

A Forrester Total Economic Impact™ Study Prepared For EMC

The Total Economic Impact Of EMC's Isilon Clustered Storage System

Multicompany Analysis

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FORRESTER

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TABLE OF CONTENTS

Executive Summary	2
Isilon Storage Increases Utilization And Efficiency While Adding Flexibility	2
Factors Affecting Benefits And Costs	3
Disclosures.....	4
TEI Framework And Methodology	5
Analysis	6
Interview Highlights.....	6
Costs	7
Benefits	12
Flexibility.....	16
Risk	16
Financial Summary	18
EMC Isilon Clustered Storage: Overview	20
Appendix A: Composite Organization Description	21
Appendix B: Total Economic Impact™ Overview	21
Appendix C: Glossary	22
Appendix D: Endnotes	23

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Executive Summary

In June 2013, EMC commissioned Forrester Consulting to examine the total economic impact and potential return on investment (ROI) enterprises may realize by deploying Isilon storage. Clustered file storage is an alternative to traditional file storage, allowing organizations to easily and effectively scale their storage capacity for unstructured data. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of the Isilon storage system on their organizations.

Isilon Storage Increases Utilization And Efficiency While Adding Flexibility

In conducting in-depth interviews with four existing customers, Forrester found that these companies achieved benefits including lowering upfront costs, reducing the need for administrative resources, reducing the need for training and professional services, and avoiding the cost of traditional storage media. Due to advantages associated with Isilon's architecture, organizations were able to reduce the overall volume of storage required. Additionally, organizations were able to leverage Isilon's architecture to support their business in ways which, in some cases, were not possible with traditional storage, allowing them to accomplish new business imperatives.

Our interviews with four existing customers and subsequent financial analysis found that a composite organization based on these companies experienced the risk-adjusted ROI, costs, and benefits shown in Table 1 (see Appendix A for a description of the composite organization).

Table 1

Composite Organization Three-Year Risk-Adjusted ROI¹

ROI	Payback period	Total benefits (PV)	Total costs (PV)	Net present value
169%	<6 months	\$2,565,164	(\$954,912)	\$1,610,252

Source: Forrester Research, Inc.

- **Benefits.** The composite organization experienced the following benefits that represent those experienced by the interviewed companies:
 - **Avoiding the cost of an alternate solution.** In order to accurately model the financial impact of using Isilon storage, Forrester has included a cost avoidance benefit. This benefit captures the cost associated with an alternative solution, as we assume that every organization needs to have a storage solution in place.
 - **Increasing the efficiency of storage administration.** All of the interviewees cited an improvement in the storage administration process; in this benefit we capture the value of this increase in efficiency through a decreased need for administration resources. One interviewee described the Isilon solution as “fast and easy to manage.”

- **Avoiding professional services costs.** When using Isilon storage, the interviewed companies were able to avoid using the professional services typically associated with other available solutions.
- **Avoiding capacity costs due to increased utilization.** Due to the nature of the Isilon architecture and the specific storage needs of the interviewees, the companies were able to increase their utilization rates compared with storage alternatives, thereby reducing the overall capacity required. Forrester has included the cost avoidance associated with this additional capacity.
- **Reducing training requirements.** Interviewees described the Isilon system as easy to learn and manage, requiring less training than other storage options. We have included a benefit associated with the lower training requirements.
- **Requiring fewer ports.** The Isilon system requires fewer ports than alternate systems, so Forrester has included cost avoidance for these additional ports.
- **Costs.** The composite organization experienced the following costs:
 - **Isilon license.** For this study, we have included the costs from EMC for six NL nodes initially, adding an additional node in the second and third years, for a total of eight. This license cost includes maintenance for three years, so no additional costs are included in this category beyond the upfront cost.
 - **InfiniBand switch.** Forrester has included the cost of two switches associated with the Isilon storage solution.
 - **Planning and implementation.** To capture the costs associated with time spent internally planning for and deploying the solution, Forrester has included the costs for four people for a total of four months. This amount varied greatly across the interviewees.
 - **Training.** In order to calculate the cost of training, Forrester has included both the cost associated with training a trainer and the time spent training the internal team.
 - **Ongoing administration.** To account for ongoing administration needs, we have included the cost of three people, each of whom spends 30% of their time on managing Isilon storage; in total, this is less than one full-time equivalent.
 - **Network upgrade.** Forrester has included the costs associated with additional ports required, as well as overall network upgrades as described by the interviewees.

Factors Affecting Benefits And Costs

Table 1 illustrates the risk-adjusted financial results that the composite organization achieved. 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:

- Both costs and benefits may vary widely, depending on the size of the organization and the storage requirements.

- The nature of the storage requirements in terms of data types and speeds required influences the impact of Isilon, particularly in efficiency gains and improvements in storage utilization.

Disclosures

The reader should be aware of the following:

- The study is commissioned by EMC and delivered by the Forrester Consulting group.
- Forrester makes no assumptions as to the potential return on investment that other organizations will receive. Forrester strongly advises that readers use their own estimates within the framework provided in the report to determine the appropriateness of an investment in EMC Isilon storage.
- EMC 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 EMC.

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 EMC/Isilon storage. 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 EMC's Isilon storage can have on an organization (see Figure 1). Specifically, we:

- Interviewed EMC marketing personnel and Forrester analysts to gather data relative to Isilon storage and the marketplace for Isilon storage.
- Interviewed four organizations currently using Isilon storage to obtain data with respect to costs, benefits, and risks.
- Designed a composite organization based on characteristics of the interviewed organizations (see Appendix A).
- 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 EMC Isilon clustered storage:

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 B for additional information on the TEI methodology.

Analysis

Interview Highlights

A total of four interviews were conducted for this study, involving representatives from the following companies (EMC customers based in the US):

1. A global courier delivery services company.
2. A cloud-based provider of disaster recovery and backup solutions for midmarket companies.
3. A privately owned auction house which combines proxy and live Internet bidding with traditional floor auctions.
4. A global producer of large and small jet engines for commercial and military aircraft.

The four interviews revealed that:

- Isilon's structure allowed for growth and flexibility in a way that traditional storage did not. One of the interviewees stated that "it gives us a competitive advantage and will enhance our cloud portfolio."
- All of the interviewed customers found the Isilon easier to manage than alternative solutions. One interviewee said, "People without much experience can manage it. We don't need to have resources specifically dedicated to Isilon. We don't need to administer it all that much or touch it very often."
- All of the interviewed customers reported either using fewer people to manage their storage systems than previously required, or using less storage volume than projected for an alternative solution.
- Several interviewees mentioned that the ability to operate without downtime for planned maintenance was an important feature. One described the situation as: "When you try to schedule downtime to do maintenance, it never exists. Now I can reconfigure the storage myself, without limiting anything, because there's no downtime." Another said, "Isilon runs so effectively. Previously, we had downtime, which caused business disruption. Our customers were concerned about our performance. Now we don't have that worry."

Composite Organization

Based on the interviews with the four existing customers provided by EMC, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the areas affected financially. The composite organization that Forrester synthesized from these results represents an organization with a storage environment of approximately 300 TB. This is divided over six NL nodes initially, with the acquisition of two additional nodes over a period of three years.

Framework Assumptions

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

Table 2
Model Assumptions

Ref.	Metric	Calculation	Value
A1	Hours per week		40
A2	Weeks per year		52
A3	Hours per year (M-F, 9-5)		2,080
A4	Hours per year (24x7)		8,736
A5	Annual fully loaded compensation of a storage administrator		\$100,000
A6	Hourly rate of a storage administrator	(A5/A3)	\$48

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 3 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.

Costs

The costs included in this financial analysis are the costs of the Isilon system itself, the planning, administration, and training costs, and the cost of network upgrades associated with the Isilon implementation. Each of these costs is detailed in the sections below.

Isilon License Costs

The license costs included in this analysis represent the upfront costs for six NL nodes, with an additional node added in each of Years 2 and 3. This upfront cost includes the maintenance for three years; the cost distribution is shown in Table 3.

Table 3

Isilon License Costs

Ref.	Metric	Calculation	Initial	Year 1	Year 2	Year 3	Total
B1	Number of NL nodes		6		1	1	
B2	Cost per node		(\$55,000)		(\$55,000)	(\$55,000)	
Bt	Isilon license costs	B1*B2	(\$330,000)		(\$55,000)	(\$55,000)	
Bto	Total (original)		(\$330,000)	\$0	(\$55,000)	(\$55,000)	(\$440,000)

Source: Forrester Research, Inc.

InfiniBand Switch Costs

In addition to the costs for the NL nodes, we include the costs for InfiniBand switches, shown in Table 4.

Table 4

InfiniBand Switch Costs

Ref.	Metric	Calculation	Per period
C1	Cost of a 72-port IB switch		(\$79,650)
C2	Number of switches		2
Ct	InfiniBand switch costs	C1*C2	(\$159,300)

Source: Forrester Research, Inc.

Planning And Implementation Costs

The planning costs identified by the interviewed organizations varied greatly, from several weeks to eight months. The cost included in the analysis is for four full-time people involved in four months (640 hours) of planning and implementation assistance. The hourly rate used reflects a fully burdened compensation rate of \$100,000 annually. The total cost associated with planning for the Isilon implementation is \$122,880.

Table 5
Planning And Implementation Costs

Ref.	Metric	Calculation	Per period
D1	Number of people involved		4
D2	Length of time (hours)		640
D3	Hourly rate		\$48
Dt	Planning and implementation costs	$D1 * D2 * D3$	(\$122,880)

Source: Forrester Research, Inc.

Training Costs

Although none of the interviewed organizations used professional training, several of them identified a need for internal training, ranging from the time for a single administrator to come up to speed to a more formal session developed internally for a small team. The cost listed below reflects the latter scenario: five days for a single resource to develop training and a 2-hour training session for a team of five people. At a fully burdened rate of \$100,000 per year, this gives a cost of \$2,400.

Table 6
Training Costs

Ref.	Metric	Calculation	Per period
E1	Internal trainers required		1
E2	Trainer hours required		40
E3	Number of people trained		5
E4	Trainee hours required		2
E5	Hourly rate		\$48
Et	Training costs	$(E1 * E2 * E5) + (E3 * E4 * E5)$	(\$2,400)

Source: Forrester Research, Inc.

Ongoing Administration Costs

The cost of administering the Isilon systems varied from several hours per week to approximately 50% of several resources' time for the largest organization. For an environment of the size of the composite organization, Forrester estimates that Isilon administration would require approximately 30% of three full-time resources; this gives an annual cost of \$90,000.

Table 7

Ongoing Administration Costs

Ref.	Metric	Calculation	Per period
F1	Number of FTEs required		3
F2	Percentage of FTEs' time required		30%
F3	Annual rate per FTE		\$100,000
Ft	Ongoing administration costs	$F1 * F2 * F3$	(\$90,000)

Source: Forrester Research, Inc.

Network Upgrade Costs

In order to implement the Isilon system, a number of additional ports must be added to the network. This is estimated to be an average of one port per node. In this analysis, the composite organization has a total of six nodes, requiring six ports at a cost of \$250 per port. Additionally, the composite organization requires general network upgrades to support the Isilon storage, estimated at a cost of \$15,000. This gives a total cost of \$16,500.

Table 8
Network Upgrade Costs

Ref.	Metric	Calculation	Per period
G1	Number of nodes		6
G2	Number of ports per node		1
G3	Cost per port		\$250
G4	Additional network upgrades		\$15,000
Gt	Network upgrade costs	$(G1 * G2 * G3) + G4$	(\$16,500)

Source: Forrester Research, Inc.

Total Costs

Table 9 summarizes the costs included in the financial analysis over the three year period.

Table 9
Total Costs

Costs	Initial	Year 1	Year 2	Year 3	Total	Present value
Isilon license costs	(\$330,000)		(\$55,000)	(\$55,000)	(\$440,000)	(\$416,777)
InfiniBand switch costs	(\$159,300)				(\$159,300)	(\$159,300)
Planning and implementation costs	(\$122,880)				(\$122,880)	(\$122,880)
Training costs	(\$2,400)				(\$2,400)	(\$2,400)
Ongoing administration costs		(\$90,000)	(\$90,000)	(\$90,000)	(\$270,000)	(\$223,817)
Network upgrade costs	(\$16,500)				(\$16,500)	(\$16,500)
Total costs	(\$631,080)	(\$90,000)	(\$145,000)	(\$145,000)	(\$1,011,080)	(\$941,674)

Source: Forrester Research, Inc.

Benefits

The benefits included in the financial analysis are detailed in the sections below. All of these benefits are cost avoidance benefits, which represent costs which would have been incurred by adopting an alternate solution. These benefit areas were all identified during the customer interviews; in some cases, Forrester used estimates based on overall market rates to quantify the benefits.

Cost Avoidance Of An Alternate Solution

As storage is a requirement for almost any business, this study includes a comparable cost of storage for an alternate solution. Based on Forrester's knowledge of the overall market, this can range from \$1 to \$7 per GB. For this study, we include an estimated cost of \$3 per GB (\$3,000 per TB). For the composite organization's environment of 300 TB, the total cost avoidance is \$900,000. It's worth noting that the alternate solution is bought all in the first year, as capacity cannot be added steadily each year. This is reflected in the present value of the cost used in the financial analysis, which incorporates the time value of money.

Table 10

Cost Avoidance Of An Alternate Solution

Ref.	Metric	Calculation	Year 1
H1	Cost per terabyte		\$3,000
H2	Number of terabytes		300
Ht	Cost avoidance of an alternate solution	H1*H2	\$900,000

Source: Forrester Research, Inc.

Increased Efficiency Of Storage Administration

All of the customers interviewed for this study projected that with a traditional storage solution, they would need additional resources to manage the storage environment. The actual number of additional staff required varied based on the volume of storage that each organization possessed. For the composite organization, Forrester estimates an increase in staff of 4 resources. At a fully burdened rate of \$100,000, this gives an annual savings of \$400,000.

Table 11

Improvement In Storage Administration Efficiency

Ref.	Metric	Calculation	Per period
I1	Number of staff		4
I2	Annual rate		\$100,000
It	Increased efficiency of storage administration	I1*I2	\$400,000

Source: Forrester Research, Inc.

Professional Services Cost Avoidance

Several of the interviewees identified, either from past experience or projected situations, that alternate solutions would require a significant investment in professional services — an investment that was unnecessary for users of the Isilon system. Based on Forrester's market expertise, the amount of professional services required for an environment of this size would cost approximately \$100,000.

Table 12

Professional Services Cost Avoidance

Ref.	Metric	Year 1
Jt	Professional services cost avoidance	\$100,000

Source: Forrester Research, Inc.

Capacity Cost Avoidance

All of the interviewees stated that they would be able to utilize a lower percentage of the storage capacity of a traditional storage environment and would therefore require a larger total capacity. This has an associated cost depending on the extra capacity required. The interviewed organizations estimated this extra capacity at anywhere from 10% to 100% of their current environment; one organization estimated that it would require an environment with double its current storage capacity!

In order to calculate the volume of additional storage that the composite organization would require, two key factors were used: the Isilon utilization rate and the utilization rate of traditional storage. The Isilon rate used is 82%, while the rate for traditional storage is 60%. The discrepancy between the two is related directly to the difference in Isilon's architecture. This calculation is summarized in Table 13.

Table 13

Capacity Cost Avoidance

Ref.	Metric	Calculation	Per period
K1	Total present capacity		300
K2	Average Isilon utilization		82%
K3	Total capacity utilized	$K1 * K2$	246
K4	Average utilization of a traditional solution		60%
K5	Total traditional capacity required	$K3 / K4$	410
K6	Total additional capacity required	$K5 - K1$	110
K7	Cost per terabyte		\$3,000
Kt	Capacity cost avoidance	$K6 * K7$	\$330,000

Source: Forrester Research, Inc.

Reduced Training Requirements

None of the interviewed organizations required formal training from Isilon in order to use the systems, although a few organized some internal training for their staff. Comparable storage systems almost always require formal training, which has an associated cost. The training cost benefit included in the analysis represents the cost of three people receiving a week of training, at a daily rate of \$2,000. This gives a total cost avoidance of \$30,000.

Table 14

Reduced Training Requirements

Ref.	Metric	Calculation	Per period
L1	Number of people		3
L2	Number of days		5
L3	Cost per day		\$2,000
Lt	Reduced training requirements	$L1 * L2 * L3$	\$30,000

Source: Forrester Research, Inc.

Fewer Ports Required

In order to compare the Isilon implementation with a reasonable alternative, the cost of traditional storage was included in the benefits analysis as a cost avoidance. This also encompasses the cost of the ports required with traditional storage, which is detailed in the table below. This cost is structured differently from the Isilon port cost; for traditional storage, Forrester estimates a capacity of 50 TB per node, with 4 ports per node. This gives a total of 24 ports. At a cost of \$250 per port, the total cost for the ports with a traditional storage solution is \$6,000.

Table 15

Fewer Ports Required

Ref.	Metric	Calculation	Per period
M1	Number of nodes		6
M2	Ports per node		4
M3	Cost per port		\$250
Mt	Cost avoidance due to requiring fewer ports	$M1 * M2 * M3$	\$6,000

Source: Forrester Research, Inc.

Total Benefits

The total benefits included in this financial analysis are shown in Table 16.

Table 16

Total Benefits

Benefits	Initial	Year 1	Year 2	Year 3	Total	Present value
Cost avoidance of alternate solution		\$900,000	\$300,000	\$300,000	\$1,500,000	\$1,291,510
Improvement in storage administration efficiency		\$400,000	\$400,000	\$400,000	\$1,200,000	\$994,740
Professional services cost avoidance		\$100,000			\$100,000	\$90,909
Capacity cost avoidance		\$330,000			\$330,000	\$300,000
Reduced training requirement		\$30,000			\$30,000	\$27,273
Fewer ports required		\$6,000			\$6,000	\$5,455
Total benefits		\$1,766,000	\$700,000	\$700,000	\$3,166,000	\$2,709,887

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 Isilon storage 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 B).

All of the organizations interviewed for this study stated that using Isilon made their businesses more flexible, in that they could easily expand their storage to accommodate larger files of unstructured data. Although extremely valuable, this benefit is not quantified in the financial analysis. However, it is an important one to consider.

Risk

Risk is the third component within the TEI model; it is used as a filter to capture the uncertainty surrounding different cost and benefit estimates. If a risk-adjusted ROI still demonstrates a compelling business case, it raises confidence that the investment is likely to succeed because the risks that threaten the project have been taken into consideration and quantified. The risk-adjusted numbers should be taken as “realistic” expectations, since they represent the expected values considering risk. In general, risks affect costs by raising the original estimates and they affect benefits by reducing the original estimates.

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

For example, take the case of benefit attributable to the reduced need for storage capacity. The \$1,536,000 value used in this analysis can be considered the “most likely” or expected value. However, this benefit will obviously vary based on specific utilization rates of each organization. This variability represents a risk that must be captured as part of this study. Forrester uses a risk factor of 105% on the high end, 100% as the most likely, and 85% on the low end. This has the effect of decreasing the benefit estimate to take into account the fact that original benefit estimates are more likely to be revised downward than upward. Forrester then creates a triangular distribution to reflect the range of expected costs, with 96.7% as the mean (96.7% is equal to the sum of 105%, 100%, and 85% divided by three). Forrester applies this mean to the most likely estimate, \$1,536,000, to arrive at a risk-adjusted value of \$1,484,800.

Different cost and benefits estimates have different levels of risk adjustments. For example, Forrester applied a higher risk weighting to the capacity benefit based on utilization rate as compared with licensing costs, in part due to the assumption that there is more variability in the capacity benefit estimate. Readers are urged to apply their own risk ranges based on their own degree of confidence in the cost and benefit estimates.

Risk adjustments for costs increase the original cost estimates. For example, Forrester applies a risk range of 110% on the high end of the estimate and 100% on the most likely and high end for the planning costs. This has the effect of reducing the benefit estimate by 3%, equal to 97% of the original value.

Financial Summary

The financial results calculated in the Costs and Benefits sections can be used to determine the return on investment, net present value, and payback period for the organization's investment in Isilon storage. These are shown in Table 17 below.

Table 17

Cash Flow — Non-Risk-Adjusted

Cash flow — original estimates						
	Initial	Year 1	Year 2	Year 3	Total	Present value
Costs	(\$631,080)	(\$90,000)	(\$145,000)	(\$145,000)	(\$1,011,080)	(\$941,674)
Benefits		\$1,766,000	\$700,00	\$700,000	\$3,166,000	\$2,709,887
Net benefits	(\$631,080)	\$1,676,000	\$555,000	\$555,000	\$2,154,920	\$1,768,214
ROI	188%					
Payback period	<6 months					

Source: Forrester Research, Inc.

Table 18 below shows the risk-adjusted ROI, NPV, and payback period values. These values are determined by applying the risk-adjustment values as described in the Risk section to the cost and benefits numbers in Tables 9 and 16.

Table 18

Cash Flow — Risk-Adjusted

Cash flow — risk-adjusted estimates						
	Initial	Year 1	Year 2	Year 3	Total	Present value
Costs	(\$633,128)	(\$94,500)	(\$149,500)	(\$149,500)	(\$1,026,628)	(\$954,912)
Benefits		\$1,673,333	\$661,667	\$661,667	\$2,996,667	\$2,565,164
Net benefits	(\$633,128)	\$1,578,833	\$512,167	\$512,167	\$1,970,039	\$1,610,252
ROI	169%					
Payback period	<6 months					

Source: Forrester Research, Inc.

EMC Isilon Clustered Storage: Overview

The Isilon storage product is a clustered architecture, file-based system used in environments that require high levels of scalability and ease of use for the storage of large volumes of files. File-based storage refers to storage devices that natively support standard file access protocols, like CIFS or NFS. As opposed to block-based storage systems that require an application or server to interpret blocks on disk, a file-based storage system allows users and applications to access files directly, without the use of a gateway server. A clustered architecture means that multiple independent hardware nodes are joined together with clustering software that allows them to be treated as a consistent whole. In the case of Isilon, industry standard x86 servers are connected via an InfiniBand switch. A proprietary operating system, OneFS, manages the operation of the cluster. To scale the system, new nodes are added, and the operating system software reoptimizes the data layout to take advantage of the new nodes. Cache is shared globally among the nodes, and input/output requests can be handled by any of the nodes and then served from multiple nodes, so as the system scales, aggregate performance is improved. Nodes of different ages and sizes can be intermixed, allowing a cluster to be scaled over time without the replacement of previously installed nodes. Accelerator nodes that do not contain hard drives can be added to the system, which increase cache, CPU, and I/O capabilities for the existing storage nodes in the cluster. In addition to the scalability features of the Isilon system, the OneFS operating system also provided a graphical user interface for system management, reporting capabilities, replication, thin provisioning, and other core storage management capabilities.

Traditional scale-up file storage systems and many clustered file storage systems that use traditional scale-up storage have fixed file system and volume scalability limits. Once the files have filled the maximum capacity of the system, a new system must be added, which is not consistent with the previous user access path. As a result, significant administrator effort is required to migrate data, and there is a change in user behavior associated with large-scale growth of data in a nonclustered file storage system. Such systems are also less automated in general, requiring more administrator intervention for activities such as provisioning and capacity optimization. The main value propositions of the Isilon clustered file storage system compared with a traditional file storage system include:

- High levels of scalability: 20 petabytes in a single file system and volume.
- Linear, independent performance and capacity scaling.
- 60-second scaling with automated balancing of cluster resources.
- The highest level of end-to-end data protection — up to quadruple failure protection, with 100% availability of data.
- Unmatched simplicity and ease of use, enabling scaling without additional management resource commitment.
- Multitier automatic and transparent tiering.

Appendix A: Composite Organization Description

For this TEI study, Forrester has created a composite organization to illustrate the quantifiable costs and benefits of implementing Isilon storage. Based on the interviews with the four existing customers provided by EMC, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the areas affected financially. The composite organization that Forrester synthesized from these results represents an organization with a storage environment of approximately 300 TB. This is divided over six NL nodes initially, with the acquisition of two additional nodes over a period of three years.

Appendix B: 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 C: Glossary

Discount rate: The interest rate used in cash flow analysis to take into account the time value of money. Although the Federal Reserve Bank sets a discount rate, 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 D: 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 17.