IDC TECHNOLOGY SPOTLIGHT

Sponsored by: Pure Storage

Denser storage workload consolidation can lower infrastructure costs, increase resource utilization, simplify data sharing, improve productivity, and simplify vendor management. Doing this effectively requires a specific set of storage capabilities that customers should look for as they refresh their existing storage infrastructure.

Enabling Denser Storage Workload Consolidation to Improve Infrastructure Efficiency

February 2022

Written by: Eric Burgener, Research Vice President, Infrastructure Systems, Platforms, and Technologies Group

Introduction

Almost 70% of enterprises plan to refresh their information technology (IT) infrastructure within the next two years. The primary reason for doing so is to meet the evolving performance, availability, and management functionality requirements of workloads being deployed as part of digital transformation. As IT organizations consider technology upgrade options, increasing the efficiency of IT infrastructure is a key objective.

To that end, enterprises are focused on consolidating more storage workloads onto fewer platforms without putting performance, availability, security, and other IT objectives at risk. IDC extensively discusses storage workload consolidation in *What to Look for When Considering Enterprise Storage Workload Consolidation* (IDC #US48670822, January 2022), making very specific recommendations for how enterprises should approach workload consolidation efforts.

AT A GLANCE

WHAT'S IMPORTANT

As enterprises refresh their storage infrastructure as part of digital transformation, they should be consciously pursuing dense workload consolidation opportunities.

KEY TAKEAWAY

To intelligently pursue dense workload consolidation, customers should set their objectives, group workloads by functional requirements, identify the optimum deployment model, and then evaluate new storage systems based on their ability to meet individual consolidation requirements.

In just the past few years (perhaps since your enterprise's last storage technology refresh cycle), a number of technologies have matured that significantly change the landscape when it comes to consolidating multiple types of workloads onto a single system. Those developments include:

- More affordable solid state storage
- Additional price/performance points in the memory/storage hierarchy with persistent and storage-class memory devices
- NVMe technologies (including NVMe over Fabrics)
- Software-defined infrastructure
- Artificial intelligence-driven management

Storage systems that intelligently leverage each of these technologies make it easier than ever to create very cost-efficient IT infrastructures without putting service-level agreement (SLA) commitments at risk.

Creating an effective storage workload consolidation strategy starts with setting objectives (e.g., cost, productivity, data sharing), grouping workloads by functional requirements (e.g., performance, data organization and/or access method, scalability) and data services requirements (e.g., data reduction, encryption, replication), and identifying the optimum deployment model (e.g., traditional IT, private cloud, or public cloud-based infrastructure). Application dependencies and any compliance and/or internal organizational requirements must also be considered before workloads can be grouped for possible colocation on a single storage system.

The final step involves evaluating storage platform capabilities for their ability to most effectively meet an organization's established objectives in hosting mixed workload groups. During this process, IT managers should evaluate:

- Performance and scalability
- Range of data services
- High availability and rapid, flexible recovery
- Multitenant, multitier management capabilities
- Integrated ecosystems for monitoring, management, and orchestration
- Support for cloud-native workloads

Systems that simultaneously support multiple access methods offer advantages when consolidating workloads of different types. A popular type of storage system for primary workloads is the "peer protocol unified storage platform." These systems support both block- and file-based access as peer protocols and are typically targeted for tier 0 workloads that must service a lot of low-latency, random, write-intensive I/O that also requires high availability, strong resiliency, and rapid recovery. These kinds of systems stand in stark contrast to block-based arrays that use NAS gateways for file support. Because file is not a "peer protocol" in these systems, they support much lower file system performance and scalability and tend not to be widely used for multiprotocol workload consolidation.

Availability concerns are paramount on systems used for dense workload consolidation. Enterprises should understand the impacts of failures (as well as online upgrades) and make sure that they have access to the features they need to address the expanded size of fault domains with more densely consolidated workloads. Access to stretch cluster topologies that deliver zero recovery point objective (RPO) options is important as is the performance of interconnects (regardless of whether they are intrasystem or intersystem in nature).

The four maturing technologies — solid state storage, persistent and storage-class memory, NVMe, and software-defined infrastructure — have resulted in storage systems that exhibit unprecedented levels of infrastructure density in terms of performance and storage capacity. High-end enterprise storage systems are often used for dense storage workload consolidation and will continue to be used in this manner to create more efficient storage infrastructures.

Benefits

Enterprises that plan appropriately will benefit significantly from intelligent workload consolidation. They can expect to lower infrastructure costs, enable higher utilization rates for IT resources, simplify data sharing across workloads (an important consideration in this era of digital transformation), achieve higher administrative productivity, and reduce the number of storage vendors with which they must interact.

Considering Pure Storage

Pure Storage is an enterprise all-flash array (AFA) vendor with a broad portfolio of offerings that cover primary and secondary as well as structured and unstructured data workloads. When the company first entered the market in 2012, it primarily targeted midrange customers with its performance, ease of use, and differentiated customer experience (CX) value propositions that include fully nondisruptive upgrades and the popular Evergreen subscription program. Over the past decade, the vendor has been continuously expanding the performance of its higher-end offerings, giving its customers access to enterprise storage systems with lower latencies, higher performance and throughput, and greater capacity.

In December 2021, Pure Storage again extended the capabilities of its higher-end offerings with the introduction of FlashArray//XL. Compared with the company's previous higher-end system, the FlashArray//X90, the FlashArray//XL offers up to 70% greater throughput and 60% greater capacity. The infrastructure density of the FlashArray//XL is impressive — an 11U system can deliver 150 microsecond latencies, 36GBps of throughput, and up to 5.5 petabytes of effective capacity (assuming a 5:1 data reduction ratio, which can be guaranteed by the vendor through its Evergreen Storage program).

To support the increased performance and scalability, the FlashArray//XL (which is based on the FlashArray dual controller architecture) has incorporated some changes. The FlashArray//XL uses the same active/passive controller approach, which ensures no performance degradation in the event of a controller failure. The new design distributes nonvolatile random access memory (NVRAM) to each of the DirectFlash Modules (DFMs), significantly increasing the array performance and freeing up PCIe slots that can be used for additional DirectFlash and DirectMemory modules (also based on Intel's 3D XPoint media) or expanded networking capabilities. With this change, the 5U base chassis can now accommodate up to 40 DFMs and offers 9 PCIe slots for expansion. Workloads can be pinned within the DirectMemory cache if desired to prioritize those workloads for consistent low latencies. Pure Storage has added support for 64Gb Fibre Channel (FC), and given the increased PCIe slot count (relative to FlashArray//X90), the FlashArray//XL can support up to 36 FC ports. (In addition, 100Gbe Ethernet is also supported). The design incorporates larger fans to cool the more powerful system as well.

The system backplane is NVMe but is built around the latest PCIe Gen 4 specification for wider lanes and increased bandwidth between controllers and attached devices. The 5U base chassis can accommodate up to two 3U expansion chassis, each of which supports up to 28 DFMs, for a total of up to 96 storage devices per system. The expansion chassis are connected to the base chassis over 100Gbe RDMA over Converged Ethernet (RoCE) links.

Pure Storage expects its customers to use the FlashArray//XL for increased workload consolidation. To address any concerns about the fault domain size, Pure Storage has added some new availability features. The FlashArray//XL boosts replication performance by 50% and supports ActiveCluster and ActiveDR over both FC and Ethernet. ActiveCluster leverages asynchronous replication for business continuity while ActiveDR uses asynchronous replication for disaster recovery. The additional performance allows customers to deploy multisite configurations with a near zero recovery point objective (RPO) for enhanced business continuity and disaster recovery capabilities. Each system now also includes four power supplies that deliver N+2 redundancy.

Beyond the FlashArray//XL's appeal for existing Pure Storage customers, the product's increased performance and scalability should also introduce the vendor to new customers who may not have considered it before. For these customers, the most interesting differentiator may prove to be the CX for enterprise storage ownership that Pure Storage delivers through its Evergreen Storage subscription program. Evergreen includes subscriptions to software and hardware upgrades, in addition to guarantees and proactive support, that greatly improve ownership CX. This CX, maintained since the vendor's initial entry into enterprise storage, has literally raised the bar for other vendors. The Pure Storage CX generates the vendor's Net Promoter Score, which is the highest among any enterprise SAN vendor, and drives the extremely high repurchase rates among existing customers. For a more complete discussion of the Pure Storage CX, see *Evergreen Storage Continues to Drive Industry-Leading Customer Experience as a Differentiator for Pure Storage* (IDC #US48785022, January 2022).

Other features introduced at the same time as the FlashArray//XL will interest customers considering it for dense storage workload consolidation. New SafeMode capabilities improve ransomware protection. SafeMode snapshots are immutable snapshots that can be either retained locally or replicated to remote sites for "air gap" protection. SafeMode capabilities now include a tamperproof eradication timer, further improving the integrity of SafeMode. A new single-click "system-level" snapshot makes it easier than ever to create a recoverable copy of an entire system. All SafeMode features can be used with both ActiveDR and the FlashArray File Services (which made the FlashArray a peer protocol unified storage system when the file services were introduced in 2020). Other security features added with the release of Purity 6.2 (the storage operating system for the FlashArray//XL) include multifactor authentication and single sign-on (based on SAML 2.0).

The FlashArray//XL is covered by Pure1, the vendor's artificial intelligence-driven cloud-based systems management and monitoring platform, as well as by Evergreen Storage. It is also supported in Pure Fusion, the vendor's cloud-based storage-as-code offering that can deliver infinite scale with single-pane-of-glass management.

Challenges

Although Pure Storage has continuously expanded its performance and scalability over the years, many enterprise customers still think of it as a midrange storage vendor. With over 30,000 FlashArrays deployed in production, the vendor has established a strong track record with its customers for ease of use, reliability, and a differentiating CX. With its new performance and scalability, the FlashArray//XL will clearly allow Pure Storage to compete in segments of the high-end storage market. While Pure Storage expects many of its existing customers to purchase FlashArray//XL systems (since the genesis of this system was at least partially fueled by customer requests to bring the vendor's CX to higher-end systems), one challenge will be introducing itself to customers that may not know of it.

Conclusion

The benefits of denser storage workload consolidation have been proven in many enterprise environments, but systems that can effectively enable it must support a set of very specific features and capabilities. With the introduction of the FlashArray//XL, Pure Storage is specifically addressing those requirements. Among its current customers, Pure Storage is known for its ease of use, always-on data protection, Evergreen Storage, and differentiating CX. The FlashArray//XL delivers on all those requirements, but in a package with 50% higher performance and 60% higher capacity than any system the vendor has shipped to date.

Pure Storage is known for its ease of use, always-on data protection, Evergreen Storage, and differentiating CX.

There is no doubt that enterprises will continue to pursue denser workload consolidation as they upgrade their storage infrastructures during digital transformation, but they will want to

see the capabilities necessary to address the risks in any systems they may consider. The best systems for denser workload consolidation will be able to deliver consistent latencies at scale, multipetabyte capacities, rich storage management functionality, and multitenant management to meet service-level agreements and security requirements on an application-by-application basis. In short, customers will be looking for enterprise storage that offers the kinds of capabilities the FlashArray//XL brings to the table.

About the Analyst

Eric Burgener, *Research Vice President, Infrastructure Systems, Platforms, and Technologies Group*

Eric Burgener is Research Vice President within IDC's Enterprise Infrastructure Practice. Mr. Burgener's core research coverage includes storage systems, software and solutions for both structured and unstructured data storage, quarterly trackers, and end-user research as well as advisory services and consulting programs. He brings more than 30 years of experience working in enterprise storage-related roles in start-up and larger vendors as well as venture capital, regularly presents at industry events, and is often quoted by the press in his research area. He was awarded the Alexander Motsenigos Memorial Award for Outstanding Innovation in Market Research in 2017 by IDC and is an active participant in the IT Buyer's Research Program at IDC.

MESSAGE FROM THE SPONSOR

Pure Storage helps customers put their data to use while reducing the overall complexity and expense of enterprise storage infrastructure. With the introduction of FlashArray//XL to the Pure portfolio, users gain the performance to support their most demanding, business-critical applications and the scale-up to consolidate workloads on fewer arrays. This means more efficient operations, easier data sharing and reduced costs. FlashArray//XL coupled with Pure Fusion -- Pure's self-service, autonomous Storage-as-Code platform -- delivers enterprise-grade scale to its promise of subscription storage that easily evolves to keep IT infrastructure agile and up to date.

Learn more at purestorage.com/flasharrayxl

IDC Custom Solutions

The content in this paper was adapted from existing IDC research published on www.idc.com.

IDC Research, Inc.
140 Kendrick Street
Building B
Needham, MA 02494, USA
T 508.872.8200
F 508.935.4015
Twitter @IDC
idc-insights-community.com
www.idc.com