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The Total Economic Impact of WANdisco Subversion MultiSite

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Executive Summary

In September 2009, WANdisco commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) enterprises may realize by deploying WANdisco Subversion MultiSite. WANdisco Subversion MultiSite is a software application that enables near-real-time replication of changes to Subversion source code repositories between Subversion servers that are located in geographically disparate locations. This study illustrates the financial impact on a company that is using WANdisco Subversion MultiSite to replicate Subversion servers that are located in the US and Asia.

In conducting in-depth interviews with a WANdisco customer, Forrester found that at any given time, the customer saved up to two man-days of idle time per elapsed day at their Asia-based development sites because developers at these locations did not need to use US-located repositories to store source code against which code builds were run. They also achieved a 30% improvement in the velocity of their bug fix rate by using WANdisco Subversion MultiSite to replicate their bug tracking system to remote sites. Other benefits include zero downtime while performing maintenance on Subversion servers, virtually no ongoing maintenance costs and an improved ability to respond to security audits.

Purpose

The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of WANdisco Subversion MultiSite on their organizations. Forrester's aim is to clearly 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 WANdisco Subversion MultiSite.

Methodology

WANdisco selected Forrester for this project because of its industry expertise in source code management (SCM) 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 WANdisco Subversion MultiSite:

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

Given the increasing sophistication that enterprises 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 A 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 WANdisco Subversion MultiSite and the source code management market in general.
2. Forrester interviewed WANdisco's marketing and sales personnel to fully understand the potential (or intended) value proposition of WANdisco Subversion MultiSite solutions.
3. Forrester conducted an in-depth interview with one organization currently using WANdisco Subversion MultiSite.
4. Forrester constructed a financial model representative of the interview. This model can be found in the "TEI Framework" section below.
5. Forrester created a composite organization based on the interviews and populated the framework using data from the interviews as applied to the composite organization.

Key Findings

Forrester's study yielded three key findings:

- **ROI.** Based on the interview with an existing customer, Forrester constructed a TEI framework and the associated ROI analysis illustrating the financial impact areas. As seen in Table 1, the ROI for our composite company is risk-adjusted 150% with a breakeven point (payback period) of 0.9 years or slightly over 10 months after deployment. The non-risk adjusted or best-case ROI is 167%, with a payback period of 0.8 years.
- **Benefits.** The total three-year benefits are \$776,509 The specific benefits that the company identified are:
 - Enabling the Asian developers to perform builds locally. This eliminated up to two man-days of idle time each day. As a result, the number of builds completed each day increased by 100%.
 - Increasing the development teams' bug find/fix velocity by 30%, because Asian testers were able to perform testing locally.
 - Avoiding developer downtime while maintaining Subversion servers.
 - Clearly identifying the owners and originators of intellectual property.
 - Identifying active Subversion users and reducing the number of Subversion accounts from 800 to 350 after the initial deployment of Subversion MultiSite. After the initial deployment, the number of user accounts increased by 170.
 - Substantially increasing the number of software configurations that they support and release.
- **Costs.** The total three-year costs for deploying and operating WANdisco Subversion MultiSite are \$311,092 Costs include software licenses and maintenance, server hardware, setup and deployment, and ongoing system maintenance.

Table 1 illustrates the risk-adjusted cash flow for the composite organization, based on data and characteristics obtained during the interview process. Forrester risk-adjusts these values to take into account the potential uncertainty that exists in estimating the costs and benefits of a technology investment. The risk-adjusted value is meant to provide a conservative estimation, incorporating any potential risk factors that may later impact the original cost and benefit estimates. For a more in-depth explanation of risk and risk adjustments used in this study, please see the “Risk” section.

Table 1: Composite Company ROI, Risk-Adjusted

Summary Financial Results	Original Estimate	Risk-Adjusted
ROI	167%	150%
Payback period (years)	0.8	0.9
Total costs (PV)	(\$316,476)	(\$311,092)
Total benefits (PV)	\$843,465	\$776,509
Total (NPV)	\$526,989	\$465,417

Source: Forrester Research, Inc.

Forrester found that higher ROIs may be achieved for organizations that: 1) have a larger proportion of geographically distributed developers; 2) have more remote locations; and 3) deploy Subversion servers to more remote locations.

Disclosures

The reader should be aware of the following:

- The study is commissioned by WANdisco and delivered by the Forrester Consulting group.
- 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.
- 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 report to determine the appropriateness of an investment in WANdisco Subversion MultiSite.
- This study is not meant to be used as a competitive product analysis.

WANdisco Subversion MultiSite: Overview

According to WANdisco, WANdisco Subversion MultiSite uses its own unique replication technology to synchronize Subversion repositories connected over a wide-area network (WAN). Users at remote locations experience local-area network (LAN) speed performance for both read and write operations to the Subversion repository (because their copy of the repository is local to them). WANdisco Subversion MultiSite also provides continuous hot backup and self-healing capabilities that automate disaster recovery. Some of the benefits that WANdisco Subversion MultiSite offers include:

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- Near-real-time synchronization of each development site's Subversion repository with its peers at other sites on every commit or other write operation.
- 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.
- Allowing developers and administrators to use the Subversion clients and tools they're familiar with. Subversion's functionality doesn't change because Subversion MultiSite's implementation architecture makes it transparent with respect to the underlying Subversion servers and clients accessing those servers
- 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.

Analysis

As stated in the Executive Summary, Forrester took a multistep approach to evaluate the impact that implementing WANdisco Subversion MultiSite can have on an organization:

- Interviews with WANdisco marketing and sales personnel.
- An in-depth interview with one company currently using WANdisco Subversion MultiSite.
- Construction of a financial framework for the implementation of WANdisco Subversion MultiSite.

Interview Highlights

Forrester interviewed one company for this study. The interviewed company is a Global Fortune 500 US-based manufacturer of electronic components that are used in a broad range of commercial and consumer applications. The company performs software development in two primary locations in the US and Asia. It has three smaller software development facilities in other parts of Asia and Europe. The company has approximately 400 developers working on projects at any given time.

Prior to using WANdisco Subversion MultiSite, the company had a single Subversion repository located in the US. The initial deployment had 40 to 50 developers using the repository. The company uses a home-grown build system, and all builds were executed in the US. Subversion's popularity and usage grew quickly, and within two years the repository held 500,000 source code revisions and supported more than 100 developers. At this stage, developers in Asia began to experience unacceptable delays in moving code in and out of the repository. The delays were caused primarily by the volume of data flowing over the wide-area network between sites in the US and Asia. Also, the Asian developers needed their colleagues in the US to kick off builds in the US, and the time differences between Asia and the US hampered effective communications between the developers. These delays grew over time to the point that developers had to wait up to two days to get build results.

The company realized that to regain control of its development environment, it needed to support multiple repositories in different locations with effective replication between the repositories. The company's primary goals for deploying a repository replication system were to:

- Reduce the latency between remote locations, thereby reducing the wait times for source code check-in and checkout, and to enable builds at three remote locations using a common code base.
- Provide redundancy in the repository/build system so that there was no single point of failure.

The company evaluated numerous alternate open source and commercial SCM solutions as a replacement for Subversion. These were all rejected for performance, technical, and pricing reasons.

The company's WANdisco Subversion MultiSite deployment consists of two Subversion nodes, one in the US and one in Asia that are accessed by multiple development sites in each region. Our in-depth interview with the company found that after using WANdisco Subversion MultiSite in a production environment for nine months, the number of stored source code revisions grew from

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500,000 to millions, and the number of repositories grew from 12 to 32. During this period of rapid growth, the company was able to:

- Eliminate wait time for the Asian developers and allow them to perform builds locally. The number of daily builds increased by 100%. The development manager we spoke to said that “builds are much more real time” and that “people were able to more agilely track what changes were happening in the Subversion source tree, and it made the groups that were distant actually work better together when they didn’t have to wait for things to happen . . .”
- Increase the bug fix rate by 30%, because Asian testers are able to perform testing locally. This benefit was enabled by tying the bug tracking system into Subversion and being able to replicate it at all locations.
- Avoid developer downtime while maintaining Subversion servers. The company was able to direct traffic to servers at other locations where Subversion MultiSite was installed and then automatically resynchronize the servers after maintenance was complete.
- Load-balance between the servers. The company observed a decreased load on the servers despite the growth in the number of revisions.
- Substantially increase the number of software flavors that the company supports and releases. This resulted from Asian testers being able to perform tests and builds locally.
- Grow the number of stored source code revisions from 500,000 to millions and make them accessible to all the developers without any performance degradation.
- Clearly identify the owners and originators of intellectual property.
- Identify active Subversion users and reduce the number of Subversion accounts from 800 to 350. After initial deployment the number of active user accounts was increased by a further 170 to 520.

TEI Framework

Introduction

From the information provided in the in-depth interview Forrester has constructed a TEI framework for those organizations considering implementation of WANdisco Subversion MultiSite. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that impact the investment decision.

Framework Assumptions

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

Table 2: General Assumptions

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

Source: Forrester Research, Inc.

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

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

Table 3: Salary Assumptions

Ref.	Metric	Calculation	Value
A1	Total number of Subversion users		520
A2	Total number of developers/testers		390
A3	Number of developers: Asia location No. 1		150
A4	Number of developers: Asia location No. 2		10
A5	Number of developers: Asia location No. 3		10
A6	Total developers in Asia		170
A7	Number of developers: North America and Europe		220
A8	Number of nondeveloper users		70
A9	Number of downstream dependent developers		60
A10	Average fully loaded developer salary: US and Europe		\$120,000
A11	Average fully loaded developer salary: Asia		\$40,000
A12	Weighted fully loaded average salary		\$83,077
A13	Average fully loaded hourly rate: US and Europe		\$58
A14	Average fully loaded hourly rate: Asia		\$19
A15	Weighted fully loaded hourly rate		\$40

Source: Forrester Research, Inc.

Average developer salaries are best estimates provided by Forrester Research analysts. Forrester recognizes that each organization may experience different pay rates. Readers are encouraged to apply their company's pay rates when evaluating WANdisco MultiSite.

Costs

The costs for implementing WANdisco Subversion MultiSite include software license fees, license maintenance fees, and hardware (including labor for deployment and operation).

Software License Fees

Software licenses are priced per WANdisco Subversion MultiSite node and per user. Pricing was calculated using list prices supplied to Forrester as of September 2009. The pricing for the

interviewed customers reflects the actual number of active nodes and users. Total software license fees are \$167,996 (see Table 4).

Table 4: Software License Fees

Ref.	Metric	Calculation	Per period
B1	Number of nodes		2
B2	Node license fee (each)		\$5,998
B3	Number of end user licenses		520
B4	End user license fee (each)		\$300
Bt	Software license fees	$(B1*B2)+(B3*B4)$	\$167,996

Source: Forrester Research, Inc.

Software License Maintenance Fees

Annual software maintenance fees are calculated at 20% of license cost. These come to \$33,599 (see Table 5).

Table 5: Software Maintenance Fees

Ref.	Metric	Calculation	Per period
C1	License fees		\$167,996
C2	Yearly percent		20%
Ct	Annual software maintenance fees	$C1*C2$	\$33,599

Source: Forrester Research, Inc.

Hardware Costs

WANdisco Subversion MultiSite does not require dedicated hardware and can run on the same server as the Subversion software. Assuming two entry-level servers running open source operating systems are used to run Subversion and Subversion MultiSite, the total hardware cost is \$8,000 (see Table 6). We recognize that some companies may choose to run their servers on existing hardware and/or in virtualized environments.

Table 6: Hardware Costs

Ref.	Metric	Calculation	Per period
D1	Server unit cost		\$4,000
D2	Number of units		2
Dt	Server costs	$D1 * D2$	\$8,000

Source: Forrester Research, Inc.

WANdisco Subversion MultiSite Implementation Costs

The customer we interviewed reported that the effort to install and configure WANdisco Subversion MultiSite was low. The customer went through a two-week evaluation effort before entering production mode. The cutover from evaluation to production mode required 2 hours for one developer and 2 hours of downtime for 390 developers. The total implementation costs were \$46,846 (see Table 7).

Table 7: WANdisco Subversion MultiSite Implementation Costs

Ref.	Metric	Calculation	Per period
E1	Number of implementers		1
E2	Implementer hourly rate		\$58
E3	Number of implementation hours		2
E4	Hours of implementation downtime hours		3
E5	Number of developers idled		390
E6	Average weighted developer hourly rate		\$40
Et	Implementation labor costs	$E1 * E2 * E3 + E4 * E5 * E6$	\$46,846

Source: Forrester Research, Inc.

Ongoing Operations Costs

The developer manager we interviewed said that “as far as Subversion MultiSite maintenance goes, it’s fairly minimal. It’s almost zero.” The two servers require approximately 12 hours of maintenance per year. This gives a cost of \$692 (see Table 8).

Table 8: Annual Ongoing Operations Costs

Ref.	Metric	Calculation	Per period
F1	Number of people		1
F2	Hourly rate per person		\$58
F3	Ongoing support hours		12
Ft	Ongoing support costs	$F1 * F2 * F3$	\$692

Source: Forrester Research, Inc.

Total Costs

The total three-year costs for implementing and operating WANdisco Subversion MultiSite are \$325,717 (see Table 9).

Table 9: Total Implementation And Support Costs

Costs	Initial	Year 1	Year 2	Year 3	Total
Software license and maintenance fees	(\$167,996)				(\$167,996)
Annual software maintenance fees	(\$33,599)	(\$33,599)	(\$33,599)		(\$100,798)
Server costs	(\$8,000)				(\$8,000)
Implementation labor costs	(\$46,846)				(\$46,846)
Ongoing support costs		(\$692)	(\$692)	(\$692)	(\$2,077)
Total	(\$256,441)	(\$34,292)	(\$34,292)	(\$692)	(\$325,717)

Source: Forrester Research, Inc.

Benefits

The interviewed company experienced quantifiable benefits in a broad range of areas, which can be tied to WANdisco Subversion MultiSite’s ability to provide remote users with real-time access to Subversion repositories, redundancy for Subversion repositories, and improved ability to tie users to specific Subversion accounts.

Improved Developer Productivity

The primary goal of the interviewed company was to reduce the wait times, or latency, that users at remote sites experienced while moving source code in and out of repositories. On average, wait times affected two remote workers every working day i.e. the company was losing the equivalent of 2 man-days for each work day in its Asian development organization. Using WANdisco Subversion MultiSite with a server in Asia, the time waited for builds to complete was reduced from one-to-two days (16 working hours) to 1.5 hours. The company noted that a portion of the productivity gain resulted from improvements made to the build software, so we discount the overall value of the benefit by 30%. Assuming 240 working days per year, the productivity improvements are valued at \$93,692 (see Table 10).

Table 10: Improved Developer Productivity Due To Decreased Latency

Ref.	Metric	Calculation	Per period
G1	Number of developers affected daily		2
G2	Number of working days per year		240
G3	Developer hourly rate in Asia		\$19
G4	Time delay waiting for builds to complete (hours)		16
G5	New build time (hours)		1.5
G6	Percent captured		70%
Gt	Developer productivity increase due to decreased latency	$G1 * G2 * G3 * (G4 - G5) * G6$	\$93,692

Source: Forrester Research, Inc.

Increased Bug Fix Rate

The company made improvements to its bug tracking system and then used WANdisco Subversion MultiSite to replicate its bug tracking system to remote locations. This allowed developers to detect, fix, and track bugs from any location and eliminated the dependency of a centrally located bug tracking system. This improvement was experienced most by the Asian developers. The company saw an increase in the rate at which bugs were found and fixed, which resulted in an overall improvement in the bug fix rate of 30%. (We define bug fix rate as bugs fixed ÷ bugs found.) We assume that developers spent 30% of their time addressing bugs and that only 10% of the overall improvement can be tied to WANdisco Subversion MultiSite. This yields a productivity increase valued at \$234,000 (see Table 11). It ignores any other benefits that can be linked to improved bug fix rates like faster time-to-market and overall product quality.

Table 11: Productivity Increase In Bug Fix Rate

Ref.	Metric	Calculation	Per period
H1	Number of developers/testers		150
H2	Developer hourly rate in Asia		\$19
H3	Percent increase in bug fix rate		30%
H4	Number of working hour per year		2,080
H5	Percent time performing bug detection and fixing		30%
H6	Percentage productivity increase due to WANdisco Subversion MultiSite		10%
Ht	Productivity increase in bug fix rate	$H1*H2*(1+H3)*H4*H5*H6$	\$234,000

Source: Forrester Research, Inc.

Avoided Downtime For Subversion Server Maintenance

Having two replicated Subversion repositories allowed the company to avoid complete developer downtime when the Subversion servers were brought down for maintenance. We assume that the servers were brought down three times per year for a duration of 2 hours per maintenance event. We also assume that only 50% of avoided downtime in used productively. This gives a benefit of \$7,988 (see Table 12).

Table 12: Avoided Downtime For Subversion Server Maintenance

Ref.	Metric	Calculation	Per Period
I1	Number of workers affected		200
I2	Average weighted developer hourly rate		\$40
I3	Number of upgrades per year		3
I4	Duration of maintenance (hours)		2.0
I5	Percent captured		50%
It	Downtime avoided for system upgrades	$I1*I2*I3*I4*I5$	\$7,988

Source: Forrester Research, Inc.

Improvements In Performing Security Audits

The interviewed company had restrictions regarding which people were allowed access to certain pieces of software code. Prior to installing WANdisco Subversion MultiSite, the Subversion repositories had more accounts than users, and it was very difficult to understand which accounts belonged to which users. This meant that the company had little understanding about who accessed the code. WANdisco Subversion MultiSite allowed the company to rationalize its user accounts and understand who had access to certain pieces of software. This allowed the company to reduce the time to respond to security audits from five days to two days. This benefit affects all 520 Subversion users. We assume one administrator for 100 users and an average administrator hourly rate of \$40. This yields a benefit of \$3,489 (see Table 13).

Table 13: Salary Assumptions

Ref.	Metric	Calculation	Per period
J1	Total number of users affected		520
J2	Number of workers per administrator		100
J3	Administrator hourly rate		\$40
J4	Time needed to perform security verification prior to WANdisco (days)		5
J5	Time needed to perform security verification with WANdisco (days)		2
J6	Percent captured		70%
Jt	Reduced labor needed to perform security audits	$(J1/J2)*J3*(J4-J5)*8*J6$	\$3,489

Source: Forrester Research, Inc.

Total Benefits

The total benefits for the company are valued at \$1,017,509 (see Table 14).

Table 14: Total Benefits

Benefits	Initial	Year 1	Year 2	Year 3	Total
Developer productivity increase due to decreased latency		\$93,692	\$93,692	\$93,692	\$281,077
Productivity increase in bug fix rate		\$234,000	\$234,000	\$234,000	\$702,000
Downtime avoided for Subversion system upgrades		\$7,988	\$7,988	\$7,988	\$23,964
Reduced labor needed to perform security audits		\$3,489	\$3,489	\$3,489	\$10,468
Total		\$339,170	\$339,170	\$339,170	\$1,017,509

Source: Forrester Research, Inc.

Risk

Forrester defines two types of investment risk associated with this analysis: implementation risk and impact risk. **Implementation risk** is the risk that a proposed technology investment may deviate from the original resource requirements needed to implement and integrate the investment, 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 technology investment, 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 risk, by directly adjusting the financial estimates, results in more meaningful and accurate estimates and a more accurate projection of the return on an investment. The risk-adjusted numbers should be taken as “realistic” expectations, since they represent the expected values considering risk. In general, risks affect costs by raising the original estimates, and they affect benefits by reducing the original estimates.

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

- The number of server nodes and licenses will vary from user to user.
- The time needed to deploy WANdisco Subversion MultiSite will vary, especially the time needed to perform the initial server synchronization.

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

- The amount paid to developers in different parts of the world will vary.
- The amount of working time gained due to reduced latency will vary, as will how effectively that time is used.

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- Achieving increased bug fix rates has many variables, not all of which can be tied back to replicating source code repositories.
- The time needed to perform security audits will vary, as this function can be managed by dedicated software applications.
- The time needed to support the Subversion repositories, the underlying server hardware and associated operating systems.

As noted earlier, Forrester recognizes that each company's pay rates may differ from those used in this study and that these will affect the monetary value of the analysis. We have made no attempt to model this variability.

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

Table 15 show the values used to adjust for uncertainty in the benefit estimates. Different benefit estimates have different levels of risk adjustments. Readers are urged to apply their own risk ranges based on their own degree of confidence in the benefit estimates.

Table 15: Benefit Category Risk Adjustments

Benefits	Low	Most likely	High	Mean
Number of workers benefiting daily from decreased latency	1	2	2	1.66
Number of developer/testers benefiting from improved bug fix rates	110	150	170	143
Number of developer/testers benefiting from avoided downtime	170	200	220	196
Days need to perform security verification prior to WANdisco Subversion MultiSite	3	5	5	4.33
Costs	Low	Most likely	High	Mean
Hours of implementation downtime hours	2	2	3	2.33
Ongoing support hours	8	12	12	10.66

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 at some additional cost. Flexibility benefits typically increase with the scalability of the technology investment. This provides an organization with the “right” or the ability to engage in future initiatives but not the obligation to do so.

In the case of this investment, customers who choose to employ WANdisco Subversion MultiSite may see additional benefits if they deploy Subversion servers in more locations and use WANdisco Subversion MultiSite to replicate these servers. In particular, customers may be able to leverage labor arbitrage by shifting development resources to locations with lower hourly rates. Users may also experience the disaster recovery capabilities that WANdisco Subversion MultiSite provides.

While Forrester believes organizations that adopt WANdisco Subversion MultiSite can take advantage of these flexibility options, quantification (using the financial industry standard Black-Scholes or the binomial option pricing models) of the additional value associated with these options for this customer would require scenario development and forward-looking analysis that is not available at this time. The value of flexibility is unique to each organization, and the willingness to measure its value varies from company to company.

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 16 shows the consolidation of the numbers for the composite organization.

Table 17 below shows the risk-adjusted values, applying the risk adjustment method indicated in the “Risk” section and the values from Table 15 to the numbers in Table 9 and Table 14.

It is important to note that values used throughout the TEI framework are based on an in-depth interview with one organization. Forrester makes no assumptions as to the potential return that other organizations will receive within their own environment. Forrester strongly advises that readers use their own estimates within the framework provided in this study to determine the expected financial impact of implementing WANdisco Subversion MultiSite.

Table 16: Cash Flow Summary – Non-risk Adjusted

Cash flow (original estimates)						
	Initial	Year 1	Year 2	Year 3	Total	Present value
Costs	(\$256,441)	(\$34,292)	(\$34,292)	(\$692)	(\$325,717)	(\$316,476)
Benefits		\$339,170	\$339,170	\$339,170	\$1,017,509	\$843,465
Net benefits	(\$256,441)	\$304,878	\$304,878	\$338,477	\$691,792	\$526,989
ROI	167%					
Payback period	0.8					

Source: Forrester Research, Inc.

Table 17: Cash Flow Summary – Risk Adjusted

Cash flow (risk-adjusted estimates)						
	Initial	Year 1	Year 2	Year 3	Total	Present value
Costs	(\$251,249)	(\$34,215)	(\$34,215)	(\$615)	(\$320,294)	(\$311,092)
Benefits		\$312,246	\$312,246	\$312,246	\$936,737	\$776,509
Net benefits	(\$251,864)	\$278,031	\$278,031	\$311,630	\$616,444	\$465,417
ROI	150%					
Payback period	0.9					

Source: Forrester Research, Inc.

Study Conclusions

Forrester's in-depth interview with a WANdisco Subversion MultiSite customer yielded several important observations:

- Organizations can realize benefits in the form of reduced idle time for developers, increased bug fix rates, improved ability to respond to security audits, and elimination of developer downtime during Subversion server maintenance events.
- The financial analysis provided in this study illustrates the potential way an organization can evaluate the value proposition of WANdisco Subversion MultiSite. Based on information collected in one in-depth customer interview, Forrester calculated a best-case ROI of 167%, with a payback period of 0.8 years and a three-year risk-adjusted ROI of 150% with a payback period of 0.9 years. Forrester anticipates that ROI may increase when Subversion MultiSite is deployed in organizations with greater numbers of Subversion users and locations.

Based on these findings, companies looking to implement WANdisco Subversion MultiSite can see improvements in developer productivity. Using the TEI framework, many companies may find the potential for a compelling business case to make such an investment.

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. 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 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 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. 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 flows in each year.

Example Table

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

Source: Forrester Research, Inc.