The Total Economic Impact Of WANdisco SVN MultiSite

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Executive Summary

In July 2013, WANdisco commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) enterprises may realize by deploying SVN MultiSite. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of the SVN MultiSite on their organizations.

For the study, Forrester interviewed the director of global software engineering at a Fortune 500 company — referred to as CSA. CSA has a business unit that builds and markets commercial software that generates more than $1 billion in revenue annually. CSA uses WANdisco SVN MultiSite for software development using Subversion — replicating source code to local servers in different geographic locations. By giving developers local access to source code, CSA reduces the time that developers spend waiting as data is copied between locations.

WANdisco SVN MultiSite Reduces The Cost Of Availability, Accessibility, And Recovery Of Source Code

CSA has development centers globally with major locations in the US, England, and India. In its six largest centers, CSA replicates source code for 900 developers using SVN MultiSite. In addition to replicating source code, CSA told Forrester that SVN MultiSite supports many of its needs for backup and recovery.

Although CSA runs nightly and weekly backups, when a server goes down, developers lose work done on the same day as the outage. With the real-time replication of SVN MultiSite, CSA is able to recover the same-day work of developers without purchasing an expensive real-time backup solution. Because CSA has six nodes globally, when a local server does go down, developers are able to access the same data on nodes in other locations.

The impact of CSA using SVN MultiSite is an improvement in developer productivity of more than 4%, in addition to avoiding costs of more than $600,000. Forrester's interview and subsequent financial analysis show that CSA experienced the risk-adjusted ROI, costs, and benefits shown in Table 1.

Table 1

CSA Results — Three-Year Risk-Adjusted ROI

ROI	Payback period	Total benefits (present value)	Total costs (present value)	Net present value
357%	1.7 months	$4,949,565	($1,083,725)	$3,865,840

Source: Forrester Research, Inc.

- **Benefits.** CSA experienced the following benefits:

  o **Increasing developer productivity by reducing latency.** CSA reduced the time that developers spend waiting for builds from 10 to 1.5 hours — an increase in productivity valued at more than $4.4 million.

  o **Increasing developer productivity during debugging.** CSA also increased developer productivity by implementing a common methodology for debugging software, allowing teams in different geographic locations to work together on the same source code, resulting in an increase in developer productivity valued at $909,015.

  o **Recovering same-day work after server outages.** CSA is able to recover the same-day work of developers — work that is usually lost when relying on nightly backups — boosting productivity worth $442,500.

  o **Avoiding purchase of real-time backup solution.** By using SVN MultiSite to restore data, CSA avoids the need for an expensive real-time backup solution, resulting in an avoided cost of $648,000.

- **Costs.** CSA incurred the following costs:

  o **Subscribing to SVN MultiSite.** CSA pays an annual subscription for SVN MultiSite that is based on the number of nodes and users for a total three-year cost of $651,600.

  o **Managing SVN MultiSite servers.** CSA employs two full-time employees who configure and manage its six SVN MultiSite servers. The burdened cost of employees is $510,000.

Disclosures

The reader should be aware of the following:

- The study is commissioned by WANdisco and delivered by the Forrester Consulting group.

- 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 WANdisco/SVN MultiSite.

- WANdisco 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 names for the interviews were provided by WANdisco.

TEI Framework And Methodology

Introduction

From the information provided in the interviews, Forrester constructed a Total Economic Impact™ framework for organizations that are considering WANdisco SVN MultiSite. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

Approach And Methodology

Forrester took a multistep approach to evaluate the impact that WANdisco SVN MultiSite can have on an organization (see Figure 1). Specifically, we:

- **Interviewed WANdisco marketing/sales/consultants personnel and Forrester analysts to gather data relative to SVN MultiSite and the marketplace for SVN MultiSite.**

- **Interviewed an organization currently using WANdisco SVN MultiSite to obtain data with respect to costs, benefits, and risks.**

- **Constructed a financial model representative of the interviews using the TEI methodology.** The financial model is populated with the cost and benefit data obtained from the interviews as applied to the composite organization.

Figure 1

TEI Approach
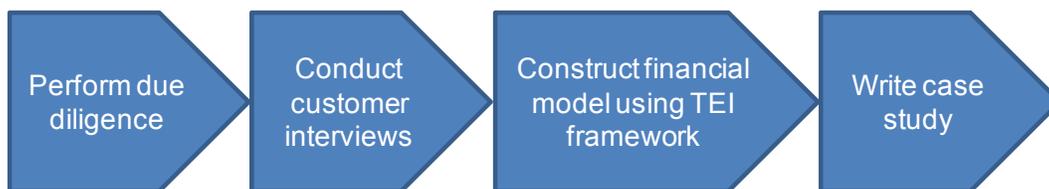
Source: Forrester Research, Inc.

Forrester employed four fundamental elements of TEI in modeling WANdisco/SVN MultiSite's service:

1. Costs.

2. Benefits to the entire organization.

3. Flexibility.

4. Risk.

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

Analysis

Interview Highlights

Forrester interviewed the director of global software engineering at CSA. CSA represents the Fortune 500 company with more than 25,000 employees. In general, the CSA executive described the environment of the development team as:

- **Being located at development centers around the globe.** CSA employs 1,300 development engineers who are located around the globe, with most concentrated in the US, England, and India.

- **Allowing developers to use preferred coding tools.** Developers prefer a variety of coding tools, including open source products, and change their preferences from time to time.

- **Complying with corporate operational policies.** Within CSA, IT auditors examine and test the software development team's workflows and tools, including backup and recovery of source code.

Situation

CSA's commercial software business is more than $1 billion annually and the productivity of software developers is a mission-critical concern for executives. Developers follow standard processes, and tasks are staged through repeatable workflows. CSA told Forrester that developers must:

- **Access the same source code across all locations.** Developers in different locations — and often different continents — must access common source code without spending inordinate amounts of time moving or copying data over networks. SVN MultiSite provides developers with access to the same source code on local servers.

- **Devise solutions to complex problems.** Developers create software that solves complex problems for customers. CSA's executive told Forrester that developers should be free from operational concerns such as latency delays or losing work because of inadequate backups.

  "We try to keep developers developing. We don't want them to feel that they are limited in the tools that they can use or become preoccupied with activities that should be behind the scenes, such as processes for backing up or restoring data. We want to protect the productivity of our developers." (Director, global software engineering at CSA)

- **Synchronize development and debugging.** Team members who are in different locations and working with the same source code must have frequent check-ins to monitor the progress, obstacles, and changes to code. CSA told Forrester that check-in meetings occur much more frequently when teams are using SVN MultiSite and working from the same code.

- **Keep pace with development schedules.** Because developers are working as part of a collective team on commercial software products, meeting deadlines is critical. SVN MultiSite keeps teams in sync and reduces the likelihood of oversights, gaps, or delays.

Solution

After working with a number of Subversion products, CSA's director chose to standardize the development team on SVN MultiSite. According to the CSA executive, SVN MultiSite:

- **Performs better than other Subversion products.** After testing and evaluating a number of Subversion products, CSA standardized on SVN MultiSite because "it just worked better." The CSA director said:

  "I attend a lot of webinars, but leave most of them after 5 to 10 minutes. Repeatedly, WANdisco seems to present more valuable content than others. WANdisco has its finger on the pulse of the industry."
  (Director, global software engineering at CSA)

- **Interoperates effectively with a wide range of development tools.** CSA has a culture that allows developers to use the development tools that they prefer.

  "We want developers to creatively solve customer problems. Developers won't give you their best work or come up with creative solutions if they feel constrained in how they want to work." (Director, global software engineering at CSA)

- **Benefits from WANdisco's embracing open source.** WANdisco built SVN MultiSite on Subversion, an open source platform. It actively supports open source initiatives and provides educational webinars, online guides, and other resources that help CSA optimize the working environment for developers.

Results

Using SVN MultiSite, CSA experienced an increase in the productivity of developers by:

- **Reducing latency during software builds.** SVN MultiSite reduced the time that developers wait for software builds from 10 hours to 1.5 hours, providing a boost in productivity that is the equivalent of 8,978 developer days — 2.7% of CSA's total developer days per year.

- **Improving the efficiency of debugging.** By using SVN MultiSite, developers are 10% more efficient at debugging software, resulting in a productivity boost equivalent to 1,820 developer days — 0.5% of CSA's total developer days annually.

In addition, CSA uses SVN MultiSite as an alternative to backup solutions because it enables:

- **Restoring same-day development work.** Developers often lose the work from the same day as an outage when backups are run nightly. Using SVN MultiSite to restore same-day work saves the equivalent of 3,120 developer days — 0.9% of CSA's total developer time each year.

- **Avoiding the purchase of a real-time backup solution.** By using SVN MultiSite to restore data, the CSA development team is able to avoid purchasing an expensive backup solution for its 120 TBs of data, avoiding a cost of $216,000 annually.

Framework Assumptions

Tables 2 and 3 provide assumptions that Forrester used in this analysis.

Table 2

Model Assumptions

Metric	Value
Hours per week	40
Hours per year (M-F, 9-5)	2,080
Total number of developers	1,300
Developers using SVN MultiSite	900

Source: Forrester Research, Inc.

Table 3

Assumptions About Labor Costs

Metric	Value
Burdened salary of developers in the US	$120,000
Equivalent hourly rate for developers in the US	$57.69
Burdened salary of developers in the UK	$135,000
Equivalent hourly rate for developers in the UK	$64.90
Burdened salary of developers in India	$42,676.75
Equivalent hourly rate for developers in India	$20.52
Blended average hourly rate for developers globally	$47.28

Source: Forrester Research, Inc.

All salary and burden figures are converted into equivalent US dollars based on input from CSA. The discount rate used in the present value (PV) and net present value (NPV) calculations is 10%, and the time horizon used for the financial modeling is three years. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult with their respective companies' finance departments to determine the most appropriate discount rate to use within their own organizations.

Costs

The direct costs incurred by CSA for SVN MultiSite are for:

- Subscribing to SVN MultiSite.

- Managing SVN MultiSite nodes.

CSA incurred some nominal costs to implement SVN MultiSite — the hardware for each node and for the central IT organization to manage the servers — but Forrester excluded the costs from this study because each cost amounts to less than 1% of the total cost of SVN MultiSite for CSA.

Subscribing To SVN MultiSite

CSA pays WANdisco an annual subscription fee based on the number of SVN MultiSite nodes and the number of registered users. The annual fee for CSA is $217,200 resulting in a total three-year cost of $651,600 at the time CSA purchased (see Table 4). Because CSA pays the subscription fees for SVN MultiSite at the beginning of each calendar year, Table 4 shows the payment at the end of the preceding year.

Table 4

Subscribing To SVN MultiSite

Ref.	Cost	Calculation	Initial	Year 1	Year 2	Total
A1	Number of nodes		6	6	6	
A2	Subscription price per node		$20,000	$20,000	$20,000	
A3	Number of users		900	900	900	
A4	Price per user		$108	$108	$108	
At	Total	(A1*A2)+ (A3*A4)	($217,200)	($217,200)	($217,200)	($651,600)

Source: Forrester Research, Inc.

Managing SVN MultiSite Nodes

CSA employs two people (full-time employees [FTEs]) who configure and manage the SVN MultiSite nodes, including maintaining the software, troubleshooting difficulties, validating backups, and restoring data after system outages. The total cost for two employees with fully burdened salaries over three years is $510,000 (see Table 5).

Table 5

Managing SVN MultiSite Nodes

Ref.	Cost	Calculation	Year 1	Year 2	Year 3	Total
B1	FTEs dedicated to managing nodes		2	2	2	
B2	Average burdened salary		$85,000	$85,000	$85,000	
Bt	Total	B1*B2	($170,000)	($170,000)	($170,000)	($510,000)

Source: Forrester Research, Inc.

Total Costs

The total cost that CSA incurs for SVN MultiSite is more than $1.1 million over three years (see Table 6).

Table 6

Total Costs

Ref.	Cost	Initial	Year 1	Year 2	Year 3	Total
At	Subscribing to SVN MultiSite	($217,200)	($217,200)	($217,200)		($651,600)
Bt	Managing SVN MultiSite nodes		($170,000)	($170,000)	($170,000)	($510,000)
	Total	($217,200)	($387,200)	($387,200)	($170,000)	($1,161,600)

Source: Forrester Research, Inc.

Benefits

CSA realized value from four benefits that Forrester quantified. By using SVN MultiSite, CSA:

- Increased developer productivity by reducing latency.

- Increased developer productivity during debugging.

- Recovered same-day work after server outages.

- Avoided purchase of a real-time backup solution.

Increasing Developer Productivity By Reducing Latency

CSA uses SVN MultiSite to reduce the wait times, or latency, that developers experience while moving source code in and out of repositories. Before using SVN MultiSite, an average of 33 developers (2.5% of total developers) were affected by latency delays every day, and the average amount of time that developers waited for builds was 10 hours.

Using SVN MultiSite, the average time that developers wait for builds dropped to 1.5 hours, boosting developer productivity by 8,978 hours of developer time, which is valued at more than $4.4 million (see Table 7).

Table 7

Increasing Developer Productivity By Reducing Latency

Ref.	Benefit	Calculation	Year 1	Year 2	Year 3	Total
A1	Hours spent waiting for builds before		10.0	10.0	10.0	
A2	Hours spent waiting for builds after SVN MultiSite		1.5	1.5	1.5	
A3	Average number of developers affected each working day	1,300*2.5%	33	33	33	
A4	Hourly rate for Indian developers	$40,000/260 days/8 hours	$20.52	$20.52	$20.52	
At	Total productivity increase	(A1-A2)*A3* A4*260	$1,496,354	$1,496,354	$1,496,354	$4,489,063

Source: Forrester Research, Inc.

Increasing Developer Productivity During Debugging

According to the CSA director, developers spend approximately 20% of their time debugging source code, and the productivity of developers during debugging improved by 10% after implementing SVN MultiSite. Developers were more productive, in part, because source code was local. Even if a local server went down, developers could access the same source code on other servers. CSA's director said:

> *"Multiple nodes mean multiple potential points of connection. If one node or site is unavailable, users can continue to use the system by connecting to one of the other five nodes. This prevents lost developer hours and reduces the impact of mistakes."* (Director, global software engineering at CSA)

In addition to reducing latency and providing redundancy, SVN MultiSite allows disparate team members to work on the same source code. When team members are working on the same code, check-ins occur more frequently than they would otherwise, according to CSA's director:

> *"Globally located nodes put source code closer to people working on it. As a result, check-ins between development teams get held much more frequently and granularly. This prevents IP loss at the local level when computers crash [or] get corrupted or when developers inadvertently delete files."* (Director, global software engineering at CSA)

The total increase in developer productivity during debugging is the equivalent of 1,820 developer days, valued at $910,000 over three years (see Table 8).

Table 8

Increasing Developer Productivity During Debugging

Ref.	Benefit	Calculation	Year 1	Year 2	Year 3	Total
B1	Number of remote developers using SVN MultiSite		350	350	350	
B2	Percentage of time spent debugging source code		20%	20%	20%	
B3	Improved productivity during debugging because of reduced latency with SVN MultiSite		10%	10%	10%	
Bt	Total	B1*B2*B3 *2,080 *$20.52	$303,005	$303, 005	$303, 005	$909,015

Source: Forrester Research, Inc.

Recovering Same-Day Work After Server Outages

Because most companies run backups at night, developers usually lose work from the same day that a server goes down. SVN MultiSite provides real-time replication across six servers at CSA, providing a copy that can be used to restore the same-day work for developers.

On average, when a server goes down, it affects 130 developers, and CSA experiences an average of six outages each year. The ability of CSA to recover four hours of work per developer after each outage improves productivity by 3,120 developer hours and is valued at $442,500 over three years (see Table 9).

Table 9

Recovering Same-Day Work After Server Outages

Ref.	Benefit	Calculation	Year 1	Year 2	Year 3	Total
C1	Developers affected by each server outage	1,300*10%	130	130	130	
C2	Average hours of same-day work recovered		4	4	4	
C3	Number of outages annually		6	6	6	
C4	Blended hourly rate of developers globally		$47.28	$47.28	$47.28	
Ct	Total value of productivity increase	C1*C2* C3*C4	$147,500	$147,500	$147,500	$442,500

Source: Forrester Research, Inc.

Avoiding Purchase Of Real-Time Backup Solution

While CSA runs nightly backups, using SVN MultiSite allows CSA to avoid purchasing a real-time backup solution. The CSA director said:

> *"Subversion as a version-control system maintains a living history of whatever is stored within it — be it source code, documents, images, etc. If an item is changed in SVN MultiSite, the previous states of that item are not lost — they are stored as revisions that can be recovered if necessary."* (Director, global software engineering at CSA)

CSA continued by outlining specific ways that SVN MultiSite helps manage source code. Using SVN MultiSite, CSA is able to:

- **Roll back updates.** Development teams may find it necessary to roll back to an earlier state of the code.

- **Research history.** Products with a long history have code embedded that may not make sense any longer. Being able to go back in history and recover the development log for those changes can be invaluable.

- **Identify errors.** People inevitably make mistakes. Teams often remove errors by returning to earlier revisions.

- **Isolate sabotage.** Not all errors are unintentional. It is not unheard of for someone to introduce something malicious into source code. Having a code history allows this to be easily removed and to identify the culprit.

The development team overall has 120 TB of data that would require backing up. By applying an average price of $1,800 per TB, Forrester calculates an annual cost of $216,000 and a total of $648,000 over three years that CSA avoids by using replication instead of real-time backup solutions (see Table 10).

Table 10

Avoiding Purchase Of Real-Time Backup Solution

Ref.	Benefit	Calculation	Year 1	Year 2	Year 3	Total
D1	Data replicated annually in TBs		120	120	120	
D2	Industry price per TB for real-time backup		$1,800	$1,800	$1,800	
Dt	Total avoided cost	D1*D2	$216,000	$216,000	$216,000	$648,000

Source: Forrester Research, Inc.

Total Benefits

The total benefit that CSA gets from using SVN MultiSite is more than $6.4 million over three years (see Table 11).

Table 11

Total Benefits

Ref.	Benefit	Calculation	Year 1	Year 2	Year 3	Total
At	Increasing developer productivity by reducing latency		$1,496,354	$1,496,354	$1,496,354	
Bt	Increasing developer productivity during debugging		$303,005	$303,005	$303,005	
Ct	Recovering same-day work after server outages		$147,500	$147,500	$147,500	
Dt	Avoiding purchase of real-time backup solution		$216,000	$216,000	$216,000	
	Total	At+Bt+ Ct+Dt	$2,162,858	$2,162,858	$2,162,858	$6,489,563

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. This provides an organization with the right or the ability to engage in future initiatives but not the obligation to do so. There are multiple scenarios in which a customer might choose to implement SVN MultiSite and later realize additional uses and business opportunities. Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

Based on CSA's experience, companies may get additional leverage from using SVN MultiSite in the area of:

- **Open source.** Because WANdisco SVN MultiSite is based on open source Subversion and WANdisco is an active promoter of open source software, CSA allows developers to use a variety of tools that enhance productivity or improve the job satisfaction of developers.

- **Labor arbitrage.** Employing WANdisco SVN MultiSite creates the opportunity of deploying nodes in more locations, using SVN MultiSite to replicate source code, and leveraging lower hourly rates by shifting development work to lower-cost locations.

Risk

Forrester defines two types of risk associated with this analysis: implementation risk and impact risk. Implementation risk is the risk that a proposed investment in SVN MultiSite may deviate from the original or expected requirements, resulting in higher costs than anticipated. Impact risk refers to the risk that the business or technology needs of the organization may not be met by the investment in SVN MultiSite, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for cost and benefit estimates.

Quantitatively capturing investment and impact risk by directly adjusting the financial estimates results in more meaningful and accurate estimates and a more accurate projection of the ROI. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates. The risk-adjusted numbers should be taken as realistic expectations since they represent the expected values considering risk.

The following implementation risks that affect costs are identified as part of this analysis:

- The number of server nodes and license costs will vary from company to company.

The following impact risks that affect benefits are identified as part of the analysis:

- The amount paid to developers in different parts of the world will vary.

- The productivity of individual developers — or of geographical teams overall — will determine the precise improvement that a company gains from reduced latency.

- The efficiency of debugging has many variables, many of which can be tied back to replicating source code.

- The time needed to perform audits for security, backup/restore, and other company policies will vary.

- The number of staff needed to support the SVN MultiSite nodes will vary based on location.

Table 12 shows the values used to adjust for risk and uncertainty in the cost and benefit estimates. 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. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

Table 12

Cost And Benefit Risk Adjustments

Costs	Low	Most likely	High	Mean
Subscribing to SVN MultiSite	98%	100%	105%	101%
Managing SVN MultiSite nodes	100%	100%	125%	108%
Benefits	**Low**	**Most likely**	**High**	**Mean**
Increasing developer productivity by reducing latency	50%	100%	110%	87%
Increasing developer productivity during debugging	80%	100%	103%	94%
Recovering same-day work after server outages	92%	100%	105%	101%
Avoiding purchase of real-time backup solution	50%	100%	110%	87%

Source: Forrester Research, Inc.

Financial Summary

The financial results calculated in the Costs and Benefits sections can be used to determine the ROI, NPV, and payback period for the organization's investment in SVN MultiSite. These are shown in Table 13. The financial analysis provided in this study illustrates the potential way an organization can evaluate the value proposition of WANdisco SVN MultiSite. Based on information collected in one in-depth customer interview, Forrester calculated an ROI of 357%, with a payback period of 1.7 months. Forrester anticipates that ROI may increase when SVN MultiSite is deployed in organizations with greater numbers of Subversion users and locations.

Table 13

Cash Flow — Non-Risk-Adjusted

Cash flow — original estimates						
	Initial	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present value**
Costs	($217,200)	($387,200)	($387,200)	($170,000)	($1,161,600)	($1,042,632)
Benefits	$0	$2,162,858	$2,162,858	$2,162,858	$6,488,575	$5,573,896
Net benefits	($217,200)	$1,775,658	$1,775,658	$1,992,858	$5,326,975	$4,531,264
ROI	435%					
Payback period	1.5 months					

Source: Forrester Research, Inc.

Table 14 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk-adjustment values from Table 12 in the Risk section to the cost and benefits numbers in Tables 6 and 11.

Table 14

Cash Flow — Risk-Adjusted

Cash flow — risk-adjusted estimates						
	Initial	**Year 1**	**Year 2**	**Year 3**	**Total**	**Present value**
Costs	($219,372)	($402,972)	($402,972)	($183,600)	($1,208,916)	($1,083,725)
Benefits	$0	$1,920,597	$1,920,597	$1,920,597	$5,761,792	$4,949,565
Net benefits	($219,372)	$1,517,625	$1,517,625	$1,736,997	$4,552,876	$3,865,840
ROI	357%					
Payback period	1.7 months					

Source: Forrester Research, Inc.

WANdisco SVN MultiSite: Overview

According to WANdisco, SVN MultiSite enables LAN-speed collaboration between distributed teams at large global organizations using Apache Subversion, allowing them to work as if they were all at one location. With SVN MultiSite, all repositories are fully readable, writable, and continuously in sync. Leveraging WANdisco's patented replication technology, not only are downtime and data loss eliminated, but also merge conflicts and other issues are resolved when they occur, instead of days later. These capabilities result in shorter development cycles, higher quality, and lower cost. Some of the benefits that WANdisco SVN MultiSite offers include:

- Automated failover and recovery capabilities eliminate downtime and lost productivity during server maintenance, enabling 24x7 operation — when the server returns online, it automatically resynchronizes with the others in the implementation.

- It provides simultaneous checkout and check-in of the same source code files across different locations and the ability to resolve update conflicts and other problems when they occur exist.

- It allows developers and administrators to use the Subversion clients and tools they're familiar with. Subversion's functionality doesn't change because SVN MultiSite's implementation architecture makes it transparent with respect to the underlying Subversion servers and clients accessing those servers.

- It provides continuous hot backup and self-healing capabilities that automate disaster recovery without administrator involvement. The cost and administrative overhead of disk mirroring solutions are avoided.

Appendix A: Total Economic Impact™ Overview

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

Benefits

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

Costs

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

Risk

Risk measures the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: 1) the likelihood that the cost and benefit estimates will meet the original projections, and 2) the likelihood that the estimates will be measured and tracked over time. TEI applies a probability density function known as "triangular distribution" to the values entered. At 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 PV that can be estimated. The flexibility component of TEI captures that value.

Appendix B: 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, companies often set a discount rate based on their business and investment environment. Forrester assumes a yearly discount rate of 10% for this analysis. Organizations typically use discount rates between 8% and 16% based on their current environment. Readers are urged to consult their respective organization to determine the most appropriate discount rate to use in their own environment.

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

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

Payback period: The breakeven point for an investment. This is 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 Framework Assumptions section) 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.

Table [Example]

Example Table

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

Source: Forrester Research, Inc.