A Forrester Total Economic Impact™ Study Prepared For Red Hat

The Total Economic Impact Of Migrating From Unix To Red Hat Enterprise Linux

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FORRESTER®

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Executive Summary

In April 2012, Red Hat commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) enterprises may realize by deploying Red Hat Enterprise Linux. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of the Red Hat Enterprise Linux on their organizations.

Red Hat Enterprise Linux Reduces IT Operations Expense

Our interview with one existing customer and subsequent financial analysis found that the organization we interviewed experienced the risk-adjusted ROI, costs, and benefits shown in Table 1.

Table 1
Three-Year Risk-Adjusted ROI[1]

ROI	Payback period	Total benefits (PV)	Total costs (PV)	Net present value
35%	12 months	$1,161,689	($862,958)	$298,731

Source: Forrester Research, Inc.

- **Benefits.** The company we interviewed experienced the following financially quantifiable benefits:
  - **Infrastructure maintenance expense of $1,086,259 saved.** This savings is the annual maintenance expense that would have been paid and was discontinued as a result of deploying Red Hat Enterprise Linux.
  - **Capital expense of $75,430 for new servers avoided.** Improvements in application performance as a result of using Red Hat Enterprise Linux allowed the company to avoid purchasing additional servers to achieve a similar level of application performance.
- **Costs.** The company we interviewed experienced the following financially quantifiable costs:
  - **Annual subscription fees of $801,984 paid to Red Hat.** This is the annual subscription expense paid to Red Hat for Premium support for 170 2-socket servers.
  - **Professional services fees of $38,880 for initial deployment and migration.** The company used professional services to assist with the initial Red Hat Enterprise Linux deployment and migration of applications and data.
  - **Internal labor expense of $14,904 for initial planning, deployment, and migration.** This represents the internal labor effort that was needed for initial planning, deployment, and migration.

- **Training expense of $7,280.** This is cost of Red Hat Enterprise Linux training for two systems administrators.

Factors Affecting Benefits And Costs

Table 1 illustrates the risk-adjusted financial results that were achieved by the interviewed company. The risk-adjusted values take into account any potential uncertainty or variance that exists in estimating the costs and benefits, which produces more conservative estimates. The following factors may affect the financial results that an organization may experience:

- The maintenance expense saved will depend on how much each organization pays for its Unix hardware and software. Similarly, the Red Hat Enterprise Linux subscription fee and the maintenance for new server hardware will vary from organization to organization. These expenses are the strongest determinant of the ROI in this analysis, and readers are urged to apply their own estimates to determine their ROI.
- Capital costs avoided for new server purchases will depend on whether any gains in application performance are experienced or whether application performance increases have a tangible business benefit.
- The annual Red Hat Enterprise Linux subscription expense will vary with the type of subscription purchased.
- The labor effort needed to migrate from Unix to Red Hat Enterprise Linux will depend on the scale and complexity of the Unix and Red Hat Enterprise Linux environments.

Disclosures

The reader should be aware of the following:

- The study is commissioned by Red Hat 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 Red Hat/Red Hat Enterprise Linux.
- Red Hat 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 Red Hat.

TEI Framework And Methodology

Introduction

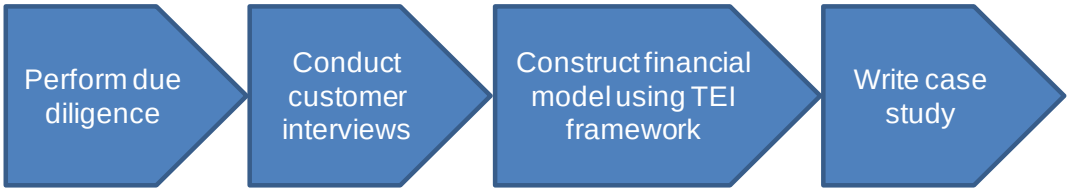
From the information provided in the interviews, Forrester has constructed a Total Economic Impact™ framework for those organizations considering implementing Red Hat/Red Hat Enterprise Linux. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the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

Approach And Methodology

Forrester took a multistep approach to evaluate the impact that migrating from Unix to Red Hat Enterprise Linux can have on an organization (see Figure 1). Specifically, we:

- Interviewed Red Hat marketing personnel and Forrester analysts to gather data relative to Red Hat Enterprise Linux and the marketplace for Red Hat Enterprise Linux.
- Interviewed one organization currently using Red Hat Enterprise Linux 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 the impact of Red Hat Enterprise Linux:

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 head of infrastructure (a CTO equivalent) from a Canadian financial services firm.

Company Background

The company has deployed Red Hat Enterprise Linux on 170 standard x86 servers. These servers run the company's six mission-critical applications used in its operations. The company uses the Windows platform to run its nonmission-critical applications and services such as productivity suites, file sharing, Active Directory, and testing tools. It uses SaaS for its email and CRM application.

The company's IT department has fewer than 20 permanent internal and contract employees. It relies heavily on its outsourcing partners for data center hosting, operating system support, maintenance, and after-hours customer support.

Prior to adopting Red Hat Enterprise Linux, the company ran its mission-critical applications on a proprietary Unix operating system (OS). For performance reasons, the company's applications run on nonvirtualized servers. Server clustering (for performance and redundancy) is managed at the application layer.

Reasons For Migrating From Unix

The company's primary reasons for migrating from Unix were to:

- **Avoid being tied to a platform whose future was perceived to be uncertain.** The company was concerned about the future direction of its Unix vendor's hardware and software road map and the future availability of talented Unix systems administrators. The company believed that by being able to choose its OEM x86 server vendor, it would be able to take advantage of the latest developments in the x86 platform, and at the best possible prices.
- **Reduce IT operations expense.** The company believed that the combination of an open source OS and OEM x86 servers would help reduce its operating expenses.

Key Solution Attributes

As part of its decision-making criteria to migrate to Red Hat Enterprise Linux, any proposed solution needed to:

- **At a minimum, be cost-neutral.** The company was not willing to incur any additional cost to operate the solution and was hoping for a cost reduction.

- **Improve application performance by at least 10%, either in sheer processing speed or transaction throughput.** Any performance improvement had to be apparent to the company's clients, who were keenly aware of the time needed to complete automated (computerized) transactions. To this end, the company involved its application and hardware vendors, outsourcing providers, and Red Hat in an extensive evaluation of the proposed solution.
- **Be saleable to the company's management committee and board of directors.** Since the proposed solution could impact the core of the company's business operations with potentially severe consequences, it had to be one whose risks were low and could be easily mitigated.

Qualitative Benefits

From the interview, we learned that after the Red Hat Enterprise Linux deployment the company experienced:

- **Easier access to skilled system administrators.** According to the CTO, this " has helped us with our smart sourcing model . . . we can find more people out there among our partners and in managed services providers who have more, deeper skills and more readily available skills with Red Hat versus other operating systems."

The company also experienced increased throughput in certain areas of its applications system and an overall reduction in server maintenance expense. These benefits are fully described and financially quantified in the Benefits section.

Framework Assumptions

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

Table 2
Model Assumptions

Ref.	Metric	Calculation	Value
A1	Workdays per year		250
A2	Systems administrator fully loaded annual salary		$115,000
A3	Number of servers running Red Hat Enterprise Linux		170

Source: Forrester Research, Inc.

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

Note about exchange rates: The company we interviewed is Canadian, and all data that we received was in Canadian dollars. The values represented in this analysis are in US dollars. The US dollar values were calculated using an exchange rate of 0.989 (the average rate in 2011 and the time when the company's Red Hat Enterprise Linux deployment was done). We recognize that variations in exchange rates may affect the result of the financial analysis.

Costs

To migrate from Unix to Red Hat Enterprise Linux, the company incurred costs in following areas:

- Red Hat Enterprise Linux OS and Network Satellite annual subscription expense.
- Contract labor for planning and migrating from Unix to Red Hat Enterprise Linux.
- Internal labor for planning and migrating from Unix to Red Hat Enterprise Linux.
- Training costs for systems administrators.

In the implementation period, the Red Hat Enterprise Linux servers were brought online while Unix servers were decommissioned. We assume that the implementation period lasts six months. This means we account for 50% of the Red Hat Enterprise Linux subscription and server maintenance during the implementation period.

We did not include systems administration expense in this analysis because this expense would have been incurred regardless and there was no change in the overall systems administration expense.

We did not include hardware (server) acquisition costs in this analysis because the company would have incurred this expense anyway because it refreshes its hardware on a regular basis.

Red Hat Enterprise Linux And Network Satellite Annual Subscription Expense

The company uses a Premium subscription for 2-socket servers with no virtual guests. The annual hardware maintenance for these servers is assumed to be $349/server. The annual subscription expense for Red Hat Enterprise Linux and Network Satellite is $1,230. As noted, we account 50% of annual Red Hat Enterprise Linux subscription and server maintenance as being paid during the implementation period. The annual subscription and maintenance expense is $268,475 for a three-year total of $939,661 (see Table 3). Note that all Red Hat Enterprise Linux subscription costs were supplied to Forrester by Red Hat.

Table 3
Red Hat Enterprise Linux Subscription And Server Maintenance Expense

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
B1	Number of servers		170				
B2	Annual per-server hardware maintenance expense		$349				
B3	Annual per-server Red Hat Enterprise Linux subscription fee		$1,230				
Bt	Total annual server maintenance and Red Hat Enterprise Linux subscription expense	B1*(B2+B3)	$268,475	$268,475	$268,475	$268,475	
	Spread		50%	100%	100%	100%	
Bto	Total (original)		($134,237)	($268,475)	($268,475)	($268,475)	($939,661)

Source: Forrester Research, Inc.

Professional Services Fees

As the time of initial deployment, the company's Unix systems administrators were not familiar enough with Red Hat Enterprise Linux to play a major role in the deployment process. The company used professional services to overcome this skill set gap. The professional services were primarily used for assistance in testing the deployment and perfecting the deployment process.

The company used 30 days of professional services. Assuming a daily consulting rate of $1,200/day, the professional services fees were $36,000 (see Table 4).

Table 4
Professional Services Fees For Red Hat Enterprise Linux Deployment And Migration

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
C1	Number of days		30				
C2	Consultant daily rate		$1,200				
Ct	Professional services fees	C1*C2	$36,000	$0	$0	$0	
	Spread		100%	0%	0%	0%	
Cto	Total (original)		($36,000)	$0	$0	$0	($36,000)

Source: Forrester Research, Inc.

Internal Labor Expense

The company used some if its internal resources to work on planning, deployment, and data migration. Internal labor was also needed to modify management scripts. The total internal labor effort was estimated to be 30 days. This yields an internal labor expense of $13,800 (see Table 5).

Table 5
Internal Labor Expense For Red Hat Enterprise Linux Planning, Deployment, And Migration

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
D1	Number of people		30				
D2	Red Hat Enterprise Linux systems administrator daily rate	A2/A1	$460				
Dt	Internal labor for planning, deployment, and migration	D1*D2	$13,800	$0	$0	$0	
	Spread		100%	0%	0%	0%	
Dto	Total (original)		($13,800)	$0	$0	$0	($13,800)

Source: Forrester Research, Inc.

Systems Administrator Training Expense

The company needed to provide Red Hat Enterprise Linux training for two systems administrators at a cost of $3,640 per course. This yields a training expense of $7,280 (see Table 6).

Table 6
System Administrator Training Expense

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
E1	Number of people		2				
E2	Number of training courses		1				
E3	Cost per person		$3,640				
Et	Training fees	E1*E2*E3	$7,280	$0	$0	$0	
	Spread		100%	0%	0%	0%	
Eto	Total (original)		($7,280)	$0	$0	$0	($7,280)

Source: Forrester Research, Inc.

Total Costs

The total three-year cost to the company for deploying Red Hat Enterprise Linux and Red Hat Enterprise Linux subscription fees is $996,741 (see Table 7).

Table 7
Total Costs

Ref.	Cost category	Initial	Year 1	Year 2	Year 3	Total
Bto	Total annual server maintenance and Red Hat Enterprise Linux subscription expense	($134,237)	($268,475)	($268,475)	($268,475)	($939,661)
Cto	Professional services fees	($36,000)	$0	$0	$0	($36,000)
Dto	Internal labor for planning, deployment, and migration	($13,800)	$0	$0	$0	($13,800)
Eto	Training fees	($7,280)	$0	$0	$0	($7,280)
	Total costs (original)	($191,317)	($268,475)	($268,475)	($268,475)	($996,741)

Source: Forrester Research, Inc.

Benefits

The company experienced financially quantifiable benefits in the following areas:

- Reduction in infrastructure maintenance costs.
- Capital expense avoided for additional server hardware.

Hardware And Software Maintenance Saved

Prior to deploying Red Hat Enterprise Linux, the company paid annual maintenance fees to its Unix vendor. This expense covered both the server and the OS. After Red Hat Enterprise Linux was deployed, the company stopped paying maintenance fees to its Unix vendor. This represents a savings to the company.

The company paid $2,595/server annually to its Unix vendor. This yields an annual savings of $441,213 for 170 servers and a total three-year savings of $1,323,638 (see Table 8).

Table 8

Reduction In Server Hardware And OS Software Maintenance Expense

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
F1	Number of servers			170			
F2	Annual hardware and software maintenance expense paid to Unix vendor			$2,595			
Ft	Reduction in hardware and software maintenance expense	F1*F2		$441,213	$441,213	$441,213	
	Spread			100%	100%	100%	
Fto	Total (original)			$441,213	$441,213	$441,213	$1,323,638

Source: Forrester Research, Inc.

Capital Cost Avoided For Servers

The company found that throughput increased by 40% in a certain layer of its application stack. The company attributes this gain entirely to Red Hat Enterprise Linux because the OS was the only factor that could impact performance that had changed. This kind of application performance gain allowed the company to avoid purchasing additional servers because it could do more with the same server footprint. The company estimates the capital cost

avoided at $101,105 (equivalent to C$100,000) (see Table 9). For this analysis, we spread the savings over three years because this represents the average depreciation period of a midrange x86 server.

Table 9
Capital Cost Avoided For Servers

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
G1	Average annual server purchase expense avoided			$33,702	$33,702	$33,702	
Gt	Capital cost avoided	G1		$33,702	$33,702	$33,702	
	Spread			100%	100%	100%	
Gto	Total (original)			$33,702	$33,702	$33,702	$101,105

Source: Forrester Research, Inc.

Total Benefits

The total three-year benefits that the company experienced from deploying Red Hat Enterprise Linux are $1,424,744 (see Table 10).

Table 10
Total Benefits

Ref.	Benefit category	Initial	Year 1	Year 2	Year 3	Total
Fto	Reduction in hardware and software maintenance expense		$441,213	$441,213	$441,213	$1,323,638
Gto	Capital cost avoided		$33,702	$33,702	$33,702	$101,105
	Total benefits (original)		$474,915	$474,915	$474,915	$1,424,744

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 Red Hat Enterprise Linux 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).

The company told us that migrating to Red Hat Enterprise Linux gives access to a broader set of third-party support options, which would allow it to move to best-of-breed in the future.

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 Red Hat Enterprise Linux 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 Red Hat Enterprise Linux, 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 labor effort needed to plan and execute the migration will vary with the complexity and scale of the migration.
- The professional services fees will vary among suppliers and geography.

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

- The maintenance expense saved will depend on the actual maintenance costs paid to the Unix vendor.
- Capital costs avoided for servers will depend on whether any significant application performance increases are experienced after migrating to Red Hat Enterprise Linux.

There are additional risks and variables that will affect the benefits and costs that may be experienced. These include:

- The annual subscription fee paid will vary according to the actual subscription purchased.
- Labor rates for consultants and internal employees will vary by geography and experience level.
- The amount of training needed for system administrators will vary by administrator experience.

Table 11 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 11
Cost And Benefit Risk Adjustments

Costs	Low	Most likely	High	Mean
Professional services fees	100%	100%	125%	108%
Internal labor for planning, deployment, and migration	100%	100%	125%	108%
Benefits	**Low**	**Most likely**	**High**	**Mean**
Reduction in hardware and software maintenance expense	92%	100%	105%	99%
Average annual server purchase expense avoided	50%	100%	120%	90%

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 Red Hat Enterprise Linux. These are shown in Table 12 below.

Table 12
Cash Flow — Non-Risk-Adjusted

	Cash flow — original estimates					
	Initial	Year 1	Year 2	Year 3	Total	Present value
Costs	($191,317)	($268,475)	($268,475)	($268,475)	($996,741)	($858,974)
Benefits		$474,915	$474,915	$474,915	$1,424,744	$1,181,042
Net benefits	($191,317)	$206,440	$206,440	$206,440	$428,003	$322,069
ROI	37%					
Payback period	11 months					

Source: Forrester Research, Inc.

Table 13 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk-adjustment values from Table 11 in the Risk section to the cost and benefits numbers in Tables 7 and 10.

Table 13
Cash Flow — Risk-Adjusted

	Cash flow — risk-adjusted estimates					
	Initial	Year 1	Year 2	Year 3	Total	Present value
Costs	($195,301)	($268,475)	($268,475)	($268,475)	($1,000,725)	($862,958)
Benefits		$467,132	$467,132	$467,132	$1,401,397	$1,161,689
Net benefits	($195,301)	$198,658	$198,658	$198,658	$400,672	$298,731
ROI	35%					
Payback period	12 months					

Source: Forrester Research, Inc.

Red Hat Enterprise Linux: Overview

Red Hat Enterprise Linux is the market-leading open source platform for mission-critical computing, with a majority of the commercial Linux server operating system worldwide market share.

Red Hat Enterprise Linux is built for the modern datacenter environment and has the following features:

- Pervasive networking and virtualization.
- Comprehensive security.
- Support for advanced multicore hardware.
- Scalable from workstations, to servers, to mainframes.
- Consistent application environment across physical, virtual, and cloud deployments.
- Certification from leading hardware and software vendors.

To learn more, visit http://www.redhat.com/products/enterprise-linux/server/

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 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 respective organization to determine the most appropriate discount rate to use in their own environment.

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

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

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

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

A Note On Cash Flow Tables

The following is a note on the cash flow tables used in this study (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. 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.

Table [Example]
Example Table

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

Source: Forrester Research, Inc.

Appendix C: Endnotes

[1] Forrester risk-adjusts the summary financial metrics to take into account the potential uncertainty of the cost and benefit estimates. For more information on Risk, please see page 13.