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## **Total Economic Impact™ Of Silver Peak's WAN Optimization Solution**

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## **Executive Summary**

In December 2009, Silver Peak commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) that enterprises may realize by deploying Silver Peak's Wide Area Network (WAN) optimization solution. This solution is comprised of one or more NX appliances being installed at each endpoint on the WAN and is used to reduce bandwidth requirements, speed the transmission of data between locations, and improve overall application performance. This study illustrates the financial impact of moving from an un-optimized WAN for data transport to implementing the Silver Peak WAN optimization solution.

In conducting in-depth interviews with an existing Silver Peak customer in the software industry, Forrester found that this organization achieved significant benefits. Some were easily measured for this ROI study, and others may have been equally valuable but could not be quantified. Specifically, the benefits fall into the following categories:

1. Reduced bandwidth requirements and cost.
2. Infrastructure hardware and maintenance cost savings.
3. IT support cost savings.
4. Increased cloud computing reliability.
5. Enhanced user experience and productivity.
6. Strengthened IT security.
7. Improved WAN performance.

## **Purpose**

The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of Silver Peak's WAN optimization solution on their organizations. Forrester's aim is to clearly show all of the calculations and assumptions used in the analysis. Readers should use this study to better understand and communicate a business case for investing in Silver Peak's WAN optimization solution.

## **Methodology**

Silver Peak selected Forrester for this project because of its industry expertise in assessing the WAN optimization solution marketplace and Forrester's Total Economic Impact™ (TEI) methodology. TEI not only measures costs and cost reduction (areas that are typically accounted for within IT) but also weighs the enabling value of a technology in increasing the effectiveness of overall business processes.

For this study, Forrester employed four fundamental elements of TEI in modeling Silver Peak's solution:

1. Costs and cost reduction.

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

Given the increasing sophistication that enterprises have regarding cost analysis related to IT investments, Forrester's TEI methodology is useful in providing a clear and simplified picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

### Approach

Forrester used a 4-step approach for this study:

1. Forrester gathered data from existing Forrester research relative to Silver Peak's solution and the WAN optimization market in general.
2. Forrester interviewed Silver Peak marketing and sales personnel to fully understand the potential (or intended) value proposition of the solution.
3. Forrester conducted a series of in-depth interviews with one organization currently using the solution.
4. Forrester constructed a financial model representative of the interviews. This model can be found in the TEI Framework section below.

### Key Findings

Forrester's study yielded the following key findings:

- **ROI.** Based on the interviews with an existing customer in the software industry, Forrester constructed a TEI framework and the associated ROI analysis illustrating the financial impact areas. As seen in Table 1, the risk-adjusted ROI for this customer is 135% with a breakeven point (payback period) of 8 months after deployment.
- **Benefits.** For the purposes of the ROI analysis, only benefits associated with reduced bandwidth costs, eliminated hardware maintenance costs, and reduced IT support efforts were quantified. The risk-adjusted present value (PV) of the benefits amounted to \$17.8 million over a three-year period.
- **Costs.** Installing and configuring Silver Peak NX appliances is a fairly straightforward process, especially when deployed using Silver Peak Global Management System (GMS), as is the case with this customer. Therefore, implementation costs are very low, as are the ongoing administration costs. The majority of the costs are for the hardware and ongoing maintenance. The risk-adjusted PV of the costs amounted to \$7.6 million over a three-year period.

Table 1 illustrates the risk-adjusted cash flow for the customer, based on data obtained during the interview process. Forrester risk-adjusts these values to take into account the potential uncertainty that exists in estimating the costs and benefits of a technology investment. The risk-adjusted value

is meant to provide a conservative estimation, incorporating any potential risk factors that may later affect the original cost and benefit estimates. For a more in-depth explanation of risk and risk adjustments used in this study, please see the Risk section.

**Table 1: ROI Summary, Risk-Adjusted**

<b>Summary financial results</b>	<b>Unadjusted (best case)</b>	<b>Risk-adjusted</b>
ROI — three years	176%	135%
Payback	6 months	8 months
Total three-year costs (PV)	<b>\$7,239,985</b>	<b>\$7,574,884</b>
Total three-year benefits (PV)	\$19,985,725	\$17,768,069
Total three-year net savings (NPV)	\$12,745,740	\$10,193,185
Internal rate of return (IRR)	216%	171%

Source: Forrester Research, Inc.

## **Disclosures**

The reader should be aware of the following:

- The study is commissioned by Silver Peak and delivered by the Forrester Consulting group.
- Silver Peak 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.
- The customer name for the interviews was provided by Silver Peak.
- Forrester makes no assumptions as to the potential ROI that other organizations will receive. Forrester strongly advises that readers should use their own estimates within the framework provided in the report to determine the appropriateness of an investment in Silver Peak's WAN optimization solution.
- This study is not meant to be used as a competitive product analysis.

## Silver Peak's WAN Optimization Solution: Overview

Silver Peak offers a robust solution for WAN optimization that supports strategic activities like server centralization, data center consolidation, network backup, offsite replication, virtualization, and unified communications. The vendor provides hardware-based appliances that mitigate the ill effects of latency and network congestion on application performance and data transfer times, while optimizing WAN bandwidth utilization to minimize IT operations costs. Silver Peak NX Series appliances leverage the following technology components to optimize WAN bandwidth, latency and loss for enhanced application performance:

### Network Acceleration

WAN latency is directly proportional to the distance traveled between the two network endpoints. When routers and other network elements perform queuing and processing functions, additional latency is added to the equation.

Silver Peak offers a variety of TCP acceleration techniques to mitigate WAN latency, which include:

- **Window scaling.** Silver Peak utilizes the TCP Window Scale option to deliver window sizes as large as 1 GB, thus overcoming the throughput limitation imposed by the standard 64 KB TCP window size in higher latency networks.
- **Selective acknowledgement.** Selective acknowledgements (SACKs) provide a mechanism for handling packet loss in a WAN environment. Unlike the normal process whereby a cumulative acknowledgment is provided across all TCP packets, SACKs give the sender a complete picture of which segments are queued at the receiver and which have not yet arrived, so the sender only needs to retransmit the missing data segments.
- **Round-trip measurement.** Silver Peak utilizes a proprietary round-trip time (RTT) measurement scheme that enables RTTs to be calculated more efficiently. This leads to more accurate retransmission timeout (RTO) measurements, which, in turn, can improve throughput.
- **HighSpeed TCP.** Silver Peak has implemented HighSpeed TCP, which is a modification to TCP's congestion control mechanism for use with TCP connections with large congestion windows. It alters the way in which the window is opened on each round trip and closed on congestion events as a function of the absolute size of the window. Silver Peak also offers various techniques to overcome latency caused by the Microsoft CIFS protocol.

### Network Integrity

Even when the physical layer of a WAN is error-free, packet loss can still occur at the network layer due to congestion in routers, link failures, network re-routes, and other equipment problems. Packet loss is especially prevalent on MPLS and IP VPN WANs, where oversubscribed network resources can experience congestion during periods of peak usage.

- Forward error correction (FEC) is a technology that is well-known for its ability to correct bit errors at the physical layer. Silver Peak adapted this technology to operate on packets at the network layer to improve application performance across WANs that have high-loss characteristics.

- Packet order correction (POC) is used to re-sequence packets on the far end of a WAN link on the fly to avoid retransmissions that occur when packets arrive out of order.
- Quality of service (QoS) and traffic shaping techniques are used to maximize WAN utilization when WAN links are oversubscribed. Silver Peak's QoS implementation consists of an extensive deep-packet-inspection-based classification engine and advanced queuing and service engine.

### Network Memory™

All Silver Peak NX Series appliances are equipped with Network Memory™ technology for WAN deduplication. Network Memory is used to inspect all inbound and outbound WAN traffic in real-time, storing a single local instance of data on each appliance.

Prior to sending information across the WAN, NX Series appliances compare real-time traffic streams to patterns stored using Network Memory. If a match exists, a short reference pointer is sent to the remote Silver Peak appliance, instructing it to deliver the traffic pattern from its local instance. Repetitive data is never sent across the WAN, saving bandwidth and enabling LAN-like application performance.

If content is modified, the Silver Peak appliance will detect the change at the byte level and update the network's "memory". Only the modifications are sent across the WAN, improving scalability and application response time.

### Secure Content Architecture

Silver Peak keeps enterprise data secure with its Secure Content Architecture. This is achieved via the following capabilities:

- **Disk encryption.** Silver Peak employs 128-bit AES encryption to protect all data stored on NX appliances.
- **Secure transmission (IPSec).** Silver Peak supports 128-bit IPSec (using AES for encryption) to ensure that data is secure as it is transferred over the WAN.
- **Secure socket layer (SSL) acceleration.** Silver Peak accelerates SSL traffic using a variety of techniques, including QoS and TCP acceleration.
- **Centralized control.** Silver Peak's Global Management System (GMS) enables advanced authentication policies to be centrally configured and enforced. This includes peer authentication, whereby only valid Silver Peak appliances are allowed on the network and connectivity can only be established between trusted Silver Peak devices.
- **Secure access.** Access to all Silver Peak devices is tightly controlled using TACACS+ and RADIUS. This ensures complete AAA protection, including user tracking, auditing per-command authorization, and group-based authentication privileges.

## Analysis

As stated in the Executive Summary, Forrester took a multistep approach to evaluate the impact that implementing Silver Peak's appliance solution for WAN optimization can have on an organization:

- Interviews with Silver Peak marketing and sales personnel.
- In-depth interviews with one organization currently using Silver Peak's NX-appliance-based WAN optimization solution.
- Construction of a common financial framework for the implementation of Silver Peak.

### Interview Highlights: Software Company

The customer interviewed for the TEI study is a global software as a service (SaaS) company. Specifically, this customer uses Silver Peak for its internal WAN connecting more than 100 offices and data centers in 54 countries around the world. These locations all have different security and bandwidth requirements based on the country in which they reside.

The interviews with the customer uncovered the following relevant points:

- Prior to implementing a WAN optimization solution, the approach for dealing with its increased bandwidth needs was to increase the size of links between locations. According to the Network Engineering Manager interviewed for this study, "We were spending a lot of time and resources upgrading bandwidth across our network to meet the demands of the end users. Throwing bandwidth at the problem was not a long-term solution, especially in developing countries where we could not get anything larger than a DS3 line. We decided to look at how we could extend the life of our existing WAN."
- As part of the evaluation and proof-of-concept (POC) effort, the customer considered features such as encryption, traffic shaping, IP security, and appliance throughput. "Other vendors had difficulties when we asked about 20 GB throughputs."
- The customer also took into consideration support response times and geographies, scalability, and lead times required for ordering hardware.
- The greatest reduction in bandwidth usage is attributable to de-duplication of data transmission. Across the entire WAN, the customer has seen a 30% to 50% reduction in bandwidth consumed because of de-duplication.
- Support for all types of Web traffic was very important. For example, the Network Engineering Manager explained that the company is a very large user of video conferencing. "A challenge was finding a solution that could support all applications — beyond NFS and CIFS. Many potential solutions could not handle unique applications built in-house. Silver Peak took a different approach. They don't care what the application is. They will try to de-duplicate and accelerate at the IP level, not the application level."
- WAN optimization was very important because of the company's commitment to cloud computing. "The majority of employees are software engineers. For us, everything is in the cloud so the circuit is very important."

## TEI Framework

### *Introduction*

From the information provided in the in-depth interviews, Forrester has constructed a TEI framework for those organizations considering implementation of the Silver Peak WAN optimization solution. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision. Most monetary values shown in this study are rounded to the nearest dollar for simplicity of presentation. Actual financial calculations might be based on figures carried to more decimal points than shown here and therefore might not entirely match the resultant figures presented in the tables.

### *Framework Assumptions*

Table 2 lists the discount rate used in the PV and NPV calculations and time horizon used for the financial modeling.

**Table 2: General Assumptions**

Ref.	General assumptions	Value
A1	Discount rate	10%
A2	Length of analysis	Three years

Source: Forrester Research, Inc.

Organizations typically use discount rates of between 8% and 16% based on their current environment. Readers are urged to consult with the finance departments to determine the most appropriate discount rate to use within their own organizations.

In addition to the financial assumptions used to construct the cash flow analysis, Table 3 provides salary assumptions used within this analysis.

**Table 3: Salary Assumptions**

Ref.	Metric	Calculation	Value
B1	Fully burdened salary per IT developer/software engineer <sup>†</sup>		\$200,000
B2	Fully burdened salary per IT operations employee <sup>†</sup>		\$100,000
B3	Workdays per year		250

<sup>†</sup>Includes salary, variable compensation, and all direct benefits (e.g., health insurance)

Source: Forrester Research, Inc.

## Costs

This section describes the overall costs of implementing Silver Peak and the ongoing costs of managing the WAN optimization solution.

### *Proof-Of-Concept Internal Labor Costs*

The customer undertook a lengthy POC effort. This included defining business and technology requirements, evaluating various vendor solutions, and implementing solutions in a test environment. This effort took six months in total, reflecting the strong desire to get the right solution in place the first time.

There were two IT resources working 25% of the time for six months. The monthly fully burdened cost for a full-time IT resource was \$200,000 divided by 12 months, or \$16,667. Two resources multiplied by a 25% level of effort and then multiplied by six months and \$16,667 results in a POC labor cost of \$50,000.

**Table 4: Proof-Of-Concept Internal Labor Costs, Non-Risk-Adjusted**

Ref.	Metric	Calculation	Initial
C1	Number of IT resources		2
C2	Level of effort		25%
C3	Monthly total burdened cost	B1/12 months	\$16,667
C4	Number of months		6
Ct	POC internal labor costs	$C1 * C2 * C3 * C4$	\$50,000

Source: Forrester Research, Inc.

### *Implementation Internal Labor Costs*

After completion of the POC, the customer undertook a two-phased implementation effort. The first effort consisted of implementing Silver Peak at 12 locations around the world to validate the findings and decision taken in the POC. This effort lasted four months. It chose locations where it already had multiple DS3 lines and could not add any additional bandwidth.

One of the main contributors to the time required to complete phases 1 and 2 of the implementation was waiting for permission to import the Silver Peak NX appliances into certain countries around the world. The customer and Silver Peak built a simple deployment process with automated scripts and instructions for the field techs. "Working through the process up front allowed us to deploy quickly. We also automated repeatable activities such as configurations."

The process typically took one day per location. After the appliance was installed, it took 2 hours to get the solution up and running. Some locations would get two or three appliances online in a single day. The customer had a contractor acting as the project manager, and Silver Peak was responsible for shipping the hardware to remote locations. The phase-2 effort to complete installation at the remaining locations lasted eight months.

**Table 5: Implementation Internal Labor Costs, Non-Risk-Adjusted**

Ref.	Metric	Calculation	Initial
D1	Number of IT resources		3
D2	Level of effort		50%
D3	Monthly total burdened cost	B1/12 months	\$16,667
D4	Number of months (phase 1)		4
D5	Number of months (phase 2)		8
Dt	Implementation internal labor costs	$D1 * D2 * D3 * (D4 + D5)$	\$300,000

Source: Forrester Research, Inc.

### *Professional Services*

As part of the implementation effort, Silver Peak provided professional services to the customer. These services included network design, installation planning, network configuration, and capacity planning.

**Table 6: Professional Services, Non-Risk-Adjusted**

Ref.	Metric	Calculation	Initial
E1	Number of Silver Peak resources		2
E2	Weekly rate per resource		\$12,000
E3	Number of weeks		10
Et	Professional services	$E1 * E2 * E3$	\$240,000

Source: Forrester Research, Inc.

### *Silver Peak Hardware And Software*

The customer implemented at least one NX appliance at each location. This consisted of a mix of NX-2000 (2 Mbps), NX-5000 (50 Mbps), NX-8000 (500 Mbps), and NX-9000 (1 Gbps) appliances, with the majority being NX-5000 and NX-8000 appliances. The actual hardware was determined by the current bandwidth in place. The customer also purchased Silver Peak's GMS with a 200 node license. Additionally, the customer purchased a platinum-level support contract from Silver Peak.

The costs below reflect the total expenditure since the customer was not able to share the actual cost per appliance.

**Table 7: Silver Peak Hardware And Software, Non-Risk-Adjusted**

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
F1	Hardware and software costs		\$1,757,000	\$1,525,000	\$1,405,000	
F2	Maintenance	F1 (through current year)*22%		\$722,040	\$1,031,140	\$1,031,140
Ft	Silver Peak hardware and software costs	F1+F2	\$1,757,000	\$2,247,040	\$2,436,140	\$1,031,140

Source: Forrester Research, Inc.

### *Ongoing Operations*

The customer has one resource located in Europe who is “responsible for ensuring that the ROI for the solution is met in addition to monitoring and product stability.” This individual does not have responsibility for changing configurations at a specific location. Configuration changes, along with installation of Silver Peak NX appliances at new locations, are part of business-as-usual operations at each location. There is no incremental cost of operations at these individual locations

**Table 8: Silver Peak Hardware And Software, Non-Risk-Adjusted**

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3
G1	Number of resources			1	1	1
G2	Level of effort			25%	25%	25%
G3	Annual fully burdened cost	B2		\$100,000	\$100,000	\$100,000
Gt	Ongoing operations	G1*G2*G3		\$25,000	\$25,000	\$25,000

Source: Forrester Research, Inc.

*Total Costs*

Table 9 summarizes the costs to implement Silver Peak's WAN optimization solution.

**Table 9: Total Costs Of Silver Peak, Non-Risk-Adjusted**

<b>Ref.</b>	<b>Costs</b>	<b>Initial</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Total</b>	<b>PV</b>
Ct	POC internal labor costs	\$50,000				\$50,000	<b>\$50,000</b>
Dt	Implementation internal labor costs	\$300,000				\$300,000	<b>\$300,000</b>
Et	Professional services	\$240,000				\$240,000	<b>\$240,000</b>
Ft	Silver Peak hardware and software costs	\$1,757,000	\$2,247,040	\$2,436,140	\$1,031,140	\$7,471,320	<b>\$6,587,813</b>
Gt	Ongoing operations		\$25,000	\$25,000	\$25,000	\$75,000	<b>\$62,171</b>
	<b>Total</b>	<b>\$2,347,000</b>	<b>\$2,272,040</b>	<b>\$2,461,140</b>	<b>\$1,056,140</b>	<b>\$8,136,320</b>	<b>\$7,239,985</b>

Source: Forrester Research, Inc.

**Benefits**

The first half of this section details the quantitative benefits included in the ROI. The second half describes qualitative benefits that the customer described but that could not be quantified for this study. They are not part of the ROI analysis. Readers should take the qualitative benefits into consideration when analyzing the total benefits their organizations may realize by implementing Silver Peak.

*Bandwidth Savings*

The customer has been able to reduce the amount of data transmitted between locations by 30% to 50% across its global WAN. This reduction is primarily due to de-duplication of data being transmitted and directly attributable to the Silver Peak implementation. On average, each location saved \$50,000 per year in bandwidth costs paid to network providers in the first year. The bandwidth savings per location increases over time because the customer "continually gets better performance from the WAN devices." This benefit calculation assumes that the customer does not open any additional locations in Year 2 through Year 3 of the study.

**Table 10: Bandwidth Savings, Non-Risk-Adjusted**

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
I1	Number of locations		100	100	100
I2	Bandwidth savings per location		\$50,000	\$60,000	\$70,000
It	Bandwidth savings	I1*I2	\$5,000,000	\$6,000,000	\$7,000,000

Source: Forrester Research, Inc.

### *Avoided Hardware And Maintenance Costs*

The customer has been able to eliminate hardware it previously had in place and avoid adding additional hardware because of features included in Silver Peak's NX appliances. Specifically, it has been able to remove IPSec VPN appliances since Silver Peak includes this in its hardware. The customer has also avoided adding additional hardware, including the upgrade of routers at locations to accommodate additional bandwidth and hardware for new locations. In addition, the customer recently purchased a Silver Peak solution to replace existing standalone appliances for Quality of Service (QoS) and traffic shaping. With Silver Peak, this functionality is integrated into the same platform that is used for other WAN optimization functions.

For the purposes of this study, only the savings from ongoing maintenance for IPSec hardware are included.

**Table 11: Avoided Hardware And Maintenance Costs, Non-Risk-Adjusted**

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
J1	Number of locations		100	100	100
J2	IPSec VPN hardware maintenance per location		\$20,000	\$20,000	\$20,000
Jt	Avoided hardware and maintenance costs	J1*J2	\$2,000,000	\$2,000,000	\$2,000,000

Source: Forrester Research, Inc.

### *IT Support Savings*

The customer has reduced the total effort required to negotiate and install additional bandwidth, address user complaints, and manage the WAN solution. For the purposes of this study, the financial benefit associated with only one full-time equivalent (FTE) for managing the WAN solution is included. Readers are encouraged to consider how their total IT support costs may be reduced, including location setup/upgrade and helpdesk costs.

**Table 12: IT Support Savings, Non-Risk-Adjusted**

Ref.	Metric	Calculation	Year 1	Year 2	Year 3
K1	IT operations FTEs redeployed		1	1	1
K2	Annual fully burdened cost	B2	\$100,000	\$100,000	\$100,000
Kt	IT support savings	K1*K2	\$100,000	\$100,000	\$100,000

Source: Forrester Research, Inc.

### *Total Quantified Benefits*

Table 13 summarizes the total quantified benefits that the customer realized by using Silver Peak's WAN optimization solution.

**Table 13: Total Quantified Benefits Of Silver Peak, Non-Risk-Adjusted**

Ref.	Benefits	Year 1	Year 2	Year 3	Total	PV
It	Bandwidth savings	\$5,000,000	\$6,000,000	\$7,000,000	\$18,000,000	<b>\$14,763,336</b>
Jt	Avoided hardware and maintenance costs	\$2,000,000	\$2,000,000	\$2,000,000	\$6,000,000	<b>\$4,973,704</b>
Kt	IT support savings	\$100,000	\$100,000	\$100,000	\$300,000	<b>\$248,685</b>
	<b>Total</b>	<b>\$7,100,000</b>	<b>\$8,100,000</b>	<b>\$9,100,000</b>	<b>\$24,300,000</b>	<b>\$19,985,725</b>

Source: Forrester Research, Inc.

### *Qualitative Benefits*

#### **Increased Cloud Computing Reliability**

The customer's internal business model embodies the cloud computing principles of their SaaS offerings. This means that a high-performing WAN is critical to its operations and collaboration across locations. The customer said that, "The dependency on the data center has gone up because we are removing resources from the remote offices. We cannot depend on the carriers to self-police their own networks. We have to assume that the carriers will make mistakes or build networks that do not perform at the expected level. With WAN optimization, we provide a protection mechanism so that if the carrier makes a mistake, we will still get the same good service. There are examples where the network had packet loss in excess of 3%, but we experience none because of forward packet protection."

They went on to say that, "The WAN circuit needs to be reliable. If the burden is on the carriers, we need SLAs, and we need to know when things are going to fail in their environment, in which we have no visibility. With WAN optimization, we are less impacted by what the carrier does. The cloud becomes more reliable."

### Improved User Experience And Productivity

Improved WAN performance has directly improved user experiences around the globe. The customer remarked that network-related user complaints are down 80% to 90% because of improved WAN performance. In the past, employees at some of the more remote locations around the world would often work from home because of poor network performance in the office.

Additionally, the customer can now provide a more consistent work experience, regardless of location. "People go from the campus to remote locations. In the past, they felt their productivity was impacted because of WAN performance. With WAN acceleration, we don't get those complaints anymore. People can work more effectively from remote locations."

The customer has seen a large improvement in worker productivity because of the increased speed of WAN traffic. The time for software engineers to compile code has been reduced, on average, by 50%. There are examples of jobs that used to take 2 hours that are now being completed in 2 minutes. With thousands of software engineers working out of remote locations, the potential productivity gains are very large. Administrative departments have also seen productivity gains. Sharing 100 MB files between Europe and the US has been reduced from 30 minutes to less than 1 minute.

### Strengthened IT Security

In addition to the financial benefit of removing IPSec hardware, the customer's IT security has improved. According to the customer, the Silver Peak NX appliances perform at, or better than most firewalls for IPSec security due to high throughput rates and high packet ramp-up rates. The customer is also able to set its own private keys, which eliminates concerns over MPLS security. It is now "easy to encrypt packets on the fly."

### Improved WAN Performance

All of the previously discussed benefits are underpinned by a general improvement in WAN performance. The customer explained that "Silver Peak has reduced the likelihood of WAN failure. When the bandwidth needs to be there during peak times, it is there." The customer has also seen a substantial reduction in packet loss. Prior to implementing Silver Peak, some locations were regularly experiencing 10% to 20% packet loss.

Silver Peak provides the network management team with much better visibility into what is transpiring across the WAN. They now have reports that show data traffic by application, which allows them to better plan and make adjustments to the WAN. QoS marking also allows them to better optimize data flows across their WAN.

## Risk

Risk is the third 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 they affect benefits by reducing the original estimates.

For the purpose of this analysis, Forrester risk-adjusts 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, take the case of the professional service costs. The \$240,000 value used in this analysis can be considered the most likely or expected value. Professional service costs vary based on duration and complexity of an implementation. This variability represents a risk that must be captured as part of this study. In this particular case, the risk level was judged as low, since this level of professional services is on the larger end of what a reader's organization can expect.

In this example, Forrester uses a risk factor of 105% as the high end, 100% as the most likely, and 98% as the low end. This has the effect of increasing the cost estimate to take into account the fact that original cost estimates are more likely to be revised upward than downward. Forrester then creates a triangular distribution to reflect the range of expected costs, with 101% as the rounded mean (101% is equal to the sum of 105%, 100%, and 98% divided by three and rounded to the nearest whole percent). Forrester applies this mean to the most likely estimate, \$240,000 to arrive at a risk-adjusted value of \$242,400.

Risk adjustments for benefits reduce the original benefits estimates. For example, Forrester applies a risk range of 60% on the low end of the estimate, 100% on the high end, and 100% on the most-likely scenario for bandwidth savings. This reduces the benefit estimate by 13%, or 87% of the original value.

The following general management and process risk was considered in this study:

- **Adding core infrastructure hardware into an existing solution.** This risk was mitigated through extensive testing in a POC and limited phase 1 rollout. Also, the customer has architected the solution in such a way that the appliances can be taken offline without affecting data flows.
- **Ensuring that the appliances were configured properly and IT personnel at each location knew how to manage the appliances.** This risk was mitigated through the creation of automated configuration scripts and by providing instructions and tutorials to IT personnel in the field.

Each cost and benefit was assigned either a "low," "medium," "high," or "none" risk rating. The following benefits and costs were rated as either low-, medium-, or high-risk:

- **Professional services (cost) — low risk.** The implementation effort was on the longer end of the normal range because of the time needed to import hardware into some countries. A reader's organization may expect a lower total cost of professional services, but it might be a higher percentage of the overall contract if the organization does not have enough in-house resources to complete the work.
- **Silver Peak hardware and software (cost) — medium risk.** In total, a reader's organization will most likely realize lower total costs because of a smaller implementation — fewer than 100 locations. This risk factor indicates that the cost per appliance will likely be higher because of lower volume discounts.
- **Ongoing operations (cost) — medium risk.** Depending on the level of expertise within an organization, it may require more effort for ongoing operation of the Silver Peak NX appliances.

- **Bandwidth savings (benefit) — high risk.** The level of bandwidth savings realized by the customer through de-duplication may be higher than other organizations realize because of total traffic volumes and the nature of the data being sent across the WAN.
- **Avoided hardware and maintenance costs (benefit) — medium risk.** If a reader's organization does not already have hardware in place that can be removed, there will be no maintenance savings. A savings from future added hardware may be realized by avoided upgrades to routers, among other elements.

The following tables show the values used to adjust for uncertainty in cost and benefit estimates. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

**Table 14: Risk Adjustments To Costs**

Ref.	Risk adjustments to costs	Low	Most likely	High	Risk-adjusted
L1	POC internal labor costs (no risk)	100%	100%	100%	100%
L2	Implementation internal labor costs (no risk)	100%	100%	100%	100%
L3	Professional services (low risk)	98%	100%	105%	101%
L4	Silver Peak hardware and software costs (medium risk)	100%	100%	115%	105%
L5	Ongoing operations (medium risk)	100%	100%	115%	105%

Source: Forrester Research, Inc.

**Table 15: Risk Adjustments To Benefits**

Ref.	Risk adjustments to benefits	Low	Most likely	High	Risk-adjusted
M1	Bandwidth savings (high risk)	60%	100%	100	87%
M2	Avoided hardware and maintenance costs (medium risk)	80%	100%	103%	94%
M3	IT support savings (no risk)	100%	100%	100%	100%

Source: Forrester Research, Inc.

## Flexibility

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for some future additional investment. Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

## Total Economic Impact™ Of Silver Peak's WAN Optimization Solution

The customer is looking at several additional uses for Silver Peak in the near future. These include improved disaster recovery through data replication, enhanced QoS marking and potentially taking advantage of real-time data routing based on the network congestion. None of these potential uses have been included in the ROI analysis.

In general terms, Silver Peak has made the customer a much more flexible organization. They can now open a new office much faster by not waiting on additional bandwidth that might not be available at all. Silver Peak also allows for better collaboration across multiple locations by reducing the time to share documents. In addition, the customer can deploy any application on their network without worrying about performance across the WAN. This includes off the shelf applications, as well as their own SaaS offering.

### TEI Framework: Summary

Considering the financial framework constructed above, the results of the Costs, Benefits, Risk, and Flexibility sections using the representative numbers can be used to determine a return on investment, net present value (NPV), and payback period.

Tables 16 and 17 below show the risk-adjusted values, applying the risk-adjustment method indicated in the Risk section and the values from Tables 14 and 15 to the numbers in Tables 9 and 13.

**Table 16: Risk-Adjusted Costs**

Ref.	Costs	Initial	Year 1	Year 2	Year 3	Total	PV
N1	POC internal labor costs	\$50,000				\$50,000	<b>\$50,000</b>
N2	Implementation internal labor costs	\$300,000				\$300,000	<b>\$300,000</b>
N3	Professional services	\$242,400				\$242,400	<b>\$242,400</b>
N4	Silver Peak hardware and software costs	\$1,844,850	\$2,359,392	\$2,557,947	\$1,082,697	\$7,844,886	<b>\$6,917,204</b>
N5	Ongoing operations		\$26,250	\$26,250	\$26,250	\$78,750	<b>\$65,280</b>
<b>Nt</b>	<b>Total</b>	<b>\$2,437,250</b>	<b>\$2,385,642</b>	<b>\$2,584,197</b>	<b>\$1,108,947</b>	<b>\$8,516,036</b>	<b>\$7,574,884</b>

Source: Forrester Research, Inc.

**Table 17: Risk-Adjusted Benefits**

<b>Ref.</b>	<b>Benefits</b>	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>	<b>Total</b>	<b>PV</b>
O1	Bandwidth savings	\$4,350,000	\$5,220,000	\$6,090,000	\$15,660,000	<b>\$12,844,102</b>
O2	Avoided hardware and maintenance costs	\$1,880,000	\$1,880,000	\$1,880,000	\$5,640,000	<b>\$4,675,282</b>
O3	IT support savings	\$100,000	\$100,000	\$100,000	\$300,000	<b>\$248,685</b>
<b>Ot</b>	<b>Total</b>	<b>\$6,330,000</b>	<b>\$7,200,000</b>	<b>\$8,070,000</b>	<b>\$21,600,000</b>	<b>\$17,768,069</b>

Source: Forrester Research, Inc.

It is important to note that values used throughout the TEI framework are based on in-depth interviews with one organization. Forrester makes no assumptions as to the potential return that other organizations will receive within their own environment. Forrester strongly advises that readers use their own estimates within the framework provided in this study to determine the expected financial impact of implementing Silver Peak's WAN optimization solution.

## Study Conclusions

Forrester's in-depth interviews with one customer in the software industry yielded several important observations about Silver Peak:

- Forrester found that organizations can benefit from bandwidth, hardware, and support savings; increased cloud computing reliability; enhanced user experience and productivity; strengthened IT security; and a general improvement in WAN performance through the implementation of Silver Peak's WAN optimization solution.
- Key ROI drivers include the number of locations that comprise the WAN, the total size of WAN traffic, and the latency and general quality of performance of the WAN pre-optimization. The nature of the traffic, and therefore the ability to de-duplicate data transmission, also contributes to higher ROI.
- Silver Peak created an inherently more flexible business environment for the customer by allowing it to open offices more quickly in locations it otherwise might not have been able to and by enabling greater collaboration between employees across multiple locations.

The financial analysis provided in this study illustrates the potential way an organization can evaluate the value proposition of Silver Peak's WAN optimization solution. Based on information collected in in-depth customer interviews, Forrester calculated a three-year risk-adjusted ROI of 135% with a payback period of 8 months after implementation. All final estimates are risk-adjusted to incorporate potential uncertainty in the calculation of costs and benefits.

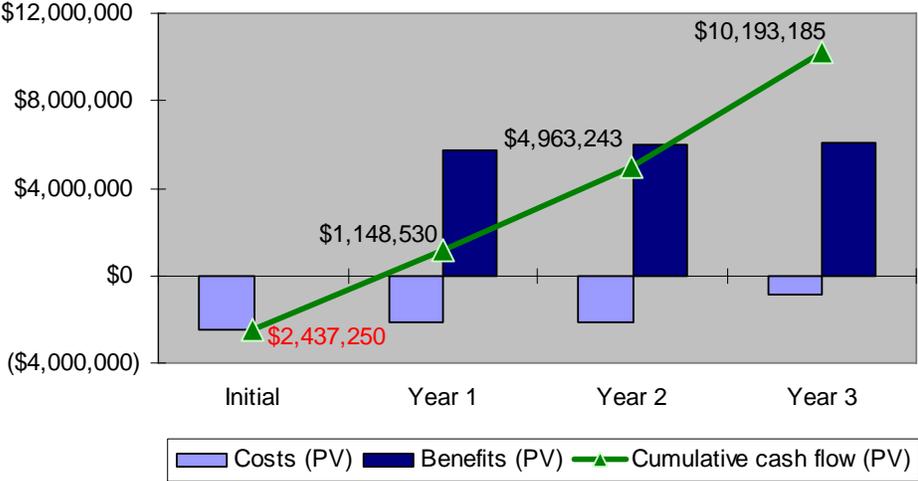
Using the TEI framework, many companies may find the potential for a compelling business case to make such an investment.

**Table 18: ROI, Original And Risk-Adjusted**

<b>Summary financial results</b>	<b>Unadjusted (best case)</b>	<b>Risk-adjusted</b>
ROI — three years	176%	135%
Payback	6 months	8 months
Total three-year costs (PV)	<b>\$7,239,985</b>	<b>\$7,574,884</b>
Total three-year benefits (PV)	\$19,985,725	\$17,768,069
Total three-year net savings (NPV)	\$12,745,740	\$10,193,185
Internal rate of return (IRR)	216%	171%

Source: Forrester Research, Inc.

Figure 1: Summary Financial Results, Risk-Adjusted



Source: Forrester Research, Inc.

## Appendix A: Total Economic Impact™ Overview

Total Economic Impact (TEI) 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. For the purpose of this analysis, the impact of flexibility was not quantified.

### 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 forms 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: the likelihood that the cost and benefit estimates will meet the original projections and 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 a 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 enterprise-wide 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 PV that can be estimated. The flexibility component of TEI captures that value.

## Appendix B: Glossary

**Discount rate:** This is 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 organization to determine the most appropriate discount rate to use in their own environment.

**Net present value (NPV):** This is 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):** This is 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 NPV of cash flows.

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

**Return on investment (ROI):** This is 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 (see the Example Table below). 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 Year 1 through Year 3 are discounted using the discount rate shown in the table at the end of the year. PV calculations are calculated for each total cost and benefit estimate. 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.

### **Example Table**

Ref.	Category	Calculation	Initial cost	Year 1	Year 2	Year 3	Total

Source: Forrester Research, Inc.