



Quantifying the Economic Value of the IBM Storwize Family

An ESG Economic Value Analysis of IBM Storwize Family Arrays with IBM Spectrum Virtualize Software

By Adam DeMattia, Director of Custom Research

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Introduction

Executive Summary

ESG was engaged by [IBM](#) to conduct an Economic Value Validation (EVV) and develop a detailed economic value model for its midrange arrays (Storwize V5030 and V7000). Of particular note is that these arrays leverage IBM Spectrum Virtualize, IBM's storage virtualization software platform. In the economic value model, V5030 and V7000 arrays are compared to alternative midrange

storage arrays, which lack the features and functionality delivered by Spectrum Virtualize. The goal of the EVV is to provide potential customers with a comprehensive picture of the direct and indirect costs and benefits that they should consider when evaluating an investment to meet their storage needs.

The IBM Storwize family arrays take advantage of differentiating storage virtualization and compression technology, which significantly drive down the TCO for storage based on a smaller, easier to manage, and more cost-efficient footprint. ESG's analysis of IBM Storwize arrays yields an estimated 220% ROI over the baseline of investing in traditional storage arrays—lowering TCO by 59% while adding benefits in excess of \$180K over a three-year time horizon. A closer examination of the TCO delta shows that IBM Storwize is expected to be the more cost-effective solution along both CapEx (61% decrease) and OpEx (56% decrease annually) vectors.

Market Overview

As any storage administrator can attest, data and the associated storage capacity required to house that data continue to grow at an impressive rate. According to recent ESG research, a majority (64%) of organizations are growing their data storage capacity by more than 20% annually, and 23% report annual capacity growth in excess of 50%.¹ Furthermore, database-driven applications like business intelligence, analytics, and enterprise resource planning were most frequently cited as the workloads that will be most responsible for future capacity growth.²

While prices for storage media—both flash and spinning—continue to drop, these price reductions are offset by the pace of data growth. IT must ensure that any storage infrastructure purchased is able to handle the explosive growth of data, but do so in an economical fashion. This dichotomy is represented in Figure 1, which shows the two most prevalent storage challenges faced by organizations as “hardware costs” and “rapid data growth.”³

Analysis Highlights, Typical Enterprise Use Case:

- For a Storwize array use case, ESG modeled a 220% ROI and a 5-month payback period compared to alternative tiered storage systems.
- Incremental benefits enabled by IBM Storwize over the three-year time horizon exceed \$180K.

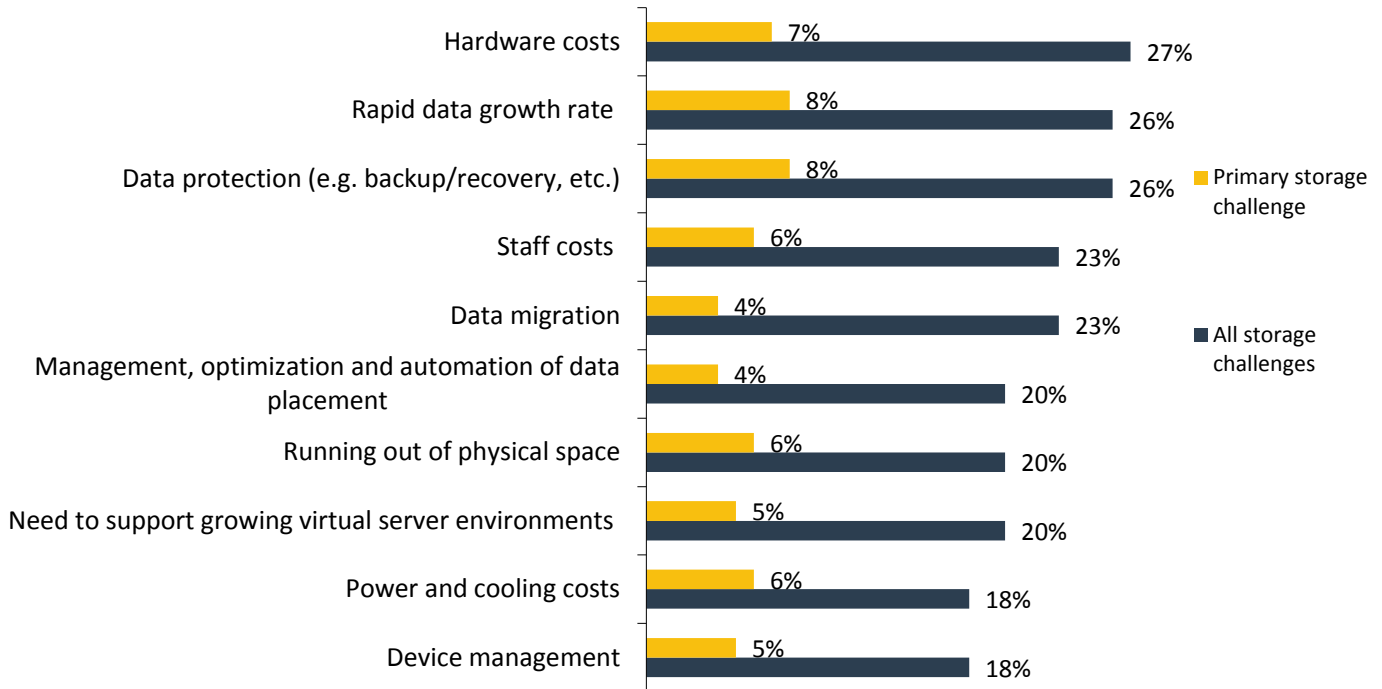
¹ Source: ESG Research Report, [2015 Data Storage Market Trends](#), October 2015.

² Source: Ibid.

³ Source: Ibid.

Figure 1: Top Ten Biggest Challenges in Today's Storage Environment

In general, what would you say are your organization's biggest challenges in terms of its storage environment? Which would you characterize as the primary storage challenge for your organization? (Percent of respondents, N=373, top ten shown)



Source: Enterprise Strategy Group, 2016

How IBM Spectrum Virtualize Can Help

The IBM Spectrum Virtualize platform enables IT to better manage its storage needs via storage virtualization. The software is core to the IBM Storwize family, which is intended for midmarket customers. Storage virtualization enables the customer to create virtual storage pools, allowing for more agile management and provisioning of storage. In addition, IBM's Real-Time Compression (RTC) allows more data to be stored in less physical storage capacity without sacrificing application performance. These features help IT better utilize the storage capacity on hand, thus deferring storage purchases in anticipation of future data growth. Once storage is virtualized, other features of the IBM Spectrum Virtualize platform can be applied globally to the storage pool, such as encryption-at-rest. Competitive storage solutions would only be able to enable these features through the purchase of additional software licenses (based on the number of TBs or drives purchased) and/or hardware (in this example, encrypted drives).

The Spectrum Virtualize platform can also increase IT operational efficiency. Not only does Spectrum Virtualize eliminate the need for scheduling post-process compression tasks (via RTC), but the platform offers unified storage management for both existing storage (within Storwize arrays) as well as storage physically located outside of the storage array. Problems can be more easily located, identified, and resolved, decreasing the time IT spends on these activities.

The features of IBM Spectrum Virtualize should be manifested for the customer in both a comparatively low TCO and compelling ROI, and ESG research has shown that ROI is a chief consideration with respect to budget approvals for IT initiatives (cited second most frequently as the single most important criteria).⁴

IBM Spectrum Virtualize: Economic Value Analysis Overview

Methodology

For this project, ESG adhered to the following research and modeling methodology:

- ESG conducted initial market research across IBM and other relevant IT vendors to assess current market trends, vendor value claims, and purchase considerations that are most important and relevant to storage customers.
- Based on this initial research, ESG identified a “present mode of operation” (PMO)—effectively, a traditional approach that customers may take to meet their storage requirements—against which the costs and benefits of utilizing IBM Storwize arrays were to be compared. The PMO is a blended average of traditional tiered storage systems from competitive vendors.
- ESG then conducted a series of in-depth interviews with systems engineering, service and support, and technical marketing representatives from IBM, as well as actual customers using one of the two IBM arrays under consideration. The data collected in these interviews was used to refine assumptions built into the model related to current customer environments and the direct and indirect costs and benefits attributable to IBM Storwize solutions compared to the PMO. Product marketing collateral, configuration guides, and case studies of IBM customers were also used to identify specific IT and user workflows and the labor burden (in both time and cost) associated with those workflows. These findings were then compared against the results of ESG’s qualitative and quantitative market research of the storage segment.
- Once the economic model was finalized and all validation was complete, ESG modeled a default scenario that is designed to demonstrate the relative costs and benefits of the IBM solutions in typical environments. Those results were then compared with model outcomes for a similar-scale PMO solution. The results for this use case are described in the remainder of this paper.

Please note that the data and conclusions presented in this report regarding the costs and benefits associated with implementing and utilizing IBM Storwize reflect the output of ESG’s economic value analysis based on the default use case assumptions. ESG acknowledges that changes to these assumptions will lead to a different set of results and, as such, advises IT professionals to use this report as one validation point in a comprehensive financial analysis process prior to making a purchase decision.

IBM provided current standard pricing and product information for IBM Storwize to ESG. Other IT equipment and labor cost assumptions were obtained from publicly available sources such as IT vendor and channel partner websites and published price lists.

Economic Value Model Overview

ESG’s EVV methodology analyzes a scenario in which an organization elects to support its application workloads with a current generation IBM Storwize array taking advantage of IBM Spectrum Virtualize’s differentiated features. This IBM scenario is compared with an alternative scenario in which the organization supports the same application workloads on a traditional storage array leveraging a mix of flash and spinning media. The TCO of each storage environment was modeled and compared for this use case based on the requirements for usable storage and its growth over three years.

The basic profile of the use case is:

⁴ Source: ESG Research Report, [2016 IT Spending Intentions Survey](#), February 2016.

- IBM Storwize:** The customer is leveraging an appropriately configured IBM Storwize system as the primary storage supporting its internally facing application workloads. The system will contain a mix of flash and disks of various RPMs (15K, 10K, 7.2K) based on model inputs. The model accounts for all storage environment components including hardware, software, data center infrastructure, and support and maintenance costs associated with IBM Storwize. Related IT and user labor costs and efficiencies for planning, implementation, and ongoing administration are also within the scope of the model.
- Traditional storage present mode of operation:** In this scenario, the customer is using an alternative tiered storage array or multiple arrays managed individually, containing a mix of flash and HDDs of various RPMs (15K, 10K, 7.2K). Costs, configurations, specifications of controller nodes, HDDs, other hardware and infrastructure, and OS and management software are based on blended averages of offerings from competitive storage vendors.

To provide an accurate picture of both costs and benefits, the model uses estimates of operational improvements offered by IBM Storwize over and above the traditional storage baseline. The tasks and processes used as the basis of comparison between both scenarios include:

- Storage system planning, architecture, and deployment (including data migration).
- Storage system management over time, including provisioning, RAID group setup, system tuning, and adjustments.
- IT time and effort spent responding to break-fix events.
- The impact of storage performance on helpdesk requirements—from both a user perspective and an IT staff perspective.

Default Use Case

To illustrate the relative costs and benefits of leveraging current-generation Storwize arrays against the traditional storage PMO, ESG developed a set of model inputs representative of a typical customer use case, including the tiers of storage media used within the array.

For the Storwize array scenario, the model assumes that the storage array is supporting database-driven, employee-facing applications, such as business intelligence (BI), enterprise resource planning (ERP), or analytics, which are likely to be driving significant data growth within the organization. This workload is assumed to require 30 TB of usable capacity initially and to grow by 50% over three years. The breakdown of storage media tiers is: SSD – 5%, 15K RPM – 15%, 10K RPM – 25%, and 7.2K RPM – 55%. There are assumed to be an average of 1,000 concurrent users in any given application at any given time and the user community is modeled to grow by 20% over the three-year time horizon. Finally, two core applications are supported in this scenario. These and other key assumptions are listed in Table 1.

Table 1. Key Default Storage Use Case for Analysis

Parameter	Default
How much usable storage is required in the first year, and at what rate will storage grow over three years?	30 TB / 50%
How will the storage media be allocated (between SSDs and HDDs)?	SSD – 5%, 15K RPM – 15%, 10K RPM – 25%, 7.2K RPM – 55%
What is the average number of concurrent users supported by any given employee-facing application (e.g., CRM, ERP, BI, analytics)?	1,000
At what rate will the number of concurrent users grow over three years?	20%
How many core employee-facing applications will be supported by this storage system over the next three years?	2

What is the time horizon of the analysis?	3 years
What is the average annual salary for an IT engineer (i.e., employees responsible for planning, installation, resolution of major issues)?	\$80,000
What is the average annual salary for an IT admin (i.e., employees responsible for daily storage administration and management)?	\$70,000
What is the average annual salary for an application end-user?	\$75,000

Source: Enterprise Strategy Group, 2016.

Economic Value Validation Results

Summary of Results

With the model parameters tuned to the default assumptions in Table 1, ESG’s economic value analysis concludes that the net benefits of implementing IBM Storwize greatly outweigh the associated costs. Table 2 shows the annual return on investment (ROI), payback period, average annual total cost of ownership (TCO), and average annual incremental benefit for IBM Storwize compared against the PMO. The following sections detail the most compelling findings from this analysis.

Table 2. Economic Value Summary, IBM Storwize

Solution	ROI	Payback Period (months)	Average Annual TCO	Average Annual TCO Avoided Versus PMO	Average Annual Incremental Benefit
IBM Storwize Array (V7000)	220%	5	\$35,636	\$51,703	\$62,286

Source: Enterprise Strategy Group, 2016

Annual Benefit

This ESG analysis considers two primary benefit categories: IT efficiency and user improvements delivered over and above that which can be expected to be achieved with the PMO.

- Increases in IT efficiency include savings in areas like reduced storage spending and administration labor requirements, fewer helpdesk issues, and conservative estimates for the return earned on reinvested TCO savings.
- User improvements include value delivered to the user community in terms of saved time to enterprise application users.

The sum of these two macro-categories equals the total benefit delivered by IBM Storwize. The annual benefit is the sum of all the benefit categories averaged over the time horizon of three years.

Annual TCO

This ESG analysis considers four cost categories: hardware, software, maintenance and support, and data center infrastructure:

- To calculate hardware costs, the model considers the usable storage required in the first year and how it is expected to scale over three years. The model then configures an appropriately sized IBM Storwize array to support the environment and utilizes IBM pricing to derive hardware costs. Similarly, the model configures a generic hybrid storage array (i.e., controller nodes, disks, disk shelves, and other infrastructure) based on the storage requirements and a blended average of likely IBM alternatives and publicly available pricing.
- Software costs for the Storwize array are calculated based upon the number of disk enclosures that are used. For each disk enclosure, the customer purchases base and feature licenses. ESG’s model assumes that the customer purchases all available features, including Real-Time Compression, via these licenses. By

contrast, the PMO is calculated to require operating system and management licensing costs, estimated on a capacity (per-TB) basis.

- For both IBM Storwize and the PMO, maintenance and support costs are estimated based on industry norms. Hardware maintenance and support are estimated as an annual cost equal to 10% of hardware CapEx (i.e., upfront storage system costs). Software maintenance and support are estimated as an annual cost equal to 18% of software CapEx (i.e., upfront storage OS/feature licensing costs). Together, these two charges make up the total annual maintenance and support costs expected for each solution.
- Three data center infrastructure costs are within the scope of ESG’s model for both IBM and the PMO: power, cooling, and data center space. The model estimates wattage consumption for each system hardware configuration and assumes 24x365 system operation, along with a utility rate of \$.13/KWH to generate power consumption costs. Similarly, the model estimates the BTUs dissipated by each system configuration and the wattage needed to counteract that amount of heat being introduced into the data center. Finally, ESG’s model assigns a value of \$12,000/rack for data center real estate. This cost can be viewed as either an opportunity cost (every rack used for storage cannot be used for another purpose) or as a hard cost (for organizations renting space from a hosting or colocation facility).

The sum of these cost categories is the estimated TCO for each solution. Annual TCO is the sum of all the cost categories included in the analysis averaged over the time horizon of three years.

ROI

ROI is a financial ratio that compares net benefits (including avoided costs) against TCO and helps makes sense of the cost and benefit numbers estimated by the model. Another important metric is the payback period, which is an estimate of when customers will start to see a positive return from their investment. As displayed in Table 2, the ROI for IBM Storwize is 220%. The payback period for IBM Storwize is estimated to be 5 months, a relatively short time period for a three-year time horizon.

Quantifying Relevant Cost and Benefit Differences

Economic models are, by definition, abstractions from reality. In any model, numerous estimates and assumptions must be made. ESG’s methodology leverages rigorous market research and in-depth interviews to estimate material differences between two fundamentally different approaches to enterprise storage, both in terms of how the storage systems would be configured and how they would impact organizational efficiencies from an IT and end-user perspective. This section discusses important estimates incorporated into ESG’s economic value model.

Comparative Cost Analysis

For the default customer scenario described, the subcategorized TCO for IBM Storwize and the PMO are displayed in Table 3.

Table 3. Subcategorized, Three-year TCO, Tier-1 IBM Storwize versus the PMO

Cost	Category	IBM Storwize	PMO
CapEx	Hardware	\$50,700	\$136,146
	Software	\$19,662	\$43,355
OpEx	Maintenance and Support	\$25,827	\$60,717
	Data Center Infrastructure	\$10,719	\$21,801
Total		\$106,908	\$262,019

Source: Enterprise Strategy Group, 2016.

Key TCO estimates driving economic differences between IBM Storwize and the PMO follow:

Hardware: For both Storwize arrays, the hardware needed to support the default scenario makes up the lion’s share of the TCO according to ESG’s EVV model. While the PMO configuration occupies 8u of space (one

controller node and 3 expansion nodes, the IBM Storwize array configuration occupies half of that space: 4u (one controller and one expansion node). The decrease in space is due to Real-Time Compression, which by default provides a usable to raw capacity increase of 250%. Using the mix of storage media noted in Table 1, the total number of disks decreases from 76 to 27 in the IBM case. Each SSD in the PMO carries with it a unit cost of \$2,200, while 15K, 10K, and 7.2K drives are modeled to cost \$1,400, \$900, and \$2,500 respectively. As such, the significant reduction in the number of drives needed for the Storwize configuration significantly reduces hardware costs compared to the PMO.

Software: In the IBM configurations, software costs are a smaller portion of the overall system TCO. Due to the smaller number of enclosures and disks, software purchases in the IBM Storwize use case are expected to represent a 54% decline compared to the PMO since IBM licenses on an enclosure basis (and only one expansion enclosure is needed), while the PMO software is priced on a TB/disk basis (with 76 disks and 59.5 TBs of raw capacity present in the configuration).

Maintenance and support: Based on the hardware and software CapEx estimated by the model, the total maintenance and support cost incurred in the IBM Storwize use case is \$25,828. Because anticipated hardware and software CapEx are materially lower in the IBM case, derived maintenance costs are commensurately lower. In fact, ESG’s model estimates maintenance and support in the IBM Storwize use case to be ~60% lower than in the PMO scenario.

Data center infrastructure: The smaller footprint and significant reduction in the number of disks needed in the IBM Storwize scenario has another cost impact. The configuration will consume less power and dissipate less heat than the PMO configuration. Based on both IBM Storwize specifications and a blended average of power and BTU dissipation characteristics of alternative arrays, ESG’s model estimates the financial impact of powering and cooling will be reduced by 52% compared to the PMO over three years.

ESG’s model also estimates a financial benefit tied directly to decreasing the physical data center space occupied by the IBM configuration. As articulated, this cost can be viewed as either an opportunity cost (every rack used for storage cannot be used for another purpose) or as a hard cost (for organizations renting space from a hosting or colocation facility). ESG’s model quantifies this cost as \$12,000 per year, per rack. Because the IBM configuration occupies half the rack units of the PMO (4u vs. 8u), the annual cost will be halved.

Comparative Benefit Analysis

For the default scenario described, the incremental benefits that are estimated to be delivered by IBM Storwize beyond what is expected in the PMO scenario are displayed in Table 4.

Table 4. Three-year Incremental Benefits Delivered by IBM Storwize

Benefit Category	Benefit Delivered by IBM Storwize
IT Efficiency Savings	\$269,675
User Improvements	\$72,293
Total	\$341,968

Source: Enterprise Strategy Group, 2016

To estimate these quantities, ESG leveraged qualitative anecdotes from customers related to the ease of planning for, installing, and managing the IBM Storwize over time. Additionally, customer experiences associated with both a reduction in the number and ease of remediating trouble tickets (thus increasing the time that end-users had to complete their work), were included in the model. The overall quantity of improvement in these areas is influenced by the number of concurrent end-users and number of applications that the storage array is supporting, with larger, more complicated environments achieving greater results.

Many benefits included in the scope of ESG’s model are characterized as time saved for either the IT administrators or application end-users. However, it is important to note that ESG’s model does not assume every saved staff-hour

is productive. ESG uses the assumption that only 50% of saved staff time to either constituency will be productive. A detailed breakdown of efficiency benefits follows:

- **Avoided PMO storage costs:** In ESG's model, the assumption is made that the organization will incur storage costs, either for IBM or a competitor. In either case, the customer requires a storage solution underpinning their application workload. As such, the net cost reductions, which would be incurred in the PMO scenario, are allocated as an economic IT efficiency benefit for investing in IBM Storwize. In the use case described, and as shown in Table 2, TCO reduction through the utilization of IBM Storwize is estimated as \$51,703.
- **Increases in IT Efficiency:** ESG's model ascribes significant value in the area of planning and deploying the IBM array compared to alternatives. This is due to the ability of IBM Spectrum Virtualize to abstract data from the existing storage in place and seamlessly migrate the data onto the Storwize system selected. This application of storage virtualization eliminates the time and effort associated with more manual data migration approaches. To represent this benefit, in ESG's model the IT labor associated with standing up a new Storwize array is 9 hours. By comparison, ESG's model uses a man-hour estimate of 19 in the PMO.

Once deployed, it is estimated that the number of FTEs required to service the array over time will be reduced. The model attributes the improvement in this category to the best-of-breed management GUI. As related to ESG by end-users, the intuitive user interface is reported to be extremely useful for day to day storage administration tasks, including provisioning storage and tuning the array. ESG's model allocates the number of FTEs dedicated to ongoing storage administration as a function of the raw capacity in the configuration, with 1 FTE required per 400 TBs. Due to IBM's significantly lower raw capacity requirement to support the environment, the IBM configuration achieves a material advantage over the PMO, representing the improvement in labor required over time by the array.

Finally, the decreased number of drives required by the system translates into fewer break/fix events and fewer trouble tickets reported to IT. In the PMO scenario, among the effective 2,000-person end-user community (which is expanding over time), an average of 2,400 trouble tickets per year are reported to IT related to performance or availability events. In the IBM Storwize use case, which delivers excellent price/performance characteristics, delivers exceptional uptime, and has fewer points of failure, it is estimated that the number of tickets submitted to IT will be reduced to 1200. Additionally, the mean time to resolution in the PMO scenario is 30 minutes, while in the IBM use case, average remediation actions are estimated to take only 18 minutes. In total, much less labor is expended in the IBM Storwize use case as compared to alternative array solutions, creating significant financial efficiency improvements (i.e., the opportunity for IT administrators to conduct more valuable tasks than merely "keeping the lights on").

- **Return Earned on Avoided Costs:** Another IT efficiency consideration is that for every dollar of avoided cost, the opportunity exists for the customer to reinvest savings (i.e., budgeted, not spent) and earn an economic return. For example, by reducing the TCO of storage, perhaps the organization will be able to invest those savings in a new big data initiative which will help the organization capitalize on the value locked up in its data. Or the organization may be able to fortify its security posture and prevent a potentially catastrophic breach. Whatever the investment, the key is that the opportunity exists and that ESG's model ascribes a value to that opportunity.

By default, ESG's model assumes that every dollar that the hypothetical customer is able to save in terms of a net TCO reduction earns a 5% annual return in subsequent years of the time horizon. In total, over three years, this return is estimated as \$7,386 in value delivered to the customer.

- **Increases in User Productivity:** As discussed above, it is estimated that fewer helpdesk tickets will be submitted to IT in an IBM Storwize use case compared to the PMO. Not only does this create significant efficiency for IT, but, because the IBM Storwize solutions reduce the number of trouble tickets and the time to resolve those tickets, more time is "given back" to end-users that would be otherwise wasted submitting tickets and waiting for resolution. In the aggregate over three years, the reduction in both the number of

tickets submitted and the time taken to resolve those tickets is estimated to increase user productivity by \$77,293 compared to the PMO.

The Bigger Truth

The conclusion of this study clearly shows that the IBM Storwize solutions—V5030 and V7000—offer a compelling value proposition in helping customers to decrease storage costs while still accommodating data growth. *ESG's analysis of a typical enterprise workload running on IBM V5030/V7000 Gen2 yields an estimated **220% ROI** over the baseline of traditional storage arrays—lowering TCO by 59% over the modeled three-year time horizon.*

Based on these results, it is clear that IBM's Spectrum Virtualize technology can deliver significant bottom line results to customers and that IBM's Storwize arrays warrant consideration by IT organizations striving to enable both economic efficiency and user productivity in the face of rapidly growing capacity requirements.

To run a customised scenario estimating the ROI and total economic benefit of IBM Storwize for your specific environment, please visit the interactive web-based calculator [HERE](#).



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