

MARKETFOCUS REPORT

Gautam Desai, Jim Bragg and Christine Klima

Improving the Bottom Line Through Server-Based Computing



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Table of Contents

I. Executive Summary.....	3
<i>The Citrix Solution.....</i>	<i>4</i>
<i>Key Findings.....</i>	<i>5</i>
II. Analyzing Cost.....	6
III. Customer Case Studies.....	9
<i>Cellular Telecommunications Company.....</i>	<i>9</i>
<i>Publishing Company.....</i>	<i>12</i>
<i>Outpatient Physical Therapy Company.....</i>	<i>15</i>
IV. Customer Benefit Analysis.....	16
<i>Key Customer Benefits.....</i>	<i>16</i>
<i>Customer Profiles.....</i>	<i>18</i>
<i>Evaluating the Cost Savings.....</i>	<i>19</i>
<i>Value of Publishing via the Web: Citrix NFuse.....</i>	<i>21</i>
V. Conclusion.....	22
Appendix A: ACE Cost Analyzer Worksheet.....	23
Appendix B: About Doculabs.....	24

I. EXECUTIVE SUMMARY

Today more than ever, organizations seek to minimize the costs associated with owning, deploying, and managing applications. Since 1989, Citrix Systems, Inc. has provided solutions that dramatically reduce these costs through the use of a server-based computing model. These solutions, powered by the Citrix MetaFrame family, have become even more powerful with the introduction in 2001 of MetaFrame XP.

Doculabs was commissioned to provide an independent analysis of the cost related benefits of the Citrix server-based computing model. In addition to studying Citrix's solution in comparison to unmanaged and managed desktop computing environments, Doculabs interviewed half a dozen Citrix customers to understand the real world strengths and challenges of implementing and managing a Citrix server-based computing model.

Before going any further, however, it is essential for readers to understand the three primary computing models organizations use today to deploy applications. These models are the *Unmanaged Desktop*, *Managed Desktop*, and the *Citrix Application Computing Environment*.

- 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.
- The *Citrix Application Computing Environment* is focused on a server-based computing model. 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 Web browser.

Each of these models presents unique cost and support implications. Typically, the unmanaged desktop is the most costly, with server-based computing offering the lowest desktop management costs. Complicating matters, most organizations currently employ more than one of these computing models. This not only increases overall cost; it also creates technical delivery challenges for users who need access to applications that run under different models. The fact that these same organizations also need to support multiple platforms (e.g. Windows, Unix, Mac) complicates matters further and dramatically increases costs under some of these models.

The Citrix Solution

The Citrix solution is comprised of several infrastructure software components. Typically, customers choose a combination of products that meet their needs today, and add on to the solution as their requirements change. The major components of the Citrix solution include:

- ***MetaFrame XP***
Citrix MetaFrame XP provides a platform for application deployment and management optimized for the Internet and Microsoft® Windows 2000, regardless of the device type (e.g. PC desktops, notebooks, thin-client appliances).
- ***MetaFrame for Unix***
Citrix MetaFrame for Unix provides a platform for application deployment and management optimized for the Internet, UNIX, and Java applications, regardless of the device type (e.g. PC desktops, notebooks, thin-client appliances).
- ***NFuse***
Citrix NFuse provides a three-tier solution that includes a Citrix server component, a Web server component, and a Citrix Independent Computing Architecture (ICA®) client component with a Web browser. Organizations have the ability to integrate and publish interactive applications into any standard Web browser.
- ***Citrix Extranet***
Citrix Extranet provides a virtual private network (VPN) that allows users to securely deploy business applications to users around the world via the Internet.

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.

Key Findings

After conducting an independent analysis, interviewing Citrix customers, and performing cost benefit calculations, Doculabs concluded that the major cost components associated with deployment of any of the computing models are:

- Loss of Productivity (due to server, desktop, and network downtime)
- Desktop (includes hardware, operating system licenses, and support)
- Application Maintenance (desktop and client/server applications)
- 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 50 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.

Organizations also derive other key 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 organization
- 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

II. ANALYZING COST

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 thin-client workstations. 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 the cost, it is possible to use a smaller set of variables known to significantly influence cost.

Understanding how these variables affect cost allows organizations to intelligently and effectively deploy applications. To determine the cost of various solutions without performing complex calculations, Doculabs used a web-based tool called the Application Computing Environment (ACE) Cost Analyzer. The ACE Cost Analyzer¹, developed by independent consulting company Kaptronix, Inc., is available at the Citrix web site at www.acecostanalyzer.com.

Incorporating more than 100 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.

¹ ACE Cost Analyzer is a proprietary tool and copyright of Kaptronix, Inc., a consulting company with clients worldwide. Kaptronix has developed several IT cost analysis models for various computing models, including thin-client computing, server-based computing, client/server vs. Web-based application deployment, and Application Service Provider (ASP) vs. in-house computing. For further information about Kaptronix, call 201-385-0992 or visit www.kaptronix.com.

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
Desktop Environment	Number, type, and cost of desktops that are used	Management costs increase with the number of desktops. Multi-platform requirement also drives costs higher, especially in the area of support.
Application Software	Number, type, and platform of application software in use	The types of applications that need to be deployed and managed can drastically affect the cost of maintenance and upgrades. Client/server based applications are more costly to deploy than web-based applications.
Cross Platform Applications Access	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.
Extranet/VPN	Requirements for secure access to applications by users outside the organization (including partners and/or remote employees)	There are significant costs associated with remote access software. Bandwidth requirements are also an important consideration.
Help Desk and Support	Time spent supporting users by help desk staff	The complexity of the environment and applications can lead to significant support costs.
Operating System Upgrade and Maintenance	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.
Desktop Application Upgrade and Maintenance	Time to test and upgrade applications on individual managed or unmanaged desktops	Although not as extensive as operating system upgrades, the number of updates generally increases, pushing costs higher.
Loss of Productivity	Amount of downtime, both on the server-side, client-side, and network	Users that are not able to access their applications due to hardware downtime are less productive, which leads to a higher cost structure.
Server Cost	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.
Backup and Utilities	Backup software and hardware, backup media, and related utilities	Especially important in server-based computing environments where backup of application data is critical for disaster recovery. Advanced backup infrastructure can be costly.
Training	Administrator and user training time	Most technology requires user training, which is costly in terms of time away from work and tuition cost. 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, “soft” and “hard” costs must be measured:

- *Soft costs* refer to costs associated with non-tangible items. These include the costs associated with loss of productivity due to downtime or training.
- *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.

Most calculations discussed in the following sections are described as being “with soft costs”, which is total cost (including both hard and soft costs), and as being “without soft costs”, which is hard cost only.

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.

III. CUSTOMER CASE STUDIES

In an effort to determine the true significance of the Citrix value proposition, Doculabs interviewed three Citrix customers representing various industries, organizational sizes, and technical and business requirements.

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-based computing model. Doculabs then synthesized a third customer from data gathered from three large financial institutions. This composite customer is used to demonstrate the cost savings that very large and complex organizations can expect to achieve.

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

Cellular Telecommunications Company

The product of mergers between more than a dozen separate companies, this organization faced staggering technical challenges as it tried to determine how to most effectively maintain productivity and minimize time-consuming development efforts while unifying disparate systems and technologies.

Through the use of Citrix MetaFrame, which provides 2,500 users with access to everything from productivity and office applications to Oracle Financials, the organization has managed to leverage existing mission critical applications while providing the ability to run in a complex technical environment.

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

- *Ease of deployment* – 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 costs.
- *Cost savings* – Although there was an initial investment in moving to a server-based computing model, it has paid off quickly.
- *Unification of the enterprise through a single, stable technology* – With a very complex and fragmented network infrastructure, the Citrix solution has provided a common platform for application level communication.

This customer 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 results obtained using data from this customer.

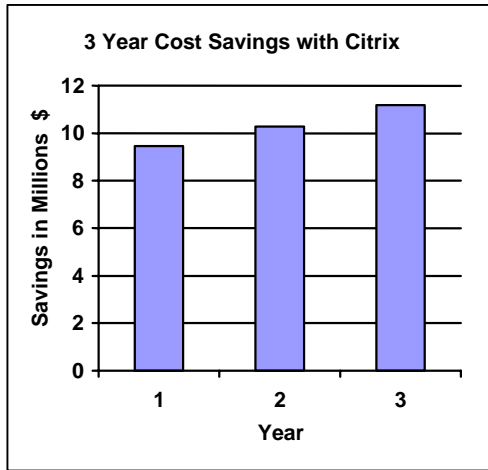


Figure 1 – Cellular Company: Two to Three Year Cost Savings using Citrix

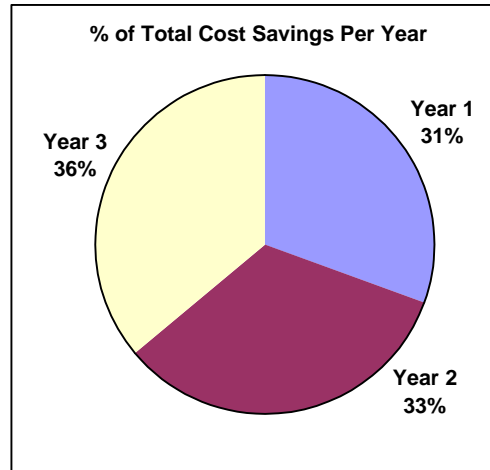


Figure 2 – Cellular Company: Percentage of Total Cost Savings Per Year

The total cost savings over 3 years is \$30.9 million. It is interesting to note that the savings are clearly evident even in the first year of implementation. The ACE Cost Analyzer breaks down the individual cost elements as follows:

Basic Three-Year Cost Comparison With and Without Citrix				
Cost Factor	Cost without Citrix (in USD)	Cost with Citrix (in USD)	Savings (in USD)	% Of Total Savings
Desktop Devices	\$13,083,803	\$7,395,718	\$5,688,085	18.4%
Software License	\$317,769	\$801,425	(\$483,656)	(1.56%)
Server	\$774,800	\$1,189,753	(\$414,953)	(1.34%)
Application Maintenance	\$6,492,669	\$160,753	\$6,331,916	20.5%
Network & Secure Remote Access	\$331,012	\$331,012	\$0	0%
Loss of Productivity*	\$45,911,434	\$31,446,188	\$14,465,246	46.8%
Training*	\$15,775,110	\$10,443,602	\$5,331,508	17.2%
Totals	\$82,686,597	\$51,768,451	\$30,918,146	100%

Table 2 – Cellular Communications Company: Three-Year Cost Comparison

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

The following figure illustrates the percentage of three-year cost savings.

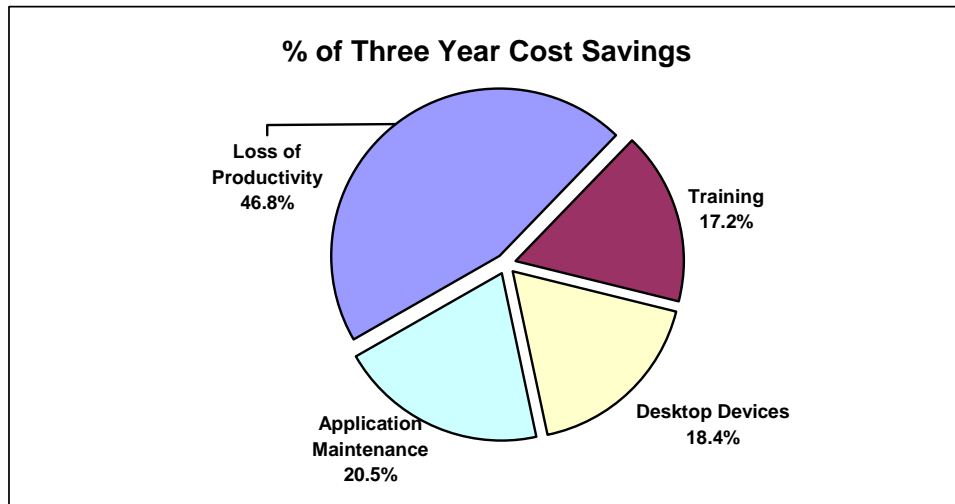


Figure 3 – Cellular Communications Company: Percentage of Three-Year Cost Savings

This analysis demonstrates that the majority of savings stem from reduced spending on desktop devices (18.4%), application maintenance (20.5%), loss of productivity (46.8%), and training (17.2%). Even discounting soft costs such as loss of productivity and training, this organization could realize a savings of more than \$11 million over three years.

Although the data clearly shows that organizations face greater upfront expenses (in the form of server and software license costs) when moving to a Citrix solution, it is also clear that they will recoup their initial investments quickly.

Publishing Company

This leading media company based in the United Kingdom urgently needed to deliver applications to its geographically dispersed offices. After a careful review of the options, the company chose to implement a Citrix solution. Prior to this move, application deployment and maintenance had kept a large team of administrators busy for weeks. Since implementing Citrix, the company has minimized staffing requirements and significantly reduced deployment time.

The company employs Citrix to deliver diverse applications such as sales, ERP, and customer relationship management solutions over Windows and Apple systems to 1,200 users across multiple offices.

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

- *Cost savings* – Even in the first year, the Citrix solution started paying back returns in the form of reduced administrative and maintenance related costs.
- *Simplified application deployment* – Deployments that took weeks now take hours with the Citrix solution.
- *Improved availability* – The advanced load balancing capabilities of the Citrix MetaFrame solution provide strong fault tolerance and high availability features right out of the box.

This customer 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 results achieved using the customer's data.

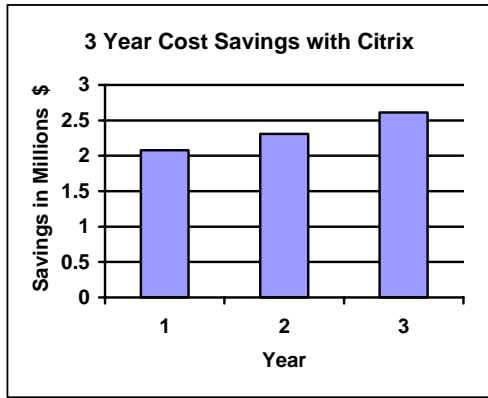


Figure 4 – Publishing Company: Three-Year Cost Savings With Citrix

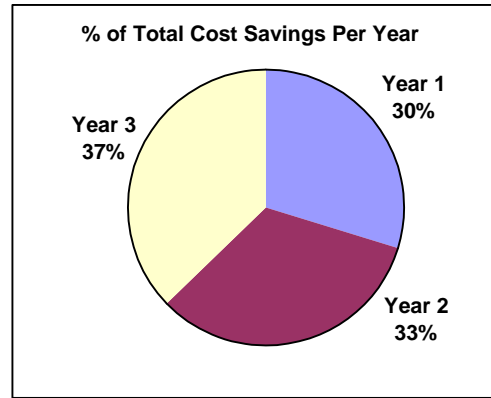


Figure 5 – Publishing Company: Percentage of Total Cost Savings Per Year

The three-year cost savings using Citrix is \$7.02 million. Before using the analyzer, the customer noted that it had seen very good return on investment in the first year following deployment. The numbers from the analyzer substantiate this claim: 30% of the total three-year savings is realized in the first year.

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

Basic Three-Year Cost Comparison With and Without Citrix				
Cost Factor	Cost without Citrix (in USD)	Cost with Citrix (in USD)	Savings (in USD)	% Of Total Savings
Desktop Devices	\$2,489,465	\$1,569,756	\$919,709	13.1%
Software License	\$199,535	\$402,993	(\$203,458)	(2.90%)
Server	\$172,709	\$203,092	(\$30,383)	(0.43%)
Application Maintenance	\$860,644	\$32,291	\$828,353	11.8%
Network & Secure Remote Access	\$681,948	\$520,982	\$160,966	2.30%
Loss of Productivity*	\$18,597,276	\$14,251,413	\$4,345,863	62.1%
Training*	\$2,901,087	\$1,919,164	\$981,923	14.0%
Totals	\$25,902,664	\$18,899,691	\$7,002,973	100%

Table 3 – Publishing Company: Three-Year Cost Comparison

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

The following figure illustrates the percentage of three-year cost savings.

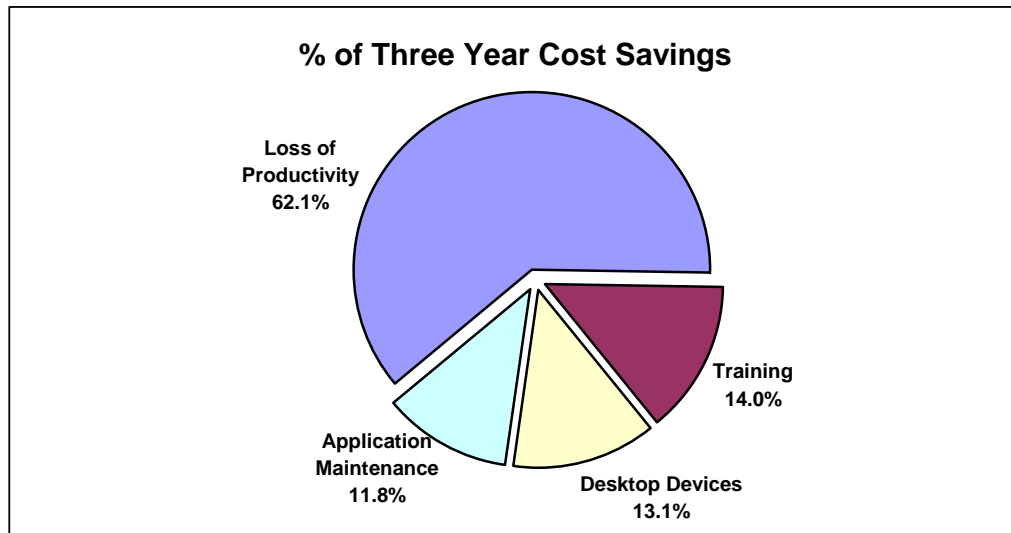


Figure 6 – Publishing Company: Percentage of Three-Year Cost Savings

This analysis demonstrates that the majority of savings stem from reduced loss of productivity (62.1%), followed by training (14.0%), desktop devices (13.1%), and application maintenance (11.8%). It is extremely likely that this company’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.

In any case, it is quite evident that the Citrix solution has made a significant impact on this publisher’s bottom line, so much so that a company spokesperson has declared that it is “hard to imagine life without Citrix.”

Outpatient Physical Therapy Company

This organization provides outpatient physical therapy from 190 clinics across 13 states. At each clinic, health care professionals need access to applications that enable them to effectively treat patients and obtain information in a timely manner. Company requirements for a computing solution included minimizing network utilization, providing high application performance, and ease of administration.

Before deploying applications using the Citrix solution, the clinics experienced performance and manageability issues with the client/server architecture. Once a Citrix solution was put in place, it began to provide immediate benefits, including improved application access and performance. Company employees now have access to their practice management and Microsoft Office 2000 productivity applications; Internet access; and access to the company intranet, which enables them to obtain information from the company knowledge base. These improvements have permitted health care professionals to see over 30% more patients daily.

The organization uses Wyse Windows-based thin-client terminals in tandem with the Citrix solution. This architecture supports approximately 1,700 users (800 concurrently) on 16 dual-processor HP servers, leveraging load balancing capabilities for redundancy and preventing downtime during hardware upgrades. Since the Citrix implementation, the company's IT support staff have centralized management and control of these systems. Upgrades, for example, are greatly simplified and can now be performed company-wide in hours rather than months. Citrix also provides the ability to "shadow" user sessions, a feature which allows help desk staff to see what the user sees and resolve problems quickly. Furthermore, since deploying Citrix enabled applications, the company requires only three to four full-time employees to manage the entire infrastructure.

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

- *Centralized management and control* – With an extensive national network to manage, it was critical to be able to manage the applications remotely, and more importantly, from a centralized location.
- *Total cost savings* – The customer estimates that the Citrix solution saved more than two million dollars within the first two years of implementation.
- *Ease of performing application rollouts and upgrades* – Today, only three to four full-time employees are required to manage the entire application environment.

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

IV. CUSTOMER BENEFIT ANALYSIS

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

Key Customer Benefits

Six organizations were interviewed in total (including the three customers discussed in the preceding case studies, two of which also walked through the ACE Cost Analyzer). 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 repeatedly. The following table highlights the top three benefits cited by each customer Doculabs interviewed.

Customer Success Factors	
Customer	Top Three Benefits
Cellular Provider	<ul style="list-style-type: none"> • Ease of Deployment • Long Term Cost Savings • Unification of Enterprise Technology
Publishing Company (United Kingdom)	<ul style="list-style-type: none"> • Rapid Cost savings • Simplified Application Deployment • Improved Availability
Healthcare Provider	<ul style="list-style-type: none"> • Centralized Management and Control • Total Cost Savings • Ease of Deployment
Distributor	<ul style="list-style-type: none"> • Centralized Management and Control • Enables Standardized Desktop Configuration • Ease of Deployment
Higher Educational Institution (Denmark)	<ul style="list-style-type: none"> • Cross-platform Support and Connectivity • Ease of Support (fewer staff required) • Centralized Management and Control
Government Council (United Kingdom)	<ul style="list-style-type: none"> • Reduced Cost of Ownership • Ease of Support (fewer staff required) • Low Bandwidth Utilization

Table 4 – Customer Success Factors

The following diagram categorizes the key benefits by percentage of frequency cited by the customers.

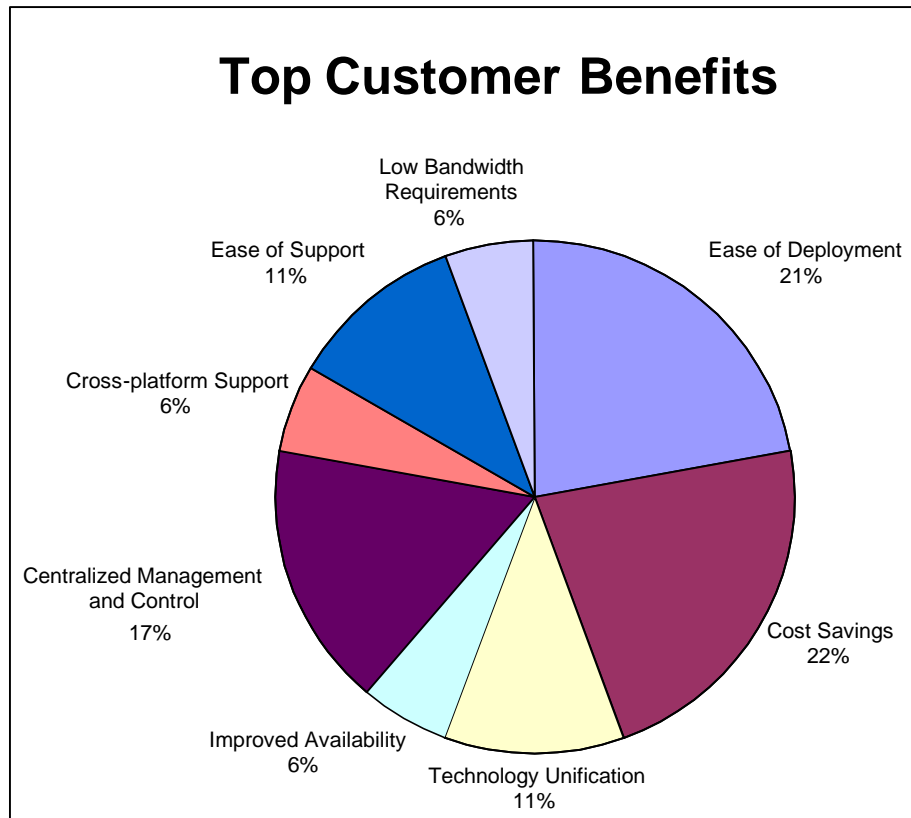


Figure 7 – Top Customer Benefits by Frequency Cited

Customer Profiles

The following table contains the key data points used to calculate the cost savings.

	Customer			
	Publisher	Cellular Provider	Large Financial without NFuse	Large Financial with NFuse
Desktops (#)				
Windows	900	2500	7000	7000
Unix	0	0	500	500
Mac	100	0	300	300
Notebooks (#)				
Windows	200	0	1000	1000
Unix	0	0	0	0
Mac	0	0	20	20
Thin-Clients (#)				
Windows	25	0	100	100
Unix	0	0	100	100
Applications (#)				
Windows				
Desktop	8	12	8	8
Client/Server	20	2	20	20
Unix				
Desktop	0	0	4	4
Client/Server	0	0	12	12
Publication Via Web (#)				
Purchased	0	0	0	15
Homegrown	0	0	0	10
Cross-Platform Usage				
Windows/Mac users Accessing Unix	0%	0%	10%	10%
Unix users accessing Windows	0%	0%	80%	80%
Network				
Hardware Cost (annual)	\$60,000	\$80,000	\$2,000,000	\$2,000,000
Telecom Cost (annual)	\$100,000	\$60,000	\$1,000,000	\$1,000,000
Utilization (%)	40%	60%	50%	50%
System Uptime (%)				
Desktop				
Windows	95.0%	94.0%	95.0%	95.0%
Unix	N/A	N/A	97.0%	97.0%
Server				
Windows	99.2%	99.2%	99.2%	99.2%
Unix	N/A	N/A	99.5%	99.5%

Table 5 – Customer Profiles by Key Data Points

Note: The large 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 extremely complex multi-platform environments with multiple applications.

Evaluating the Cost Savings

The following table provides a summary of the cost savings indicated by the ACE Cost Analyzer for the customers we evaluated in the first year and in the first three years after deploying applications using Citrix.

	Customer			
	Publisher	Cellular Provider	Large Financial without NFuse	Large Financial with NFuse
First Year				
<i>With Soft Costs</i>				
Without Citrix	\$7,980,037	\$25,688,714	\$80,567,264	\$87,532,264
With Citrix	\$5,902,920	\$16,228,973	\$58,237,941	\$58,237,941
Savings	\$2,077,117	\$9,459,741	\$22,329,323	\$29,294,323
Percentage Savings	26%	37%	28%	33%
<i>Hard Costs Only</i>				
Without Citrix	\$1,160,572	\$6,121,214	\$18,728,086	\$25,693,086
With Citrix	\$773,475	\$2,941,173	\$12,990,849	\$12,990,849
Savings	\$387,097	\$3,180,041	\$5,737,237	\$12,702,237
Percentage Savings	33%	52%	31%	49%
Three Year Cumulative				
<i>With Soft Costs</i>				
Without Citrix	\$25,902,664	\$82,686,597	\$260,008,865	\$281,252,115
With Citrix	\$18,899,681	\$51,768,451	\$185,548,427	\$185,548,427
Savings	\$7,002,983	\$30,918,146	\$74,460,438	\$95,703,688
Percentage Savings	27%	37%	29%	34%
<i>Hard Costs Only</i>				
Without Citrix	\$4,404,301	\$21,000,053	\$65,060,856	\$86,304,106
With Citrix	\$2,729,104	\$9,878,661	\$42,906,969	\$42,906,969
Savings	\$1,675,197	\$11,121,392	\$22,153,887	\$43,397,137
Percentage Savings	38%	53%	34%	50%

Table 6 – Evaluation of Customer Cost Savings

The following chart is a graphical representation of the savings achieved by each customer, including soft costs.

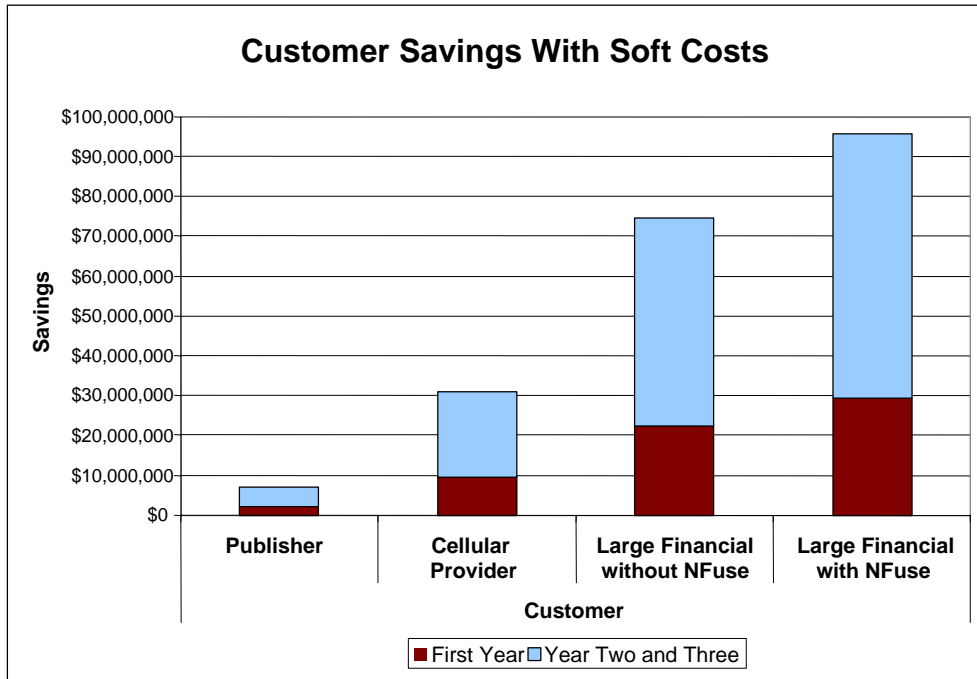


Figure 8 – Customer Savings With Soft Costs

The following chart shows the same information without soft costs.

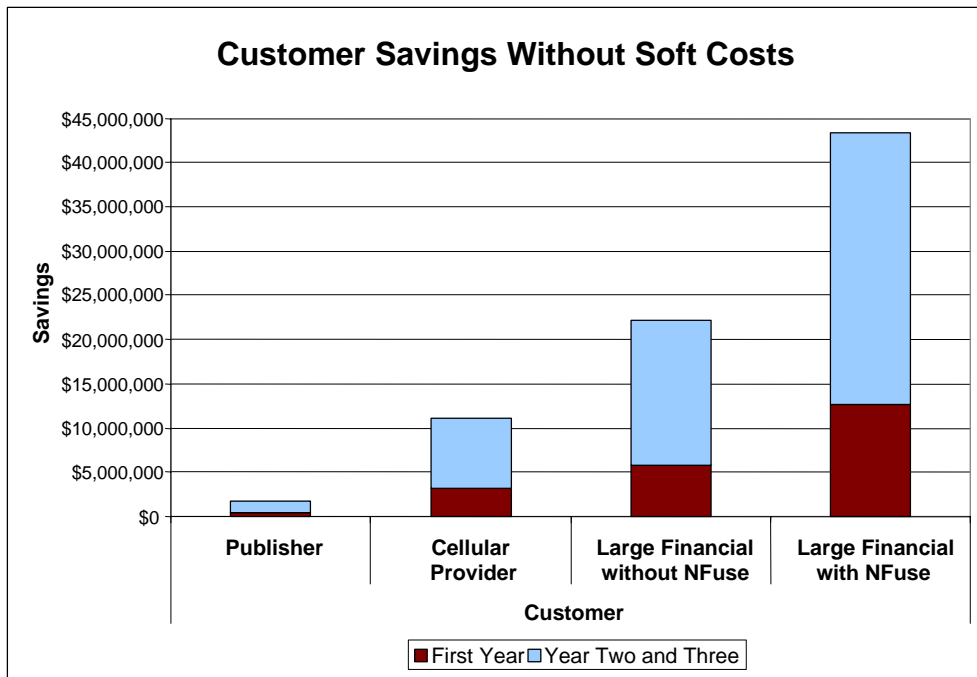


Figure 9 – Customer Savings Without Soft Costs

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 improves dramatically. The initial investment in hardware and software licenses is truly leveraged in years two and three.
- Excluding soft costs from the calculations resulted in customer savings ranging from 34 to 53 percent over three years.
- Including soft costs in the calculations resulted in customer savings ranging from 27 to 37 percent over three years.

Value of Publishing via the Web: Citrix NFuse

Adoption of Citrix's NFuse technology is becoming more widespread as organizations begin migrating to Citrix MetaFrame XP. This technology allows organizations to realize all of the benefits of the Citrix MetaFrame solution and provide a HTML-based framework for accessing applications with a web browser. The following chart shows the cost benefits, both in the first year and cumulatively over three years, for our composite large financial institution.

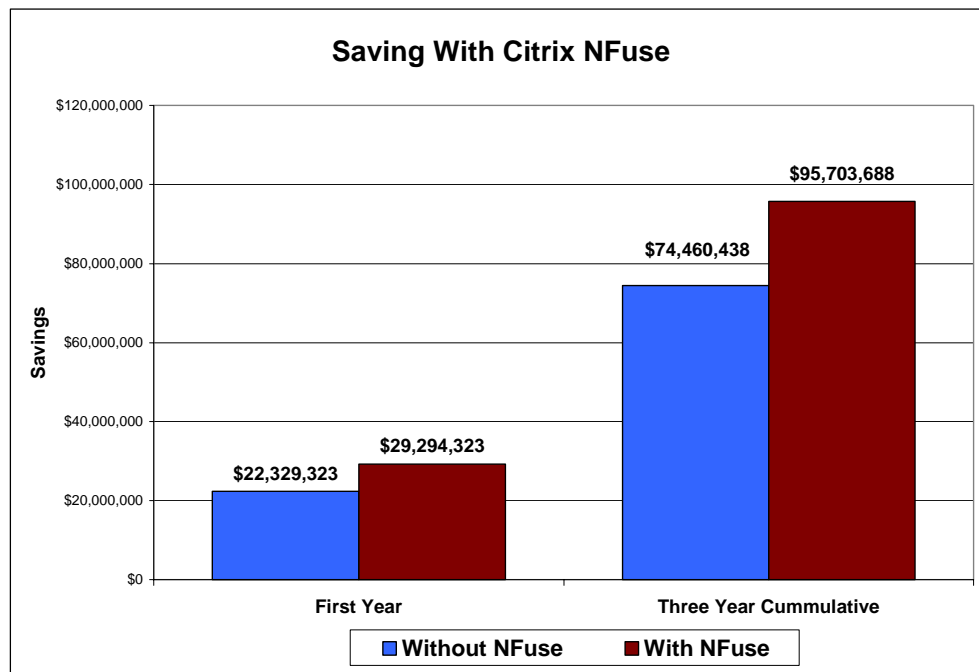


Figure 10 - Savings With Citrix NFuse

V. CONCLUSION

After careful analysis of the various computing models, including a detailed review of factors affecting cost in real organizations and conversations with existing Citrix customers, Doculabs asserts that the Citrix solution provides significant cost benefits.

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 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.

Prospective customers interested in seeing the results for themselves should feel confident in the results generated by the 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 almost every major element in their computing environment.

Organizations can realize significant benefits by moving to a Citrix solution, particularly those relying on client/server applications to conduct business. In this day of tighter spending and more focused technology investment, server-based 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.

APPENDIX A: ACE COST ANALYZER WORKSHEET

This worksheet contains a partial list of cost data that users are asked to provide when using the ACE Cost Analyzer. This worksheet may be used to collect and organize data prior to calculating computing costs.

ACE Cost Analyzer Worksheet	
A breakdown of total number of different types of devices by each operating system in use (Windows, UNIX, Mac): <ul style="list-style-type: none"> • Desktops • Notebooks • Thin-client appliances (terminals) 	
Average cost of desktop devices and servers	
Annual growth of users	
Percentage of desktop devices replaced each year	
Cost of publishing applications via a Web interface	
Annual cost of telecommunications services such as leased lines, T1/E1 or other high-speed services, Frame Relay services, etc.	
Average utilization of your network	
If you do not have a VPN: <ul style="list-style-type: none"> • Number of remote users (if any) serviced through a remote access server • Number and average cost of remote access servers • Average telecommunication service cost per user per month 	
Number of UNIX applications	
Helpdesk/support cost data: <ul style="list-style-type: none"> • Number of helpdesk calls per month • Average duration of calls • Average salary of technical staff 	
Operating system and applications upgrade and maintenance cost data: <ul style="list-style-type: none"> • Number of application and OS upgrades • Time to install an application and an OS 	
Server upgrade, maintenance, and support cost data	
Loss of productivity data: <ul style="list-style-type: none"> • Desktops, servers, and network availability • Average user salary 	
Training costs	

Table 7 – Cost Analyzer Worksheet

APPENDIX B: ABOUT DOCULABS

Doculabs is an independent industry analyst firm guided by the principle that both vendors and end users benefit from objective feedback about product strengths and limitations. Founded in Chicago in 1993, Doculabs was one of the first industry analyst firms to ground its vendor and end-user advisory services in unbiased, reality-based assessment results.

Doculabs uses its hands-on assessment to help end users choose the right technology solutions and to provide critical feedback to vendors. Doculabs' timely and objective assessment results make its broad spectrum of advisory services, market analyses, and research results among the most practical and valuable in the industry. Doculabs uses its reality-based product assessments to build a truly credible information bridge between end-user need and vendor product development.

Doculabs has a growing staff of analysts dedicated to product assessment, advisory services, and market analyses. The company specializes in emerging technology solutions in all facets of e-Business, including e-Content and Community, e-Commerce, e-Fulfillment and Delivery, and e-Business infrastructure technologies.

Doculabs' service offerings include advisory and consulting services, assessment services, and publications (reports and annual subscriptions). Because Doculabs does not resell products, we remain completely objective in our research and our recommendations.

For more information about Doculabs, call 312-433-7793, or visit our Web site – <http://www.doculabs.com>.



**1201 West Harrison Street, Third Floor
Chicago, IL 60607
312-433-7793
www.doculabs.com**