

A Forrester Total Economic Impact™ Study Prepared For VMware

# The Total Economic Impact Of VMware View

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FORRESTER

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## Executive Summary

In August 2012, VMware commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) enterprises may realize by efficiently managing their virtual desktop infrastructure from a single console using VMware View. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of VMware View on their organizations.

This study illustrates the financial impact of VMware View for a specific VMware customer, a United States Army training center that provides classroom-based technical training to support the US Army's military operations. This organization ("Customer Organization"), which has asked to remain anonymous, adopted VMware View as its virtual desktop infrastructure solution.

### VMware View Reduces The Cost And Complexity Of Managing A Traditional Desktop Environment

Our interviews with the VMware customer and subsequent financial analysis found that the Customer Organization experienced the risk-adjusted ROI, costs, and benefits shown in Table 1.

**Table 1**

Three-Year Risk-Adjusted ROI

ROI	Payback period (months)	Total benefits (PV)	Total costs (PV)	Net present value
164%	6.2	\$14,639,434	(\$5,535,324)	\$9,104,110

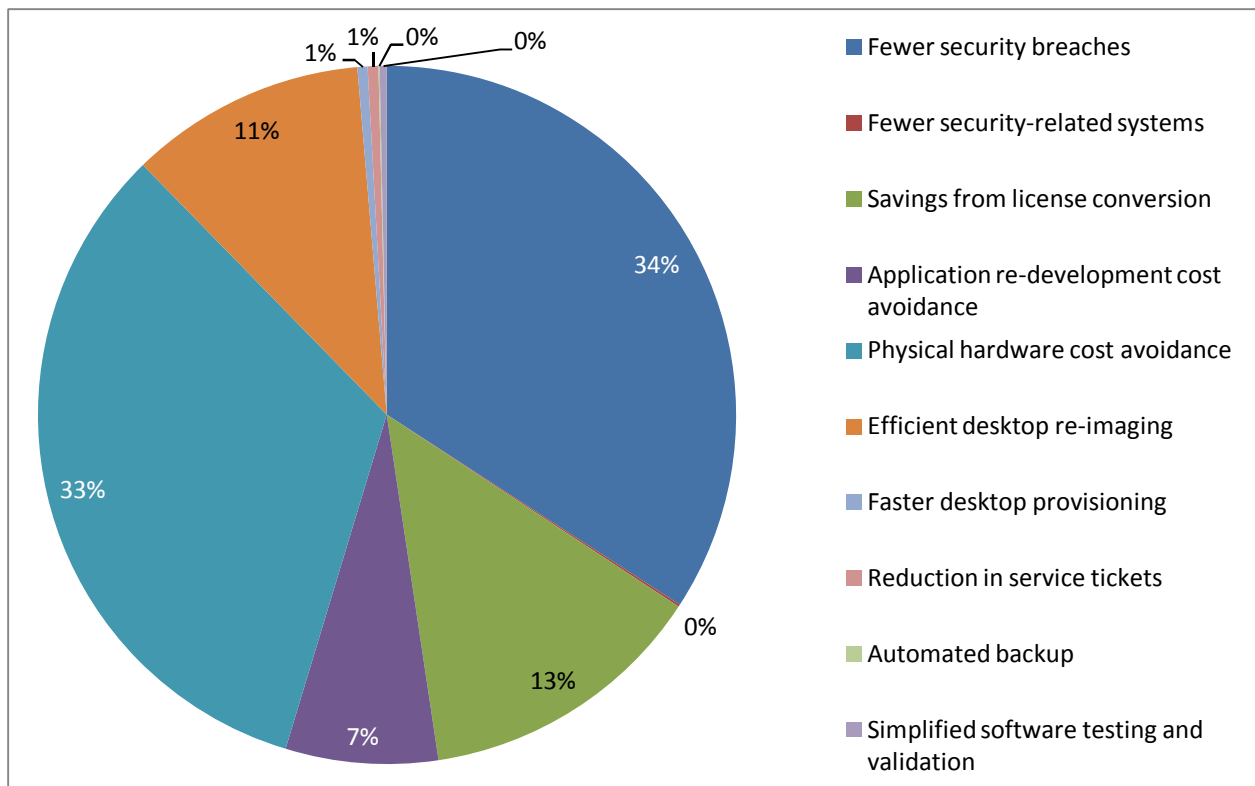
Source: Forrester Research, Inc.

- **Benefits.** In conducting in-depth interviews with the Customer Organization, Forrester found that this organization achieved significant financial benefits as a result of its investment in VMware View. Forrester quantifies the benefits of the customer's VMware View implementation principally in terms of:
  - **Improved security.** VMware View's built-in security features allowed the Customer Organization to save more than \$6 million across three years.
  - **Hardware and software cost avoidance.** The Customer Organization was able to avoid more than \$6.4 million in hardware and software costs over three years.
  - **Productivity gains.** VMware View allowed the Customer Organization to save nearly \$2.4 million across three years as a result of improvements in efficiency resulting in productivity gains.

- Costs.** Forrester learned that the key cost components are: 1) VMware View license fees; 2) hardware and infrastructure costs; 3) professional services costs; 4) internal implementation costs; 5) training fees; and 6) ongoing administration and maintenance costs. The total PV of the risk-adjusted costs for the three-year period of analysis amounts to \$5.5 million, with the VMware View license costs and hardware costs making up the majority of the total three-year costs.

**Figure 1**

Three-Year Risk-Adjusted Benefits



Source: Forrester Research, Inc.

**Disclosures**

The reader should be aware of the following:

- The study is commissioned by VMware and delivered by the Forrester Consulting group.
- Forrester makes no assumptions as to the potential return on investment that other organizations will receive. Readers should understand that the customer interviewed by Forrester for the purposes of this study was provided by VMware and represents an optimal scenario for investing in VMware View and experiencing a high

ROI. Forrester strongly advises that readers use their own estimates within the framework provided in the report to determine the appropriateness of an investment in VMware View.

- VMware reviewed and provided feedback to Forrester, but Forrester maintains editorial control over the study and its findings and does not accept changes to the study that contradict Forrester's findings or obscure the meaning of the study.

## TEI Framework And Methodology

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### Introduction

From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ framework for those organizations considering implementing VMware View. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

### Approach And Methodology

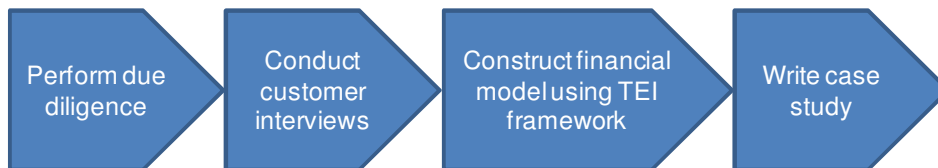
Forrester took a multistep approach to evaluate the impact that VMware View can have on an organization (see Figure 2). Specifically, we:

- Interviewed VMware marketing/sales/consulting personnel and Forrester analysts to gather data relative to VMware View and the marketplace for VMware View.
- Interviewed one organization currently using VMware View to obtain data with respect to costs, benefits, and risks.
- Constructed a financial model representative of the interviews using the TEI methodology. The financial model is populated with the cost and benefit data obtained from the interviews as applied to the composite organization.

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**Figure 2**

TEI Approach



Source: Forrester Research, Inc.

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Forrester employed four fundamental elements of TEI in modeling VMware View's service:

1. Costs.
2. Benefits to the entire organization.
3. Flexibility.
4. Risk.

Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves the purpose of providing a complete picture of the total economic impact of purchase decisions. Please see Appendix A or additional information on the TEI methodology.

## Analysis

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### Interview Highlights

Forrester interviewed the chief technical officer of a United States Army training center that provides classroom-based technical training to support the US Army's military operations. The training center includes 274 classrooms across three field sites and is used to train 3,300 students daily in 63 courses that vary in duration from two weeks to five months. The following are some insights Forrester learned from speaking with the interviewee:

- **Improving staff productivity was the main driver for investing in VMware View, which formed the lynchpin of the Customer Organization's overall desktop virtualization strategy.** The interviewee said that "standard desktop and application provisioning and maintenance activities dominated the small [IT administrative support] team's time and attention, at the expense of other business-enablement activities." The Customer Organization found itself consistently underperforming and having difficulty providing the IT administrative support for all 274 classrooms, including tasks related to desktop provisioning, desktop image maintenance, hardware configuration, software deployment and maintenance, application testing and patching, system/data security management, and backup and archiving tasks.
- **The need to simplify and centralize the management hassles of individually monitoring, updating, and maintaining the various systems, applications, and data for each course was also important.** The Customer Organization wanted a solution that would automate the process of setting up classrooms quickly and on demand of instructors.
- **Facilitating compliance with industry and governmental regulations regarding data privacy and access was a key determinant.** As an organization entirely devoted to providing classified military training, the Customer Organization placed a high emphasis on keeping abreast of and abiding by the latest rules and regulations governing application and data access, privacy, and control. Ensuring such compliance was resource-intensive and expensive in a physical IT environment.
- **VMware View's ability to reduce costs associated with ensuring a highly secure environment also figured prominently in the decision to invest in VMware View.** A more controlled IT environment due to greater oversight and control provided by VMware View resulted in fewer costly security breaches.

### Framework Assumptions

Table 2 provides the model assumptions that Forrester used in this analysis.

**Table 2**  
Model Assumptions

Ref.	Metric	Calculation	Value
A1	Hours per week		40
A2	Weeks per year		52
A3	Hours per year (M-F, 9-5)		2,080
A4	Hours per year (24x7)		8,736

Source: Forrester Research, Inc.

The discount rate used in the PV and NPV calculations is 10% and time horizon used for the financial modeling is three years. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult with their respective company's finance department to determine the most appropriate discount rate to use within their own organizations.

### Costs

This section summarizes the costs that the Customer Organization incurred to implement and maintain VMware View. These costs include initial upfront costs such as those related to license fees, hardware, implementation, and regularly occurring costs such as ongoing administration and maintenance costs.

#### VMware View License Fees

The Customer Organization incurred VMware View license fees, which are calculated based on the number of virtual machines that need to be managed (see Table 3). The Customer Organization paid \$148.75 for each license used to manage 6,400 virtual machines. This license fee was determined based on the specific implementation of the VMware View and includes discounts typically offered at the time of purchase to public sector educational institutions such as the Customer Organization. The total initial perpetual license costs amounted to \$952,000, and the annual 22% maintenance costs amounted to \$209,440.

**Table 3**  
VMware View License Fees

Ref.	Metric	Initial	Year 1	Year 2	Year 3	Total
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A1	Number of licenses	6,400				
A2	Cost per license	\$148.75				
At	VMware View licensing fees	\$952,000	\$209,440	\$209,440	\$209,440	
	Spread	100%	100%	100%	100%	
Ato	Total (original)	(\$952,000)	(\$209,440)	(\$209,440)	(\$209,440)	(\$1,580,320)

Source: Forrester Research, Inc. and VMware

### *Hardware And Infrastructure Costs*

Hardware costs were also a major cost element. The Customer Organization described the need to purchase 45 VDI servers, at a total hardware and software cost of \$4,000, which were used to store and execute all of the programs, applications, processes, and data required to provide the IT needs for all training courses (see Table 4). The organization also spent \$200,000 on storage arrays and \$87,000 on two processors. Lastly, the organization purchased 6,400 Dell Wyse Technology® thin clients at a cost of \$100 per system. The total initial hardware cost incurred by the Customer Organization was \$1.1 million.

While this represents the hardware costs paid by the Customer Organization, readers should note that in other deployment scenarios, customers may experience additional costs such as those for storage components, storage and capacity management tools, network switches, additional cabling, and data center power and cooling costs.

**Table 4**  
Hardware And Infrastructure Costs

Ref.	Metric	Initial	Year 1	Year 2	Year 3	Total
B1	Number of VDI servers	45				
B2	Percent of servers purchased	100%				
B3	Cost per server	\$3,000				
B4	Average software cost per server	\$1,000				
B5	Cost of a storage array	\$200,000				
B6	Cost of two processors	\$87,000				
B7	Number of thin clients	6,400				
B8	Average thin client cost (hardware, peripherals, etc.)	\$500				
Bt	Hardware and infrastructure costs	\$3,667,000	\$0	\$0	\$0	
	Spread	100%	0%	0%	0%	
Bto	Total (original)	(\$3,667,000)	\$0	\$0	\$0	(\$3,667,000)

Source: Forrester Research, Inc.

### *Professional Services Costs*

At the start of the project, the customer engaged a full-time on-site VMware consultant and technical account manager to implement VMware View and aid in architecture design, IT process mapping, project management, and operational consulting services. The total upfront professional services costs total \$53,000.

### *Internal Implementation Costs*

In addition to VMware professional services, an internal team at the Customer Organization consisting of three IT professionals was involved on a full-time basis for the entire implementation duration of three days (see Table 5). The interviewee described VMware View's wizard-driven installation process: "It was a really easy and intuitive install . . . it involved clicking next, next, next through the wizard to complete the process." Using average full-time hourly salary estimates, Forrester estimates that the opportunity cost for these three professionals equals \$4,320.

**Table 5**

## Internal Implementation Of VMware View

Ref.	Metric	Initial	Year 1	Year 2	Year 3	Total
D1	Number of individuals on project team	3				
D2	Duration of implementation (days)	3				
D3	Hourly IT FTE fully loaded rate	\$60.00				
Dt	Internal implementation of VMware View	\$4,320	\$0	\$0	\$0	
	Spread	100%	0%	0%	0%	
Dto	Total (original)	(\$4,320)	\$0	\$0	\$0	(\$4,320)

Source: Forrester Research, Inc.

*VMware View Training Fees*

Each of the professionals on the internal implementation team also attended a week-long VMware View training course (see Table 6). The Customer Organization spent \$2,500 per person on course fees and provided a \$2,000 travel and lodging allowance for each attendee. The total training costs amount to \$13,500.

**Table 6**

## VMware View Training Fees

Ref.	Metric	Initial	Year 1	Year 2	Year 3	Total
E1	Course fee per person	\$2,500				
E2	Number of people attending	3				
E3	Travel and lodging allowance per person	\$2,000				
Et	VMware View training fees	\$13,500	\$0	\$0	\$0	
	Spread	100%	0%	0%	0%	
Eto	Total (original)	(\$13,500)	\$0	\$0	\$0	(\$13,500)

Source: Forrester Research, Inc.

### Ongoing Administration And Maintenance Costs

The customer has allocated 16 hours per month of an IT professional's time on ongoing administration and maintenance of VMware View, which includes software patching and updating, making configuration changes, and troubleshooting (see Table 7). At a fully burdened hourly rate, this totals \$11,520 per year.

Readers of this study should carefully estimate their own labor costs associated with ongoing administration and maintenance. VMware View customers that assign an IT professional with additional administrative and maintenance activities beyond VMware View, such as those related to the physical server (firmware upgrade testing and rollout), the ESX hypervisor operating system, the management server, server disaster recovery, storage systems, and network troubleshooting and maintenance, should expect the ongoing costs to be much higher than what was mentioned by the customer.

**Table 7**  
Ongoing Administration And Maintenance

Ref.	Metric	Initial	Year 1	Year 2	Year 3	Total
F1	Hours per month dedicated to VMware View administration and maintenance		16			
F2	Hourly IT FTE fully loaded rate		\$60.00			
Ft	Ongoing administration and maintenance	\$0	\$11,520	\$11,520	\$11,520	
	Spread	0%	100%	100%	100%	
Fto	Total (original)	\$0	(\$11,520)	(\$11,520)	(\$11,520)	(\$34,560)

Source: Forrester Research, Inc.

### Total Costs

Table 8 summarizes the costs spent by the Customer Organization on VMware View over a three-year period.

**Table 8**

## Total Costs

Ref.	Cost category	Initial	Year 1	Year 2	Year 3	Total	Present value
Ato	VMware View licensing fees	(\$952,000)	(\$209,440)	(\$209,440)	(\$209,440)	(\$1,580,320)	(\$1,472,846)
Bto	Hardware and infrastructure costs	(\$3,667,000)	\$0	\$0	\$0	(\$3,667,000)	(\$3,667,000)
Cto	Professional services	(\$53,000)	\$0	\$0	\$0	(\$53,000)	(\$53,000)
Dto	Internal implementation of VMware View	(\$4,320)	\$0	\$0	\$0	(\$4,320)	(\$4,320)
Eto	VMware View training fees	(\$13,500)	\$0	\$0	\$0	(\$13,500)	(\$13,500)
Fto	Ongoing administration and maintenance	\$0	(\$11,520)	(\$11,520)	(\$11,520)	(\$34,560)	(\$28,649)
	Total costs (original)	(\$4,689,820)	(\$220,960)	(\$220,960)	(\$220,960)	(\$5,352,700)	(\$5,239,315)

Source: Forrester Research, Inc.

**Benefits**

*“Reduced maintenance costs, increased productivity, lowered security risks . . . were the key things that drove our business case. And we’ve seen all of those.”* (Chief technical officer, Customer Organization)

This section describes the benefits that the Customer Organization experienced adopting VMware View. The benefits included in the analysis fall into two main categories: direct cost savings and cost avoidance, which are easy to measure and track, and indirect productivity gains, which are more difficult to measure but equally as important. The various benefits are explained in the subsections below.

*Direct Benefits***Fewer Security Breaches**

Being a government-funded training institute, the Customer Organization was mandated to institute the strictest-possible information security processes to ensure the integrity of sensitive and classified information and minimize any potential damage from security breaches. As such, even incidents as harmless as a student plugging an untrusted USB device into an endpoint in the network necessitated the Customer Organization treating the occurrence as a full-on security breach, requiring a complete replacement of all local and networked storage devices and a re-image of all endpoints. The Customer Organization calculated that such occurrences happened as often as once every month and cost the organization \$500,000 in total, including labor, hardware, and lost opportunity costs. With VMware View’s ability to “lock down” a system and consistently apply configuration management policies on all endpoints, closing

potential security loopholes that could be exploited, the Customer Organization was able to all but eliminate such occurrences and expenses. Using these estimates, the Customer Organization saved \$3 million per year.

Readers should note that they may see very different savings than reported by the Customer Organization. Because of the high degree of variability in quantifying the value of improved security, driven largely by the scale of operations involved to remediate security breaches, and the types of systems and applications impacted, readers should evaluate the actual benefit their organization is likely to experience by considering the direct and indirect costs avoided.

### Fewer Security-Related Systems

The Customer Organization described the potential of decommissioning three security agents already in place throughout the training center's infrastructure and saving the annual maintenance fees associated with those agents. According to the interviewee, the Customer Organization could save more than \$8,000 per year in maintenance fees and administrative support for security systems made obsolete by VMware View (see Table 9). However, the Customer Organization was unable to save this amount because of policies written years ago that required the Customer Organization to have redundant non-virtual security systems in place.

**Table 9**

Fewer Security-Related Systems

Ref.	Metric	Year 1	Year 2	Year 3	Total
B1	Number of security-related agents/systems replaced by VMware View	3			
B2	Average annual maintenance fees for each agent/system	\$1,000			
B3	Average IT hours to maintain/administer each agent/system per month	32			
B4	Fully loaded average hourly salary	\$60.00			
Bt	Fewer security-related systems	\$8,760	\$8,760	\$8,760	
	Spread	100%	100%	100%	
Bto	Total (original)	\$8,760	\$8,760	\$8,760	\$26,280

Source: Forrester Research, Inc.

### Savings From License Conversion

The interviewee reported that in lieu of VMware View, hypervisors would have been used to manage the virtual infrastructure. By implementing VMware View, the Customer Organization was able to convert the VMware ESX licenses to VMware View licenses and thereby avoid the more expensive annual maintenance costs of the hypervisors, amounting to savings of more than \$1 million per year (see Table 10).

**Table 10**

Savings From License Conversion

Ref.	Metric	Year 1	Year 2	Year 3	Total
C1	Number of hypervisor licenses	6,400			
C2	Annual maintenance cost per hypervisor	\$158			
Ct	Savings from license conversion	\$1,010,526	\$1,010,526	\$1,010,526	
	Spread	100%	100%	100%	
Cto	Total (original)	\$1,010,526	\$1,010,526	\$1,010,526	\$3,031,578

Source: Forrester Research, Inc.

### Application Redevelopment Cost Avoidance

The Customer Organization also noted VMware View's ability to eliminate software application conflicts arising from operating system incompatibility. By packaging applications into self-contained executables and isolating them from underlying operating system dependencies, VMware View saved the Customer Organization from having to upgrade or update old and obsolete applications incompatible with current and existing operating systems (see Table 11).

According to the interviewee, in the absence of VMware View, the Customer Organization would need to allocate three programmers for 25 weeks to upgrade four custom applications. Additionally, the Customer Organization would need to work one full week on upgrading obsolete operating systems. The total upfront cost of doing so, assuming average fully loaded salary estimates, amount to nearly \$1.5 million. This doesn't include the software license costs of the upgraded operating system since the Customer Organization was entitled to free upgrades as a benefit of its software assurance agreement with the providing vendor.

**Table 11**  
Application Redevelopment Cost Avoidance

Ref.	Metric	Year 1	Year 2	Year 3	Total
D1	Number of obsolete operating systems in use	2			
D2	Number of applications that would need to be ported to new operating systems	4			
D3	Percent of applications that require custom development	100%			
D4	Number of weeks of development and testing time	25			
D5	Number of programmers	3			
D6	Fully loaded average hourly salary	\$60			
D7	Hours to upgrade each operating system	40			
D8	Additional OS license upgrade costs	\$0			
D9	Number of end clients	6,400			
Dt	Application redevelopment cost avoidance	\$1,456,320	\$0	\$0	
	Spread	100%	0%	0%	
Dto	Total (original)	\$1,456,320	\$0	\$0	\$1,456,320

Source: Forrester Research, Inc.



### Physical Hardware Cost Avoidance

As part of its virtualization strategy enabled by VMware View, the Customer Organization was able to avoid costs associated with procuring 6,200 physical PCs at a cost of \$1,000 per system and instead was able to invest in cheaper thin clients (see Table 12). Furthermore, the interviewee mentioned that his organization was able to benefit from the longer shelf life of thin clients and avoid the costs of having to refresh physical PCs every three years. Using data provided by the Customer Organization, Forrester calculates the total hardware cost avoidance to total \$6.4 million.

**Table 12**

Physical Hardware Cost Avoidance

Ref.	Metric	Year 1	Year 2	Year 3	Total
E1	Number of physical desktop/laptops not purchased	6,400			
E2	Average cost per desktop	\$1,000			
Et	Physical hardware cost avoidance	\$6,400,000	\$0	\$0	
	Spread	100%	100%	100%	
Eto	Total (original)	\$6,400,000	\$0	\$0	\$6,400,000

Source: Forrester Research, Inc.

*Indirect Benefits***Efficient Desktop Re-Imaging**

Forrester learned that managing the Customer Organization's desktop image without VMware View was a difficult task. Since the requirements of all courses were different from one another, so was the need to develop, deploy, support, and maintain each of those images (see Table 13). Different courses often required completely different sets of applications, and separate images were often required for each course. On average, PCs in each classroom would need to be re-imaged at least once a month, an activity that would “typically take half a day.” To address the manual burden and improve productivity, the Customer Organization was able to centralize the management of desktop images and specifically use VMware View to deliver those images efficiently to the various endpoints. With VMware View, the Customer Organization was able to re-image “an entire classroom within 15 minutes.” Organizations like the Customer Organization can also benefit from this productivity gain, which Forrester values at \$2.3 million in productivity gain over three years, taking into account fully loaded salary assumptions and the annual increase in the number of classrooms supported by the Customer Organization.

**Table 13**

Efficient Desktop Re-Imaging

Ref.	Metric	Year 1	Year 2	Year 3	Total
F1	Desktop re-image frequency per month	1			
F2	Number of classrooms	274	289	304	
F3	Time to re-image all desktops (minutes) before VMware View	240			
F4	Time to re-image all desktops (minutes) after VMware View	15			
F5	Hourly FTE rate	\$60.00			
Ft	Efficient desktop re-imaging	\$739,800	\$780,300	\$820,800	
	Spread	100%	100%	100%	
Fto	Total (original)	\$739,800	\$780,300	\$820,800	\$2,340,900

Source: Forrester Research, Inc.

### Faster Desktop Provisioning

Another area of improved productivity was desktop provisioning (see Table 14). Without VMware View, the Customer Organization explained that it took a professional 3 hours to set up, install, configure, and test each PC. With VMware View, the Customer Organization was able save nearly 85% of that time by securely creating, provisioning, and deploying virtual desktops, with the correct configuration standards enforced, in 30 minutes. These time savings translate into \$30,000 in annual productivity gain when you take into account fully burdened hourly wage rates and that the Customer Organization provisions approximately 200 new desktops each year.

**Table 14**  
Faster Desktop Provisioning

Ref.	Metric	Year 1	Year 2	Year 3	Total
G1	Number of new physical PCs each year	200			
G2	Time to set up each PC (minutes) before VMware View	180			
G3	Time to set up each PC (minutes) after VMware View	30			
G4	Hourly FTE rate	\$60.00			
Gt	Faster desktop provisioning	\$30,000	\$30,000	\$30,000	
	Spread	100%	100%	100%	
Gto	Total (original)	\$30,000	\$30,000	\$30,000	\$90,000

Source: Forrester Research, Inc.

### Reduction In Service Tickets

Productivity also improved as a result of having to resolve fewer technical issues related to the classroom infrastructure as reported through automated IT alerts or “tickets” (see Table 15). The Customer Organization experienced a 20% reduction in the number of actionable tickets because of fewer errors resulting from better desktop image maintenance and management, ability to address system inconsistencies preemptively before they turn into IT service requests, and fewer hardware failures or compatibility issues arising from a simpler thin-client architecture with fewer hardware components. Assuming fully loaded salary rates, the Customer Organization benefitted by a minimum \$30,000 per year if taking into account an average ticket mean-time-to-resolution of 15 minutes.

**Table 15**

Reduction In Service Tickets

Ref.	Metric	Year 1	Year 2	Year 3	Total
H1	Number of IT service tickets annually	15,000			
H2	Percent tickets actionable	50%			
H3	Percent reduction due to VMware View	20%			
H4	Average time to address ticket (hours)	0.3			
H5	Fully loaded average hourly salary	\$60			
Ht	Reduction in service tickets	\$30,000	\$30,000	\$30,000	
	Spread	100%	100%	100%	
Hto	Total (original)	\$30,000	\$30,000	\$30,000	\$90,000

Source: Forrester Research, Inc.

### Automated Backup

Another productivity benefit that the Customer Organization experienced was in not having to do manual backups. Prior to VMware View, the IT staff would manually back up all local hard drives every three weeks, an activity that would take half a day. With a virtualized infrastructure managed by VMware View and all data centrally housed on secure servers, the Customer Organization was freed from this activity. Using fully burdened salary rates, Forrester values this benefit at \$3,840 per year.

### Simplified Software Testing And Validation

Forrester learned that VMware View saved time and effort for IT professionals tasked with application testing and validation responsibilities (see Table 16). The Customer Organization described how VMware View helped shorten the time frame by 50% and thereby reduced costs associated with application release processes including development, QA, performance testing, and deployment. On average, the Customer Organization reduced time spent on testing and validation from three days to 1.5 days. The total annual productivity gain resulting from this is \$21,600, if such testing and QA testing is done approximately 30 times per year. Moreover, the Customer Organization also mentioned that each new version released using VMware View contained far fewer errors, and, therefore, there were far fewer instances of software patches and update versions after each release.

**Table 16**

Simplified Software Testing And Validation

Ref.	Metric	Year 1	Year 2	Year 3	Total
J1	Number of times new software deployed per year	30			
J2	Number of days required to conduct QA and correct configuration/driver issues	3			
J3	Percent time saved due to View	50%			
J4	Fully loaded average hourly salary	\$60			
Jt	Simplified software testing and validation	\$21,600	\$21,600	\$21,600	
	Spread	100%	100%	100%	
Jto	Total (original)	\$21,600	\$21,600	\$21,600	\$64,800

Source: Forrester Research, Inc.

### Other Qualitative Benefits

Forrester believes that the benefits described above are those that are the most immediately quantifiable. In addition to these benefits, the Customer Organization also reported other ancillary benefits. Because of the difficulty in measuring these metrics and level of accuracy in estimating the financial value of these benefits, Forrester decided not to quantify these benefits and to leave it to the reader to include in the final results if he or she so wishes.

### **Benefit Of Improved Centralized Desktop Management**

The Customer Organization stressed the benefits of VMware View in providing a single point of control from which all VMs can be managed, controlled, and monitored. VMware View provides sophisticated built-in reports indicating the health and status of all VMs.

### **Improved Compliance**

Forrester believes that VMware View improves an organization's ability to better meet government and industry regulations governing data reporting and IT security issues by being able to lock down and standardize systems.

### **Increased Flexibility And Scalability**

The Customer Organization also reported that VMware View afforded the organization the flexibility to change a large number of desktop configurations easily in a moment's notice without having to devote IT staff's time and effort. This was important given the fact that the Customer Organization was a training center and allowed it to better serve its customers.

### Total Benefits

Table 17 summarizes the quantified benefits the Customer Organization experienced upon implementing VMware View over a three-year time frame.

**Table 17**

Total Benefits

Ref.	Benefit Category	Year 1	Year 2	Year 3	Total	Present Value
Ato	Fewer security breaches	\$3,000,000	\$3,000,000	\$3,000,000	\$9,000,000	\$7,460,556
Bto	Fewer security-related systems	\$8,760	\$8,760	\$8,760	\$26,280	\$21,785
Cto	Savings from license conversion	\$1,010,526	\$1,010,526	\$1,010,526	\$3,031,579	\$2,513,029
Dto	Application re-development cost avoidance	\$1,456,320	\$0	\$0	\$1,456,320	\$1,323,927
Eto	Physical hardware cost avoidance	\$6,400,000	\$0	\$0	\$6,400,000	\$5,818,182
Fto	Efficient desktop re-imaging	\$739,800	\$780,300	\$820,800	\$2,340,900	\$1,934,101
Gto	Faster desktop provisioning	\$30,000	\$30,000	\$30,000	\$90,000	\$74,606
Hto	Reduction in service tickets	\$30,000	\$30,000	\$30,000	\$90,000	\$74,606
Ito	Automated backup	\$3,840	\$3,840	\$3,840	\$11,520	\$9,550
Jto	Simplified software testing and validation	\$21,600	\$21,600	\$21,600	\$64,800	\$53,716
	Total Benefits (Original)	\$12,700,846	\$4,885,026	\$4,925,526	\$22,511,399	\$19,284,057

Source: Forrester Research, Inc.

### Flexibility

Flexibility, as defined in Forrester’s TEI methodology, is an investment in additional capacity or agility today that can be turned into future business benefits at some additional cost in the future. This provides an organization with the “right” or the ability to engage in future initiatives — but not the obligation to do so. There are multiple scenarios in which a customer might choose to adopt VMware View and later discover additional value that can be realized by further building on the existing platform and services in-house.

While the Customer Organization Forrester interviewed was unable to provide the data necessary for calculating the monetary value of flexibility options, Forrester does recognize the additional flexibility that an organization gains by switching to a more efficient and less laborious and time-consuming desktop management solution. Customers can also expand the footprint of VMware View at their organization. For example, they can quickly scale up their virtual environment without the significant additional effort or cost associated with oversight and management of such resources. This provides the flexibility for an organization to grow operations on short notice.

Additionally, Forrester believes that the range of flexibility options available to an organization is only limited by what it can do with the increased availability of skilled IT staff to work on valuable projects to the organization.

## **Risk**

Risk is a key component within the TEI model; it is used as a filter to capture the uncertainty surrounding different cost and benefit estimates. If a risk-adjusted ROI still demonstrates a compelling business case, it raises confidence that the investment is likely to succeed because the risks that threaten the project have been taken into consideration and quantified. The risk-adjusted numbers should be taken as “realistic” expectations, since they represent the expected values considering risk. In general, risks affect costs by raising the original estimates and alter benefits by reducing the original estimates.

For the purpose of this analysis, Forrester risk-adjusts certain cost and benefit estimates to better reflect the level of uncertainty that exists for each estimate. The TEI model uses a triangular distribution method to calculate risk-adjusted values. To construct the distribution, it is necessary to first estimate the low, most likely, and high values that could occur within the current environment. The risk-adjusted value is the mean of the distribution of those points.

For example, the financial benefit calculation for the reduction in service tickets benefit shown in Table 15 above can be considered the “most likely” value. This benefit will vary based on several specific factors, including the number of service tickets the Customer Organization needs to address annually, the average time it takes to address each ticket, and the percent reduction due to VMware View. Nearly all of the benefits will vary based on the overall success of the implementation, usage adoption, and other technical factors that are difficult or impossible to forecast before putting VMware View into actual production. These variables represent the risk that is captured as part of this study.

The following tables show the values used to adjust for uncertainty in cost and benefit estimates. Different costs and benefits estimates have different levels of risk adjustments. In general, Forrester uses a risk-adjustment factor of 120% of the original estimates on the high end, 100% as the most likely, and 50% of the original estimate on the low end. This has the effect of decreasing the benefit estimate to take into account the fact that original benefit estimates could very well be revised downward. Forrester then creates a triangular distribution to reflect the range of expected benefit, with 90% as the mean (equal to the sum of 120%, 100%, and 50%, divided by three).



**Table 18**

## Cost And Benefit Risk Adjustments

Ref.	Cost category	Risk adjustment
RC1	VMware View licensing fees	100%
RC2	Hardware and infrastructure costs	108%
RC3	Professional services	103%
RC4	Internal implementation of VMware View	105%
RC5	VMware view training fees	102%
RC6	Ongoing administration and maintenance	102%
Ref.	Benefit category	Risk adjustment
RB1	Fewer security breaches	67%
RB2	Fewer security-related systems	78%
RB3	Savings from license conversion	88%
RB4	Application redevelopment cost avoidance	75%
RB5	Physical hardware cost avoidance	83%
RB6	Efficient desktop re-imaging	92%
RB7	Faster desktop provisioning	89%
RB8	Reduction in service tickets	97%
RB9	Automated backup	83%
RB10	Simplified software testing and validation	93%

Source: Forrester Research, Inc.

Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

## Financial Summary

The financial results calculated in the Costs and Benefits sections can be used to determine the return on investment, net present value, and payback period for the organization's investment in VMware View. These are shown in Table 19 below.

**Table 19**

Cash Flow — Non-Risk-Adjusted

Summary	Initial	Year 1	Year 2	Year 3	Total	Present value
Total costs	(\$4,689,820)	(\$220,960)	(\$220,960)	(\$220,960)	(\$5,352,700)	(\$5,239,315)
Total benefits		\$12,700,846	\$4,885,026	\$4,925,526	\$22,511,399	\$19,284,057
Total	(\$4,689,820)	\$12,479,886	\$4,664,066	\$4,704,566	\$17,158,699	\$14,044,742
ROI						268%
Payback period (months)						4.5

Source: Forrester Research, Inc.

Table 20 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk-adjustment values from Table 18 in the Risk section to the cost and benefits numbers in Tables 8 and 17.

**Table 20**

Cash Flow — Risk-Adjusted

Summary	Initial	Year 1	Year 2	Year 3	Total	Present value
Total costs	(\$4,985,256)	(\$221,190)	(\$221,190)	(\$221,190)	(\$5,648,827)	(\$5,535,324)
Total benefits		\$9,946,082	\$3,531,768	\$3,565,383	\$17,043,232	\$14,639,434
Total	(\$4,985,256)	\$9,724,892	\$3,310,577	\$3,344,192	\$11,394,405	\$9,104,110
ROI						164%
Payback period (months)						6.2

Source: Forrester Research, Inc.

## VMware View: Overview

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VMware View allows organizations to do more with less and adopt a truly user-centric and modern approach to computing in the branch. By decoupling the applications, data, and operating system from the endpoint, and by moving these components into the data center, desktop and application virtualization offers IT a more streamlined, secure way to manage employees with agile desktop services that can be accessed on-demand.

The VMware View product has a number of components that are required to provide the virtual desktops, including:

- VMware vSphere for Desktops.
- VMware vCenter Server.
- View Composer.
- View Manager.
- View Client.

In order to transport a view of the desktop to users, keyboard, video, mouse, and other interactions travel over a LAN connection. VMware View supports both the Microsoft-developed RDP (Remote Desktop Protocol) and the PCoIP protocol.

Client connections to VMware View sessions are established by running a VMware View Client on a local host. Clients are supported for most versions of Windows, along with Mac OS X. Specific embedded clients are also supported for a large number of thin clients; for a list of supported clients refer to the VMware website.

## Appendix A: Total Economic Impact™ Overview

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Total Economic Impact is a methodology developed by Forrester Research that enhances a company's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, risks, and flexibility.

### *Benefits*

Benefits represent the value delivered to the user organization — IT and/or business units — by the proposed product or project. Often product or project justification exercises focus just on IT cost and cost reduction, leaving little room to analyze the effect of the technology on the entire organization. The TEI methodology and the resulting financial model place equal weight on the measure of benefits and the measure of costs, allowing for a full examination of the effect of the technology on the entire organization. Calculation of benefit estimates involves a clear dialogue with the user organization to understand the specific value that is created. In addition, Forrester also requires that there be a clear line of accountability established between the measurement and justification of benefit estimates after the project has been completed. This ensures that benefit estimates tie back directly to the bottom line.

### *Costs*

Costs represent the investment necessary to capture the value, or benefits, of the proposed project. IT or the business units may incur costs in the form of fully burdened labor, subcontractors, or materials. Costs consider all the investments and expenses necessary to deliver the proposed value. In addition, the cost category within TEI captures any incremental costs over the existing environment for ongoing costs associated with the solution. All costs must be tied to the benefits that are created.

### *Risk*

Risk measures the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections, and 2) the likelihood that the estimates will be measured and tracked over time. TEI applies a probability density function known as “triangular distribution” to the values entered. At minimum, three values are calculated to estimate the underlying range around each cost and benefit.

### *Flexibility*

Within the TEI methodology, direct benefits represent one part of the investment value. While direct benefits can typically be the primary way to justify a project, Forrester believes that organizations should be able to measure the strategic value of an investment. Flexibility represents the value that can be obtained for some future additional investment building on top of the initial investment already made. For instance, an investment in an enterprisewide upgrade of an office productivity suite can potentially increase standardization (to increase efficiency) and reduce licensing costs. However, an embedded collaboration feature may translate to greater worker productivity if activated. The collaboration can only be used with additional investment in training at some future point in time. However,

having the ability to capture that benefit has a present value that can be estimated. The flexibility component of TEI captures that value.

## Appendix B: Glossary

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**Discount rate:** The interest rate used in cash flow analysis to take into account the time value of money. Although the Federal Reserve Bank sets a discount rate, companies often set a discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult their respective organization to determine the most appropriate discount rate to use in their own environment.

**Net present value (NPV):** The present or current value of (discounted) future net cash flows given an interest rate (the discount rate). A positive project NPV normally indicates that the investment should be made, unless other projects have higher NPVs.

**Present value (PV):** The present or current value of (discounted) cost and benefit estimates given at an interest rate (the discount rate). The PV of costs and benefits feed into the total net present value of cash flows.

**Payback period:** The breakeven point for an investment. The point in time at which net benefits (benefits minus costs) equal initial investment or cost.

**Return on investment (ROI):** A measure of a project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits minus costs) by costs.

### *A Note On Cash Flow Tables*

The following is a note on the cash flow tables used in this study. The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1. Those costs are not discounted. All other cash flows in Years 1 through 3 are discounted using the discount rate (shown in Framework Assumptions section) at the end of the year. Present value (PV) calculations are calculated for each total cost and benefit estimate. Net present value (NPV) calculations are not calculated until the summary tables and are the sum of the initial investment and the discounted cash flows in each year.