

A Forrester Total Economic Impact™  
Study Commissioned By IBM  
April 2020

# The Total Economic Impact™ Of IBM Spectrum Virtualize

Cost Savings And Business Benefits  
Enabled By Storage Built With IBM  
Spectrum Virtualize

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Operational simplicity:

**60% reduction in storage management effort**



Storage cost efficiency:

- **33% improvement in utilization**
- **3-to-1 data reduction**
- **Storage growth reduced from 15% to 6%**



Improved disaster recovery:

**Reduce RPOs by 98%**

## Executive Summary

To meet functionality requirements and capacity constraints, organizations are investing in software-defined, or virtualized, storage. Software-defined storage separates storage software from the underlying hardware, enabling I&O pros to provision and manage storage independent of the hardware while providing hardware choice. This creates benefits such as more efficient operations, improved backup and disaster recovery, and cost savings. IBM commissioned Forrester Consulting to conduct a Total Economic Impact™ (TEI) study and examine the potential return on investment (ROI) enterprises may realize by deploying IBM Spectrum Virtualize.

IBM Spectrum Virtualize is a flexible software foundation that consolidates storage management across differing storage resources. To better understand the benefits, costs, and risks associated with this investment, Forrester interviewed several customers with years of experience using IBM Spectrum Virtualize. The purpose of this study is to provide readers with a framework to evaluate the potential financial impact of IBM Spectrum Virtualize on their organizations. IBM Spectrum Virtualize software is packaged with IBM FlashSystem arrays and SAN Volume Controller. It is also available in the cloud but that version is not part of this paper.

### Key Findings

**Quantified benefits.** The following risk-adjusted present value (PV) quantified benefits are representative of those experienced by the companies interviewed:

- › **Interviewed organizations consolidate and manage all storage as if it's one pool, reducing admin effort by 60%.** Admins can take a unified view across all storage systems and sites and leverage automation to reduce the amount of time spent on daily management and maintenance tasks. This improves scalability and frees up resources to work on innovative projects.
- › **Eliminating silos of capacity and leveraging data reduction techniques enables organizations to generate significant cost efficiency.** Interviewed organizations improve the utilization of existing storage infrastructure by 33%, achieve an average 3-to-1 data reduction ratio across different data sets, and reduce storage growth from 15% to 6% year over year with IBM Spectrum Virtualize.
- › **Eliminating up to 50 hours of downtime per year reduces impact to the business.** Interviewees struggled with both planned and unplanned downtime in the prior environment related to administrative tasks, data migration, and storage issues. Now they migrate data between sites and systems with zero downtime and leverage proactive data for preventative maintenance to reduce any impact on business users.
- › **A 98% reduction in RPOs reduces the cost of data loss.**<sup>1</sup> Interviewed organizations use replication technology within IBM Spectrum Virtualize to improve disaster recovery metrics and drastically reduce the window between backups for business-critical information.

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



**ROI**  
**359%**



**Benefits PV**  
**\$1.9 million**



**NPV**  
**\$1.5 million**



**Payback**  
**8 months**

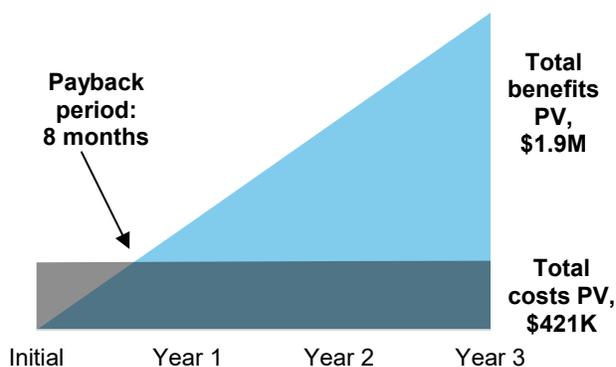
- › **Enhanced security.** Interviewed organizations extend encryption capabilities to all storage regardless of the underlying hardware. This reduces security risk and improves IT security staff efficiency.
- › **Improved diagnostics.** Interviewees leverage the visibility provided through IBM Storage Insights to quickly diagnose and resolve performance issues that otherwise would be difficult to understand.

**Costs.** The interviewed organizations experienced the following risk-adjusted PV costs:

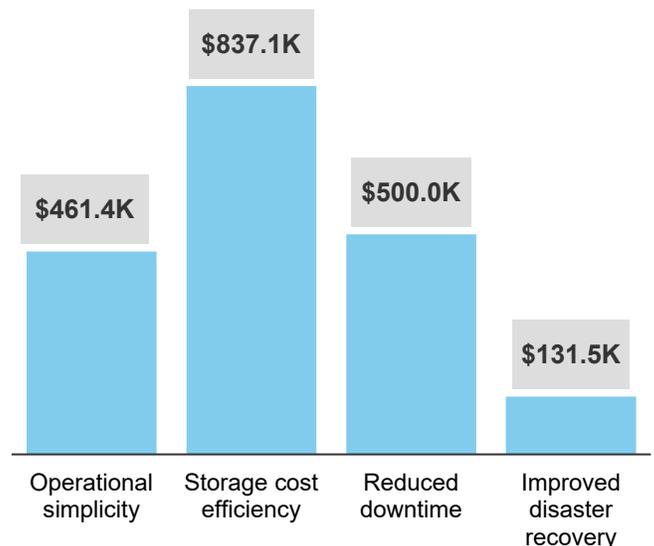
- › **IBM Spectrum Virtualize software license fees and storage system costs.** Interviewed organizations pay license and annual maintenance fees based on functionality scope and the size of the environment. IBM Spectrum Virtualize is purchased with IBM FlashSystem storage and SAN Volume Controller.
- › **Implementation and training costs.** Interviewed organizations use internal staff and IBM or third-party services to install IBM Spectrum Virtualize and associated hardware. Storage admins participate in upfront training and minimal ongoing training.

Customer interviews and subsequent financial analysis found that an organization based on these interviewed organizations experienced benefits of \$1.9 million over three years versus costs of \$421,000, adding up to a net present value (NPV) of \$1.5 million and an ROI of 359%.

### 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 interviews, Forrester has constructed a Total Economic Impact™ (TEI) framework for those organizations considering implementing IBM Spectrum Virtualize.

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 IBM Spectrum Virtualize can have on an organization:



### **DUE DILIGENCE**

Interviewed IBM stakeholders and Forrester analysts to gather data relative to IBM Spectrum Virtualize.



### **CUSTOMER INTERVIEWS**

Interviewed four organizations using IBM Spectrum Virtualize to obtain data with respect to costs, benefits, and risks.



### **COMPOSITE ORGANIZATION**

Designed a composite organization based on characteristics of the interviewed organizations.



### **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 organizations.



### **CASE STUDY**

Employed four fundamental elements of TEI in modeling the impact of IBM's Spectrum Virtualize: 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 IBM 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 IBM Spectrum Virtualize.

IBM 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.

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

# The IBM Spectrum Virtualize Customer Journey

## BEFORE AND AFTER THE IBM SPECTRUM VIRTUALIZE INVESTMENT

### Interviewed Organizations

For this study, Forrester conducted four interviews with IBM Spectrum Virtualize customers. Interviewed customers include the following:

INDUSTRY	REGION	INTERVIEWEE	STORAGE CAPACITY
Healthcare	Headquartered in the United States	Lead systems engineer	3 PBs
Consumer products	Headquartered in the United States	Senior IT systems engineer	600 TBs
Government	Headquartered in the United States	Chief information officer	200 TBs
Healthcare	Headquartered in the United States	Manager server services	1 PBs

### Key Challenges

Prior to the investment in IBM Spectrum Virtualize, interviewed organizations faced the following common challenges:

- › **Storage vendor silos with different management needs and pockets of capacity.** Organizations struggled with islands of storage that were preventing admins from improving utilization, replicating data, moving data around, and cost effectively migrating to new storage hardware. However, these organizations also wanted the flexibility afforded by not being locked into any one hardware vendor.
- › **Rapid data growth juxtaposed against shrinking budgets.** The organizations also struggled with rapidly growing data volumes and capacity needs while also facing increasing pressure on infrastructure costs. Some organizations experienced up to 15% data growth per year. As these heterogenous environments grow, they become increasingly complex and expensive to manage. One interviewee said, “We already spend a lot on IT, and we didn’t want to spend too much on our SAN.”
- › **Impacts to business-critical applications.** As a result of having silos of storage infrastructure, admins lacked the visibility to make decisions that could improve performance or availability. The organizations sought to reduce latency and downtime and improve backup capabilities in order to lessen the impact on business users. One interviewee stated, “If I can provide the data quicker to our police officers or fire department, they can provide the service to the citizens quicker.”

“We had several different storage platforms on the floor at the time and we had various disciplines of storage administration that were going on within the environment. We had various IBM storage on the floor that wasn’t managed by the same people. So, the decision was made to bring that in to try to consolidate not just the storage itself, but the administration of the storage.”

*Manager server services,  
healthcare*



## Key Results

The interviews revealed that key results from the IBM Spectrum Virtualize investment include:

- › **Improved agility creates simplicity and cost effectiveness.** By consolidating storage management within one software platform, organizations drastically simplify operations. Storage admins are now able to — without disruption — move data to different storage systems to optimize performance, i.e., tier data to cost effective storage and easily migrate storage to new hardware. Storage personnel can use saved time for more strategic work.
- › **Access to advanced storage functionality without a hardware upgrade.** Organizations use IBM Spectrum Virtualize to take advantage of data reduction techniques (like deduplication and compression) and encryption to improve their security. Admins can extend these newer capabilities across all storage, regardless of if it is native to the underlying hardware, avoiding hardware upgrades otherwise needed to get that functionality. One interviewee said: “[Spectrum Virtualize] augments the underlying hardware — like the encryption, we can use encryption for any storage array that doesn’t have encryption native. That’s another advantage you get from the Virtualize approach.”
- › **Access to innovative hardware without disruption.** When organizations want to introduce new storage hardware, IBM Spectrum Virtualize makes it much easier. Considering the platform supports most vendors (more than 500 heterogeneous storage systems), admins can quickly add new hardware without having to make major changes or undergo a big data migration effort. One interviewee said, “We are able to bring storage arrays with newer features and functions and capacities online faster.”
- › **Improved business continuity.** Instead of ad hoc backups, organizations create consistent backup processes that improve RPOs and reduce impact to users in the event of a disruption in the primary data center. Additionally, organizations experience less unplanned downtime associated with storage management processes, and storage admins reduce off-hours work associated with planned downtime. One interviewee said, “The replication technology within Spectrum Virtualize, when it comes down to it, I have lower RPOs than I ever had on any other storage platform.”

“What specifically has been improved is the amount of time my admin spends provisioning, troubleshooting performance issues, just your daily work. There has been significant reduction in the amount of time that’s spent on that. The amount of time for storage migration from one platform to the next — I’ve gone back and forth between platforms too and this one was by far the easiest.”

*Manager server services, healthcare*



“The other feature we love is the self-reporting aspect of it, that if there is an issue it’s reported out before we know it, that if there is a hardware failure, that someone is already with parts onsite and/or they already mailed them to us — so we can take care of business. This proactiveness has been very helpful to us.”

*CIO, government*



## Composite Organization

Based on the interviews, Forrester constructed a TEI framework, a composite company, and an associated ROI analysis that illustrates the areas financially affected. The composite organization is representative of the four companies that Forrester interviewed and is used to present the aggregate financial analysis in the next section. The composite organization that Forrester synthesized from the customer interviews has the following characteristics:

**Description of composite.** The composite organization is a large organization managing close to 1 PB of data across a primary and secondary datacenter. The organization has a mix of storage hardware vendors and vendor systems within its environment and struggles with maintaining this complexity while experiencing up to 15% year-over-year data growth.



### Key assumptions:

- 1 PB of data
- IBM and non-IBM hardware
- Uses IBM Storage Insights

**Deployment characteristics.** The composite organization deploys IBM Spectrum Virtualize over almost 1 PB of data. The composite leverages several advanced features including deduplication, compression, replication, and encryption. While IBM Spectrum Virtualize can be adopted independent of hardware vendors, the composite uses a 50/50 mix of IBM and non-IBM hardware. The composite is also using IBM Storage Insights, a free software-as-a-service (SaaS) service that monitors the performance, health, and capacity of its infrastructure. IBM Storage Insights comes with IBM Spectrum Virtualize free of charge.

# Analysis Of Benefits

## QUANTIFIED BENEFIT DATA AS APPLIED TO THE COMPOSITE

Total Benefits						
REF.	BENEFIT	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Atr	Operational simplicity	\$179,550	\$185,963	\$192,375	\$557,888	\$461,449
Btr	Storage cost efficiency	\$292,125	\$339,625	\$387,125	\$1,018,875	\$837,103
Ctr	Reduced downtime	\$180,000	\$202,500	\$225,000	\$607,500	\$500,038
Dtr	Improved disaster recovery	\$52,875	\$52,875	\$52,875	\$158,625	\$131,492
	Total benefits (risk-adjusted)	\$704,550	\$780,963	\$857,375	\$2,342,888	\$1,930,082

### Operational Simplicity

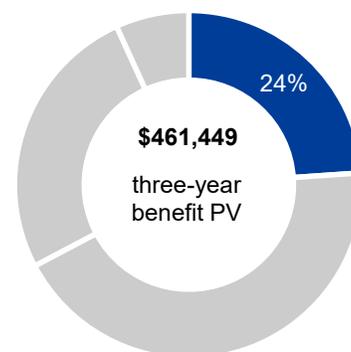
With IBM Spectrum Virtualize, interviewed organizations consolidate all storage and manage it as one storage pool, separate from hardware. This results in simplified management, with a consistent approach to data reduction and encryption across all storage. Provisioning new storage, maintenance, backups, and recovery are all completed more efficiently by storage admins. Admins can also better manage capacity between primary and secondary environments. Several interviewed organizations also were able improve visibility with IBM Storage Insights by collecting data from storage systems and using AI to proactively monitor storage KPIs to predict and prevent issues before they impact the business. Interviewees noted the following:

- › “We’ve been able to survive this long because of the simplicity and the consistency of that interface across all the deliverables, same look and feel on everything. Without [IBM Spectrum Virtualize] we would need roughly two to three times more staff.”
- › “We know from looking at other setups that it has offset the staffing, the fact that you have a consistent interface, you have a consistent code base across all of it. So, you’re not fighting a bug in this product — and that product has a different bug.”
- › “Before, we were spinning our wheels to find out where all the bottlenecks were and what was causing the latency, and is it disc, is it the software, this and that. And once we went to virtualization, we get speed and efficiency so tremendous that it’s out of sight, out of mind right now.”
- › “I’ve been able to have people retrained to do more forward-looking work than backward-looking work. We spend a lot less time on the day-to-day management. Because of that, I have a ton of other initiatives that are cloud-based stuff, then containerizing application, and I now have a bank of time of people that are really smart.”

For the composite organization, Forrester assumes that:

- › By the end of Year 1, the composite is managing 790 TBs of storage with IBM Spectrum Virtualize, up to 880 TBs of storage by Year 3.

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 composite organization expects risk-adjusted total benefits to be a PV of more than \$1.9 million.



**Operational simplicity:  
24% of total benefits**

- › To manage this amount of storage in the prior state, the composite would need 2.3 FTEs worth of effort in Year 1, and up to 2.5 FTEs by Year 3. With IBM Spectrum Virtualize, the organization reduces this effort by 60%.
- › The average fully loaded annual compensation for a storage administrator is \$135,000.

Risks to achieving this benefit include:

- › How much of the storage environment is managed with IBM Spectrum Virtualize.
- › The amount of training and level of skill of existing storage admins.
- › The size and growth of the storage environment.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV of \$461,449.

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.

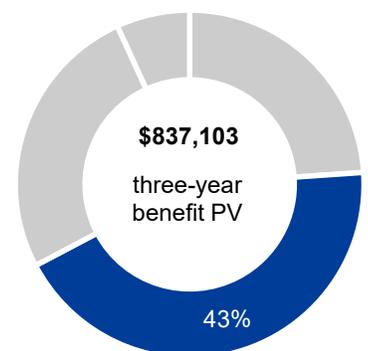
### Operational Simplicity: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
A1	Storage volume (TB)	Interviews	790	830	880
A2	Previous FTE management effort	Interviews	2.30	2.40	2.50
A3	FTE management effort with IBM Spectrum Virtualize	Interviews	0.90	0.95	1.00
A4	Average storage admin fully loaded compensation	Assumption	\$135,000	\$135,000	\$135,000
At	Operational simplicity	(A2-A3)*A4	\$189,000	\$195,750	\$202,500
	Risk adjustment	↓5%			
Atr	Operational simplicity (risk-adjusted)		\$179,550	\$185,963	\$192,375

## Storage Cost Efficiency

Interviewees leverage several capabilities of IBM Spectrum Virtualize to improve the cost effectiveness of their storage environment. Data reduction techniques allow interviewees to store up to five times as much data in the same space. Improved storage utilization eliminates pockets of capacity that were previously in silos. Admins can move data to the most appropriate type of storage, using a mix of hardware systems to optimize costs. Organizations can now rightsize their storage purchases and postpone future investments in storage assets. Organizations can also avoid upgrading hardware or investing in additional software in order to get capabilities like encryption or deduplication across their storage environment. Freed up capex can be repurposed for other IT or business strategic goals. Interviewees noted:

- › “I still keep multiple tiers of storage, so I’ll buy very inexpensive. With the ability to move stuff around, we don’t get bloat, we don’t get waste, [and] we don’t get the rounding error, because we can right size the disc for the host. We can move this to the right level for either capacity or performance easily with IBM Spectrum Virtualize.”
- › “The product and environment as a whole help me manage future growth to be responsive quickly, because I have basically everything on the floor at my fingertips that I can move stuff around as needed if I need more space.”



**Storage cost efficiency:  
43% of total benefits**

- › “The compression and the thin provisioning enable us to allocate more storage. It means that we don’t have to buy more storage.”
- › “We get way more out of compression in Spectrum Virtualize than we would get out of deduplication with some of the other platforms. And then we are doing deduplication on top of the compression, so we are getting an even bigger benefit on top of that. We’re constantly growing, but with Spectrum Virtualize, we’re growing slower than we ever have. Even though we are storing more data.”
- › “There is less dead space. We still have excess capacity, but it’s readily available for us to use across the entire enterprise as opposed to only being available for a specific system.”

For the composite organization, Forrester assumes that:

- › In Year 1, the organization avoids purchasing 150 TBs of capacity, and up to 200 TBs avoided in Year 3. The average cost for capacity is \$2 per GB, and there are 1,000 GBs per 1 TB.
- › The organization is also able to avoid the costs associated with utilizing additional space in the data center. The organization is able to save one rack at an annual cost of \$7,500 per rack for power, cooling, and space.

Risks to achieving this benefit include:

- › The magnitude of benefits will depend on which capabilities are leveraged, how much of the environment they apply to, and the opportunity for data reduction for different types of stored data.
- › Some organizations associated a small performance penalty with some advanced data reduction capabilities, leading to less use of these capabilities and the associated savings.

To account for these risks, Forrester adjusted this benefit downward by 5%, yielding a three-year, risk-adjusted total PV of \$837,103.

**Storage Cost Efficiency: Calculation Table**

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
B1	Capacity purchase avoided (TB)	Interviews	150	175	200
B2	Average cost of capacity, per TB	\$2/gig	\$2,000	\$2,000	\$2,000
B3	Racks avoided	Interviews	1	1	1
B4	Data center cost savings per rack	Assumption	\$7,500	\$7,500	\$7,500
Bt	Storage cost efficiency	$(B1*B2)+(B3*B4)$	\$307,500	\$357,500	\$407,500
	Risk adjustment	↓5%			
Btr	Storage cost efficiency (risk-adjusted)		\$292,125	\$339,625	\$387,125

## Reduced Downtime

Several interviewees struggled with downtime caused by storage issues or processes in their prior environments. These interviewees use IBM Storage Insights to collect data from their storage systems and proactively monitor storage KPIs to predict and prevent issues before they impact the business. They also leverage aspects of IBM Spectrum Virtualize, such as nondisruptive data mobility between data centers and the ability to move data between storage systems without having to take

applications offline. Not only do these improvements reduce costs associated with remedying downtime, but they also eliminate disruption to business users and external customers. Interviewees said:

- › “Storage Insights is a nice central place to not only see all of your environment at once, you can see the health status. Also, there’s an area that says, ‘Hey, this firmware is a little risky, you should upgrade these things.’”
- › “We have had downtime due to some storage issues and corruptions in the past that literally crippled us for a few days, but we were able to quickly remedy that with IBM.”
- › “Before we had two days of downtime to manage the migration of data. With IBM Spectrum Virtualize there is zero downtime. To be able to go from where I was back then, with that storage, to where I am able to migrate literally every block of storage in the environment, with zero downtime, is pretty incredible.”

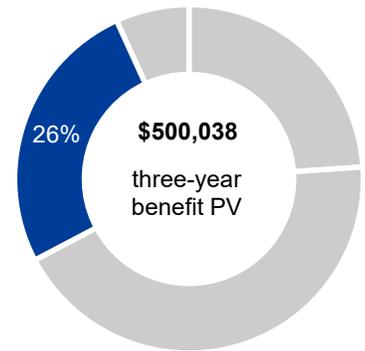
For the composite organization, Forrester assumes that:

- › The organization experiences 40 hours of downtime in Year 1 associated with its storage solutions, growing to a projected 50 hours by Year 3. Ten percent of this downtime is planned or unplanned downtime that impacts business-critical applications. The impact per hour of downtime that impacts business-critical applications is \$50,000.

Risks to achieving this benefit include:

- › The magnitude of this benefit will depend on the severity and frequency of issues related to storage in the prior environment, as well as whether or not this downtime impacts business-critical systems.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of \$500,038.



Reduced downtime: 26% of total benefits

**Reduced Downtime: Calculation Table**

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
C1	Hours of downtime per year before	Interviews	40	45	50
C2	Percent of downtime impacting mission critical data	Interviews	10%	10%	10%
C3	Business impact per hour of downtime	Assumption	\$50,000	\$50,000	\$50,000
Ct	Reduced downtime	$C1 \times C2 \times C3$	\$200,000	\$225,000	\$250,000
	Risk adjustment	↓10%			
Ctr	Reduced downtime (risk-adjusted)		\$180,000	\$202,500	\$225,000

## Improved Disaster Recovery

As the storage environment grew and became more complex at these organizations, so did the time and effort to perform scheduled backups. Several interviewed organizations leveraged the local and remote replication features of IBM Spectrum Virtualize to drive backup efficiencies and improve disaster recovery KPIs like RPO. According to interviewees:

- › “Our RPO is pretty good because we take a copy of all our production SANs using the remote copy feature to our secondary site. If we did have a major disaster in our primary data center, [as in it] just melted, then we’d have a literally up-to-date copy of the data on our secondary SAN on the majority of our systems.”
- › “Before, if our ERP corrupted, we would have rolled back, but who knows how many days or weeks we would have lost. Now, we probably lose an hour or so.”
- › “Anything less than 72 hours [of] recovery time gets replicated with Global Mirror to another Spectrum Virtualize environment. We were not meeting those agreed-upon service levels or recovery times before. Now, we’re exceeding them.”

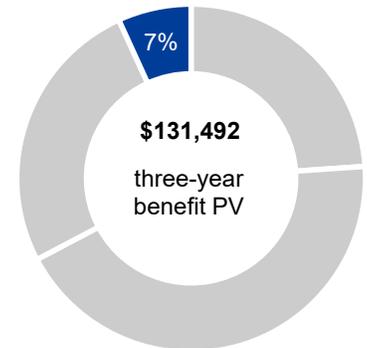
For the composite organization, Forrester assumes that:

- › The probability of a disaster recovery event is 10% in a given year.
- › Prior to IBM Spectrum Virtualize, the organization’s average RPO was 12 hours. With IBM Spectrum Virtualize the average RPO is 15 minutes.
- › The cost of data loss per hour is \$50,000.

Risks to achieving this benefit include:

- › This benefit will vary based on the amount of the environment replicated using IBM Spectrum Virtualize.

To account for these risks, Forrester adjusted this benefit downward by 10%, yielding a three-year, risk-adjusted total PV of \$131,492.



Improved disaster recovery: 7% of total benefits

### Improved Disaster Recovery: Calculation Table

REF.	METRIC	CALC.	YEAR 1	YEAR 2	YEAR 3
D1	Probability of backup event	Assumption	10%	10%	10%
D2	RPO before (hours)	Interviews	12	12	12
D3	RPO with IBM Spectrum Virtualize (hours)	Interviews	0.25	0.25	0.25
D4	Cost of data loss, per hour	Assumption	\$50,000	\$50,000	\$50,000
Dt	Improved disaster recovery	$D1*(D2-D3)*D4$	\$58,750	\$58,750	\$58,750
	Risk adjustment	↓10%			
Dtr	Improved disaster recovery (risk-adjusted)		\$52,875	\$52,875	\$52,875

### Unquantified Benefits

In addition to the quantified benefits above, interviewees detailed benefits that they were not able to quantify, including:

- › **Encryption improves data security on existing storage.** Some interviewed organizations leverage the encryption capability to extend encryption to all storage regardless of if it’s native to the hardware. This not only improves the organization’s overall security posture, but it also generates efficiencies for IT security staff. One interviewee said, “From a security code, quality, vulnerability management aspect of the Spectrum Virtualize software, I don’t get hit with those alerts on the vulnerability scanners like I do with other software.”

“We’ve used [Storage Insights] to diagnose problems, particularly performance problems, we’re having where support can get in and analyze a month’s worth of data and help diagnose the situation.”

Lead systems engineer, healthcare



- › **Storage Insights data helps to diagnose and resolve performance issues.** Some organizations use information provided through IBM Storage Insights to quickly understand and resolve performance issues. One interviewee said, “We’ve used [Storage Insights] to diagnose problems, particularly performance problems, we’re having where support can get in and analyze a month’s worth of data and help diagnose the situation.” The interviewee went on to say that without visibility provided by Storage Insights, it’s possible that they could still be searching for a solution to those performance problems today.

## 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 IBM Spectrum Virtualize and later realize additional uses and business opportunities, including:

- › **Expanding storage virtualization to the cloud.** The benefits of IBM Spectrum Virtualize can also be extended to cloud storage, creating new opportunities for cloud enablement and hybrid cloud deployments. One interviewee said: “That’s on our roadmap. There are two different use cases that are coming up. One is the potential to offload for backup repositories. The other is the data lake potential of connecting that local into AWS.”

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

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.

# Analysis Of Costs

## QUANTIFIED COST DATA AS APPLIED TO THE COMPOSITE

Total Costs							
REF.	COST	INITIAL	YEAR 1	YEAR 2	YEAR 3	TOTAL	PRESENT VALUE
Etr	IBM Spectrum Virtualize costs	\$378,000	\$0	\$0	\$0	\$378,000	\$378,000
Ftr	Implementation and training	\$34,021	\$3,570	\$3,570	\$3,570	\$44,730	\$42,898
	Total costs (risk-adjusted)	\$412,021	\$3,570	\$3,570	\$3,570	\$422,730	\$420,898

## IBM Spectrum Virtualize Costs

Interviewed organizations paid for IBM Spectrum Virtualize software license and maintenance fees. These license fees include the base system, FlashCopy, and Global Mirror. IBM Spectrum Virtualize is purchased with a storage system. The composite organization makes an initial investment of \$360,000 which covers both software and hardware costs. The composite has a 50/50 split between internal storage and external virtualized storage. These costs are incurred upfront and include a three-year warranty, and they are representative of typical discounting.

Risks that could impact the level of this cost include:

- › Software costs are variable based on volume and other vendor discounts.
- › IBM Spectrum Virtualize costs vary based on the size of the storage environment and added cost functionality used.

To account for these risks, Forrester adjusted this cost upward by 5%, yielding a three-year, risk-adjusted total PV of \$378,000.

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 composite organization expects risk-adjusted total costs to be a PV of nearly \$421,000.

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.

## IBM Spectrum Virtualize Costs: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
E1	IBM Spectrum Virtualize and storage hardware costs	Assumption	\$360,000			
Et	IBM Spectrum Virtualize costs	E1	\$360,000	\$0	\$0	\$0
	Risk adjustment	↑5%				
Etr	IBM Spectrum Virtualize costs (risk-adjusted)		\$378,000	\$0	\$0	\$0

## Implementation And Training

The interviewed organizations described the installation of IBM Spectrum Virtualize as relatively low effort. The organizations used minimal IBM or third-party services to help with the installation, along with effort by internal staff. In addition to the installation effort, internal staff spent some time on data migration and upfront and ongoing training.

Risks that impact the level of this cost include:

- › Installation effort will vary based on the number of storage vendors and switches in the environment.

- › Time spent on ongoing management of IBM Spectrum Virtualize is factored into the net time savings in the first benefit. Some interviewees noted that upgrades could be a larger effort than expected.
- › Training effort will depend on what advanced functionality is used through IBM Spectrum Virtualize.

To account for these risks, Forrester adjusted this cost upward by 10%, yielding a three-year, risk-adjusted total PV of \$42,898.

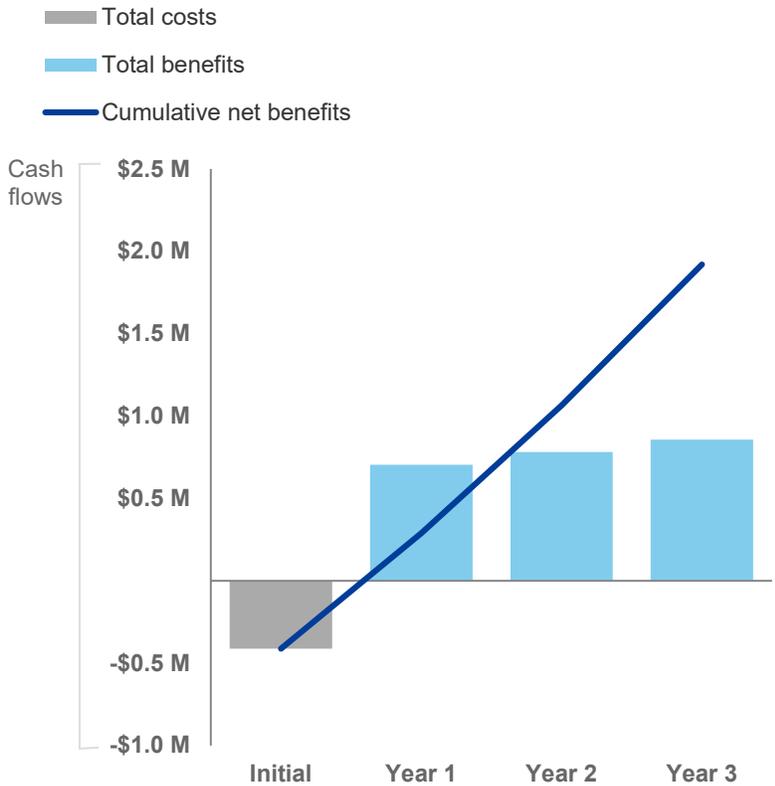
#### Implementation And Training: Calculation Table

REF.	METRIC	CALC.	INITIAL	YEAR 1	YEAR 2	YEAR 3
F1	Internal implementation and migration time, hours	Interviews	80			
F2	Third-party services implementation cost	Interviews	\$16,000			
F3	Number of storage admins	Interviews	5	5	5	5
F4	Training hours	Interviews	30	10	10	10
F5	Average storage admin fully loaded compensation	Assumption	\$135,000	\$135,000	\$135,000	\$135,000
Ft	Implementation and training	$F2 + ((F1 + (F3 * F4)) * (F5 / 2,080))$	\$30,928	\$3,245	\$3,245	\$3,245
	Risk adjustment	↑10%				
Ftr	Implementation and training (risk-adjusted)		\$34,021	\$3,570	\$3,570	\$3,570

# 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 composite 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	(\$412,021)	(\$3,570)	(\$3,570)	(\$3,570)	(\$422,730)	(\$420,898)
Total benefits	\$0	\$704,550	\$780,963	\$857,375	\$2,342,888	\$1,930,082
Net benefits	(\$412,021)	\$700,980	\$777,393	\$853,805	\$1,920,158	\$1,509,184
ROI						359%
Payback period						8.0 months

# IBM Spectrum Virtualize: Overview

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

IBM Spectrum Virtualize software is deployed within the IBM FlashSystem family and IBM SAN Volume Controller (SVC) to provide feature-rich, enterprise-grade storage solutions that help enterprises cost-effectively support the workloads and applications that are crucial to their business success. A complementary version, IBM Spectrum Virtualize for Public Cloud, is also available for cloud deployments and provides the same capabilities.



## High performance

With end-to-end NVMe, minimum latency of only 70 microseconds, and storage-class memory, IBM FlashSystem delivers high performance to meet the needs of the most demanding applications. In addition, IBM FlashCore Modules provide the performance of flash coupled with penalty-free encryption and compression for cyber resilience and lower costs.

## Reduce costs and improve return on investment

IBM Spectrum Virtualize capabilities allow clients to extend a wide range of data services and functionality to more than 500 external storage systems from IBM and other vendors, reducing both capital and operational costs while increasing the return on your investments in legacy infrastructure. Paired with IBM Spectrum Virtualize for Public Cloud, it opens up a wide range of hybrid cloud use cases even for storage systems lacking that capability.

## Virtualization and container support

IBM Spectrum Virtualize functionality supports and complements server virtualization and container technologies such as IBM PowerVM, Microsoft Hyper-V, VMware vSphere, Red Hat OpenShift, CRI-O, Kubernetes, and Container Storage Interface (CSI).

## High availability

High availability capability in IBM Spectrum Virtualize enables IBM FlashSystem arrays to deliver six-nines (99.9999%) availability. HyperSwap configurations with optional 100% availability guarantees, 3-site replication, and replication to hybrid cloud deliver comprehensive options to meet a wide range of business continuity needs.

## Support from the cloud

Cloud-based IBM Storage Insights provides monitoring, reporting, alerting, and AI-based best practices advice for on-prem and cloud storage with IBM Spectrum Virtualize. And should a problem arise, Storage Insights streamlines opening a ticket and getting support.



# 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.

# Appendix A: Endnotes

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<sup>1</sup> RPO: Recovery point objective.