

A Forrester Total Economic Impact™  
Study Commissioned By Western Digital  
July 2018

# The Total Economic Impact™ Of Western Digital IntelliFlash™

Cost Savings And Business Benefits  
Enabled By Enterprise Flash Storage

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## ABOUT FORRESTER CONSULTING

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## Executive Summary

Western Digital provides a flash storage solution that integrates with existing storage infrastructure. Flash storage reduces storage latency and enables faster access to large files, and improved performance for large databases and real time analytics workloads.

Western Digital commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying IntelliFlash Enterprise Flash Storage. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of IntelliFlash on their organizations.

To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed two customers with several years of experience using IntelliFlash.

Prior to using IntelliFlash, the interviewed customers had aging and expensive storage systems and significant pressure from business units to improve slow response times, which impeded the productivity and efficacy of working with customers. One organization reported large files that took 15 to 20 minutes to open. Another organization's system required 3 to 5 minutes for doctors and nurses to pull up a patient's medical history while working with those patients.

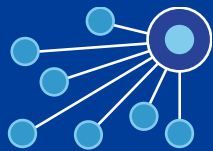
After deploying IntelliFlash, the organizations removed nearly all storage latency for end users, improved the overall performance of virtual desktop environments, and allowed end-users to focus on their jobs rather than agonize over technology deficiencies. Using IntelliFlash provided a superior management interface, enabled much faster data access, drastically lower storage response times and reduced the overall cost of storage with features such as deduplication and greater density in the data center.

### Key Findings

**Quantified benefits.** A composite organization, modeled after the interviewed organizations for this study, experienced the following risk-adjusted present value (PV) quantified benefits over 3 years:

- › **Avoided cost of lost productivity by business users valued at \$1.2 million.** On average, 150 end users experienced 30 minutes of delay waiting for data every day. By eliminating this latency, the business increased productivity equivalent to 8.7 employees on an annual basis.
- › **Avoided cost of disk-based storage system of \$773,749.** The organization's previous storage system was at its end of life and needed to be replaced. The company avoided the cost of replacing another disk-based system.
- › **Reduced storage needs due to deduplication valued at \$178,184.** Deduplication capabilities within IntelliFlash provided additional savings. The organization already experienced data growth that nearly doubled storage annually. Deduplication enabled the customer to store more data in the existing storage. It could store or accommodate 35% more than previously without deduplication.

### Benefits And Costs



Improved business productivity:  
**\$1,195,368**



Reduced costs for the IT organization:  
**\$971,367**



Total cost of flash storage:  
**\$575,640**



**ROI**  
**276%**



**Benefits PV**  
**\$2.2 million**



**NPV**  
**\$1.6 million**



**Payback**  
**<3 months**

- › **Reduced cost of power and cooling in data center valued at \$35,256.** The interviewed executives told Forrester that IntelliFlash reduced the physical footprint and power and cooling costs by one-third or 33%.

**Unquantified benefits.** The interviewed organizations experienced the following benefits, which are not quantified for this study:

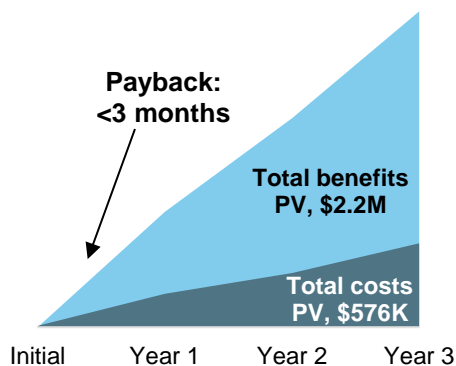
- › **Eliminated frustration by practitioners who previously waited for data.** While the financial model includes metrics related to productivity, executives at each organization shared a significant emotional response to providing faster data. Frustration, agitation, and irritation among end users vanished, and customer-facing employees could focus on work.

**Costs.** The composite organization, based on the two interviewed organizations, experienced the following risk-adjusted PV costs:

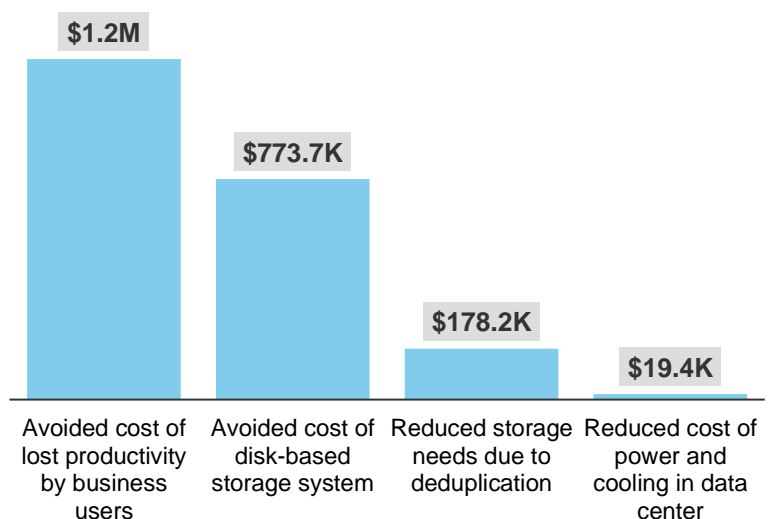
- › **Cost of IntelliFlash storage of \$565,665 over three years.** The organization began with 120 terabytes (TBs) and grew to 400 TBs by the end of three years. During the same time period, the cost per TB of flash storage declined from \$2,000 per year to \$1,500 per year.
- › **Cost to implement and configure flash storage of \$9,975.** While both companies considered the implementation effort to be nominal, it did require 25% of the time of two employees for three months to design, configure, and implement IntelliFlash into their enterprises.

Forrester's interviews with two existing customers and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of \$2.2 million over three years versus costs of \$575,640, adding up to a net present value (NPV) of \$1.6 million and an ROI of 276%.

### Financial Summary



### Benefits (Three-Year)



The TEI methodology helps companies demonstrate, justify, and realize the tangible value of IT initiatives to both senior management and other key business stakeholders.

## TEI Framework And Methodology

From the information provided in the interview, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering implementing Western Digital's IntelliFlash arrays.

The objective of the framework is to identify the cost, benefit, flexibility, and risk factors that affect the investment decision. Forrester took a multistep approach to evaluate the impact that IntelliFlash Storage can have on an organization:



### **DUE DILIGENCE**

Interviewed Western Digital's stakeholders and Forrester analysts to gather data relative to IntelliFlash.



### **CUSTOMER INTERVIEWS**

Interviewed two organizations using Enterprise Flash Storage to obtain data with respect to costs, benefits, and risks.



### **FINANCIAL MODEL FRAMEWORK**

Constructed a financial model representative of the interviews using the TEI methodology and risk-adjusted the financial model based on issues and concerns of the interviewed organization.



### **CASE STUDY**

Employed four fundamental elements of TEI in modeling Western Digital's IntelliFlash impact: benefits, costs, flexibility, and risks. Given the increasing sophistication that enterprises have regarding ROI analyses related to IT investments, Forrester's TEI methodology serves to provide a complete picture of the total economic impact of purchase decisions. Please see Appendix A for additional information on the TEI methodology.

## DISCLOSURES

Readers should be aware of the following:

This study is commissioned by Western Digital and delivered by Forrester Consulting. It is not meant to be used as a competitive analysis.

Forrester makes no assumptions as to the potential ROI 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 Western Digital's IntelliFlash Enterprise Flash Storage.

Western Digital 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.

Western Digital provided the customer names for the interviews but did not participate in the interviews.

# The Enterprise Flash Storage Customer Journey

## BEFORE AND AFTER THE ENTERPRISE FLASH STORAGE INVESTMENT

### Interviewed Organizations

For this study, Forrester interviewed two of Western Digital's IntelliFlash customers:

- › A real estate organization that designs and manages the mechanical, electrical, and plumbing systems for large, commercial buildings. Many of its users work with extremely large computer-aided design (CAD) files, which took extensive amounts of time to load. This created a burden on employees who are paid hourly.
- › A healthcare organization that includes hospitals, clinics, and related medical facilities. Medical records were delivered to doctors and nurses using a virtual desktop infrastructure (VDI) system. Doctors complained that they often waited several minutes for information to load. The financial model is primarily based on the experience of this IntelliFlash customer.

### Key Challenges

The healthcare organization faced challenges with its existing storage system. The organization:

- › **Required a storage system that would support 100% uptime.** The executives told Forrester: "We are a hospital and need 7x24x365 availability. When the system goes down, it impacts the healthcare and potentially even the life of hospital patients."
- › **Improved response time in virtual desktop environment.** The executive said: "Our virtual desktop interface environment was becoming very slow. Doctors would sometimes have to wait for 3 to 5 minutes for information to come up on the computer just so that they could treat patients."
- › **Reached end of life for its previous storage architecture.** "Our current storage system was obsolete and aging out. We needed to upgrade anyway and chose to skip over other disk-based systems and go directly to a flash environment."

The real estate organization:

- › **Suffered significant latency for users to open large files for CAD.** "Our designers are governed by union rules, and we have to monitor their work hours carefully. Most of the large CAD files that they were working on would take 15 to 20 minutes to open in the morning. They used to tell us that they would open the files and then go get their coffee because they had to wait so long."

"We are a healthcare organization, including a hospital, and need 7x24x365 availability. When the system goes down, it impacts the healthcare and potentially even the life of hospital patients."

*Systems analyst, healthcare provider*



## Key Results

The interviews revealed several key results from the IntelliFlash investment. Organizations:

- › **Realized significant capacity savings from deduplication.** “We realized a deduplication level of 51%, which had a significant impact on our capacity requirements. I think that we achieved that level because we had about 600 VDI devices that have a lot of files in common, which really compounds the efficacy of deduplication.”
- › **Leveraged a hybrid storage environment.** “At first, we used IntelliFlash to manage a hybrid environment that included flash and disk technologies. Using flash for caching makes a huge difference for frequently used data and the rest of the less frequently used data sits on spindles. It made a big difference to our environment immediately while we made other changes to our systems.”
- › **Maintained the same number of storage admins even with significant growth in capacity.** “We have the same number of people managing 400 TBs of storage today that we had maintaining our 20 TB disk-based system five years ago. We realize that all storage vendors have improved their interfaces and management tools, so we might have gotten a similar benefit from any storage provider, but we love the point-and-click capabilities of IntelliFlash.”
- › **Enjoyed great support from Western Digital.** “Western Digital has a lot of experienced employees who have worked with other technology firms. Whenever we encounter a problem, they remain engaged and persistent until the problem is resolved, even if that means calling up and working with other technology firms. They have never exhibited the finger-pointing blame game that is common in support by technology vendors.”
- › **Simplified the design of failover systems for disaster recovery.** “We were previously using a product that had a combined hardware and software structure, which required two different storage arrays [one for production and one for DR site], and we wrote to them simultaneously. Latency was horrible, so we removed that system and relied more heavily on IntelliFlash for backup and disaster recovery.”
- › **Reduced the data center space required for the same capacity compared to disk by one-third.** “We only had about 100 TBs [when we started], so the data center space required wasn’t tremendous, but we did reduce the space required by one-third when implementing IntelliFlash.”

“Western Digital has a lot of experienced employees who have worked with other technology firms. Whenever we encounter a problem, they remain engaged and persistent until the problem is resolved, even if that means calling up and working with other technology firms. They have never exhibited the finger-pointing blame game that is common in support by technology vendors.”

*Storage administrator, healthcare industry*



# Analysis Of Benefits

## QUANTIFIED BENEFIT DATA

### Total Benefits

REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Atr	Avoided cost of lost productivity by business users	\$480,675	\$480,675	\$480,675	\$1,442,025	\$1,195,368
Btr	Avoided cost of disk-based storage system	\$306,000	\$238,000	\$397,800	\$941,800	\$773,749
Ctr	Reduced storage needs due to deduplication	\$75,600	\$55,125	\$85,050	\$215,775	\$178,184
Dtr	Reduced cost of power and cooling in data center	\$7,200	\$13,140	\$23,760	\$44,100	\$35,256
	Total benefits (risk-adjusted)	\$869,475	\$786,940	\$987,285	\$2,643,700	\$2,182,557

### Avoided Cost Of Lost Productivity By Business Users

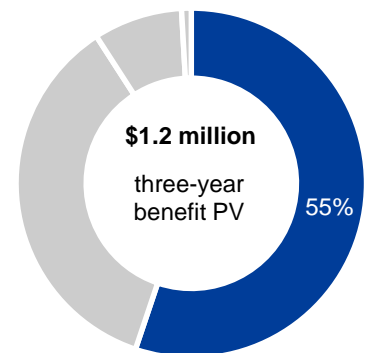
The real estate company had a group of business users with a job that used very large CAD files. Opening the large files took significant time. For example, in the morning, employees said that they would open a file and then go get coffee because it took at least 15 to 20 minutes for the file to open.

The healthcare organization had customer-facing delays waiting for data as well. Doctors and nurses waited for customer data during patient consultations. On average, doctors reported waiting 3 to 5 minutes for patient data to appear on the screen.

In Forrester's financial model, 150 employees saved 30 minutes every day. This equates to 8.7 full-time employees on an annual basis. At an average burdened salary of \$65,000 per year, the total annual savings was \$565,500.

The likelihood of this benefit being applicable to readers depends on specific circumstances that cause slower data to impede business operations. To account for this risk, Forrester adjusted this benefit downward by 15%, yielding a three-year risk-adjusted total PV of \$1.2 million.

The table above shows the total of all benefits across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the interviewed organization expects risk-adjusted total benefits to be a PV of more than \$2.2 million.



Avoided cost of lost productivity by business users: **55%** of total benefits



### Avoided Cost Of Lost Productivity By Business Users: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Business employees impacted by slow data		150	150	150
A2	Average minutes of delay per day		30	30	30
A3	Equivalent full-time employees (rounded)	$A1*(A2 / 60 \text{ minutes} * 240 \text{ days}) / 2,080 \text{ hours}$	8.7	8.7	8.7
A4	Average burdened salary		\$65,000	\$65,000	\$65,000
At	Avoided cost of lost productivity by business users	$A3*A4$	\$565,500	\$565,500	\$565,500
	Risk adjustment	↓15%			
Atr	Avoided cost of lost productivity by business users (risk-adjusted)		\$480,675	\$480,675	\$480,675

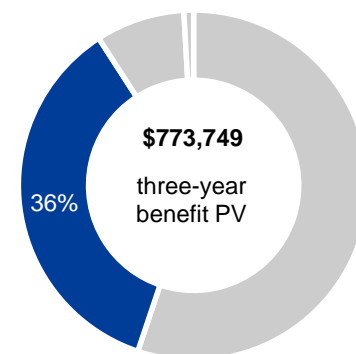
### Avoided Cost Of Disk-Based Storage System

The healthcare organization was using an expensive storage system riddled with performance problems. This combination was confusing and frustrating for executives across business and IT operations.

Although the organization knew that it needed to replace the aging system, which had reached the end of its life, storage managers debated upgrading to a newer, disk-based system vs. flash storage. In the end, the company adopted IntelliFlash because it offered management tools to enable an effective hybrid architecture. The organization then migrated to an all-flash design over about two years.

The company avoided not only the cost of its obsolete system, which had a cost of \$22,000 per TB per year, but also paid less than a new disk-based system, which would have started at an annualized price of \$3,000 per TB per year. Using the lower number of \$3,000 per TB per year, the PV savings over three years totaled \$1.7 million.

The degree to which this benefit is relevant to readers will vary with the current storage architecture. To account for this risk, Forrester adjusted this benefit downward by 15%, yielding a three-year risk-adjusted total PV of \$773,749.



**Avoided cost of disk-based storage system: 35% of total benefits**

### Avoided Cost Of Disk-Based Storage System: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	Storage capacity required (TBs)		120	220	400
B2	Incremental storage purchased yearly	$B1_{CY}-B1_{PY}$	120	100	180
B3	Cost per terabyte		\$3,000	\$2,800	\$2,600
Bt	Avoided cost of disk-based storage system	$B2*B3$	\$360,000	\$280,000	\$468,000
	Risk adjustment	↓15%			
Btr	Avoided cost of disk-based storage system (risk-adjusted)		\$306,000	\$238,000	\$397,800

## Reduced Storage Needs Due To Deduplication

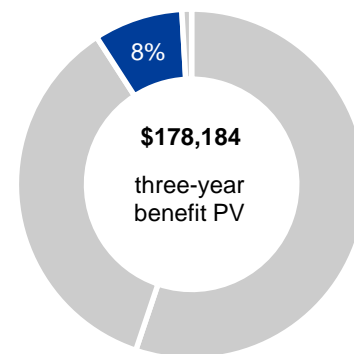
The deduplication capabilities built into IntelliFlash provided savings for both organizations that Forrester interviewed. Deduplication enabled:

- › A capacity reduction of 23% for the real estate firm.
- › A capacity reduction of 51% for the healthcare organization.

The healthcare organization realized a higher level of deduplication, in the opinion of its executives, because it operated with hundreds of virtual desktops that had redundant file structures, which enhanced the impact of deduplication.

In the financial model, Forrester used a midpoint between these two companies and assumed a 35% level of deduplication, which resulted in an avoided need to purchase a total of 140 TBs over 3 years and savings of hundreds of thousands of dollars.

The level of deduplication that readers should expect to realize will vary based on the operating environment and file structure. To account for this uncertainty, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of \$178,184.



Reduced storage needs due to deduplication: **8% of total benefits**

**Reduced Storage Needs Due To Deduplication: Calculation Table**

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
C1	Storage capacity required (TBs)		120	220	400
C2	Incremental storage purchased yearly	$B1_{CY} - B1_{PY}$	120	100	180
C3	Deduplication level realized		35%	35%	35%
C4	Avoided capacity that would otherwise be required (TBs)	$(C2 * C3)$	42	35	63
C5	Average cost per terabyte		\$2,000	\$1,750	\$1,500
Ct	Reduced storage needs due to deduplication	$C4 * C5$	\$84,000	\$61,250	\$94,500
	Risk adjustment	↓10%			
Ctr	Reduced storage needs due to deduplication (risk-adjusted)		\$75,600	\$55,125	\$85,050

## Reduced Cost Of Power And Cooling In Data Center

In addition to lower costs and improved speed, IntelliFlash required less capacity per TB in the data center. Measuring the actual footprint was challenging in a switch from one technology to another while storage requirements doubled annually.

The executives that Forrester interviewed at both organizations estimated that the physical space required along with the power and cooling cost was approximately 33% lower using IntelliFlash.

As different organizations will experience varying levels of reduction due to their previous storage systems, Forrester adjusted this benefit downward by 10%, yielding a three-year risk-adjusted total PV of \$35,256.

Implementation risk is the risk that a proposed investment may deviate from the original or expected requirements, resulting in higher costs than anticipated. The greater the uncertainty, the wider the potential range of outcomes for cost estimates.

## Reduced Cost Of Power And Cooling In Data Center: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
D1	Storage capacity required (TBs)		120	220	400
D2	Data center capacity saved (TBs)	D1*33%	40	73	132
D3	Reduced power and cooling cost (per TB per year)		\$200	\$200	\$200
Dt	Reduced cost of power and cooling in data center	D2*D3	\$8,000	\$14,600	\$26,400
	Risk adjustment	↓10%			
Dtr	Reduced cost of power and cooling in data center (risk-adjusted)		\$7,200	\$13,140	\$23,760

## Unquantified Benefits

In addition to the benefits outlined above, the interviewed executives shared other benefits that did not have specific financial implications. Specifically, the companies benefited from:

- › **The eliminated frustration of their practitioners and designers who previously waited for data and files.** “Doctors are experts in treating patients and become highly frustrated when the basic tools that they have to use don’t work right. We had many, many complaints from doctors that the poor response times were interfering with their ability to care for patients.”

Impact risk is the risk that the business or technology needs of the organization may not be met by the investment, resulting in lower overall total benefits. The greater the uncertainty, the wider the potential range of outcomes for benefit estimates.

## Flexibility

The value of flexibility is clearly unique to each customer, and the measure of its value varies from organization to organization. There are multiple scenarios in which a customer might choose to implement Enterprise Flash Storage and later realize additional uses and business opportunities, including:

- › **Maintaining the same number of storage admins even with significant growth in capacity.** “We have the same number of people managing 400 TBs of storage today that we had maintaining our 20 TB disk-based system five years ago.”
- › **Enjoying great support from Western Digital.** “Whenever we encounter a problem, they remain engaged and persistent until the problem is resolved, even if that means calling up and working with other technology firms.”
- › **Simplifying the design of failover systems for disaster recovery.** “We were previously using a product that had a combined hardware and software structure, which required two different storage arrays, and we wrote to them simultaneously.” Using flash arrays shifted the focus to data and capacity rather than duplicating the hardware and writing simultaneously.

Flexibility, as defined by TEI, represents an investment in additional capacity or capability that could be turned into business benefit for a 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.

Flexibility would also be quantified when evaluated as part of a specific project (described in more detail in Appendix A).

# Analysis Of Costs

## QUANTIFIED COST DATA

Total Costs							
REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Etr	Cost of the IntelliFlash solution	\$0	\$240,000	\$175,000	\$270,000	\$685,000	\$565,665
Ftr	Cost to implement and configure flash storage	\$9,975	\$0	\$0	\$0	\$9,975	\$9,975
	Total costs (risk-adjusted)	\$9,975	\$240,000	\$175,000	\$270,000	\$694,975	\$575,640

## Cost Of The IntelliFlash Solution

The composite organization launched its flash storage with 120 TBs and experienced growth that nearly doubled the level of capacity to 220 TBs and 400 TBs in Year 2 and Year 3, respectively.

Over the same three years, the cost per TB of storage also decreased — in part, due to the decrease in industrywide prices, but also because the increased volume of storage reduced the average cost per TB.

Forrester did not risk-adjust this cost, resulting in a three-year risk-adjusted total PV of \$575,640.

The table above shows the total of all costs across the areas listed below, as well as present values (PVs) discounted at 10%. Over three years, the interviewed organization expects risk-adjusted total costs to be a PV of \$575,640.

## Cost Of The IntelliFlash Solution: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
E1	Flash storage purchased (TBs)			120	100	180
E2	Cost per terabyte			\$2,000	\$1,750	\$1,500
Et	Cost of the IntelliFlash solution	E1*E2		\$240,000	\$175,000	\$270,000
	Risk adjustment					
Etr	Cost of the IntelliFlash solution (risk-adjusted)			\$240,000	\$175,000	\$270,000

# Cost To Implement And Configure Flash Storage

In addition to the cost of storage from Western Digital, the organization incurred a nominal expense to design, architect, and configure the flash storage system.

Two employees worked on the project for three months for about 25% of their time, resulting in an annualized effort of 0.1 full-time equivalents (FTEs). Using a burdened salary of \$95,000, the cost was \$9,500.

Some organizations will require differing amounts of effort. To account for this risk, Forrester adjusted this cost upward by 5%, yielding a three-year risk-adjusted total PV of \$9,975.

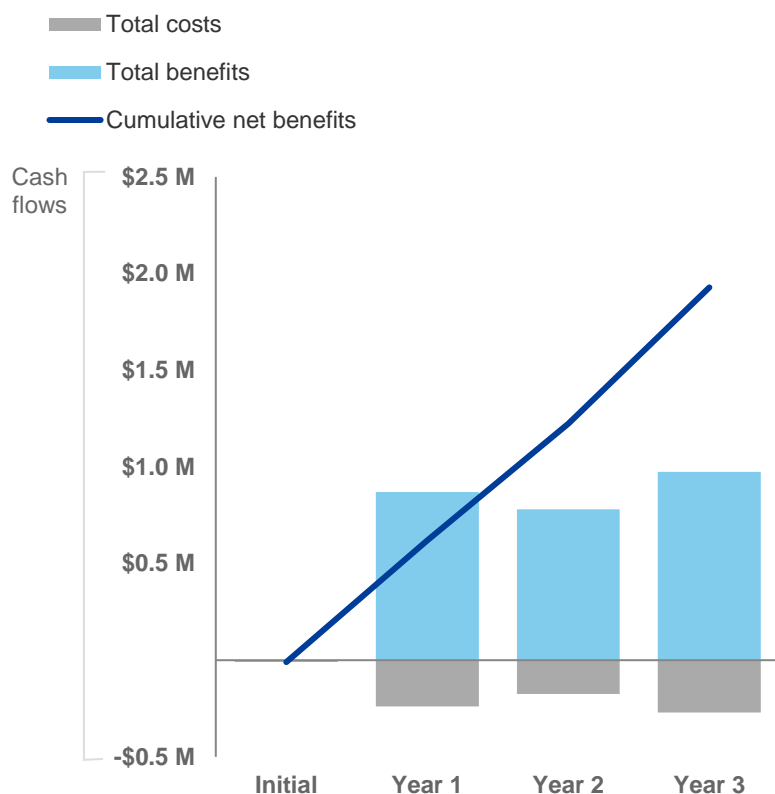
## Cost To Implement And Configure Flash Storage: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
F1	Two employees working for three months for 25% of their time (rounded)	2 employees *(3 months /12 months) *25%	0.1			
F2	Average burdened salary		\$95,000			
Ft	Cost to implement and configure flash storage	E2*E3	\$9,500			
	Risk adjustment	↑5%				
Ftr	Cost to implement and configure flash storage (risk-adjusted)		\$9,975			

# Financial Summary

## CONSOLIDATED THREE-YEAR RISK-ADJUSTED METRICS

### Cash Flow Chart (Risk-Adjusted)



The financial results calculated in the Benefits and Costs sections can be used to determine the ROI, NPV, and payback period for the interviewed organization's investment. Forrester assumes a yearly discount rate of 10% for this analysis.



These risk-adjusted ROI, NPV, and payback period values are determined by applying risk-adjustment factors to the unadjusted results in each Benefit and Cost section.

### Cash Flow Table (Risk-Adjusted)

	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Total costs	(\$9,975)	(\$240,000)	(\$175,000)	(\$270,000)	(\$694,975)	(\$575,640)
Total benefits	\$0	\$869,475	\$779,740	\$974,145	\$2,623,360	\$2,166,735
Net benefits	(\$9,975)	\$629,475	\$604,740	\$704,145	\$1,928,385	\$1,591,095
ROI						276%
Payback period						<3 months

# IntelliFlash Enterprise Flash Storage: Overview

The following information is provided by Western Digital. Forrester has not validated any claims and does not endorse Western Digital or its offerings.

Western Digital offers a comprehensive portfolio of IntelliFlash arrays, so you can choose a flash storage solution that's right for you. Western Digital's flash arrays seamlessly support different storage media (hard disks, dense flash, high-performance flash) under a single storage operating environment. They're designed to accelerate a wide variety of enterprise applications — from smaller workloads to mission-critical deployments. You also get high-performance data reduction (inline deduplication, compression, zero block elimination) and data protection (snapshots, clones, replication) features, all while accelerating performance across flash and disk.

Dial up or down the amount of flash storage to meet the specific performance needs of your applications. NVMe, all-flash, and hybrid flash array configurations give you:

- › A single operating system (OS).
- › The same feature set.
- › An identical user experience.

Users get the high performance of flash with the economics of disk storage. Fully redundant with active/active controllers, these arrays are built for enterprise data centers with resilience, data availability, and data protection in mind.

## One Flash Platform, Any Workload

Every business has unique data storage needs for performance, capacity, and data protection. To meet these needs, many businesses run multiple storage environments. With IntelliFlash, you don't have to. You don't need to choose between an NVMe, all-flash, or hybrid flash environment either. Run different types of storage in one environment and get the benefits of multiple storage environments with none of the drawbacks.



The image shows a tall, black server rack filled with blue IntelliFlash storage units. To the left of the rack is a laptop displaying a dashboard with various charts and graphs. Above the laptop is a cloud icon containing a bar chart and a line graph, with a green arrow pointing upwards, symbolizing data growth and analytics.

- ALL-NVMe, All-FLASH, HYBRID-FLASH**  
One software, Many configurations
- UNIFIED STORAGE**  
Native Block & File
- SUPERIOR DATA REDUCTION**  
Inline compression and deduplication
- MASSIVE SCALE**  
Petabyte Scale
- PREDICTIVE CLOUD ANALYTICS**  
Cloud monitoring, Predication and Remediation
- MULTI-SITE DISASTER RECOVERY**  
Asynchronous, GEO Replication
- END-TO-END DATA PROTECTION**  
Inline data encryption, Instant snapshots, clones

## Accelerate All Your Enterprise Applications

IntelliFlash arrays deliver breakthrough performance with mission-critical availability for a wide range of enterprise applications. Whether you want to virtualize business-critical applications, consolidate more virtual machines per server, or accelerate a database application, you can do so with ease by deploying IntelliFlash arrays. Western Digital's storage arrays are certified to work with all leading enterprise applications, operating systems, and hypervisors.



# Appendix A: Total Economic Impact

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.

## Total Economic Impact Approach



**Benefits** represent the value delivered to the business by the product. The TEI methodology places 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.



**Costs** consider all expenses necessary to deliver the proposed value, or benefits, of the product. The cost category within TEI captures incremental costs over the existing environment for ongoing costs associated with the solution.



**Flexibility** represents the strategic value that can be obtained for some future additional investment building on top of the initial investment already made. Having the ability to capture that benefit has a PV that can be estimated.



**Risks** measure the uncertainty of benefit and cost estimates given: 1) the likelihood that estimates will meet original projections and 2) the likelihood that estimates will be tracked over time. TEI risk factors are based on "triangular distribution."

The initial investment column contains costs incurred at "time 0" or at the beginning of Year 1 that are not discounted. All other cash flows are discounted using the discount rate at the end of the year. PV calculations are calculated for each total cost and benefit estimate. NPV calculations in the summary tables are the sum of the initial investment and the discounted cash flows in each year. Sums and present value calculations of the Total Benefits, Total Costs, and Cash Flow tables may not exactly add up, as some rounding may occur.



### Present value (PV)

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



### 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.



### Return on investment (ROI)

A project's expected return in percentage terms. ROI is calculated by dividing net benefits (benefits less costs) by costs.



### Discount rate

The interest rate used in cash flow analysis to take into account the time value of money. Organizations typically use discount rates between 8% and 16%.



### Payback period

The breakeven point for an investment. This is the point in time at which net benefits (benefits minus costs) equal initial investment or cost.