** – Deployments took months to accomplish in the past; today deployment can be done in a matter of hours.
- ***Application stability and availability*** – Custom-developed applications typically have intermittent problems due to varying desktop configurations. Centralized server-centric deployment makes applications more stable since there is only one environment to test. Therefore applications stay available more often for users.
- ***Reduced staffing requirements*** – Though the number of applications and users supported have grown dramatically, staffing has remained constant. A Citrix-based solution has made current staff better able to support the growing enterprise.

The research lab volunteered to walk through the ACE Cost Analyzer to see how well the results matched up with its own cost savings calculations.

The following charts show the research lab's expected annual hard cost savings per year for the first three years following implementation of Citrix technology.

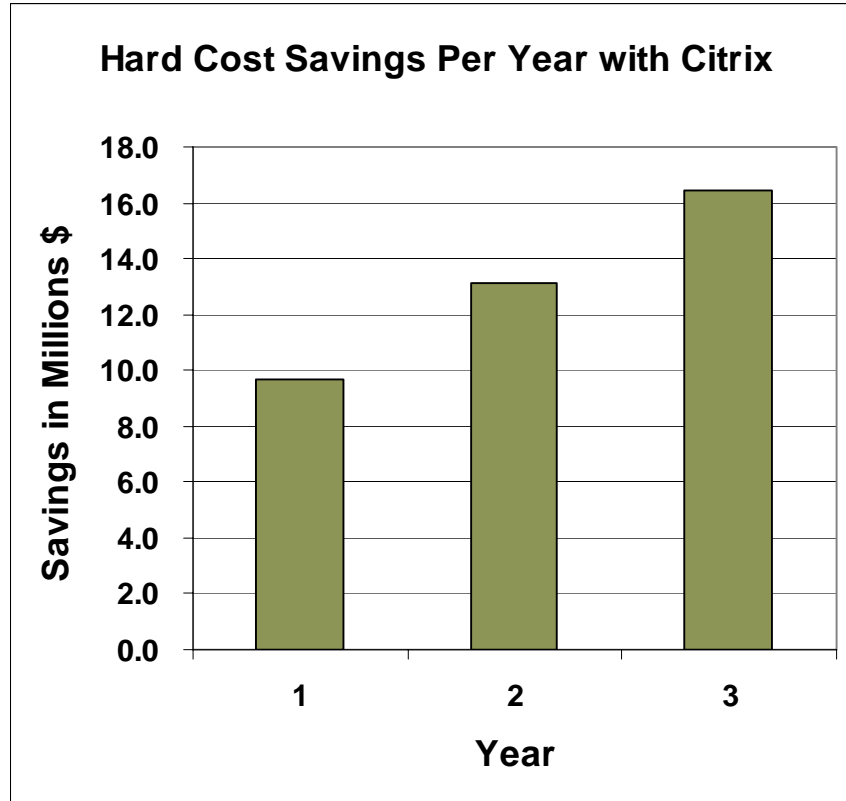


Figure 6 – National Research Laboratory: Three-Year Hard Cost Savings with Citrix

The following charts show the expected percentage of total three-year hard cost savings realized by the research lab each year when using Citrix technology.

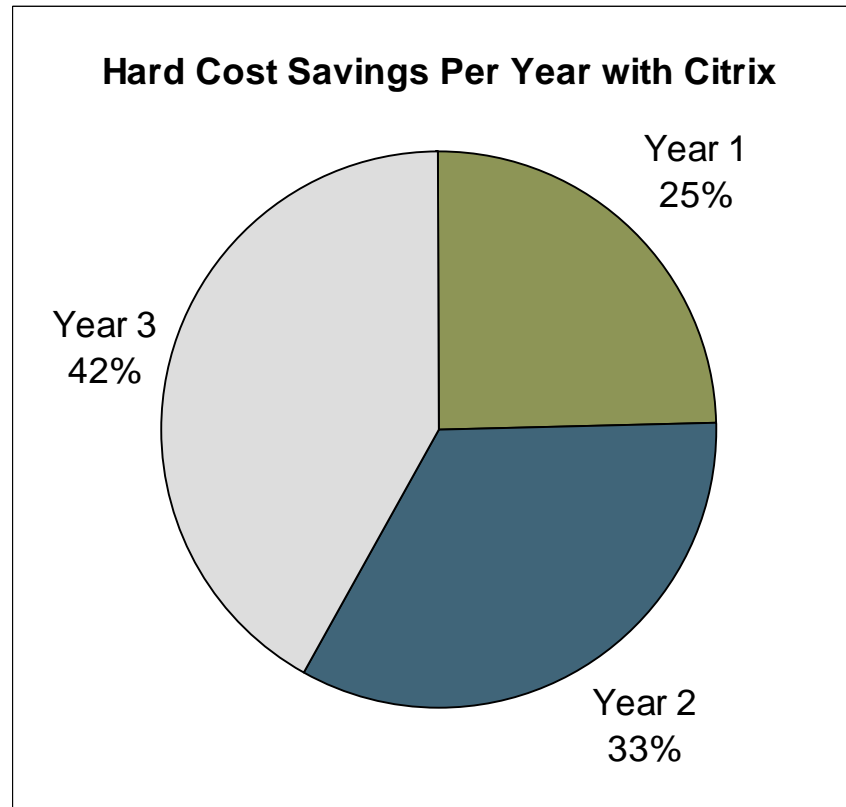


Figure 7 – National Research Laboratory: Percentage of Hard Cost Savings Per Year

The expected three-year cost savings using Citrix is \$54.2 million, of which almost \$39.3 million comes from hard costs. Since the organization has a large number of desktop devices, it is evident that much of the savings gained through Citrix are related to desktop devices (almost 50 percent of savings came from the desktop devices category). It is evident that large implementations of Citrix access infrastructure solution provide increasingly desirable cost savings characteristics, as the high levels of manual labor required to manage applications on large numbers of desktops is eliminated using Citrix products – dramatically reducing IT cost across the entire organization.

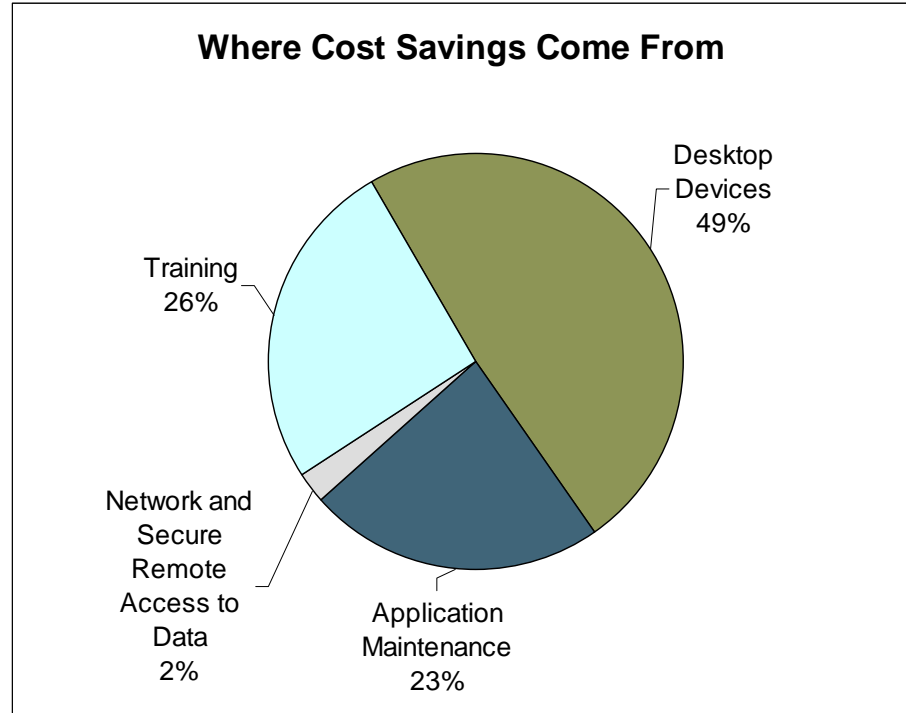
The following table highlights the detailed cost factors that resulted in cost savings over the first three years.

<b>Basic Three-Year Cost Comparison With and Without Citrix</b>				
<b>Cost Factor</b>	<b>Cost without Citrix (in U.S. dollars)</b>	<b>Cost with Citrix (in U.S. dollars)</b>	<b>Savings/ Costs (in U.S. dollars)</b>	<b>Percent of Total Savings</b>
<b>Hard Costs</b>				
Desktop Devices	\$66,009,679	\$35,535,121	\$30,474,558	48.4%
Software License	\$832,260	\$7,583,187	(\$6,750,927)	0%
Server	\$653,108	\$908,495	(\$255,387)	0%
Application Maintenance	\$14,485,918	\$156,713	\$14,329,205	22.8%
Network and Secure Remote Access	\$3,269,800	\$1,778,677	\$1,491,123	2.37%
<b>Sub-total</b>	<b>\$85,250,765</b>	<b>\$45,962,193</b>	<b>\$39,288,572</b>	<b>73.5%</b>
<b>Soft Costs</b>				
Loss of Productivity*	\$39,659,711	\$39,245,725	\$413,986	0.66%
Training*	\$48,138,675	\$31,881,233	\$16,257,442	25.8%
<b>Sub-total</b>	<b>\$87,798,386</b>	<b>\$71,126,958</b>	<b>\$16,671,428</b>	<b>26.5%</b>
<b>Totals</b>	<b>\$173,049,151</b>	<b>\$117,089,151</b>	<b>\$55,960,000</b>	<b>100%</b>

Table 3 –  
National Research  
Laboratory Three-Year  
Cost Comparison

The following figure illustrates what percentage of the research lab's savings are expected to come from different cost components.

Figure 8 – National Research Laboratory:  
Where Cost Savings Come From



This analysis demonstrates that the majority of the research lab's expected savings stem from lower costs related to desktop devices (49%), user training (26%), application maintenance (23%), and network and secure remote access costs (2%). In this instance the organization can expect even bigger savings than reported by the ACE Cost Analyzer since existing desktop PCs have a longer lifespan if they are used exclusively to access applications deployed using Citrix MetaFrame Presentation Server.

## **Telecommunications Provider**

This large telecommunications provider has an extremely heterogeneous technology and application infrastructure that resulted from a number of mergers and acquisitions over the past decade. The organization has over 180,000 employees and finds that the cost of managing and deploying applications to user desktops is too high. The organization has embraced the Citrix MetaFrame Access Suite in departments and environments on a project-by-project basis over time. Today there are over 30,000 licenses of Citrix access infrastructure software within the organization, with an active Citrix user population of 15,000 users.

The organization foresees a time when it will move to a thin-client desktop model with most applications being delivered via a Citrix server-centric application deployment. Today there are six major applications being deployed through Citrix, including desktop productivity applications like Microsoft Office. One of the key considerations leading the organization toward a Citrix-based solution is the need for technology consolidation. As complex client/server and mainframe applications become too difficult to maintain and manage, the organization uses server-centric application deployment through Citrix to provide users access, while reducing desktop application maintenance cost.

The organization sees a marked improvement in staff productivity as more applications are moved to the Citrix MetaFrame Access Suite. Users like the technology because it provides them quick access to the same applications they are accustomed to using. For the organization this means reducing training time and maintaining worker productivity.

This customer cites the top three benefits of using a Citrix solution as:

- **Technology consolidation** – When appropriate, the organization seeks to reduce the number of different applications and user constituencies it must serve. Citrix technology allows the organization to consolidate and centrally manage its applications.
- **Centralized maintenance** – The sheer number of applications that the organization must test, upgrade, and deploy is staggering. Centralized management of these applications on a single computing standard dramatically reduces the costs associated with application maintenance.
- **Simplified application deployment** – With the enormous number of desktops served by the centralized information technology group, it takes months to deploy wide-reaching applications to the geographically dispersed user base. Citrix allows server-centric application deployment to be accomplished in a fraction of the time.

Note: ACE Analyzer data is not available for this customer.

## Customer Benefit Analysis

This section summarizes the benefits of the Citrix approach, and provides customer profiles and their estimated cost savings.

### Key Customer Benefits

Many different organizations were interviewed for this paper, including firms from a variety of industries and geographic regions. Although each of the organizations interviewed employed vastly different environments, requirements, and drivers for implementing a Citrix-based solution, a number of common themes surfaced. The following table highlights the top three benefits cited by some of the customers Doculabs interviewed.

Customer Success Factors	
Customer	Top Three Benefits
<b>Semiconductor Manufacturer</b>	<ul style="list-style-type: none"> <li>• Centralized Administration</li> <li>• Consolidation of Licenses</li> <li>• High-end Workstation Consolidation and Replacement</li> </ul>
<b>National Research Laboratory</b>	<ul style="list-style-type: none"> <li>• Ease of Deployment</li> <li>• Application Stability and Availability</li> <li>• Reduced Staffing Requirements</li> </ul>
<b>Telecommunications Provider</b>	<ul style="list-style-type: none"> <li>• Technology Consolidation</li> <li>• Centralized Maintenance</li> <li>• Simplified Application Deployment</li> </ul>
<b>Brokerage Firm</b>	<ul style="list-style-type: none"> <li>• Centralized Management and Control</li> <li>• Technology Standardization</li> <li>• Ease of Deployment</li> </ul>
<b>Commercial Bank</b>	<ul style="list-style-type: none"> <li>• Productivity Improvements</li> <li>• Ease of Support</li> <li>• Centralized Management and Control</li> </ul>

Table 4 – Customer Success Factors

The following chart shows the aggregate frequency of the benefits of the Citrix solution suite based on customer testimonial.

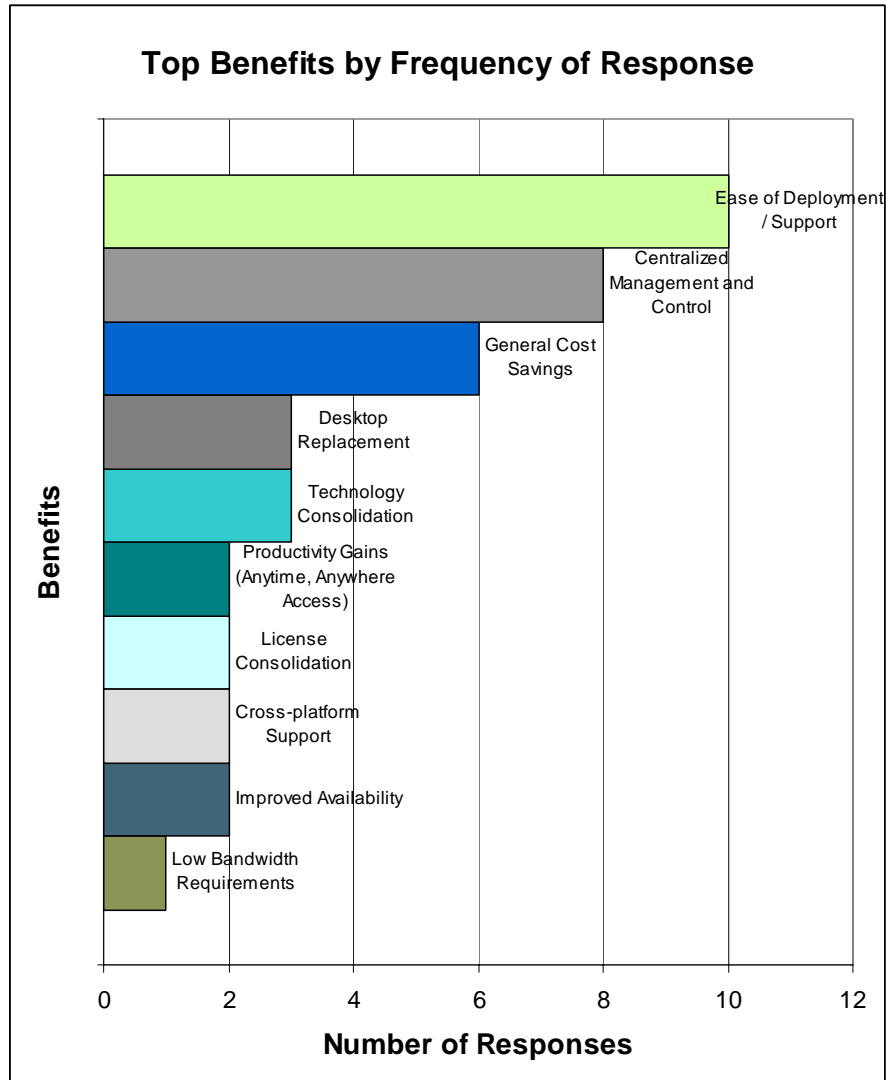


Figure 9 – Top Customer Benefits

## Customer Profiles

The following table contains the key data used to calculate the cost savings cited in this paper.

	Customers		
	Semiconductor Manufacturer	National Research Laboratory	Financial Institution*
<b>Desktops (number)</b>			
Windows	300	6500	7000
UNIX	400	2000	500
Mac	0	2000	300
<b>Notebooks (number)</b>			
Windows	500	3500	1000
UNIX	0	0	0
Mac	0	1000	20
<b>Thin-Clients (number)</b>			
Windows	0	200	100
UNIX	0	50	100
<b>Applications (number)</b>			
Windows			
Desktop	5	3	8
Client/Server	0	6	20
UNIX			
Desktop	1	3	4
Client/Server	0	4	12
<b>Cross-Platform Usage</b>			
Windows/Mac users Accessing UNIX	15%	20%	10%
Unix users accessing Windows	100%	80%	80%
<b>Network</b>			
Hardware Cost (annual)	\$100,000	\$1,000,000	\$1,500,000
Telecom Cost (annual)	\$0	\$0	\$1,250,000
Utilization (%)	< 60%	< 60%	50%
<b>System Uptime (%)</b>			
Desktop			
Windows	99.0%	99.0%	95.0%
UNIX	99.5%	99.5%	97.0%
Server			
Windows	99.5%	99.5%	99.2%
UNIX	99.8%	99.8%	99.5%

Table 5 –  
Customer Profile  
Key Data Points

\* The financial institution represents an aggregation of data collected from three different financial institutions. This example is included to illustrate the cost implications of large deployments in complex multi-platform environments with multiple applications.

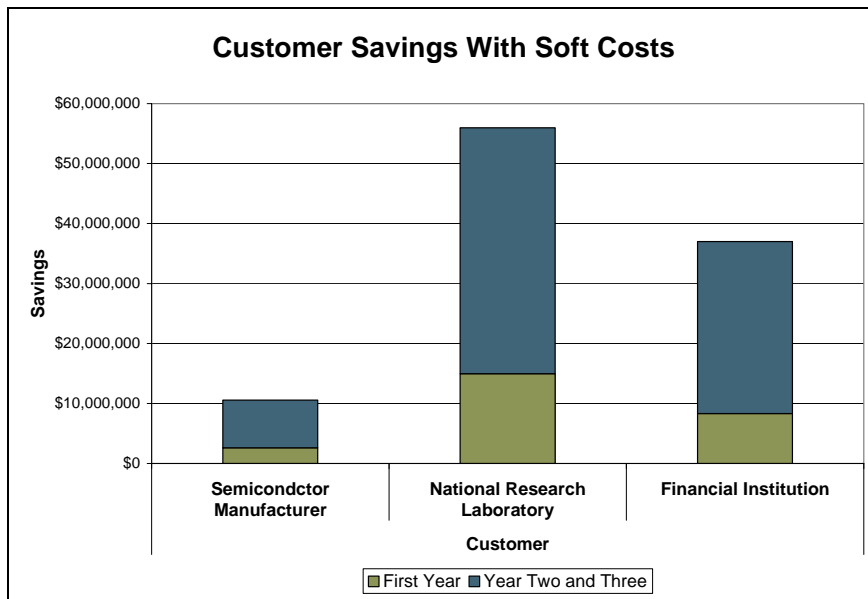
## Evaluating the Cost Savings

	Customers		
	Semiconductor Manufacturer	National Research Laboratory	Financial Institution*
<b>First Year</b>			
<i>Total (with Soft Costs)</i>			
Without Citrix	\$10,271,461	\$53,448,535	\$55,801,786
With Citrix	\$7,640,010	\$38,486,669	\$47,481,631
Savings	\$2,631,451	\$14,961,866	\$8,320,155
<b>Percentage Savings</b>	<b>26%</b>	<b>28%</b>	<b>15%</b>
<i>Hard Costs Only</i>			
Without Citrix	\$3,235,461	\$25,598,135	\$18,181,130
With Citrix	\$2,226,570	\$15,924,589	\$14,648,431
Savings	\$1,008,891	\$9,673,546	\$3,532,699
<b>Percentage Savings</b>	<b>31%</b>	<b>38%</b>	<b>19%</b>
<b>Three Year Cumulative</b>			
<i>Total (with Soft Costs)</i>			
Without Citrix	\$32,742,993	\$173,049,151	\$173,984,770
With Citrix	\$22,184,884	\$117,089,148	\$137,005,996
Savings	\$10,558,109	\$55,960,003	\$36,978,774
<b>Percentage Savings</b>	<b>32%</b>	<b>32%</b>	<b>21%</b>
<i>Hard Costs Only</i>			
Without Citrix	\$10,562,003	\$85,250,765	\$55,385,652
With Citrix	\$5,119,015	\$45,962,191	\$33,499,333
Savings	\$5,442,988	\$39,288,574	\$21,886,319
<b>Percentage Savings</b>	<b>52%</b>	<b>46%</b>	<b>40%</b>

\* The financial institution represents an aggregation of data collected from three different financial institutions. This example is included to illustrate the cost implications of large deployments in complex multi-platform environments with multiple applications.

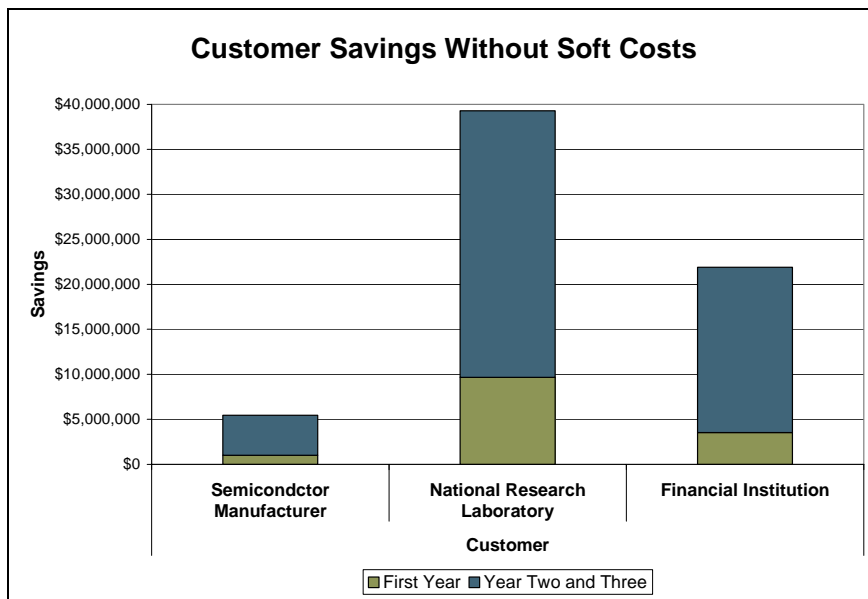
The following chart shows the savings expected to be achieved by each customer, including soft costs. It specifically highlights the savings in the first year for comparative purposes.

Figure 10 – Customer Savings with Soft Costs



The following chart shows the same information as the previous chart, but without soft costs.

Figure 11 – Customer Savings without Soft Costs



The data clearly reveals several trends that are common to each customer:

- Customers began saving money in the first year of ownership.
- Savings achieved in subsequent years increased dramatically. The initial investment in hardware and software licenses is truly leveraged in years two and three.
- Overall customer savings (including hard and soft costs in the calculations) ranged from 21 to 32 percent over three years.
- Calculating hard costs only resulted in customer savings ranging from 40 to 52 percent over three years.

## ***The Benefit of Using Thin-Client Technology***

Until recently organizations have been forced to buy full-featured workstations for users that needed to run application software. In large numbers, these systems were, and still are:

- *Expensive to buy* – Even with volume discounts, workstations are expensive to purchase and typically come with more computing power than users are likely to use in the short term.
- *Costly to maintain* – Workstations typically need servicing and upgrades to keep them running properly. In addition, workstations have demanding power requirements that may also increase electrical power consumption and facility cooling costs.
- *Quickly outdated* – The typical lifespan for a desktop workstation is between 18 months and three years.

For these reasons, organizations have started to evaluate a relatively new breed of computing device, the thin-client PC. These devices are built very much like the *dumb terminals* that accessed mainframe applications, with a number of enhancements that allow very robust capabilities. These devices are designed and manufactured by leading PC providers with a number of objectives in mind, including the following:

- *Low cost* – These systems cost a fraction of the price of a full-featured workstation.
- *Just enough computing power* – These devices focus on the use of remote or server-centric computing to allow users to be productive. They don't advocate the installation of software locally
- *Zero maintenance* – Everything needed in these PCs is built in; there are no peripherals to install or special maintenance to do.
- *Low power requirements* – Thin clients are designed to use a minimal amount of power and dissipate a minimal amount of heat; this goes a long way to saving on utility expenses.
- *Support server-centric computing* – Most thin-client devices come ready to access Web resources using Web browser technology. Many also come ready to run applications using the Citrix ICA® client.

The benefits of the technology are obvious – with nearly no maintenance and a low cost per unit, these devices can be replaced at very low cost if they malfunction. Applications can be managed centrally on the server side and deployed out to thin-client PCs that are ready to access those applications securely over an organization's extended enterprise network infrastructure.

In an effort to understand the cost benefits of using thin-client technology, the ACE Cost Analyzer provides reports that show the benefits achieved if an organization used thin-client devices exclusively with Citrix MetaFrame Access Suite.

Using the data captured in the various customer scenarios and the results from the ACE Cost Analyzer, a graph can be plotted to correlate the savings achievable through exclusive usage of thin-client technology in conjunction with Citrix MetaFrame Access Suite and the number of user devices that are being served.

This graph shows the actual and extrapolated cost savings an organization can expect to achieve over a 3-year period if they use thin-client technology with the Citrix MetaFrame Access Suite over using a traditional managed or unmanaged computing model.

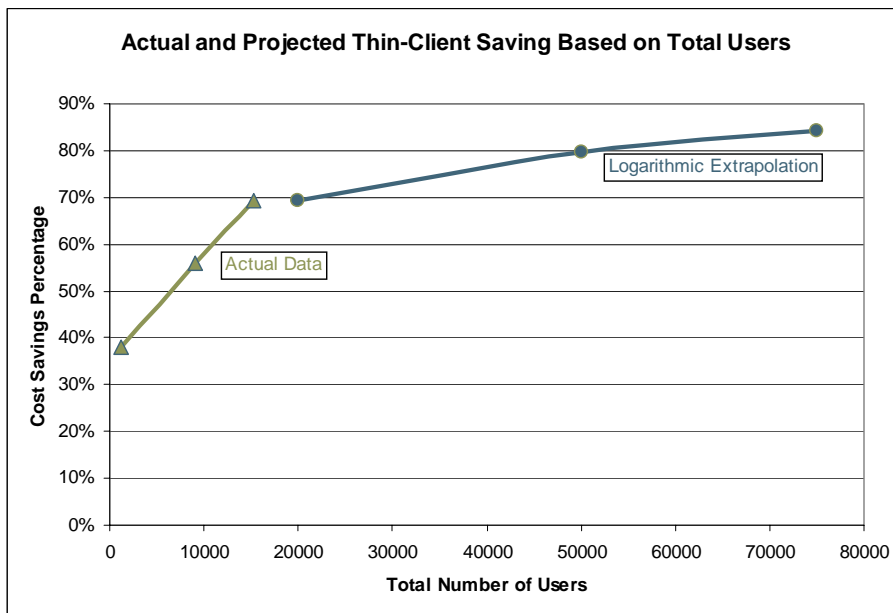


Figure 12 – Customer Savings without Soft Costs

Even though there are a limited number of data points from which to extrapolate data, it is clear that there is a trend towards higher savings when doing larger enterprise-wide deployments of thin-client technology. The Citrix MetaFrame Access Suite is well-suited to help organizations achieve such results based on the data gathered during the analysis.

## The Final Word

After careful analysis of the various computing models, including a detailed review of factors that impact cost in real organizations and conversations with existing Citrix customers, Doculabs reasserts that the Citrix access infrastructure solution provides significant cost benefits. Key points from our analysis include the following:

- Most organizations should see large returns in the first year of deployment. They will also find that support- and desktop-related costs drop off quickly, especially when they provide full desktop functionality through the Citrix access infrastructure environment.
- Other major savings will result from reduced application downtime and diminished need for user support and training.
- Generally, customers cited ease of deployment, reduced overall cost, and centralized management and control among the top benefits they have derived from the Citrix solution.
- There were a wide variety of benefits that extended beyond these top benefits, highlighting flexibility of the Citrix solution.

The cost benefits of moving towards a thin-client infrastructure with the Citrix MetaFrame Access Suite are clear. Organizations would be wise to investigate the possibilities of thin-client computing for their enterprises.

Prospective customers interested in seeing the results for themselves should consider using the updated ACE Cost Analyzer. This tool provides an unbiased analysis of the relative cost implications of deploying and managing applications using different computing models. It truly shines in “In-Depth Mode” in which users can customize the analysis by introducing almost every major element in their computing environment.

Overall, organizations, particularly those relying on client/server applications to conduct business, can realize significant benefits by moving to a Citrix access infrastructure solution. Organizations that require a highly secure computing environment will also enjoy the new features provided in the Citrix MetaFrame Access Suite to enable secure access from anywhere, along with single sign-on capability. Server-centric computing in general – and Citrix’s solution in particular – keeps costs low and manageability high. The end result: customers that are able to manage their bottom lines more effectively.

## About Doculabs

Doculabs, Inc. is a technology consulting firm backed by research and extensive client experience. Our services lower the business risk of technology decisions through client specific recommendations, objective analysis, and in-depth research. Founded in 1993, Chicago-based Doculabs provides consulting services that are based on our fundamental belief that in order to protect a client's long-term interest, technology advisors should not be implementers.

Doculabs helps clients deliver on their business objectives through customized services that address technology initiatives related to business challenges in areas such as strategy development, technology acquisition, and go-to-market initiatives. Doculabs' consulting services are completely objective because the firm does not sell software or integration services. For over 10 years, our research methodology has provided customers facing mission-critical challenges with the information and advice they need to make confident and well informed decisions.

Hundreds of leading organizations within the Fortune 1000 – from financial services companies to major technology software providers – have turned to Doculabs for assistance with their technology strategies.

For more information about Doculabs, visit the web site at [www.doculabs.com](http://www.doculabs.com) or call (312) 433-7793.



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