

ECONOMIC VALIDATION

The Economic Benefits of Pure Storage FlashArray Unified Block and File Platform

Unified All-flash Block and File Storage without Compromises that Reduces Complexity to Manage Block and File Workloads by 62%, with a 58% Lower Total Cost of Storage Ownership

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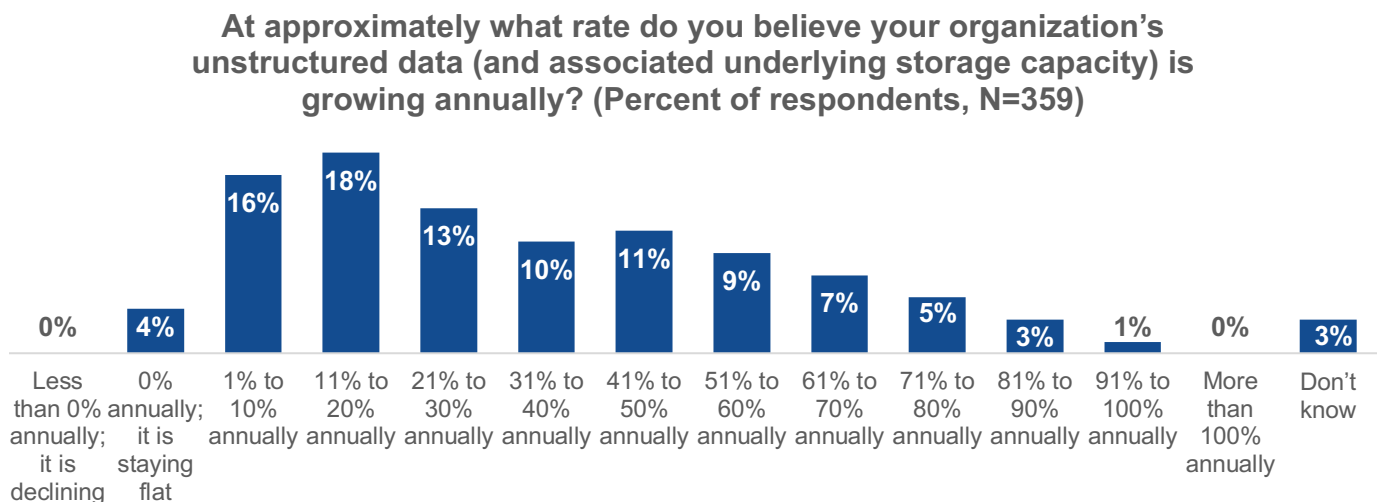
Introduction

This Economic Validation from TechTarget's Enterprise Strategy Group focuses on the quantitative and qualitative benefits organizations can expect by consolidating their legacy block and file storage systems onto Pure Storage FlashArray Unified Block and File Platform.

Challenges

Data is the lifeblood for modern organizations, as nearly all businesses have become more data driven. Enterprise Strategy Group (ESG) research found that 21% of organizations report that their core products and services rely completely on their data (i.e., they are an information-based business), while 44% reported that data helps to support their business (i.e., they offer tangible products and services), and the remaining 36% offer a mix of both information-based and tangible products and services.¹ As data continues to drive revenue and grow at unprecedented rates, organizations have struggled to provide adequate storage and storage-related services for their structured data (block) and unstructured (file and object) workloads. Unstructured file services (i.e., user-facing data stored in file format) play an important role in modern business and include things like file-based applications, backup and content repositories, media and entertainment, medical imaging, long-term archive storage, and virtualization repositories. In fact, ESG research shows that roughly half of the average organization's data is unstructured, and as shown in Figure 1, their unstructured data is growing at an average annual rate of 33% (weighted average of results shown).²

Figure 1. Expected Unstructured Annual Data Growth Rate Averages 33%



Source: Enterprise Strategy Group, a division of TechTarget, Inc.

In fact, structured and unstructured data are both growing at similarly high annual rates as storage administrators work hard to scale block and file services to support the needs of modern and legacy workloads. While capacity is growing rampant, storage budgets are not increasing, and internal resources are oversubscribed. This does not project well and suggests that a change is needed. It is a good time for organizations to reassess the siloed

¹ Source: Enterprise Strategy Group Complete Survey Results, [From Data Backup to Data Intelligence](#), January 2022.

² Source: Enterprise Strategy Group Survey Results, [2021 Data Infrastructure Trends](#), September 2021.

workloads and supporting block and file storage systems in their data centers and to consolidate in an effort to reduce complexity and cost.

Many data centers are currently managing workloads sprawled across silos of legacy storage arrays designed and optimized to handle either block or file workloads. Some of these systems offer bolt-on unified capabilities to support multiple storage protocols (either adding a file system on top of block LUNs, or block LUNs on top of a file system). But supporting multiple protocols does not mean that they support multiple protocols efficiently, simply, or cost-effectively. Legacy unified storage systems require tradeoffs that come in the form of management complexity (e.g., additional steps), additional hardware and management interfaces (e.g., gateways and appliances), wasted capacity, inefficient use of hardware resources, limited scalability and visibility, and lack of support for data services or limited efficiency of data reduction technologies.

Legacy storage systems, whether unified or siloed, slow and limit innovation. The complexity of underlying hardware should not limit business agility. Legacy systems are slow to expand and scale, require forklift upgrades and data migrations when upgrading to new controllers and storage technologies, can require disruptive operations that often require downtime, and often tie licensed features to hardware, requiring the user to re-purchase licenses to take advantage of innovations. Modern organizations require a true unified storage platform that supports block, file, and object workloads, with reduced complexity and consistent features without compromise, helping to minimize costs and accelerate innovation.

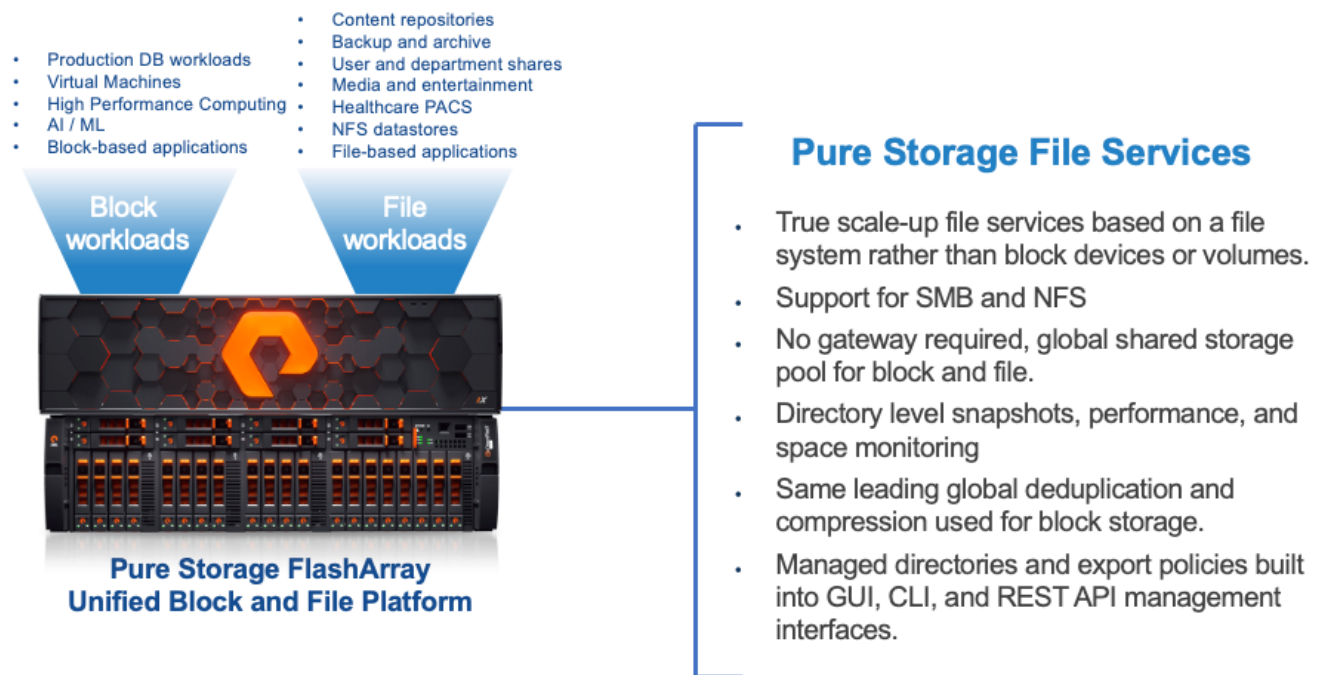
The Solution: Pure Storage FlashArray Unified Block and File Platform

The Pure Storage FlashArray is a software-defined all-flash, all-NVMe, unified block and file storage platform designed to meet the current and future needs of modern corporate and enterprise organizations. FlashArray provides the following benefits:

- **Performance:** Ultra-low and predictable 150us to 1ms latency for all applications. The self-optimized array is perfect for consolidating block (NVMe/NVMe-oF) and file (SMB/NFS) workloads with little to no performance impact.
- **High Availability:** Provides 99.9999% availability with built-in business continuity and disaster recovery across product lines while continuing to meet service-level agreements (SLAs).
- **Storage Efficiency:** Highly efficient 5:1 data reduction and 10:1 total efficiency provides up to 5.5PB of effective capacity in a greatly reduced footprint.
- **Simplicity:** Single pane of glass and AI-driven management with Pure1, combined with REST API automation to free storage administrators from time-consuming tasks. Nondisruptive updates, upgrades, and capacity expansions as well as integrated and predictive support ensure no business disruption and reduce strain on admins.

As shown in Figure 2, Pure FlashArray File Services are integrated into (not built on top of) the Purity FA6 operating system. **Key benefits of File Services include:**

- True scale-up file services based on a file system, and not built on top of block devices or volumes.
- Support for SMB and NFS.
- No gateway required; shared storage pool for block and file.
- Directory-level snapshots, performance, and space monitoring.
- Same leading global deduplication and compression used for block storage.
- Managed directories and export policies built into GUI, CLI, and REST API management interfaces.

Figure 2. Pure Storage FlashArray Unified Block and Storage Platform

Source: Enterprise Strategy Group, a division of TechTarget, Inc.

Enterprise Strategy Group Economic Validation

Enterprise Strategy Group (ESG) completed a quantitative economic analysis of the Pure Storage FlashArray Unified Block and File Platform.

ESG's Economic Validation process is a proven method for understanding, validating, quantifying, and modeling the economic value propositions of a product or solution. The process leverages ESG's core competencies in market and industry analysis, forward-looking research, and technical/economic validation. ESG conducted in-depth interviews with subject matter experts and reviewed customer case studies to better understand and quantify how FlashArray has impacted their organizations, particularly in comparison with previously deployed and/or experienced solutions. The qualitative and quantitative findings were used as the basis for a simple economic model comparing the expected costs of managing and maintaining on-premises block and file storage operations.

Pure Storage FlashArray Unified Block and File Platform Economic Overview

This Enterprise Strategy Group economic analysis revealed that the Pure Storage FlashArray Unified Block and File Platform provided its customers with significant savings and benefits in the following categories:

- **Reduced Complexity of Unified Block and File Services**
- **Reduced Storage Footprint**
- **Improved Reliability and Accelerated Innovation**

Reduced Complexity of Unified Block and File Services

The intelligent design of the Pure Storage FlashArray Unified Block and File Platform delivers low latency flash storage for consolidation of block and file workloads without compromising simplicity, scalability, performance,

functionality, or innovation. This is in contrast to legacy scale-up and scale-out storage arrays with bolt-on multiprotocol support that add additional layers of complexity and limit functionality and flexibility. Pure Storage FlashArray provides the following benefits of reduced complexity for unified operations:

- True unified storage pool architecture** – FlashArray helps to unify operations and eliminate data silos because its design supports all block and file workloads from the same single unified pool of global storage. The shared storage pool design enables file shares and archives to reside and be managed alongside production workloads with no tradeoffs. Data is stored efficiently and with the optimized context for block or file, making it an ideal system to simultaneously manage and deliver efficient storage operations for LUNs, file systems, and VMs. With Pure's shared pool design, all workloads benefit from the exact same levels of global dedupe and compression as well as data services without compromise, resulting in the ability to use more capacity per array with less overhead and inefficiency. Traditional unified designs generally require multiple pools or inefficient creation of layered constructs (for example LUNs or VMs contained in volumes or aggregates, or file systems limited by LUN or RAID group size). This wastes capacity, limits functionality and efficiency, and adds layers of management complexity.
- Simplified management experience** – Enterprise Strategy Group (ESG) validated that Pure Storage provides a single, simple management interface with an intuitive UI for block and file as well as the ability to automate file services with the CLI and REST API. ESG saw how easy it was to create a file system with a single click. Because there were no gateways or appliances to manage, and file systems are not built on top of volumes or aggregates, there were no additional prerequisite steps required to perform before creating a file system, nor were there limitations and complex relationships to manage after creation. ESG validated that admins could further simplify the management of file services with the use of profiles, managed directories, directory-level snapshots, rule-based templates, and export policies. Admins benefit from the ability to manage and grow block and file data at the granularity of the data entity they were working with rather than being tied to the limitations of the underlying constructs. For example, managing at the VM level rather than having to first fill volumes or LUN space with VMs and take snaps at the volume or LUN level instead of the individual directory level.
- Flash storage for file workloads** – Pure Storage FlashArray provides predictable low latency operations for all block and file workloads without limitation and without impact. While end-users are typically used to some degree of lag waiting for file-based applications, user directories, and content repositories to perform searches and functions, flash performance results in significantly faster time to load documents, files, and images as well as an overall better application responsiveness and end-user experience. This also enables file storage to be considered for next-generation performance-sensitive applications, such as analytics and video use cases.
- Improved visibility and reporting** – Administrators of traditional unified storage arrays often have limited visibility into the underlying resources currently being used by file services at a granular level, which makes it difficult to predict capacity growth or monitor costs and performance without managing complicated scripts and consolidating information from various interfaces. Pure FlashArray provides built-in and real-time visibility into all block and file constructs. All of the same information provided for block services is made available for file service on Pure1, making it easy to monitor capacity and performance utilization as well as predict growth, going forward.
- Hybrid cloud agility and flexibility** – Pure Storage customers can use a single interface to access the Pure1 cloud-based management platform to manage and monitor hybrid cloud deployments for all of their block and

“Pure Storage's FlashArray File Services has enabled us to reduce storage complexity by eliminating data silos and waste, without compromising overall performance or efficiency.”

“We use Pure1 daily for forecasting, reporting, real-time system performance, support cases, and purity upgrades. It works great, and it has helped us a lot.”

file workloads on storage arrays and services. Administrators can further save time and resources by leveraging the Pure Storage CLI and REST APIs to automate and orchestrate hybrid cloud management functions for their block and file workloads.

- **Cost savings and flexibility** – Pure1 and Purity lower the cost of licenses for multiple software products and appliances. There is no additional cost to enable technology feature support or software functionality, and all technologies, like ActiveCluster and ActiveDR, are included in the software subscription at no cost. With traditional systems, these software features are often tied to the hardware, making it complex to upgrade and refresh technologies. Pure Storage customers can decide between making upfront CapEx purchases, monthly OpEx subscriptions, or a combination of both. Evergreen//One and Evergreen//Flex pay-as-you-go storage subscriptions give financial flexibility of choice and can eliminate the need to manage storage for block and file workloads and/or reduce the effort required to plan for capacity and technology upgrades.

Reduced Storage Footprint

The highly efficient Pure Storage FlashArray Unified Block and File Platform can be used to consolidate siloed block and file workloads into a single platform that is at least 7x smaller, with greatly reduced complexity as well as improved performance and sustainability. Consolidating workloads running on aging legacy storage systems designed for block or file to Pure Storage FlashArray eliminates expensive maintenance and licensing costs and provides the following benefits:

- **Improved consolidation of file and block services** – Enterprise Strategy Group (ESG) learned that customers who had deployed legacy storage arrays had poor experiences running unified workloads and, because of this, tended to use their storage arrays for the purpose that they were best designed for: block workloads on purpose-built block storage arrays and file workloads on purpose-built file arrays. Customers were excited to see how Pure Storage FlashArray's NVMe flash performance and true global unified storage pool could help to consolidate multiple legacy file and block arrays into a single unit, with no compromise to performance, nor added complexity or cost. There is no need to overprovision for performance or waste space based on inefficient hierarchical constructs. Organizations can better eliminate workload sprawl with quality of service (QoS) and policies built into the system to help eliminate the possibility of noisy neighbors and provide priority access for production workloads.
- **Significantly reduced footprint** – Migrating block and file workloads running on legacy storage arrays to Pure Storage FlashArray can reduce storage footprint by 7x or more. ESG has validated the benefits of Pure Storage's 10:1 average data reduction provided by global dedupe and compression for file and block workloads. FlashArray provides the same savings for file and block workloads without restrictions, while legacy storage arrays provide lower overall data reduction savings and often are not able to achieve the same level of deduplication and compression for their file and block services based on tradeoffs in the architecture. Pure Storage systems provide far more usable capacity per array with less storage overhead. This results in less hardware to manage, maintain, power, and cool, resulting in even greater operational savings.
- **Reduced snapshot and replication overhead** – FlashArray provides a finer granularity of snapshots and replication target selection for both file and block workloads when compared to legacy storage systems. Legacy file- or block-first unified systems often suffer from "snapshot bloat"—i.e., having to store snapshots of far more capacity than intended

“With data growing at a rapid pace, we recognized the importance of modernizing and unifying our storage infrastructure to make better use of our IT resources.”

“We have been able to reduce the number of units in our data center by more than 75% by unifying with Pure.”

based on the requirement of having to snapshot a whole volume or aggregate rather than a directory, LUN, or VM. This creates even more storage inefficiency and further reduces cost per usable GB for a storage array. And it goes beyond capacity: That extra copy of data needs to be managed together rather than independently. In contrast, FlashArray's data-efficient snaps for file take up zero capacity when initially created and are far simpler to manage.

- **Faster path to sustainability** – With environmental sustainability being a top priority for organizations, consolidating and running block and file workloads more efficiently on FlashArray results in a dramatically reduced footprint, with substantially lower power and cooling requirements. In addition, the continuous innovation model provided by Pure Storage avoids periodic complete forklift technology upgrades and results in fewer components that end up in a landfill. This helps organizations better meet their sustainability initiatives.

Improved Reliability and Accelerated Innovation

Pure Storage FlashArray provides improved reliability and less business interruption to workloads and production when compared to providing storage services with siloed block and file storage arrays. In addition, Pure Storage customers enjoy guaranteed innovation and an improved overall support experience, resulting in improved business agility. Improved reliability and accelerated innovation are provided through:

- **Reduced risk of downtime** – Customers have reported far less impact to business operations with Pure as compared with alternative storage technologies. Most customers share that they had not realized a single downtime event since migrating to FlashArray, while traditional block and file storage arrays required periodic downtime and reduced performance during updates and upgrades. FlashArray architecture is designed to deliver 100% performance capabilities when performing software updates, upgrading hardware, and scaling capacity, in contrast to traditional architecture that requires downtime for forklift upgrades and that runs in a degraded state during software updates.
- **Guaranteed innovation and business agility** – The design of traditional storage systems limits innovation because full forklift upgrades to a new platform or time-consuming data migrations are generally required to take advantage of the latest innovations in storage controller, interconnect, and disk technologies. In addition, features and capabilities are often tied to the hardware and must be repurchased. Pure software updates are released at quarterly intervals and add value to the existing system, and with a Pure Evergreen//Forever subscription, organizations can take advantage of the latest improvements in hardware technology over time, without having to research, plan, or purchase new storage arrays. Customer deployments are upgraded in place without forklift upgrades and without disruption to service every three years as new technology is made available, providing improved performance and scalability for their block and file workloads.
- **Improved local and remote DR recovery** – Pure ActiveCluster provided active-active synchronous replication with automatic zero recovery point objective (RPO) and zero recovery time objective (RTO) failovers for stretched clusters. ActiveDR provided a remote DR solution that greatly lowered RPO and simplified the operation of failover down to a single click for organizations (both ActiveCluster and ActiveDR are included at no additional cost).
- **Improved security and ransomware protection** – Pure offers improved security with encryption of data to better meet regulations, and Pure SafeMode snapshots cost-effectively protect both block and file data against ransomware events and unintentional deletion, while making it possible to quickly remediate any events that do happen, without impact to operations.

“By unifying our block and file infrastructure with Pure, we have been empowered to remove technology barriers and spend more time on new innovations for customers, while achieving significant cost savings and new levels of investment protection.”

- **Improved support experience** – Pure customers share that their support experience with Pure Storage is far better than what they had previously experienced with traditional storage vendors. Pure Storage consistently enjoys a leading net promotor score (NPS) of 86 out of 100. (Note that NPSes measure customer loyalty, and a score above 50 is excellent, but many storage vendors score in the mid 30s.) Pure Storage actively supports customers through the life of the system and provides high levels of expertise on all calls, with remote assistance and mobile monitoring capabilities. Pure1 predictive analytics provides proactive support and helps identify and remediate issues before they happen.

Enterprise Strategy Group Analysis

Enterprise Strategy Group (ESG) leveraged the information collected through vendor-provided material, public and industry knowledge of economics and technologies, and the results of customer interviews to create a three-year TCO/ROI model that compares the costs and benefits of consolidating block and file workloads running on traditional block and file storage arrays onto a single Pure Storage FlashArray Unified Block and File Platform. ESG's interviews with customers who have migrated workloads to FlashArray, combined with experience and expertise in economic modeling and technical validation of storage technologies, helped to form the basis for our modeled scenario.

ESG assumed that the modeled organization managed three storage arrays. A traditional block storage array was used to provide 120TB of storage capacity for production workloads such as legacy databases and applications, along with some virtualization data stores. We assumed that this array provided data reduction of 4:1, a 25% overhead for RAID and system files, and a 20% free capacity workspace to avoid performance issues and leave space for data services and optimization. ESG's analysis concluded that this array would require 45TB of physical capacity spread over 11RU (rack units). A traditional file storage system provided 150TB of storage capacity for content repositories, NFS datastores, NFS and SMB file shares, and other unstructured data sources. Using published specifications and the same logic described above for the block storage array, we concluded that this array would require 56TB of physical storage and 20RU. Finally, an aging, low latency all-flash array provided 100TB of storage for high-performance databases and applications. Our research and analysis concluded that this array would require 36TB of physical storage in only 2RU.

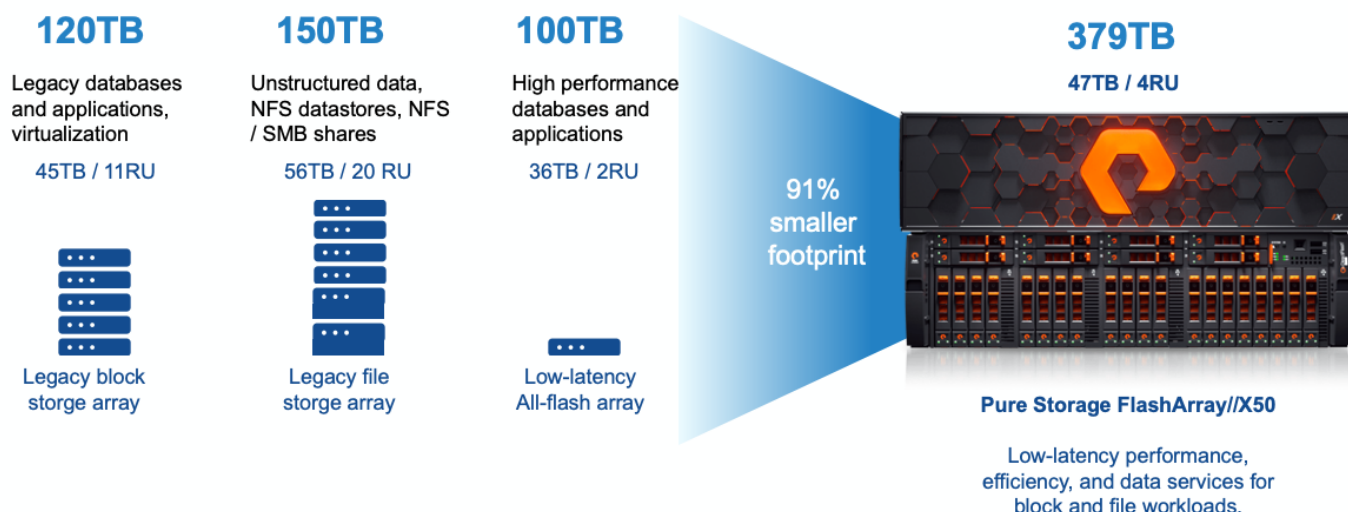
ESG then sized a Pure Storage FlashArray//X50 to consolidate the same block and file workloads totaling 379TB of capacity. Because the FlashArray provides 10:1 data reduction and requires less storage overhead, the configuration required a total of only 47TB of physical capacity in only 4RU of space. A summary of the configurations is shown in Figure 3.

Why This Matters

Organizations have settled for separating, running, and managing workloads on siloed traditional storage systems designed and optimized for either block or file workloads.

Consolidating these workloads onto the Pure Storage FlashArray Unified Block and File Platform reduces storage footprint, reduces complexity, improves reliability, and allows for continuous innovation.

ESG's models predict that consolidating block and file workloads to FlashArray can reduce management complexity by 62% and lower the total cost of storage ownership by 58%.

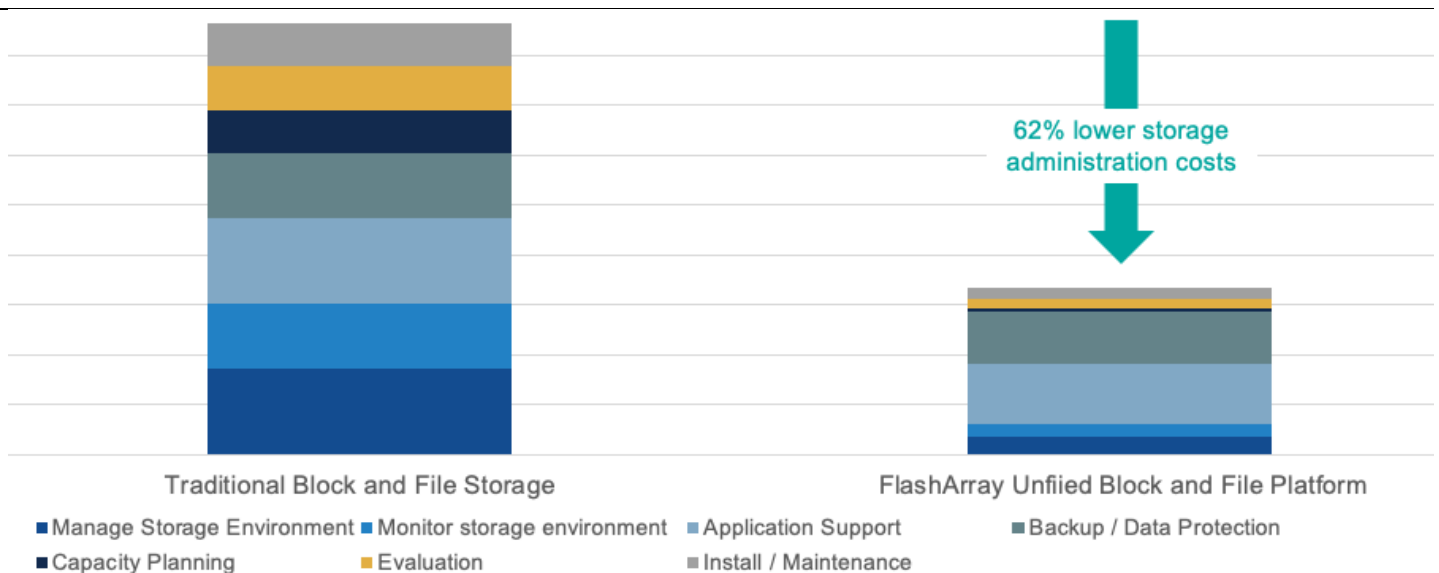
Figure 3. Consolidation Summary for ESG's Modeled Analysis

Source: Enterprise Strategy Group, a division of TechTarget, Inc.

We then modeled and compared the expected costs of hardware and software acquisition, support and maintenance, power/cooling/floorspace, and storage administration. The consolidated FlashArray provided a 55% lower cost of hardware and software acquisition. Support and maintenance costs were 38% lower, with the added benefit of dealing with only one vendor and getting Pure Storage top-tier support. FlashArray reduced the footprint of the configuration by 91%, and this dramatic reduction in hardware resulted in power, cooling, and floorspace costs that were 87% lower.

Finally, ESG modeled the expected costs of storage administration over three years. Pure Storage FlashArray Unified Block and File Platform provided operational savings by removing many of the limitations and inefficiencies built into traditional storage systems and by reducing the complexity of managing both block and file storage. Our models estimated that Pure Storage could lower the cost of administration by 62%, freeing existing storage administrators to work on other projects and initiatives. The results of this analysis are shown in Figure 4.

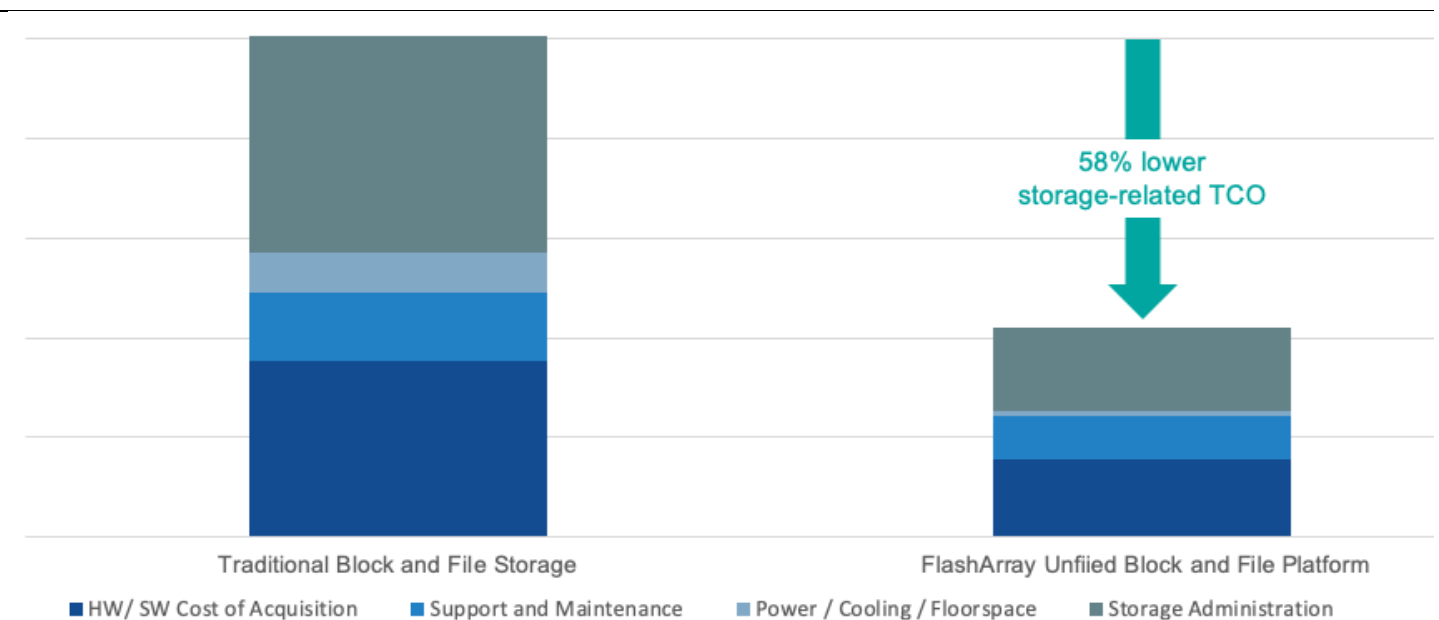
Figure 4. ESG Traditional versus FlashArray Modeled Cost of Storage Administration to Support Block and File Workloads



Source: Enterprise Strategy Group, a division of TechTarget, Inc.

These savings are provided over the lifetime of the array and are derived from the benefits outlined in the earlier sections of this report. Putting all of this together, ESG's models predict that consolidating block and file workloads on Pure Storage FlashArray can lower the expected three-year total cost of storage ownership by 58%. The results of this analysis are shown in Figure 5.

Figure 5. ESG's Traditional versus FlashArray Modeled Three-Year Total Cost of Storage Ownership



Source: Enterprise Strategy Group, a division of TechTarget, Inc.

Issues to Consider

While models by Enterprise Strategy Group (ESG) are built in good faith upon conservative, credible, and validated assumptions, no single modeled scenario will ever represent every potential environment or engagement. ESG recommends that you perform your own analysis of your unified file and block storage requirements and consult with your Pure Storage representative to understand and discuss the options and potential possibilities through your own proof-of-concept testing.

Conclusion

As organizations modernize their data centers to improve business agility, deliver hybrid cloud operations, and optimize cost, the timing is right for organizations to reassess their siloed storage environments supporting legacy block and file workloads. Traditional storage arrays were designed to optimally handle either block or file workloads and later added bolt-on unified functionality to support the other. This functionality comes with a noticeable tradeoff of increased complexity, reduced storage efficiency, limited product functionality, and slow innovation.

Pure Storage completed a public acquisition of the Compuverde software-defined file storage solution in 2019 and has invested the extra time and effort required to build the technology as a scale-up base function into their Purity operating system, rather than as a function that runs on top of it—i.e., it is not a file system built on LUNs and has no gateways or virtual controllers. The result is a FlashArray unified block and file system with no compromise for workload type (file or block) on supportability, reliability, features, or capabilities.

ESG validated that file systems could be created simply and easily on a single, global storage pool shared with block services. Pure Storage file services enjoy the same benefits that FlashArray delivers for block storage: It is simple to manage from a single point of management, supports automation and orchestration through CLI and APIs, and provides a reduced footprint, with continuous innovation, flexible financing options, and top-tier support. Our models predict that Pure Storage FlashArray's Unified Block and File Platform can lower administrative complexity by 62% and provide a three-year storage total cost of ownership that is 58% lower than the cost of continuing to run block and file workloads on siloed legacy block and file storage arrays.

More than 300 customers are now running unified block and file workloads simultaneously on FlashArray, confident that they can scale capabilities whenever needed, with no overhead or compromise. They also benefit from a management experience that is more closely tied to the type of data being stored than the type of storage being used. If your organization is looking to consolidate your traditional block and file workloads to a single cost-effective platform that delivers improved performance, operational simplicity, leading storage efficiency and support, and continuous innovation, ESG suggests that you consider Pure Storage FlashArray Unified Block and File Platform.

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