

Prepared for Cisco Systems, Inc. and Microsoft, Inc.

June 25, 2009

The Total Economic Impact™ Of Cisco Wide Area Application Services (WAAS)

Including Future Flexibility Benefits With
Windows Server on WAAS

Multicompany Analysis

Project Director: Bob Cormier, Forrester Consulting

FORRESTER®



Headquarters

Forrester Research, Inc., 400 Technology Square, Cambridge, MA 02139 USA
Tel: +1 617.613.6000 • Fax: +1 617.613.5000 • www.forrester.com

TABLE OF CONTENTS

Executive Summary	4
Purpose	4
Methodology.....	5
Approach.....	5
Key Findings	6
Disclosures.....	6
About Cisco WAAS: Overview	7
Customer Interview Highlights	9
Sample <i>Organization</i> Description	12
The Sample <i>Organization</i> Chooses Cisco WAAS	14
TEI Framework	15
Costs	16
Benefits And Savings.....	17
Risk.....	21
Flexibility Options (Future).....	22
TEI Framework: Summary.....	26
Key Findings	26
Study Conclusions.....	27
Adopting A WAN Optimization Solution.....	28
Appendix A: Sample <i>Organization</i> Description	31
Appendix B: Total Economic Impact™ Overview	34
Benefits	34
Costs	34

The Total Economic Impact™ Of Cisco WAAS And Windows Server On WAAS

Risk.....	34
Flexibility.....	34
Appendix C: Glossary.....	35
Appendix D: About The Project Manager.....	36

© 2009, Forrester Research, Inc. All rights reserved. Unauthorized reproduction is strictly prohibited. Information is based on best available resources. Opinions reflect judgment at the time and are subject to change. Forrester®, Technographics®, Forrester Wave, RoleView, TechRadar, and Total Economic Impact are trademarks of Forrester Research, Inc. All other trademarks are the property of their respective companies. For additional information, go to www.forrester.com.

Executive Summary

In May 2009, Forrester Research began updating an October 2008 case study commissioned by Cisco Systems that focused on examining the potential return on investment (ROI) that organizations may realize by adopting Cisco Wide Area Application Services (WAAS). This updated study, commissioned by both Cisco Systems and Microsoft, adds the value associated with the future flexibility option of deploying Windows Server on WAAS to branch offices.

Windows Server on WAAS integrates Windows services with the Cisco WAAS platform, giving organizations the flexibility to choose how to deploy corporate applications, store data and provision infrastructure services between branch and data center locations, leveraging WAN optimization and locally hosted Windows services. This jointly developed and supported offering from Cisco and Microsoft helps increase branch IT architecture flexibility while reducing total cost of ownership.

This updated study highlights the benefits and costs of deploying Cisco WAAS and Windows Server hosted on WAAS installations across the enterprise of a sample *Organization* (see Appendix A: Sample *Organization* Description). The findings in this study are in large part based on in-depth interviews Forrester conducted with nine organizations currently using Cisco WAAS. The study examines the estimated ROI for the sample *Organization* and presents the aggregate findings derived from the interviews and analysis process as well as our independent research.

The study found that for the sample *Organization*, Cisco WAAS provided *quantified* benefits and savings in the following areas:

- Bandwidth cost savings across all impacted branches.
- Bandwidth upgrade cost avoidance savings across all affected branches.

The study also found that for the sample *Organization*, Cisco WAAS and Windows Server on WAAS provided *quantified* benefits and savings in the following areas:

- Savings in branch server hardware, maintenance contracts, and administration costs.
- Savings associated with avoiding the costs of refreshing branch server hardware.

In addition to the benefits quantified in this study, Forrester believes that the reader should consider the following important benefits associated with Cisco WAAS that were *not quantified*:

- Increased productivity of remote branch employees.
- Improved performance of revenue-generating applications and branch IT services such as Active Directory, print, DNS, and DHCP.
- Streamlined disaster recovery via centralized data and accelerated remote data backups.

Purpose

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

Methodology

Cisco and Microsoft selected Forrester for this project because of its industry expertise in Wide Area Network (WAN) and branch optimization technology 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 Cisco WAAS:

1. Costs and cost reduction.
2. Benefits to the entire organization.
3. Risk.
4. Flexibility Options.

Given the increasing sophistication that organizations have regarding cost analyses related to IT investments, Forrester's TEI methodology serves an extremely useful purpose by providing a complete picture of the total economic impact of purchase decisions. Please see Appendix B for additional information on the TEI methodology.

Approach

Forrester used a five-step approach for this study:

1. Forrester gathered data from existing Forrester research relative to Cisco WAAS and Windows Server on WAAS and the WAN optimization market in general.
2. Forrester interviewed Cisco WAAS and Microsoft Windows Server marketing personnel to fully understand the potential (or intended) value proposition of WAAS and Windows Server on WAAS.
3. Using knowledge of the Cisco solution, as well as input from existing Forrester research, a Forrester representative conducted in-depth discussions with nine customers regarding their experiences with WAAS and Windows Server on WAAS.
4. Forrester constructed a financial model representative of data collected in the interviews.
5. Forrester created this study, which represents and examines the estimated value of the findings derived from the customer interview and analysis process and from Forrester's independent research.

Key Findings

Table 1 represents a summary of the ROI that the *Organization* expects to realize over a three-year period by deploying the Cisco WAAS solution and Windows Server on WAAS.

Table 1: Three-Year Summary Financial Results — The *Organization*

Summary financial results	Unadjusted (best case)	Risk-adjusted
ROI	240%	190%
Payback period	Within 10 months	Within 11 months
Total WAAS costs (PV)	(\$594,178)	(\$594,178)
Total WAAS cost savings and benefits (PV)	\$1,857,065	\$1,578,505
Future flexibility benefits of Windows Server on WAAS	\$162,424	\$144,746
Total (NPV)	\$1,425,310	\$1,129,073

Source: Forrester Research, Inc.

The three-year, risk-adjusted total NPV (net present value) of **\$1,129,073** represents the net cost savings and benefits attributed to using the Cisco solution when compared with the costs of the *Organization's* pre-WAN and branch optimization environment (see details below in the Costs, Benefits, Flexibility, and Risks sections). In addition, the risk-adjusted ROI was a very favorable **190%**.

Table 1 illustrates the risk-adjusted cash flow for the sample *Organization*, based on data and characteristics obtained during the customer 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 impact the original cost and benefit estimates. For this study, Forrester applied a 15% risk adjustment (reduction of 15%) to all benefits to reflect the risks listed above. For a more in-depth explanation of risk and risk adjustments used in this study, please see the Risk section.

The objective of this study is not to illustrate savings that other organizations can obtain by deploying the solution but rather to identify savings experienced by the interviewed customers. These results can be used as a guide to allow other organizations to determine the appropriate benefits for their particular environment.

Disclosures

The reader should be aware of the following:

- The study was commissioned by Cisco and Microsoft, and delivered by the Forrester Consulting group.

- Cisco and Microsoft reviewed and provided feedback to Forrester, but Forrester maintained editorial control over the study and its findings and did not accept changes to the study that contradicted Forrester's findings or obscured the meaning of the study.
- The customer names for the interviews were provided by Cisco and Microsoft.
- Forrester makes no assumptions as to the potential return on investment that other organizations will receive. Forrester strongly advises that readers should use their own estimates within the framework provided in the study to determine the appropriateness of an investment in Cisco WAAS and Windows Server on WAAS.
- This is not an endorsement by Forrester of Cisco or Microsoft or their offerings.
- The study is not a direct or implied market or competitive comparison.

About Cisco WAAS: Overview

According to Cisco, its Wide Area Application Services (WAAS) is a comprehensive WAN optimization solution that accelerates application traffic over the WAN, delivers video to the branch office, and provides local hosting of branch-office IT services such as Microsoft Windows Server 2008 software for Active Directory, print, and other branch IT services.

Cisco WAAS allows IT departments to centralize applications and storage in the data center while maintaining LAN-like application performance, and it provides locally hosted IT services while reducing the branch-office device footprint.

Cisco WAAS helps organizations to accomplish these primary IT objectives:

- **Application and branch IT services acceleration:** Improve productivity of remote employees.
- **IT hardware consolidation and WAN optimization:** Minimize branch IT costs.
- **Branch IT agility:** Respond rapidly to changing business needs.
- **Simplified data protection:** Ease compliance and business continuity.

Cisco WAAS offers advanced WAN optimization functionality including:

- **Data redundancy elimination (DRE):** WAN bandwidth optimization and improved application performance for all TCP (Transmission Control Protocol) applications.
 - Bi-directional signature-based data compression.
 - Protocol-agnostic traffic acceleration.
 - Persistent Lempel-Ziv (LZ) compression providing up to 5:1 extra compression.
- **Application-specific acceleration:** Improved layer 7 application performance.

- Based on protocols licensed from major application vendors.
- Validated with application vendors.
- Optimized with protocol-specific techniques such as read-ahead, operation batching, multiplexing, and safe caching.
- **Transport flow optimization (TFO):** Improved wide area network throughput.
 - Improved WAN efficiency and handling of WAN conditions, including packet loss, congestion, and recovery.
 - Utilizes auto-discovery for peer detection thus simplifying deployment and configuration.
 - Preserves TCP headers to ensure transparent network integration, thus simplifying ongoing operations and management.
- **Improved user experience:** with new application-specific acceleration of:
 - Common Internet File system (CIFS).
 - Microsoft Outlook messaging API (MAPI).
 - HTTP/S applications such as Oracle, SAP, and Microsoft SharePoint.
 - Secured Socket Layer (SSL) based traffic (available in March 2009)
 - Windows printing protocols.
 - UNIX Network File Services (NFS).
- **Acceleration of Virtualization Desktop Infrastructure (VDI) data stream.**

About Windows Server on WAAS

According to Cisco, its WAAS 4.1 release and its associated Wide Area Virtualization Engine (WAVE) platforms offer customers the ability to host IT services, like Windows Server 2008, on a “virtual blade” in the branch WAAS appliance. The virtualization capability embedded into the WAAS platforms allows organizations to provision local IT services without the need for additional server hardware. For example, organizations can activate local Windows services (e.g., print, DNS, DHCP, or AD) by initializing a virtual machine on the WAAS branch appliance and downloading those services to the platform from a central location. The WAAS Virtual Blades offer organizations full architectural flexibility between services they could consolidate into data centers and services they would host locally in the branch without an increased hardware footprint.

With its WAAS 4.1 release as the basis for the Cisco and Microsoft joint offering, Cisco has expanded its role of WAN optimization to the branch IT services delivery platform, providing these additional benefits:

- **Virtual Blades.** Embedded virtualization technology that allows hosting of third-party applications, servers and associated services on the WAAS platform without the need for additional server hardware.
- **Windows Server on WAAS.** Cisco and Microsoft's joint offering that allows customers the ability to host Windows Server 2003/2008 server instances on the WAAS Virtual Blade.

Customer Interview Highlights

Forrester's conclusions were derived in large part from information received in a series of in-depth interviews with executives and personnel at nine organizations; five of which were using Cisco WAAS and four were using or in the process of deploying Windows Server on WAAS. The following is a brief description of each of the interviewed customers along with a high-level summary of the benefits each experienced.

Customer Interview Highlights – Cisco WAAS

1. Centerstone is the nation's largest provider of community-based behavioral healthcare, offering a full range of mental health services, substance abuse treatment, and related educational services in Indiana and Tennessee. In 2007, Centerstone served 69,000 individuals and families at more than 120 facilities. Forrester conducted an in-depth interview with Howard McClung, IT Director, and Tommy Gillespie, Technology Manager, to understand the benefits Centerstone experienced with WAAS. It has been using WAAS in 40 branch offices and two data centers since late 2006. Centerstone's benefit highlights included:
 - 60% average acceleration of Centerstone's electronic health record application traffic. Centerstone has also been able to increase the number of VoIP devices at branch offices without the need for increased bandwidth.
 - Cost avoidance of eight domain controllers, and three file and print servers at remote branch offices.
 - Cost avoidance of \$12,000 per month, due to deferral of additional bandwidth expenses across 40 branch offices.
 - Reduced average data backup times from 3 to 4 hours to 1 to 2 hours per server at remote branch offices.
2. Amerijet International, Inc. operates its own fleet of all cargo aircraft and ground service equipment, allowing it to provide flexible transportation schedules and services designed to meet the demands of its customers. In addition, Amerijet's comprehensive domestic ground transportation trucking network allows for expedited delivery of freight in both the continental US and Canada. Forrester conducted an in-depth interview with Patrick Lawrence, IT Director, about Amerijet's experience using Cisco WAAS in its five branches over the past 18 months. Amerijet's benefit highlights include:

The Total Economic Impact™ Of Cisco WAAS And Windows Server On WAAS

- Eliminated the need to install remote file servers and storage.
 - Allowed migration to a centralized SAN storage environment.
 - Maintained LAN-like application performance for remote office employees.
3. This anonymous customer is a European-based chemical and systems manufacturer for the construction, automotive, and general industries. At 170 locations and comprised of more than 15,000 employees around the globe, it is always close to its market and customers. Forrester conducted an in-depth interview with this company's IT Team Leader and its Senior Systems Administrator, about its use of WAAS across 40 of its 170 offices. Its benefit highlights include:
- €9,900 savings in reduced server management costs over three years per branch location.
 - The time to download files from collaboration portals improved from one minute to three seconds.
 - Branch IT support time reduced by one hour per day.
 - WAN bandwidth efficiency improved by 50 percent and reduced server footprint by half.
4. Lafarge is the world leader in building materials, with market-leader positions in all of its businesses: cement, aggregates and concrete, and gypsum. With 90,000 employees in 76 countries, Lafarge posted sales of \$24.7 billion and a net income of \$2.7 billion in 2007. Forrester conducted an in-depth interview with Brent Wolfram, Lead Architect — Enterprise Infrastructure, for Lafarge North America about the benefits of deploying Cisco WAAS across 65 branch sites. Lafarge's benefit highlights include:
- \$250,000 savings per year in operating expenses by not having to support legacy email servers outside the data center.
 - \$420,000 savings in operating expenses through not supporting legacy file, print, and directory services in the field.
 - \$100,000 savings in annual operating expenses by reducing helpdesk, change, and service tickets associated to legacy servers and storage footprints.
 - Three TB (terabytes) of network traffic savings per month in application traffic in 2007; and estimated savings of four TB in network traffic by the end of 2008.
5. Michael Baker Corporation provides professional engineering and consulting expertise for public and private sector clients worldwide. With more than 4,000 employees in 50 offices, the company's markets of focus include aviation, defense, environmental, facilities, geospatial information technologies, homeland security, municipal and civil, pipelines and utilities, transportation, and water. This company is using Cisco WAAS across 32 branch offices today and over the next 12 months will be expanding to 50 branches as equipment leases expire. Forrester conducted an in-depth interview with Jeremy Gill, CIO; and Hugh Barnett and Jeff Gill, both Project Managers in the architecture group. Michael Baker's benefit highlights include:

- \$4,200 to \$7,300 bandwidth expense savings per month across 50 offices.
- More than \$1 million in net benefits across 18 months through more billable hours and less downtime.

Customer Interview Highlights — Windows Server on WAAS

Forrester's conclusions for flexibility option #1 (see Flexibility Options section) were derived in large part from information received in a series of in-depth interviews with executives and personnel at four organizations currently using, or in the process of deploying, Windows Server on WAAS. The following is a brief description of each of the interviewed customers, all of whom requested anonymity:

1. Employing more than 2,300, this organization is one of the largest noncaptive iron foundries in the world, pouring 2 million tons per year. Its markets served include agriculture, construction, automotive, and truck and hydraulics. This organization currently has deployed WAAS at four branches, one of which has deployed Windows Server on WAAS.
2. A Fortune 1000 company and leading retailer of brand name and private-label products, including personal computers, notebook computers, consumer electronics, computer-related accessories, technology supplies, and industrial products. This organization has 32 retail branches and has deployed WAAS and Windows Server on WAAS to 10 sites already.
3. An international law firm with nine offices in the United States and in Europe employing several hundred professionals. WAAS is deployed in two data centers and seven branches. Windows Server on WAAS is currently being tested for a June 2009 implementation where it's expected to be able to eliminate all remaining servers from the seven branches.
4. A regional federal credit union with total assets of about \$900 million and more than 75,000 members providing a wide range of financial products and services, from traditional deposit and loan products to alternative investment and financial planning services. It has piloted both WAAS and Windows Server on WAAS at one branch and expects to implement WAAS and Windows Server on WAAS at all 16 branches by September 2009.

Common Challenges Of Interviewed Organizations

The customers we interviewed for the most part shared several common challenges that caused them to evaluate a WAN optimization solution. These challenges included:

- High costs and operational complexity to operate servers and storage equipment at branch offices.
- Low asset utilization of branch office server installations.
- Isolated storage environments and data stores across multiple branch offices.
- The desire to consolidate and centralize servers and storage into a single data center.
- Cost prohibitive bandwidth upgrades, with questionable gains from the ability of increased bandwidth to address latency issues.

- Difficulty ensuring regulatory compliance and enforcing data protection across multiple branch offices.
- Remote branch office employees' productivity issues due to slow performance of applications across the WAN.
- Increased support burden from branch and remote employees due to rising complaints about network-dependent application performance.
- Desire to keep some Windows-based IT services in the branch on low-cost, low-footprint appliances.

Sample *Organization* Description

In this study, we have created a sample *Organization* to illustrate the quantifiable costs and benefits of deploying Cisco WAAS and Windows Server on WAAS. Our *Organization* is a Fortune 2000-size enterprise. Its branch offices are located in three major geographies worldwide (Europe, US East Coast, and US Midwest). It has 40 branch offices in North America and 10 branch offices in Europe and Asia.

Driven by the need to reduce branch office IT costs and leverage virtualized data center, our *Organization* has decided to:

- Reduce branch IT costs by centralizing branch server hardware and storage into a single data center.
- Improve remote employee productivity by ensuring LAN-like performance of centralized applications over the WAN and maintaining local branch IT services.
- Reduce WAN bandwidth expenses.

Pre-Cisco WAAS and Windows Server on WAAS Environment

- Branch-office and data center topology:
 - One primary data center and one secondary data center for disaster recovery purposes.
 - 50 distributed branch offices of varying sizes.
- Branch-office servers and storage:
 - Two servers at each branch office performing file sharing, print, and domain controller functions, often running the Windows Server operating system.
 - Three of the larger regional branch offices also have Microsoft Exchange Servers.
 - At least one direct attached storage (DAS) or network attached storage (NAS) device at each branch office, tapes for backup purposes, and encryption standards to ensure data protection purposes.

The Total Economic Impact™ Of Cisco WAAS And Windows Server On WAAS

- Weekly full data backups and daily incrementals are done at each site via tapes that are stored offsite. The *Organization* is currently coordinating backups for all of these servers individually.
- Other branch-office equipment:
 - At least one router at each branch location.
 - At least one 24-port switch with Wireless LAN control functions (WLAN) at each branch location.
 - At least one security or unified threat management (UTM) appliance providing firewall, anti-virus IDS/IPS, (intrusion detection systems/intrusion prevention systems) functions.
 - At least one VoIP server or appliance.
- WAN bandwidth:
 - Ranging from 256Kbps for the smallest offices to 1.5Mbps T1 for three large offices.
 - Currently near full saturation as bandwidth needs are growing by at least 10% annually.
- Business applications used in each branch-location:
 - Microsoft file sharing.
 - Microsoft Exchange.
 - Microsoft SharePoint as the Intranet portal.
 - Siebel Customer Relation Management (CRM).
 - PeopleSoft HR application.
 - SAP NetWeaver.
 - NetApp SnapMirror or EMC SRDF for data backup.
- Number of users:
 - Each branch office location has at least 10 users.
 - The three largest branch offices have an average of 200 users each.

Here are the high-level business objectives or strategies that the *Organization* is hoping to achieve by implementing a WAN optimization and application acceleration solution:

- Application acceleration: Improve productivity of remote employees.
- IT consolidation and WAN optimization: Minimize branch IT costs.
- Branch IT agility: Respond rapidly to changing business needs.
- Simplified data protection: Ease compliance and business continuity.

Here are the specific requirements and expectations our sample *Organization* has for WAN optimization and application acceleration products.

- **Improve application performance and minimize WAN bandwidth expenses.** Any solution must improve application performance while minimizing WAN bandwidth consumption.
- **Consolidate maximum number of branch-IT infrastructure components.** The solution must provide a significant level of branch-IT equipment consolidation to reduce device footprints and operational costs.
- **Provide ease of deployment.** The solution must be easily integrated into the sample *Organization's* existing network infrastructure.
- **Provide ease of operations and management.** The solution must not change the *Organization's* existing networking policies, including QoS (quality of service), monitoring, and application response time management.
- **Require no changes to applications and minimize risks.** There must not be any changes required to business applications. In addition, the solution must be validated by application vendors to ensure proper integration and reduce risks of incompatibility and failures.
- **Support existing security policies.** The solution must not accelerate application delivery at the expense of creating new security vulnerabilities or violating current security standards.
- **Minimize downtime.** The WAAS solution must not disrupt normal services.

The Sample *Organization* Chooses Cisco WAAS

With its growing bandwidth needs, the *Organization* did not want to increase the capacity of its WAN, unless it was absolutely essential. The *Organization* understood that latency was an issue, and, in most cases, adding bandwidth alone would not be the best solution to the problem. In addition, with redundant links to each site, adding capacity to the WAN was an expensive proposition that would add considerably to its monthly operational costs. After several months of research, our *Organization* chose Cisco WAAS to address its WAN optimization challenges.

Below is a description of the Cisco WAAS configuration, support, and training. Pricing can be found in the Costs section below. Configuration and pricing for the Windows Server on WAAS solution can be found in the Flexibility Options section.

- Data centers:
 - A pair of wide area application engine (WAE) 7371s with enterprise license at the data center with redundant configuration for high availability.

- WAAS Central Manager running on a WAE 512 at the data center.
- International branch offices:
 - 10 NME-WAE 502 network modules with enterprise license that can be inserted into existing Cisco Integrated Services Router (ISR) 2811 at 10 international branch offices.
- North American branch offices:
 - 15 NME-WAE 502 network modules with enterprise license that can be inserted into existing Cisco Integrated Services Router (ISR) 2811 at 15 North American branch offices.
 - 25 wide area virtualization engine (WAVE) 474s with enterprise licenses for 25 North American branch offices.
- Annual support cost for primary data center and branch office WAEs and WAVEs - onsite 8x5xNBD (next business day) service.
- Cisco professional services for planning, training, and implementation support.

TEI Framework

Introduction

From the information gathered in the in-depth customer interviews, Forrester has constructed a TEI framework for those organizations considering implementation of Cisco WAAS and Windows Server on WAAS. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that impact the investment decision.

Sample Organization

Based on the interviews with the nine existing customers provided by Cisco, Forrester constructed a TEI framework, a sample *Organization*, and an associated ROI analysis that illustrates the areas impacted financially. The sample *Organization* that Forrester synthesized from these results is described above and in Appendix A.

Framework Assumptions

Table 2 lists the discount rate used in the PV (present value) and NPV (net present value) calculations, the time horizon used for the financial modeling, and other costs.

Table 2: General Assumptions

General assumptions	Value
Discount rate used to compute NPV	12%
Annual server life cycle costs (hardware, Windows Server license, infrastructure, and maintenance costs)	\$3,300
Length of analysis	Three years

Source: Forrester Research, Inc.

Costs

Costs are an important part of the TEI model. Costs, or IT impact, are calculated as a change in costs primarily to IT as a result of the introduction of the technology to the *Organization*. Therefore, the introduction of the WAAS affects IT budgets negatively with the purchase of the solution, as well as positively, in terms of the potential cost savings and efficiencies created (see the Benefits and Savings section below).

The impact of cost is accrued in two different areas described below: Cisco WAAS solution costs and the *Organization's* internal preparation and planning costs, which together amount to **\$613,580**.

Costs For The Cisco Solution — \$599,180

- **\$498,875** — Cisco WAAS hardware and enterprise licenses.
- **\$3,000** — Cisco professional services fees for planning, training, and implementation.
- **\$97,305** — Three years of Cisco annual support cost (\$32,435 per year) for data centers and branch offices WAEs and WAVEs (onsite 8x5xNBD service). Hardware and Software support for the WAAS Network Modules are fully covered by the purchase of the SMARTnet contract for the ISR router in which the module is deployed. No additional support contracts are required. Forrester assumes the reader has already purchased a SMARTnet contract for each ISR Router.

Internal Preparation And Planning Labor — \$14,400

- A readiness assessment that looks at costs, benefits, and risks along with detailed planning, are essential for a successful WAN optimization initiative. Based on interviews with current Cisco customers, our *Organization* required one architect and two senior network analysts (300 hours total at \$48 per hour) to properly size the solution, identify optimum methods of traffic interception, achieve equal load balancing and high availability within the core, and document the solution.

Table 3: Organization — The Costs Of Implementing Cisco WAAS

Total costs	Initial	Year 1	Year 2	Year 3	Total	NPV
Cisco WAAS hardware and enterprise licenses *	\$498,875	\$0	\$0	\$0	\$498,875	\$498,875
Cisco professional services fees for planning, training, and implementation *	\$3,000	\$0	\$0	\$0	\$3,000	\$3,000
Cisco annual support costs*	\$0	\$32,435	\$32,435	\$32,435	\$97,305	\$77,903
Internal preparation and planning labor	\$14,400	\$0	\$0	\$0	\$14,400	\$14,400
Total costs	\$516,275	\$32,435	\$32,435	\$32,435	\$613,580	\$594,178

Source: Forrester Research, Inc.

* Cisco pricing is based on normal and average discounts off Cisco's list price as of December 2008.

Benefits And Savings

In addition to the costs associated with the Cisco solution, there were positive IT cost savings and benefits associated with WAAS. Several of these benefits were quantifiable (see below); however, the customers that Forrester interviewed were not able to quantify the following important benefits that the reader should consider:

- Increased productivity of remote branch employees due to improved access to mission-critical information and systems.
- Improved performance of revenue-generating applications.
- Streamlined disaster recovery procedures via accelerated remote backups.

Based on an analysis of the interviews with the participating customers, the following quantifiable benefits were attributed to the *Organization* as a result of implementing Cisco WAAS.

Cost Savings: Bandwidth Savings — \$1,402,500

When the *Organization* began centrally deploying applications prior to implementing Cisco WAAS, there was noticeable degradation on its multiprotocol label switching (MPLS) WAN when transmitting over its T1, OC3, and DS3 lines (across its 50 branches) that greatly compromised the application performance to which users had been accustomed. When IT attempted to centralize application deployment, the performance was far less than expected with a considerable increase in time to open a file. Many remote branches are connected via a T1 where the application performance was unacceptable, and the *Organization* ended up having to spread out application deployments in disparate locations, counter to the aims of centralization.

The Total Economic Impact™ Of Cisco WAAS And Windows Server On WAAS

Most of the interviewed organizations reported that following the upgrade to the Cisco WAAS devices, traffic began routing through at speeds that were on par with LAN speeds at the local offices. Cisco WAAS also minimized WAN bandwidth expenses for the interviewed customers with reported reductions between 40% and 69% in bandwidth usage. For our sample *Organization*, the average bandwidth cost per branch prior to implementing Cisco WAAS was \$1,700 per month or \$20,400 annually (\$1,020,000 annually for 50 branches). After implementing Cisco WAAS, bandwidth expenses were reduced by 55% to \$765 per month or \$9,180 annually (\$459,000 for 50 branches) resulting in an average annualized bandwidth savings per office of \$11,220 (\$561,000 for 50 branches). As with most of the interviewed customers, our *Organization* installed Cisco WAAS over a period of 12 months across its 50 branches. Application centralization was also possible due to the homogeneity of WAN link speeds. Table 4 below depicts the total bandwidth savings.

Table 4: *Organization* — Bandwidth Savings (Non risk-adjusted)

	Year 1	Year 2	Year 3	Total	NPV
Average number of branches using Cisco WAAS	25	50	50	—	—
Average annual savings per branch	\$11,220	\$11,220	\$11,220	—	—
Total bandwidth cost savings across all branches	\$280,500	\$561,000	\$561,000	\$1,402,500	\$1,096,981

Source: Forrester Research, Inc.

The total three year bandwidth savings is **\$1,402,500**.

Cost Savings: Bandwidth Upgrades Avoided Or Delayed — \$540,000

Key among the quantified benefits of investing in Cisco WAAS for this *Organization* has been the cost avoidance and postponement of bandwidth expansion. With the ability to control streaming content, setting policies around both recreational and legitimate business content, and the ability to accelerate applications through compression and caching techniques, the *Organization* was able to delay planned upgrading of circuits in 15 of the largest branches over the next three years (five branches per year). Average cost avoidance savings per branch, as reported by the interviewed customers, was at \$1,500 per month (\$18,000 annually), per branch. Table 5 depicts the total savings in bandwidth upgrades avoided.

Table 5: Organization — Savings In Bandwidth Upgrades Avoided (Non risk-adjusted)

	Year 1	Year 2	Year 3	Total	NPV
Cumulative number of branches avoiding upgrades	5	10	15	—	—
Average annual cost avoidance per branch	\$18,000	\$18,000	\$18,000	—	—
Total bandwidth <u>upgrade</u> savings across all branches	\$90,000	\$180,000	\$270,000	\$540,000	\$416,033

Source: Forrester Research, Inc.

The total three-year hardware savings in bandwidth upgrades avoided is **\$540,000**.

Cost Savings: A Reduction In Server Hardware And Software Maintenance — \$187,500

Upon implementation of the Cisco WAAS solution, most interviewed customers were able to reduce by an average of *half* the number of branch Windows file and print servers and experienced savings associated with the reduction in server hardware maintenance and software support. For our *Organization*, we estimate that the savings associated with a reduction in 50 *existing* servers' hardware maintenance and software support would be \$1,500 per server per year, or **\$75,000** annualized based on a reduction of 50 file and print servers coinciding with the phased implementation of Cisco WAAS during Year 1. Table 6 depicts the total server hardware maintenance and software support savings.

Table 6: Organization — Savings In Branch Server Maintenance and Software Support (Non risk-adjusted)

	Year 1	Year 2	Year 3	Total	NPV
Cumulative average number of branch servers reduced	25	50	50	—	—
Average annual hardware maintenance and software support	\$1,500	\$1,500	\$1,500	—	—
Savings in server hardware maintenance and software support	\$37,500	\$75,000	\$75,000	\$187,500	\$146,655

Source: Forrester Research, Inc.

The total three-year branch server maintenance and software support cost savings as a result of reducing the number of existing file and print servers is **\$187,500**.

Cost Avoidance: Ability To Forgo Replenishment Of 50 Servers — \$237,600

In the preceding section, we recognized the total three-year branch server maintenance and licensing cost savings as a result of reducing the number of existing file and print servers.

We now need to recognize the cost avoidance of not having to replace those 50 servers with replenishment servers. Assuming a four-year server life cycle, the *Organization* would have had to replace 12 servers per year at an annual life cycle cost of \$3,300 each, calculated as follows:

- It would have purchased 12 new file and print servers in Year 1 at a server life cycle cost of \$3,300 per year, or \$9,900, over the remaining *three* years of this analysis for hardware, Windows server license, infrastructure, and maintenance costs. Total cost avoidance savings associated with these 12 servers is **\$118,800** over the remaining *three* years.
- It would have purchased 12 new file and print servers in Year 2 at a server life cycle cost of \$3,300 per year, or \$6,600, over the remaining *two* years of this analysis for hardware, Windows server license, infrastructure, and maintenance costs. Total cost avoidance savings associated with these 12 servers is **\$79,200** over the remaining *two* years.
- It would have purchased 12 new file and print servers in Year 3 at a server life cycle cost of \$3,300 per year, or \$3,300, over the remaining *one* year of this analysis for hardware, Windows server license, infrastructure, and maintenance costs. Total cost avoidance savings associated with these 12 servers is **\$39,600** over the remaining *one* year.

Table 7 depicts the total savings of avoiding replenishment of branch servers.

Table 7: *Organization* — Savings By Avoiding Replenishment Of Branch Servers (Non risk-adjusted)

	Year 1	Year 2	Year 3	Total	NPV
Number of replacement branch servers <i>avoided</i>	12	12	12	36	—
Annual server life cycle cost remaining	\$9,900	\$6,600	\$3,300	—	—
Total savings avoiding replenishment of branch servers	\$118,800	\$79,200	\$39,600	\$237,600	\$197,396

Source: Forrester Research, Inc.

The total three-year cost avoidance savings associated with not having to replace the existing file and print server base is **\$237,600**.

Here are a summary of the benefits and costs savings included in Tables 4 to 7.

Table 8: Organization — Summary Benefits And Cost Savings (Non-risk-adjusted)

Total benefits and cost savings	Year 1	Year 2	Year 3	Total	NPV
Total bandwidth cost savings across all branches	\$280,500	\$561,000	\$561,000	\$1,402,500	\$1,096,981
Total bandwidth upgrade avoidance savings across all branches	\$90,000	\$180,000	\$270,000	\$540,000	\$416,033
Total savings in server hardware maintenance and software support	\$37,500	\$75,000	\$75,000	\$187,500	\$146,655
Total savings avoiding replenishment of branch servers	\$118,800	\$79,200	\$39,600	\$237,600	\$197,396
Total benefits and cost savings	\$526,800	\$895,200	\$945,600	\$2,367,600	\$1,857,065

Source: Forrester Research, Inc.

Risk

Risk-adjusted and non risk-adjusted ROI are both discussed in this study. The *Organization's* individual costs and benefits are quoted in non risk-adjusted (best case) terms and before risk adjustments are made. The assessment of risk provides a range of possible outcomes based on the risks associated with IT projects in general and specific risks relative to WAN optimization technology projects. In our research, we see that implementing the Cisco WAAS solution was a relatively low-risk endeavor if organizations take the time to thoroughly plan the transition process, including completing a readiness assessment that evaluates costs, benefits, and risks.

Risk factors are used in TEI to widen the possible outcomes of the costs and benefits (and resulting savings) associated with a project. Since the future cannot be accurately predicted, there is risk inherent in any project. TEI captures risk in the form of risks-to-benefits and risks-to-costs.

Measurement of risk is a way of incorporating the levels of confidence and uncertainty regarding the cost and benefit estimates of a given investment. Higher confidence that the costs and benefit estimates will be met implies that the level of risk is lower, and the variation between the risk-adjusted and non risk-adjusted outcomes is minimized.

The following *general* risks were considered in this study:

- Lack of organizational discipline in creating processes and procedures to best take advantage of the benefits.

- Lack of appropriate training for IT personnel who will be responsible for optimizing the full benefit potential from the Cisco WAAS solution.
- The potential that the benefits will not be measured and quantified in the future, and as a result, no TEI benefit would be captured and acknowledged.
- Internal inertia, conflicting priorities, and turnover, reducing the organization's ability to achieve the benefits.
- Once branch servers are consolidated to the data center, each potential point of failure in the server farm will put significantly more data at risk.

The following risks associated with Cisco WAAS were considered in this study:

- The inability of an organization to find, train, or retain network administrators fluent in Cisco's networking products overall.
- The need to foster cohesion between the network team and the server/storage teams to ensure the CIFS configuration is properly configured in order for users to be able to access network shares.

For this study, Forrester **applied a 15% risk adjustment (reduction of 15%) to all benefits** to reflect the risks listed above. We have not risk-adjusted costs as these were primarily fixed price quotes from Cisco.

If a risk-adjusted ROI still demonstrates a compelling business case, it raises confidence that the investment is likely to succeed since 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 value considering risk. Assuming normal success at mitigating risk, the risk-adjusted numbers should more closely reflect the expected outcome of the investment.

Flexibility Options (Future)

Flexibility Option #1 – Windows Server on WAAS (benefits quantified for this study)

Flexibility, as defined by TEI, represents investing in additional capacity or agility that can be turned into business benefit for some *future* additional investment. Forrester and the four customers interviewed specifically for Windows Server on WAAS believe that investing in Cisco WAAS for remote offices provides a ready platform for deploying Windows servers virtually in branch offices, specifically the ability to eliminate one more branch server for Active Directory, print services, DNS, and DHCP and experienced savings associated with the reduction in server hardware maintenance and software support and the cost avoidance of server replenishment. For purposes of our sample *Organization* we are deploying Windows Server on WAAS at 25 branches which will allow for the elimination of 25 servers (Active Directory, print services, DNS, and DHCP) coinciding with the phased implementation of Windows Server on WAAS in the middle of Year 1

Customer Interview Highlights – Windows Server on WAAS

Forrester's conclusions for flexibility option #1 were derived in large part from information received in a series of in-depth interviews with executives and personnel at four organizations currently using or in the process of deploying Windows Server on WAAS. See descriptions of these four organizations in the Customer Interview Highlights section.

Flexibility Option #1 Costs For The Windows Server On WAAS Solution — \$50,000

- **\$50,000** — WAAS Virtual Blade Windows Server 2008 licenses for the 25 North American branch offices with Wide Area Virtualization Engine (WAVE) 474s running enterprise licenses (\$2,000 per Virtual Blade software license per branch). The sample *Organization* will not need to purchase new Windows Server 2008 licenses as they may use the licenses from the physical branch servers being eliminated for Active Directory, print services, DNS, and DHCP.

Note – According to Cisco its annual software support cost for WAAS Virtual Blade software operating on branch offices WAVEs (onsite 8x5xNBD service) is fully covered by the purchase of the SMARTnet contract for the WAVEs. No additional support contracts are required.

Flexibility Option #1 Benefits For The Windows Server On WAAS Solution — \$93,000

Upon the future implementation of Windows Server on WAAS, our sample *Organization* is expecting to eliminate *one* more server in *half* of its 50 branches (25 servers) for Active Directory, print services, DNS, and DHCP, and it should experience savings associated with the reduction in server hardware maintenance and physical server licensing. For our *Organization*, we estimate that the savings associated with a reduction in 25 *existing* servers' hardware maintenance and software support would be \$1,500 per server per year, or **\$37,500** annualized based on a reduction of 25 Active Directory, print services, DNS, and DHCP servers coinciding with the phased implementation of Windows Server on WAAS in the middle of Year 1. Table 9 depicts the total server hardware maintenance and software support savings.

Table 9: *Organization* — Flexibility Option Savings In Branch Server Maintenance And Software Support (Non-Risk-Adjusted)

	Year 1	Year 2	Year 3	Total
Cumulative average number of branch servers reduced	12	25	25	25
Average annual hardware maintenance and software support	\$1,500	\$1,500	\$1,500	—
Flexibility option savings in server hardware maintenance and software support	\$18,000	\$37,500	\$37,500	\$93,000

Source: Forrester Research, Inc.

The total branch server maintenance and software support cost savings as a result of reducing 25 existing Active Directory, print services, DNS, and DHCP servers is **\$93,000**.

Flexibility #1 Cost Avoidance: Ability To Forgo Replenishment Of 25 Servers — \$118,800

In the preceding section, we recognized the total branch server maintenance and software support cost savings as a result of reducing the number of existing Active Directory, print services, DNS, and DHCP servers.

The Total Economic Impact™ Of Cisco WAAS And Windows Server On WAAS

We now need to recognize the cost avoidance of not having to replace those 25 servers with replenishment servers. Assuming a four-year server life cycle, the *Organization* would have had to replace six servers per year at an annual life-cycle cost of \$3,300 each, calculated as follows:

- It would have purchased six new servers in Year 1 at a server life-cycle cost of \$3,300 per year, or \$9,900, over the remaining *three* years of this analysis for hardware, Windows Server license, infrastructure, and maintenance costs. Total cost avoidance savings associated with these six servers is **\$59,400** over the remaining *three* years.
- It would have purchased six new servers in Year 2 at a server life-cycle cost of \$3,300 per year, or \$6,600, over the remaining *two* years of this analysis for hardware, Windows Server license, infrastructure, and maintenance costs. Total cost avoidance savings associated with these six servers is **\$39,600** over the remaining *two* years.
- It would also have purchased six new servers in Year 3 at a server life-cycle cost of \$3,300 per year, or \$3,300, over the remaining *one* year of this analysis for hardware, Windows Server license, infrastructure, and maintenance costs. Total cost avoidance savings associated with these 12 servers is **\$19,800** over the remaining *one* year. Table 10 depicts the total savings of avoiding replenishment of branch servers.

Table 10: *Organization* — Flexibility Option #1 Savings of Avoiding Replenishment Of Branch Servers (Non-Risk-Adjusted)

	Year 1	Year 2	Year 3	Total
Number of replacement branch servers <i>avoided</i>	6	6	6	18
Annual server life cycle cost remaining	\$9,900	\$6,600	\$3,300	—
Total flexibility option savings avoiding replenishment of branch servers	\$59,400	\$39,600	\$19,800	\$118,800

Source: Forrester Research, Inc.

For this flexibility option, the total cost avoidance savings associated with not having to replace the existing branch server base is **\$118,800**. Total benefits and savings associated with flexibility option #1 is **\$211,800**; and the associated total costs are **\$50,000**.

The value of flexibility is clearly unique to each organization, and the willingness to measure its value varies from organization to organization. For the purpose of this analysis, we have assumed that our *Organization* sees the future value in having the option to implement Windows Server on WAAS in the year after its WAAS implementation in order to eliminate 25 Active Directory, print services, DNS, and DHCP servers from the branches. The risk-adjusted value of flexibility option #1 is **\$144,746** and is based on the Black-Scholes Option Pricing formula. (For additional information regarding the flexibility calculation, please see Appendix B.)

Flexibility Option #2 – Cisco WAAS Mobile (not quantified for this study)

Flexibility, as defined by TEI, represents investing in additional capacity or agility that can be turned into business benefit for some *future* additional investment. Forrester and the majority of interviewed customers believe that investing in Cisco WAAS for remote offices lays the groundwork to take advantage of Cisco's WAAS Mobile, a software client solution for smaller branch offices and mobile workers who are most often relying on networks less capable than the enterprise LAN. The Cisco WAAS Mobile solution is designed to deliver consistent performance for transfers of remote files, email attachments, Web pages, and Web-based enterprise applications over narrowband, high-latency, and problematic networks.

With many organizations already employing office-to-office acceleration appliances, the opportunity exists to accelerate mobile and branch users. In most organizations today, the mobile user category represents 20% of total employees and is quickly growing. Use cases and industries likely to reap benefits from using a WAAS Mobile solution are:

- Retail and entertainment outlets.
- Financial services and insurance service branches.
- Field service and sales professionals.
- Remote home workers (home sourced employees) and part-time home workers.
- Occasional business travelers and occasional home workers (day-extenders).

Mobile WAN optimization shares many features with standard WAN optimization, designed to improve application performance by increasing throughput and decreasing latency. It's a symmetrical technology, meaning that technology sits on both ends of the link to help achieve end-to-end optimization. However, unlike traditional WAN optimization, the remote side is a software agent running directly on the endpoint as opposed to a hardware-based appliance at the perimeter of the network. Both mobile and fixed WAN optimizations apply four common acceleration techniques: 1) caching; 2) protocol optimization; 3) compression; and 4) traffic management.

A majority of the nine interviewed organizations indicated that their original investment in Cisco WAAS provided them with the experience and agility to take advantage of this flexibility "option" and the significant savings that WAAS Mobile is forecasted to bring to their organizations. At present, three of the customers Forrester interviewed were currently in the testing phase of implementing the Cisco WAAS Mobile solution; therefore, this study will not attempt to quantify the benefits of flexibility option #2. However, we encourage readers to learn more about Cisco's WAAS Mobile, to determine the potential quantifiable benefits within their organizations.

The value of flexibility is clearly unique to each organization, and the willingness to measure its value varies from organization to organization. For the purpose of this analysis, we have assumed that our *Organization* sees the potential future value (Flexibility Option #2) of using Cisco WAAS Mobile solutions to provide small offices and remote/home workers with LAN-like performance of remote file transfers, email attachments, Web pages, and Web-based enterprise applications over narrowband, high-latency, and problematic networks. The value of the flexibility option (when calculated) is based on the Black-Scholes Option Pricing formula. (For additional information regarding the flexibility calculation, please see Appendix B.)

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, and payback period. Table 9 below shows the *risk-adjusted values* for the *Organization*, applying the risk adjustment method indicated in the Risks section, which was to apply a 15% risk adjustment (reduction of 15%) to all benefits to reflect the risks listed above. No risk adjustments were made to the costs as these represented fixed price quotes from Cisco or internal planning costs.

It is important to note that values used throughout the TEI Framework are based on in-depth interviews with nine Cisco customers and the resulting sample *Organization* built by Forrester. 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 Cisco WAAS.

Key Findings

Table 11 represents a summary of the risk-adjusted costs, benefits, and ROI that the *Organization* expects to realize over a three-year period by deploying Cisco WAAS and Windows Server on WAAS.

Table 11: Organization Costs, Benefits, Flexibility And ROI (Risk-Adjusted)

	Initial	Year 1	Year 2	Year 3	Total	NPV
Total WAAS costs	(\$516,275)	(\$32,435)	(\$32,435)	(\$32,435)	(\$613,580)	(\$594,178)
Total WAAS benefits	\$0	\$447,780	\$760,920	\$803,760	\$2,012,460	\$1,578,505
Future flexibility benefits of Windows Server on WAAS	\$0	\$144,746	\$0	\$0	\$144,746	\$144,746
Total net benefits	(\$516,275)	\$560,091	\$728,485	\$771,325	\$1,543,626	\$1,129,073
Return on investment	190%	—	—	—	—	—
Payback period	11 months	—	—	—	—	—

Source: Forrester Research, Inc.

The three-year, risk-adjusted total NPV (net present value) of **\$1,129,073** represents the net cost savings and benefits attributed to using the Cisco WAAS and Windows Server on WAAS solutions when compared with the costs of the *Organization's* pre-WAN optimization environment (see details above in the Costs, Benefits, Flexibility Options, and Risks sections). In addition, the risk-adjusted ROI was a very favorable **190%**.

Study Conclusions

As the data in this study indicates, Cisco WAAS and Windows Server on WAAS has the potential to provide an excellent return on investment. In addition, the **risk-adjusted ROI of 190%, along with a 11-month payback period** (breakeven point), raises confidence that the investment is likely to succeed since the risks that may threaten the project have already been taken into consideration and quantified. In this study, risks have been modeled conservatively in the hopes of showing worst-case expectations.

In addition, we have assumed that the *Organization* sees the future value in having the option to implement Windows Server on WAAS about six months after its WAAS implementation in order to eliminate 25 Active Directory, print services, DNS, and DHCP servers from the branches. The value of flexibility option #1 is **\$144,746**.

A successful, well-planned implementation should allow quantifiable benefits and cost savings to accrue to the *Organization* in the following areas:

- Bandwidth cost savings across all WAAS-enabled branches.
- Bandwidth increase cost avoidance across all WAAS impacted branches.
- Savings in increased server hardware maintenance and software support.
- Savings of foregoing replenishment of branch servers.

In addition to the benefits quantified in this study, Forrester believes the reader should consider the following important benefits that were not quantified:

- Increased productivity of remote, home worker and branch employees.
- Improved performance of revenue-generating applications.
- Streamlined disaster recovery via accelerated remote backups.

For our *Organization*, Cisco WAAS and Windows Server on WAAS carried a low level of risk, a **positive 190% risk-adjusted ROI, and a reasonable 11-month** horizon to recoup the investment.

We make no assumptions regarding the effects of Cisco WAAS and Windows Server on WAAS at other organizations. This study examines the potential impact attributable to the nine organizations that participated in our examination and applies the common costs and benefits to a representative sample company. The underlying objective of this document is to provide guidance to technology decision-makers seeking to identify areas where value can potentially be created based on using Cisco WAAS and Windows Server on WAAS.

Adopting A WAN Optimization Solution

Multiple benefits can be realized through the adoption of WAN optimization, and the solution can be used to address many business issues; however, implementation of the technology must be tailored to the problem set unique to the organization in question.

Creating A Strategic Plan For Adoption

There are three critical factors to consider prior to a WAN optimization deployment.

- **Understand the application topology.** Gaining an understanding of which applications traverse the WAN and which physical sites rely upon access to those applications is a critical first step to take when considering an investment in WAN optimization. The technology has the highest impact on applications that have a high degree of redundant data; these applications can be easily accelerated using caching, compression, and protocol-specific techniques. This includes the critical Web-based applications such as ERP, CRM, and collaboration tools software. Other applications that benefit from the aforementioned technologies include calendaring and messaging. Although file sharing is not an application per se, both Windows and Unix/Linux environments are also top-tier candidates for WAN optimization and may see 50-times improvements in throughput efficiency. Client/server and server-based applications are less amenable to caching and compression, so expect a milder 15- to 20-times improvement in throughput for these applications and protocols. Lastly, with real-time traffic like voice and video, organizations can expect to experience approximately 10-times improvements using traffic management techniques. These improvements are common to a nationwide network with approximately 100ms of latency, but it will vary depending on where your organization falls relative to those assumptions.
- **Identify causes of application performance woes.** Pinpointing the root cause of the application performance issue is the next critical step as WAN optimization solutions are evaluated. In many cases, a faulty database or over-utilized server could be introducing application performance hits to the environment. In addition, it is important to consider that rogue applications or bandwidth hogs such as video streaming applications may also be impacting performance of the network. To pinpoint these problems, use performance monitoring tools as well as speaking to key areas within IT, like architecture, development, and the help desk, to understand the full issue. In some cases, a more costly investment in WAN optimization may be avoidable, at least in the short term, by addressing these performance detractors.
- **Testing is critical.** Most companies rely on a seven-day testing period to assess the effectiveness of changes and updates to network infrastructure. Forrester advocates a two to four week testing window. The longer timeframe ensures fluctuations in performance will appear, such as spikes and nuances in load and traffic that occur in monthly cycles. Once the IT stakeholders have selected a testing window, deploy WAN optimization gear across a sample link and measure actual gains. As a tip, isolate each optimization technique so you can measure the individual gains from caching, protocol optimization, compression, and traffic management.

Making The WAN Optimization Investment Decision

Be sure to focus your WAN optimization investment decision on six key criteria:

- **Transparency to preserve network characteristics.** One of the most common pitfalls in deploying WAN optimization is deploying a solution that alters your network characteristics.

For example, many solutions will run in a default tunnel mode that automatically maps all traffic to a single TCP port. As a result, it becomes difficult to maintain network transparency, or the ability to see native traffic and application behavior. In other words, some solutions converge all traffic across a single port, which makes it difficult to see individual applications. The workaround is to export traffic or provide network probes, but this can still impact an organization's ability to conduct network capacity planning, troubleshooting, and other network management processes. To avoid this pitfall, invest in a WAN optimization solution that can maintain network transparency. At the very least, make sure the solution preserves application header information. However, more sophisticated solutions will inherently overcome transparency issues by using routing instead of creating explicit Layer 4 tunnels among all the sites.

- **Accelerated application performance.** Clearly, the WAN optimization solution must achieve or exceed your application performance goals, including but not limited to core business resources such as file sharing, HTTP/HTTPS web-based applications, and collaboration applications like Microsoft Exchange and SharePoint. Additionally, a WAN optimization solution that has been validated by major application vendors (e.g. Microsoft, Oracle, SAP) will help reduce risks of incompatibility, and thus validated products and designs should be taken into consideration.
- **Scalability of throughput, sessions, and disk capacity.** Another critical selection criterion is scalability. Today's organizations are experiencing exponential growth in WAN bandwidth capacity. However, most organizations overlook scalability when selecting a WAN optimization technology. Most will focus on the throughput of the device — i.e., how much WAN-side traffic can pass through the box. However, the other two elements of scalability are equally important. Session scalability focuses on how many IP sessions (e.g., TCP sessions) the box can simultaneously process. Focus on solutions that can handle at least 40,000 TCP sessions or greater as a measure of session scalability. Likewise, you must ensure your WAN optimization solution can support a scalable disk architecture that supports up to hundreds of gigabytes of storage. Smaller disk capacities will limit dictionary size for critical caching and data redundancy elimination functions. If you overlook all these dimensions of scalability, you may end up with a solution that cannot optimize all traffic flowing through the appliance — regardless of the rated throughput.
- **Ability to integrate with existing branch services using virtualization.** The next criterion is the ability for a solution to foster build-on flexibility. Beyond just multiple form factors (noted below), WAN optimization solutions should also be a platform to enable further branch office consolidation. In addition to the savings highlighted in this study, many organizations will further pull remote servers into their data center including file, print, domain controllers, and directory servers. However, several branches will require that local servers stay behind to provide high-availability in the case of a WAN outage. Top WAN optimization solutions provide the ability to run these services integrated on the WAN optimization appliance. The underlying technology is enabled by virtualization so that these services run as guest services on the host WAN optimization controller. This keeps services — like those running on Microsoft Windows Server such as domain controllers as well as print and file servers — logically isolated so that performance and reliability will not impact the WAN optimization functions.
- **Flexibility in form factors.** As WAN optimization matures, organizations demand that the technology fit a myriad of form factors. For larger sites, a dedicated appliance makes sense. However, for smaller sites a dedicated solution is not always the right form factor. Instead, to optimize economics, focus on solutions that can be integrated with other branch elements like existing routers and servers. This will allow for solutions that are a fraction of

the cost of a standalone appliance where the number of users and scalability requirements are less stringent. In fact, in many branch sites where there are fewer than 10 users or for mobile users, consider a software form factor to be deployed directly on endpoint machines. However, the most important aspect is to select a vendor that can support multiple form factors so that you can minimize the cost at each location but still make a site-by-site decision for those that require dedicated hardware.

- **Interoperate with and accelerate real-time applications.** The final selection criterion requires focusing on a solution that will best interoperate with and accelerate real-time applications, given their ever growing importance. A WAN optimization solution that interoperates with your existing QoS to ensure optimum voice over IP (VoIP) and video performance will ease implementation and ongoing operations, rather than requiring wholesale changes to QoS policy. In addition, given that there are two forms of video applications – on demand (pre-recorded) and live video (real-time streaming), making sure the WAN optimization solution can accelerate both on demand and live video will provide maximum cost savings and minimize operational complexity, as well as provide the most flexibility to support ongoing company communications strategies.. Lastly, with desktop virtualization (AKA Virtual Desktop Infrastructure or VDI) emerging as a key technology trend, a WAN optimization solution that can demonstrate significant acceleration benefits should be considered (especially if validated by leading VDI solution providers, as noted above for other application vendors).

Overall, the potential for bringing improved performance and efficiency gains to an organization through the implementation of WAN optimization should provide a clear roadmap and a logical vendor selection prior to implementation.

Appendix A: Sample *Organization* Description

In this study, we have created a sample *Organization* to illustrate the quantifiable costs and benefits of deploying Cisco's WAAS and Windows Server on WAAS. Our *Organization* is a Fortune 2000-size enterprise. Its branch offices are located in three major geographies worldwide (Europe, US East Coast, and US Midwest). It has 40 branch offices in North America and 10 branch offices in Europe and Asia.

Driven by the need to reduce branch office IT costs and leverage virtualized data center, our *Organization* has decided to:

- Reduce branch IT costs by centralizing branch server hardware and storage into a single data center.
- Improve remote employee productivity by ensuring LAN-like performance of centralized applications over the WAN and maintaining local branch IT services.
- Reduce WAN bandwidth expenses.

Pre-Cisco WAAS Environment

- Branch-office and data center topology:
 - One primary data center and one secondary data center for disaster recovery purposes.
 - 50 distributed branch offices of varying sizes.
- Branch-office servers and storage:
 - Two servers at each branch office performing file sharing, print, and domain controller functions often running the Windows operating system.
 - Three of the larger regional branch offices also have Microsoft Exchange Servers.
 - At least one direct attached storage (DAS) or network attached storage (NAS) device at each branch office, tapes for backup purposes, and encryption hardware or software for data protection purposes.
 - Weekly full data backups and daily incrementals are done at each site with the tapes that are sent offsite. The *Organization* is currently coordinating backups for all of these servers individually.
- Other branch-office equipment:
 - At least one router at each branch location.
 - At least one 24-port switch with Wireless LAN (WLAN) at each branch location.

The Total Economic Impact™ Of Cisco WAAS And Windows Server On WAAS

- At least one security or unified threat management (UTM) appliance providing firewall, anti-virus, IDS/IPS (intrusion detection systems/intrusion prevention systems) functions.
- At least one VoIP server or equipment.
- WAN bandwidth:
 - Ranging from 256Kbps for the smallest offices to 1.5Mbps T1 for three large offices.
 - Currently near full saturation, as bandwidth needs are growing by at least 10% annually.
- Business applications used in each branch-location:
 - Microsoft file sharing.
 - Microsoft Exchange.
 - Microsoft SharePoint as the Intranet portal.
 - Siebel Customer Relation Management (CRM).
 - PeopleSoft HR application.
 - SAP NetWeaver.
 - NetApp SnapMirror or EMC SRDF for data backup.
- Number of users:
 - Each branch office location has at least 10 users.
 - The three largest branch offices have an average of 200 users each.

Here are the high-level business objectives or strategies that the *Organization* is hoping to achieve by implementing a WAN optimization and application acceleration solution:

- Application acceleration: Improve productivity of remote employees.
- IT consolidation and WAN optimization: Minimize branch IT costs.
- Branch IT agility: Respond rapidly to changing business needs.
- Simplified data protection: Ease compliance and business continuity.

Here are the specific requirements and expectations the *Organization* has for WAN optimization and application acceleration products:

- **Improve application performance and minimize WAN bandwidth expenses.** Any solution must improve application performance while minimizing WAN bandwidth consumption.
- **Consolidate maximum number of branch-IT equipment.** The solution must provide a significant level of branch-IT equipment consolidation to reduce device footprints and costs.
- **Provide ease of deployment.** The solution must be easily integrated into the sample *Organization's* existing network infrastructure.
- **Provide ease of operations and management.** The solution must not change the *Organization's* existing networking policies, including QoS (quality of service), monitoring, and application response time management.
- **Require no changes to applications and minimize risks.** There must not be any changes required to business applications. In addition, the solution must be validated by application vendors to ensure proper integration and reduce risks of incompatibility and failures.
- **Support existing security policies.** The solution must not accelerate application delivery at the expense of creating new security vulnerability.
- **Minimize downtime.** The WAAS solution must not disrupt normal services.

Appendix B: Total Economic Impact™ Overview

Total Economic Impact is a methodology developed by Forrester Research that enhances an organization's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps organizations 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 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 C: Glossary

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, organizations often set a discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 12% for this analysis. Organizations typically use discount rates between 10% and 20% 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): 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 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, or 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 (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 Years 1 through 3 are discounted using the discount rate shown in Table 2 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 inflows and outflows in each year.

Example Table

Category	Initial cost	Year 1	Year 2	Year 3	Total

Source: Forrester Research, Inc.

Appendix D: About The Project Manager



Bob Cormier
Principal Consultant

Bob is a principal consultant for Forrester's Total Economic Impact™ (TEI) service. He is a leading expert on deriving business value from technology investments, specializing in advising clients on the TEI framework — services that help organizations understand the overall financial value of IT strategies and investments. He serves the following client roles:

- **CIOs and their staffs.** Bob serves as a trusted advisor to create consistent, repeatable, and best practice processes to justify and add credibility to technology investments business cases using Forrester's TEI methodology.
- **Technology product management and marketing professionals.** Bob works with these professionals in their efforts to clearly articulate the unique value proposition of their solutions to prospects and customers using Forrester's TEI methodology.

Bob has authored numerous TEI case studies for Forrester's vendor clients. He has also delivered his acclaimed Justifying Technology Investments (JTI) workshop to more than 800 participants representing 400 organizations.

Bob has more than 25 years experience in the IT and consulting industries. Prior to joining Forrester, he held senior-level positions at two leading eBusiness consulting firms, ZEFER and Cambridge Technology Partners. Bob has successfully led company efforts to optimize financial, operational, and resource planning activities, incorporating leading-edge, professional service automation (PSA) applications and enterprise resource planning (ERP) systems. He has also held senior financial management positions at Digital Equipment and Anixter International.

During his career Bob has consulted with global users and vendors of IT and has been a frequent speaker at conferences, events, and seminars.

Education

Bob earned an M.B.A. from Bentley University and a B.S. in business from the University of New Hampshire. As an adjunct professor, he has taught finance and economics courses for more than 10 years at Southern New Hampshire University and Daniel Webster College.