A Forrester Total Economic Impact™ Study Prepared For NetApp

The Total Economic Impact Of NetApp MetroCluster™

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About Forrester Consulting
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Executive Summary

In late 2011, Forrester Research started work on a research project commissioned by NetApp that focused on examining the potential return on investment (ROI) enterprises may realize by adopting NetApp's solution for synchronous data replication known as MetroCluster™.

This study highlights the benefits and costs of deploying MetroCluster across the enterprise of a composite *Organization* (see section titled Composite *Organization* Description). The findings in this study are in large part based on in-depth interviews conducted by Forrester with seven organizations that have implemented NetApp's MetroCluster solution. As with the interviewed organizations, our composite *Organization* is focusing on achieving continuous availability for mission-critical applications, (i.e., the need to keep business operations up and running 24x7x365) and to seamlessly recover from failures without losing data. This requirement is also referred to as a zero recovery point objective (RPO).

The study examines the estimated ROI for the composite *Organization* as well as ROI variations that are dependent upon the cost of downtime for the reader's organization. The study also presents the aggregate findings derived from the interview and analysis process as well as our independent research.

The study found that for our composite *Organization*, a successful, well-planned implementation will allow quantifiable benefits and cost savings to accrue in the following areas totaling **$736,800** (risk adjusted) over three years:

- $73,600 — Labor savings using MetroCluster to set up a disaster recovery site.
- $79,200 — Reduced storage costs through deduplication with MetroCluster.
- $360,000 — Savings associated with reduction in unplanned downtime with the use of MetroCluster.
- $168,000 — Savings associated with reduction in planned downtime with the use of MetroCluster.
- $56,000 — Labor savings with MetroCluster and SnapMirror versus legacy tape-based DR environment.

The interviewed customers identified several additional benefits of using NetApp MetroCluster, but they were *not* able to quantify the benefits at the present time. See pages 16-17 for a list of unquantifiable benefits.

Key Findings

Our interviews and subsequent financial analysis found that the *Organization* experienced the risk-adjusted ROI, payback period, benefits, and costs shown in Table 1.

Table 1A

The *Organization* — Three-Year Risk-Adjusted ROI, Payback Period, Costs, And Benefits

Risk-adjusted ROI	Payback period	Total benefits (PV)	Total costs (PV)	NPV	Assumed hourly cost of unplanned downtime	Assumed hourly cost of planned downtime
143%	11 months	$611,156	$251,101	$360,055	**$50,000**	**$10,000**

Source: Forrester Research, Inc.

The three-year risk-adjusted total net present value (NPV) of **$360,055** represents the net cost savings and benefits attributed to using MetroCluster. These results are compared with the costs of the *Organization*'s pre-MetroCluster storage environment, which included a host-based replication solution where during a failure, the failover to the recovery site had to be initiated manually frequently causing downtime (see details below in the Costs, Benefits and Savings - Quantified, Flexibility, and Risk sections). In addition, the risk-adjusted ROI was **a very favorable 143%**.

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 estimate, incorporating any potential risk factors that may later affect the original cost and benefit estimates. For this study, Forrester applied a **20% risk adjustment — i.e., a reduction of 20%** — to all benefits to reflect the risks. For a more in-depth explanation of risk and the risk adjustments used in this study, please see the Risk section.

Readers of this study should understand that the ROI is partially but significantly driven by the cost of unplanned and planned downtime. Forrester conservatively used a $50,000 hourly cost of unplanned downtime and a $10,000 cost of planned downtime to arrive at the data in Table 1A. Calculating the hourly cost of downtime is a task that many organizations struggle with. Determining productivity losses, lost sales opportunities, and compliance penalties is easier to do, while calculating impact on customer retention, reputation, productivity, and morale is much more difficult.

In the following tables, Forrester has calculated a range of risk-adjusted ROIs, payback period, benefits, and costs based on different hourly downtime costs. The reader should calculate their organization's downtime costs and use the tables above and below to better understand the benefits and ROI of MetroCluster.

Table 1B
Based On Variable Cost Of Downtime — Three-Year Risk-Adjusted ROI, Payback Period, Costs, And Benefits

Risk-adjusted ROI	Payback period	Total benefits (PV)	Total costs (PV)	NPV	Assumed hourly cost of unplanned downtime	Assumed hourly cost of planned downtime
318%	7 months	$1,048,841	$251,101	$797,740	**$100,000**	**$20,000**

Source: Forrester Research, Inc.

Table 1C
Based On Variable Cost Of Downtime — Three-Year Risk-Adjusted ROI, Payback Period, Costs, And Benefits

Risk-adjusted ROI	Payback period	Total benefits (PV)	Total costs (PV)	NPV	Assumed hourly cost of unplanned downtime	Assumed hourly cost of planned downtime
666%	4 months	$1,924,213	$251,101	$1,673,112	**$200,000**	**$40,000**

Source: Forrester Research, Inc.

Table 1D
Based On Variable Cost Of Downtime — Three-Year Risk-Adjusted ROI, Payback Period, Costs, And Benefits

Risk-adjusted ROI	Payback period	Total benefits (PV)	Total costs (PV)	NPV	Assumed hourly cost of unplanned downtime	Assumed hourly cost of planned downtime
1,189%	2 months	$3,237,271	$251,101	$2,986,170	**$350,000**	**$70,000**

Source: Forrester Research, Inc.

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

Disclosures

The reader should be aware of the following:

- The study was commissioned by NetApp and delivered by the Forrester Consulting group.
- NetApp reviewed and provided feedback to Forrester, but Forrester maintained editorial control over the study and its findings and did not accept changes to the study that contradicted Forrester's findings or obscured the meaning of the study.
- NetApp provided the organization names for the interviews but did not participate in the interviews.
- Forrester makes no assumptions as to the potential return on investment that other organizations will receive. Forrester strongly advises that readers should use their own estimates within the framework provided in the study to determine the appropriateness of an investment in NetApp MetroCluster.
- Forrester does not endorse NetApp or its MetroCluster solution.
- The study is not a direct or implied market or competitive comparison.

TEI Framework And Methodology

Methodology

NetApp selected Forrester for this project because of our industry expertise in continuous availability storage technologies, 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 its TEI methodology in modeling and analyzing the implementation of MetroCluster:

1. Costs.
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 NetApp's MetroCluster solution.
2. Forrester interviewed NetApp's marketing, product management, and sales personnel to fully understand the potential (or intended) value proposition of its solutions.
3. Using knowledge of the MetroCluster solution, as well as input from existing Forrester research, a Forrester representative conducted in-depth discussions with seven organizations that have implemented MetroCluster to understand their experiences.
4. Forrester constructed a financial model representative of data collected in the interviews.
5. Forrester created this study, which represents and examines the estimated value of the findings derived from the customer interview and analysis process and from Forrester's independent research.

About NetApp MetroCluster

NetApp MetroCluster solution

According to NetApp, MetroCluster is a solution that combines array-based clustering with synchronous mirroring to deliver continuous data availability and zero data loss, also referred to as zero recovery point objective (RPO). MetroCluster is able to transparently recover from failures so that mission-critical applications continue to have uninterrupted access to data. As a zero RPO solution, MetroCluster provides the essential prerequisite for zero recovery time objective (RTO) application environments where there is no tolerance for downtime. MetroCluster also simplifies administration by eliminating the requirement for repetitive change management activities. In addition to saving time and money, this also reduces one of the largest sources of risk — human error.

Key points:

- Designed for zero unplanned downtime through transparent failover with protection from hardware plus network and environmental faults.
- Designed for zero planned downtime through upgrades of storage hardware and software.
- Designed for zero change management at the recovery site through automatic mirroring of changes to user, configuration, and application data.
- Set-it-once simplicity: easy to deploy, with no complex scripting or dependencies on the application or operating system. Failover is as simple as a single command.
- Improved read performance.

- Take advantage of NetApp's unified storage architecture with Data ONTAP capabilities including Snapshots, WAFL (write anywhere file layout), and Integrated Data Protection.
- Added efficiency through data deduplication and server virtualization.

Customer Interview Highlights

Forrester derived its conclusions in large part from information received in a series of in-depth interviews conducted by Forrester with executives and personnel at seven organizations, each of which are using NetApp MetroCluster. The following is a brief description of the interviewed organizations, all of whom were promised anonymity:

1. A state university in the eastern US with more than 15,000 student enrollments. It has been using MetroCluster since 2008 as part of its continuous availability (CA) strategy for the following mission-critical applications: ERP, email, course management, and its external-facing web presence. The Fabric MetroCluster is split between two buildings (6,500 feet apart) on campus with disparate Fibre paths running between them. It supports their VMware environment over FCP (Fibre Channel Protocol). It chose NetApp MetroCluster to maximize uptime in the event of a data center power or cooling failure, or any other event that risks impacting the availability of their environment.

2. A European-based reinsurance and primary insurance company with more than 10,000 employees and millions of clients in more than 30 countries. It has been using MetroCluster since 2009, mirroring data between two data centers eight miles apart to achieve continuous data availability for its business-critical applications.

3. A US-based, multi-product conglomerate with more than 80,000 employees in 65 countries. It has been using MetroCluster since 2007 in the UK and since 2009 in the US. Its initial goal was to reduce the occurrences of data loss from the five to10 outages per year (pre-MetroCluster) to zero, which it was able to do post-MetroCluster. In addition, it is using MetroCluster in conjunction with V-Series controllers to facilitate the movement and protection of data residing on both NetApp and non-NetApp storage.

4. A university in the midwestern US with nearly 4,000 student enrollments. It has been using MetroCluster since 2007 as part of its CA strategy for the following business-critical applications: email, course management, and its external-facing web presence. Prior to implementing MetroCluster, it was not satisfied with its previous solutions inability to perform seamless failovers between its two data centers and to "identify" itself to VMware. Since investing in MetroCluster they synchronously replicate transactions between campus data centers (1,600 feet apart). The capability to instantly mirror data allows them to virtualize key application services using VMware knowing that the data that supports them will always be available.

5. A southwestern US utility company providing electricity and water delivery systems to nearly 1 million retail customers. It has been using MetroCluster since mid-2011 to ensure CA and synchronous replication for its business-critical applications and its DR site. Its two data centers are 26 miles apart. This

organization believes that not providing this level of highly available services could result in potential loss of revenue, reduced employee productivity, and tarnished company reputation.

6. A very large private university in the eastern US with total enrollment exceeding 70,000 residential and online students. It has been using MetroCluster since 2008 for CA across two data centers, which are one mile apart. The university has grown online enrollment significantly over the past few years along with its reliance on self-service applications to support distance-learning activities. In implementing MetroCluster, it sought the ability to transparently recover from failures so that business-critical applications continued uninterrupted.

7. A Canadian healthcare organization comprised of three hospitals, including a teaching hospital and a wide range of clinics and treatment centers. It has been using MetroCluster for its imaging storage needs which are hosted in an HA cluster with full redundancy across its two data centers located 1,500 feet apart. HA is important to this healthcare organization as downtime directly impacts x-ray, magnetic resonance imaging (MRI), and computerized tomography (CT) revenues.

Composite *Organization* Description

For this study, we have built a composite *Organization* to help illustrate the quantifiable benefits and cost savings that can be achieved using NetApp MetroCluster. This *Organization* is based on an amalgamation of attributes and feedback collected from organizations interviewed within the scope of this study, as well as from other NetApp customers with similar business needs.

The *Organization* is a $1 billion-plus multinational manufacturer headquartered in North America with operations in Europe and Asia. Prior to investing in NetApp MetroCluster, it was challenged by the need to keep pace with the annual 30% growth in storage requirements as well as maintaining and protecting its mission-critical applications such as ERP, Exchange/Outlook, SharePoint, CRM and Active Directory applications and services. It had recently consolidated servers and storage (multi-vendor) in a virtualized environment, and was ready to move from an unclustered to a provisioned clustered environment for extremely high levels of availability for its applications. The *Organization* was running out of two data center locations, one at its headquarters and main manufacturing operation, and a second located approximately 50 miles way, at its customer support and parts distribution center. The secondary site is located in a different threat region than the primary, operates off a separate electrical grid, and has different telecommunication providers servicing it. The *Organization* was interested in using NetApp's MetroCluster to facilitate the movement and protection of data. It also wanted to be able to synchronously replicate data between the two data centers to ensure that no data would be lost in the event that there was an outage at either location.

Ten years ago, prior to the construction of its second data center and customer support offices, a power outage on the main grid shutdown its headquarters operation for more than 6 hours. Due to uninterruptible power supply (UPS) failures, many critical pieces of IT infrastructure were unable to come up on generator power. It took them several days to fully recover and considerable overtime by their IT staff to rebuild their main database applications. In recent years, there had been several near misses with weather-related disasters. Had these occurred, the direct and indirect cost to the

business would have been considerable. As their business and customer reliance on them has grown, so have the risks associated with the impact of downtime and lost data.

Finally, with its newly virtualized environment it was concerned that centralized mission critical applications were at higher risk; all the more reason for pursuing a strategy that would provide for continuous availability of applications and data that are critical to the business.

As with the organizations interviewed by Forrester, the composite *Organization*'s high-level business objectives for pursuing a continuous data availability strategy for its critical IT systems were as follows:

- **Cost reduction:** Reduce the time and money spent on managing its storage.
- **Supporting business needs:** To create a more flexible and agile storage infrastructure to respond to the business needs faster.
- **Achieve CA (continuous availability) for mission-critical applications and data:** It has a need to keep business operations up and running 24x7x365.
- **The ability to seamlessly recover from failures:** Mission-critical applications should continue uninterrupted.
- **Disaster recovery:** Improve recovery plans in the event of a disaster or major outage.
- **Non-disruptive system maintenance:** To eliminate the impact of planned downtime on business-critical applications.
- **Transparent site failover:** To reduce recovery time objectives and respond quickly and transparently to events that pose a risk to uptime without interruption to business-critical applications.
- **End-to-end continuous availability:** Within in a virtualized environment with VMware HA and FT.

Again, as with the seven interviewed organizations, the *Organization* sought to achieve the following tactical drivers and goals.

- **IT environment drivers — virtualization:**
  - Help IT to become more flexible and adaptive.
  - Improve utilization and efficiency of IT asset usage.
  - Need to support a diverse range of application types (ERP, email, collaboration, engineering).
  - Need to be able to scale to support business and data growth.
- **IT environmental drivers — operating environment:**
  - Business experiencing rapid growth (30%).
  - Volume of data has doubled in the past three years and is projected to maintain that rate of growth.

- Diverse set of user and application needs with increasing service level expectations and demands for operational resilience.
- EDI connection with suppliers and customers.
- Multiple business locations.
- Two data centers.

- **Business need: Business-critical processes are dependent upon continuous availability of data:**
  - ERP system that supports the business operation.
  - Inventory and order management systems with suppliers.
  - EDI linkage to customer systems.
  - 24x7x365 CRM operations.
- **Impact of data loss and downtime:**
  - Financial penalties based on SLA commitments with key customers.
  - Loss of business reputation.
  - Lost sales (orders are automatically routed to an alternate supplier is their systems are down).
  - Manufacturing downtime (shutdown and startup costs are high).
  - Employee productivity losses.
- **Goal:**
  - Zero loss of data; also referred to as zero RPO.
- **Location risk:**
  - Risk of power outages.
  - Site risk subject to higher risk or weather-related threats. There were near misses in the past that, although they did not result in downtime, the events highlighted the need to have a better disaster recovery plan in place for the *Organization*.
- **Execution:**
  - Have a secondary location with its own data center located approximately 50 miles away where the locational risks associated with their primary location are significantly lower.

- Customer support operations and parts distribution run out of that location. Ran CRM applications out of this location.
- Redesigned their systems to virtualize their systems across both data center locations connected by a high-speed Fibre Channel backbone.
- Implemented MetroCluster to synchronously replicate data between both data centers.

NetApp Configuration For The Organization

The *Organization* contacted NetApp, its primary storage vendor, to purchase the following MetroCluster-related hardware, software, services, and maintenance for a total cost of **$244,159**. NetApp pricing is based on normal and average discounts off NetApp's list price as of March 2012.

- **Hardware and software licenses** (total cost is **$167,859**).
  - **Platform:** FAS3240 HA system with controller & IOXM. Quantity 2.
  - **Storage:** DS-4243 (4 shelves of 24* 1TB SATA per controller). DSK SHLF, 24x1.0TB, 7.2K, SATA, IOM3, -C, R5. Quantity 8.
  - **FCVI cards:** HBA MetroCluster FC-VI w/5M Cbl 8 Gb PCIe. Quantity 2.
  - **HBA cards (FC Init):** HBA 4-Port FCP Target 4 Gb PCIe. Quantity 2.
  - **Switches:** Brocade 300 switches. 8-Pt Brocade 300 Full Fab FC 8 Gbps, -C, R5. Quantity 4.
  - **Software:** NAS Software. SW, NFS, CL, node, 3240A. Quantity 2.
  - **FC-SAS bridge:** FC-SAS bridge. Quantity 4.
  - **SFP:** SFP, Brocade 8 Gbps 10 Km LWL. Quantity 8.
- **Professional services** (implementation cost is **$17,500**).
- **Maintenance for hardware and software** (cost is $19,600 per year or **$58,800** over three years).
  - Three-year SupportEdge Premium — 4-hour on-site support.

TEI Framework

Introduction

From the information gathered in the in-depth customer interviews, Forrester has constructed a TEI framework for those organizations considering an investment in NetApp MetroCluster. The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision.

Composite Organization

Based on the interviews with the seven existing organizations that NetApp provided, Forrester constructed a TEI framework, a composite *Organization*, and an associated ROI analysis that illustrates the areas affected financially. The composite *Organization* that Forrester synthesized from these results is described above.

Framework Assumptions

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

Table 2
General Assumptions

General assumptions	Value
Discount rate used to compute NPV	10%
Length of analysis	Three years
Annual fully loaded cost of a storage administrator	$110,000

Source: Forrester Research, Inc.

Costs

Costs are an important part of the TEI model. Costs, or IT impact, are calculated as a change in costs primarily for IT as a result of the introduction of the technology to the *Organization*. Therefore, the introduction of NetApp's solution affects IT budgets with the purchase of the solution; it also affects the *Organization* positively, in terms of the cost savings and efficiencies created by the investment (see the Benefits And Savings: Quantified section below).

The impact of cost is accrued in two different areas described below. NetApp solution costs (see page 11for more details and pricing of hardware, software, services, features, and functionalities); and the *Organization*'s internal preparation, planning, and migration costs. Total three year costs are **$261,159.**

Costs For The NetApp Solution: ***$244,159*** *(See Page 11 For Detailed Configuration)*

Cost For Internal Preparation And Planning, And Testing Labor: ***$17,000***

A readiness assessment that looks at costs, benefits, and risks along with detailed planning is essential for a successful MetroCluster implementation. Based on interviews with current NetApp organizations, our *Organization* required two full-time equivalents (FTEs) (storage administrator and data center manager) to spend 4 weeks of their time — before and during implementation — planning, i.e., understanding all the Fibre Channel connections between the two sites and testing. To test the configuration before entering production operation, the *Organization* simulated a wide variety of failures, including pulling the plug on one storage node, disconnecting networks and Fibre Channel connections, turning off one of the two directors, and so on. The *Organization* also tested the manual failover capabilities to make the secondary site the primary rather. Each interviewed customer stated that the NetApp MetroCluster installation and configuration were straightforward and simple. After initial configuration, MetroCluster automatically mirrors any changes of user, configuration, and application data, helping enable data to be always available in the event of a failure. Forrester recommends doing a full assessment with NetApp up front to work out the specifics and validate the configuration.

The costs associated with implementing the NetApp MetroCluster solution are reflected in Table 3.

Table 3
The *Organization* — Total Costs (Non-Risk-Adjusted)

Total costs	Year 0	Year 1	Year 2	Year 3	Total
Storage hardware and software licenses	$167,859	$0	$0	$0	$167,859
Professional services — implementation	$17,500	$0	$0	$0	$17,500
Hardware and software maintenance — SupportEdge Premium	$0	$19,600	$19,600	$19,600	$58,800
Cost for internal preparation, planning and testing labor	$17,000	$0	$0	$0	$17,000
Total costs	**$202,359**	**$19,600**	**$19,600**	**$19,600**	**$261,159**

Source: Forrester Research, Inc.

Forrester has not included the cost of updating the Fibre Channel network to accommodate synchronous replication between data centers. Each reader should do their own due diligence to determine their organization's specific needs and subsequent costs for updating their network.

Benefits And Savings: Quantified

> *"The MetroCluster solution provides continuous data availability by replicating data synchronously, so there is no loss of data at either location. It also provides automatic failover in the event of a component failure or major site disaster. The combination of failover and data replication allows the organization to recover in minutes rather than hours or days."* (The storage system administrator of a large organization in the eastern US)

In addition to the costs associated with the NetApp solution, there were positive IT and business cost savings and benefits with NetApp MetroCluster. Based on an analysis of the interviews with the participating organizations, we could quantify the following benefits as a result of implementing NetApp MetroCluster. These benefits total **$921,000** (prior to risk or PV adjustments).

Labor Savings Using MetroCluster To Set Up Disaster Recovery Site: $92,000

Prior to implementing MetroCluster, the *Organization* considered setting up its DR site as a cold site with recovery from tape. This would have involved half of a man-day for each of the 300 systems that it will eventually migrate from tape to NetApp over the current and next year. The *Organization* reported that for its DR site, MetroCluster was simple to deploy and did not require any scripting, nor were there dependencies on applications or operating systems. The resulting labor savings totals 150 man-days (300 systems multiplied by 0.5 man-days) — 46,000 per year for Years 2 and 3, or $92,000 total (based on a fully burdened storage administrator's salary of $110,000 annually).

Reduced Disaster Recovery Storage Costs Through Deduplication With MetroCluster: $99,000

The *Organization* will be using deduplication with MetroCluster for space savings in its future DR environment. Deduplication reduces the amount of data that is transferred and stored at the DR site, thereby reducing storage costs. The *Organization* reported efficiencies resulting in an approximate 50% decrease in storage hardware needed at the DR site. This is a one-time hardware cost avoidance savings of $60,000 plus $12,000 in implementation costs. In addition the *Organization* saves $9,000 each year for avoided support for a total three year savings of **$99,000**.

Savings Associated With Reduction In Unplanned Downtime With The Use Of MetroCluster: $450,000

Several interviewed organizations indicated the need to reduce unplanned downtime related to storage. These organizations reported an almost 100% reduction in unplanned downtime attributed to using MetroCluster versus their previous replication environments. For our *Organization*, we included the benefit associated with a reduction in the number of events. First, some pertinent information about cost of downtime:

In a November 2010, Forrester conducted a survey of 72 DR decision-makers which revealed that 55% of companies claim to have calculated their cost of downtime. Calculating the hourly cost of downtime is a task that many companies struggle with. Determining productivity losses, lost sales opportunities, and compliance penalties is easier to do, while calculating impact on customer retention, reputation, productivity, and morale is much more difficult. Even though

55% of survey respondents claimed their companies have calculated the cost of downtime, only 18% actually knew what that figure was. The average reported cost of downtime per hour was almost $350,000.

For this study we assumed the "unrecoverable" cost of unplanned downtime to the *Organization* is $50,000 per hour, which is the average for our seven interviewed organizations. As the survey results seem to indicate, this cost can vary widely depending on the industry, timing, and specifics of each organization, ranging from very low to into the millions of dollars. We deliberately remained conservative in estimating the hourly cost at **$50,000** per unplanned event, although in the Executive Summary we outline variable ROIs based on higher costs of downtime. As reported by our interviewed organizations, before implementing MetroCluster, a failure at the primary site would involve at least 1 hour of downtime to allow administrators time to perform the manual process of re-pointing the systems at the alternative storage sites, and time to reconnect and come up to normal operational velocity. Prior to deploying MetroCluster, the *Organization* averaged three unplanned events per year. Every interviewed organization reported zero unplanned events since implementing MetroCluster, avoiding the unrecoverable cost of downtime of $150,000 annually or $450,000 over three years.

Savings Associated With Reduction In Planned Downtime With The Use Of MetroCluster: $210,000

Planned downtime is used to perform equipment upgrades, updates, applying software patches, and other maintenance tasks. With NetApp MetroCluster, the *Organization* has completed several controlled failovers for maintenance and upgrade purposes. Those failovers caused only 30 seconds of disruption. The *Organization's* IT department has reduced planned downtime from hours to seconds with NetApp's MetroCluster. Although planned downtime events are typically conducted during non-working hours (weekends and or nights), our *Organization* has an increasing business demand for 24x7x365 high availability. Therefore, we've captured the cost of planned downtime and the associated benefit from reducing that downtime. The cost of planned downtime is typically significantly lower than that of unplanned downtime, but it is considerable enough to be relevant to this analysis. Similar to the estimate in the cost of unplanned downtime, we estimate this as a low cost of **$10,000 per hour** to remain conservative. In some instances, this cost can be much higher. Before deploying MetroCluster the *Organization* averaged seven planned events per year with downtime at 1 hour each event. After implementing MetroCluster, planned event downtime was reduced to minutes and seconds, saving $70,000 annually or **$210,000** over three years.

Labor Savings With MetroCluster And SnapMirror Versus Legacy Tape-based DR Environment: $70,000

Several interviewed organizations reported that they were able to deploy and manage MetroCluster and SnapMirror with fewer IT resources compared with its prior tape-based DR solution. It's an 18-month project to migrate all the data from tape to NetApp storage arrays. Annualized savings are $30,000, which equates to 45 man days per year or 20% of an FTE. Partial first-year savings will be 33% of $30,000, or $10,000. Savings in Years 2 and 3 will be $30,000 each year, totaling **$70,000** for the three years of our analysis.

The quantified benefits and savings associated with implementing NetApp MetroCluster are reflected in Table 4.

Table 4
The *Organization* — Total Quantified Benefits And Cost Savings (Non-Risk Or PV Adjusted)

Total benefits and cost savings	Year 1	Year 2	Year 3	Total
Labor savings using MetroCluster to set up a cloud disaster recovery site	$0	$46,000	$46,000	$92,000
Reduced storage costs through deduplication with MetroCluster	$81,000	$9,000	$9,000	$99,000
Savings associated with reduction in unplanned downtime with the use of MetroCluster	$150,000	$150,000	$150,000	$450,000
Savings associated with reduction in planned downtime with the use of MetroCluster	$70,000	$70,000	$70,000	$210,000
Labor savings with MetroCluster and SnapMirror versus legacy tape-based DR environment	$10,000	$30,000	$30,000	$70,000
Total benefits and cost savings	**$311,000**	**$305,000**	**$305,000**	**$921,000**

Source: Forrester Research, Inc.

Benefits: Unquantified

The interviewed organizations identified the following additional benefits of using NetApp MetroCluster, but they were *not* able to quantify the benefits at the present time:

- The interviewed organizations were able to move away from application or software level tools to a hardware implemented solution (MetroCluster) at the storage layer. The organizations were able to stop using some of these third-party database and other replication tools. These tools are typically bundled into broader products so they don't have a specific cost (savings) that Forrester could quantify. Having fewer tools is an intangible benefit to the *Organization's* storage administrators.
- Prior to implementing MetroCluster, the *Organization* had no alternative but to perform backups on the primary system. Since MetroCluster, backups are performed over this less busy node and this has decreased backup windows from 12 hours to less than 2 hours.
- The interviewed organizations reported that one of the benefits of bandwidth-efficient replication is the ability to increase distance (up to 100 km or about 60 miles) between data centers to mitigate geographic disaster risk, improve operational resilience, and minimize the operational impact in the event a recovery is required.

- Most interviewed organizations had not experienced a building or site outage, but in testing MetroCluster they were confident that if there is a power failure, building loss, or another threat to their IT operation, MetroCluster would allow them to meet their data protection and DR objectives.

Risk

Risk-adjusted and non-risk-adjusted ROI are both discussed in this study. The *Organization*'s individual costs and benefits are quoted above in non-risk-adjusted (best-case) terms and before risk adjustments are made. The assessment of risk provides a range of possible outcomes based on the risks associated with IT projects in general and specific risks relative to NetApp's MetroCluster projects. In our research, we discovered that implementing the NetApp solution was a relatively low-risk endeavor if organizations took the time to thoroughly plan implementation.

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

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

Forrester considered the following *general* risks in this study:

- A lack of organizational discipline in creating processes and procedures to best take advantage of the benefits.
- A lack of appropriate training for the storage administrators who will be responsible for optimizing the full benefit potential of MetroCluster including the future simplification of DR tasks.
- Failures to reduce, transfer, or redeploy IT support headcount made redundant by deploying MetroCluster solution.
- The possibility that the benefits will not be measured and quantified in the future; as a result, no TEI benefit would be captured and acknowledged.
- Internal inertia, conflicting priorities, and turnover, reducing an organization's ability to achieve the benefits.

The following risk associated with NetApp MetroCluster solution was considered in this study:

- The inability of the *Organization* to find, train, and retain administrators fluent in technologies such as NetApp's Data ONTAP 7G operating system and other NetApp tools, to take full advantage of the benefits outlined in this study.
- For organizations with short distances between data centers, there is the risk of a single threat taking out both data centers concurrently.

For this study, Forrester applied a **20% risk adjustment — i.e., a reduction of 20%** — to all benefits to reflect the risks listed above. We did not risk-adjust costs, as these were primarily fixed quotes from NetApp.

Table 5 represents the total costs, benefits, and cost savings (risk-adjusted by 20%) of implementing NetApp MetroCluster.

Table 5
The *Organization* — Total Benefits And Cost Savings (Risk-Adjusted By 20%)

Total benefits and cost savings	Year 1	Year 2	Year 3	Total	Present value
Labor savings using MetroCluster to set up a cloud disaster recovery site	$0	$36,800	$36,800	$73,600	$58,062
Reduced storage costs through deduplication with MetroCluster	$64,800	$7,200	$7,200	$79,200	$70,269
Savings associated with reduction in unplanned downtime with the use of MetroCluster	$120,000	$120,000	$120,000	$360,000	$298,422
Savings associated with reduction in planned downtime with the use of MetroCluster	$56,000	$56,000	$56,000	$168,000	$139,264
Labor savings with MetroCluster and SnapMirror versus legacy tape-based DR environment	$8,000	$24,000	$24,000	$56,000	$45,139
Total benefits and cost savings	**$248,800**	**$244,000**	**$244,000**	**$736,800**	**$611,156**

Source: Forrester Research, Inc.

The risk-adjusted PV of benefits is **$611,156**. If risk-adjusted benefits still demonstrate a compelling business case, it raises confidence that the investment is likely to succeed as the risks that threaten the project have been taken into consideration and quantified. The risk-adjusted numbers should be taken as "realistic" expectations, as they represent the expected value considering risk. Assuming normal success at mitigating risk, the risk-adjusted numbers should more closely reflect the expected outcome of the investment.

Flexibility

Flexibility, as defined by TEI, represents investing in additional capacity or agility that can be turned into benefit for some future additional investment. We believe that investing in NetApp MetroCluster provides NetApp customers with the option to significantly downsize their legacy tape-based DR solution in the future and save on hardware, software, tape storage, and off-site storage.

Although the *Organization* and several interviewed organizations believe there is potential value in having the flexibility within the NetApp solution to take advantage of downsizing its existing tape-based DR solution system, most organizations were not yet ready to give up their tape infrastructure and/or quantify the benefits or value of these flexibility options. Therefore, Forrester will not include the value of this flexibility benefit in this analysis.

The value of flexibility is clearly unique to each organization, and the willingness to measure its value varies from organization to organization. The value of the option (when calculated) is based on the Black-Scholes Option Pricing formula. (For additional information regarding the flexibility calculation, please see Appendix A.)

Financial Summary

The financial results calculated in the Costs, Benefits And Savings: Quantified, and Risk sections can be used to determine the risk-adjusted NPV of benefits, ROI, and payback period for the *Organization*'s investment in NetApp MetroCluster. Table 1A below (repeated from the Executive Summary) shows the summarized risk-adjusted values, applying the risk-adjustment method described in the Risk section, which was to apply a 20% risk adjustment — i.e., a reduction of 20% — to all benefits. No risk adjustments were made to the costs, as these represented fixed quotes from NetApp or internal planning costs.

Table 1A
The *Organization* — Three-Year Risk-Adjusted ROI, Payback Period, Costs, And Benefits

Risk-adjusted ROI	Payback period	Total benefits (PV)	Total costs (PV)	NPV	Assumed hourly cost of unplanned downtime	Assumed hourly cost of planned downtime
143%	11 months	$611,156	$251,101	$360,055	**$50,000**	**$10,000**

Source: Forrester Research, Inc.

The three-year risk-adjusted total net present value (NPV) of **$360,055** represents the net cost savings and benefits attributed to using MetroCluster. These results are compared with the costs of the *Organization*'s pre-MetroCluster storage environment which included a host-based replication solution where during a failure, the failover to the recovery site had to be initiated manually frequently causing downtime (see details above in the Costs, Benefits, Flexibility, and Risks sections). In addition, the risk-adjusted ROI was **a very favorable 143%**.

Study Conclusions

As the data in this study indicates, NetApp MetroCluster has the potential to provide a very good return on investment. In addition, the favorable **risk-adjusted ROI of 143%, along with an 11-month payback period** (breakeven point), raises confidence that the investment is likely to succeed, as the risks that may threaten the project have already been taken into consideration and quantified. In this study, risks have been modeled conservatively in the hopes of showing worst-case expectations.

The study found that for our composite *Organization*, a successful, well-planned implementation will allow quantifiable benefits and cost savings to accrue in the following areas totaling **$736,800** (risk adjusted) over three years:

- $73,600 — Labor savings using MetroCluster to set up a disaster recovery site.
- $79,200 — Reduced storage costs through deduplication with MetroCluster.
- $360,000 — Savings associated with reduction in unplanned downtime with the use of MetroCluster.
- $168,000 — Savings associated with reduction in planned downtime with the use of MetroCluster.
- $56,000 — Labor savings with MetroCluster and SnapMirror versus legacy tape-based DR environment.

The interviewed organizations identified the following additional benefits of using NetApp MetroCluster, but they were *not* able to quantify the benefits at the present time:

- The interviewed organizations were able to move away from application or software level tools to a hardware implemented solution (MetroCluster) at the storage layer. The organizations were able to stop using some of these third-party database and other replication tools. These tools are typically bundled into broader products so they don't have a specific cost (savings) that Forrester could quantify. Having fewer tools is an intangible benefit to the *Organization's* storage administrators.
- Prior to implementing MetroCluster, the *Organization* had no alternative but to perform backups on the primary system. Since MetroCluster, backups are performed over this less busy node and this has decreased backup windows from 12 hours to less than 2 hours.
- The interviewed organizations reported that one of the benefits of bandwidth-efficient replication is the ability to increase distance (up to 100 km or about 60 miles) between data centers to mitigate geographic disaster risk and improve recovery.
- Most interviewed organizations had not experienced a building or site outage, but in testing MetroCluster they were confident that if there is a power failure, building loss, or another failure, MetroCluster will still maintain high availability.

Organizations that are likely to achieve similar results have the following characteristics:

- Organizations that seek to achieve continuous data availability for business-critical applications, i.e., the need to keep business operations up and running 24x7x365.

- Organizations that want the ability to transparently recover from failures, so mission-critical applications continue uninterrupted.
- Organizations that operate in highly regulated industries that require two copies of data be kept.
- Data centers have to be within certain synch mirroring distances to avoid data loss. For distances under 500 m (campus distances), long cables are used to create stretch MetroCluster configurations. For distances over 500 m but under 100 km/~60 miles (metro distances), a fabric is implemented across the two geographies creating a fabric MetroCluster configuration.

For our *Organization*, NetApp MetroCluster carries a low level of risk, **a very positive 143% risk-adjusted ROI, and an 11-month horizon** to recoup the investment.

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

Appendix A: Total Economic Impact™ Overview

Total Economic Impact is a methodology developed by Forrester Research that enhances an organization's technology decision-making processes and assists vendors in communicating the value proposition of their products and services to clients. The TEI methodology helps organizations demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

The TEI methodology consists of four components to evaluate investment value: benefits, costs, risks, and flexibility. For the purpose of this analysis, the impact of flexibility was not quantified.

Benefits

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

Costs

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

Risk

Risk measures the uncertainty of benefit and cost estimates contained within the investment. Uncertainty is measured in two ways: the likelihood that the cost and benefit estimates will meet the original projections and the likelihood that the estimates will be measured and tracked over time. TEI applies a probability density function known as "triangular distribution" to the values entered. At a minimum, three values are calculated to estimate the underlying range around each cost and benefit.

Flexibility

Within the TEI methodology, direct benefits represent one part of the investment value. While direct benefits can typically be the primary way to justify a project, Forrester believes that organizations should be able to measure the strategic value of an investment. Flexibility represents the value that can be obtained for some future additional investment building on top of the initial investment already made. For instance, an investment in an enterprise wide 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, organizations 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 15% 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 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, or the point in time at which net benefits (benefits minus costs) equal initial investment or cost.

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

A Note On Cash Flow Tables

The following is a note on the cash flow tables used in this study (see the Example Table below). The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1. Those costs are not discounted. All other cash flows in Years 1 through 3 are discounted using the discount rate shown in Table 2 at the end of the year. Present value (PV) calculations are calculated for each total cost and benefit estimate. Net present value (NPV) calculations are not calculated until the summary tables and are the sum of the initial investment and the discounted cash inflows and outflows in each year.

Table [Example]
Example Table

Ref.	Category	Calculation	Year 0	Year 1	Year 2	Year 3	Total

Source: Forrester Research, Inc.

Appendix C: About The Project Manager

Bob Cormier
Vice President, Principal Consultant

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

- Technology vendor marketing and sales enablement professionals. Bob works with these professionals in their efforts to clearly articulate the unique value proposition of their solutions to prospects and customers using Forrester's TEI methodology.

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

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

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

Education

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