Solution Showcase

Next Generation Isilon's Modular, Enduring Design

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Abstract: Digital information has quickly become the lifeblood of business success, enabling firms to become more operationally efficient and to better serve their customers. As companies seek to harness their data in new ways, the infrastructure that houses that data can falter under the strain. In response, new innovations have emerged to help address the concerns of managing and protecting these increasingly important data capacities. While some vendors focus innovation development on software alone and allow the hardware to remain commodity, Dell Technologies is delivering some impressive hardware innovation with Isilon's next generation hardware to complement its software's disruptive capabilities.

Overview

Multitudes of businesses and industries are being transformed by data, and the result is smarter businesses. In some industries, the transition to digital has sped up processes and reduced the timelines of projects, improving time to revenue. In others, it has helped firms better understand their customers and offer superior products and services. In a recent research study of organizations' 2017 IT spending intentions, two of the top three most-cited considerations that respondents believed would be important in justifying IT investment to their organization's business management teams in 2017 were the desires to increase employee productivity and improve customer satisfaction.[1] This digital revolution also has increased the pace of data growth. As capacity and access demands continue to increase, traditional storage infrastructure solutions can quickly hit their limits. Small complexities in infrastructure design, deployment, and support become much larger and more costly at scale. As an example, in two separate ESG research studies of storage decision makers over the past couple of years, the storage-related challenge most commonly identified by respondents was the cost of hardware infrastructure.[2]

In response, IT leaders face a crossroads. They could shift to the public cloud, but that can introduce questions of data security and has the potential for hidden costs. Even when organizations leverage the public cloud, typically a significant portion of data must remain on-premises to meet certain business demands for performance, security, or even cost. Some have turned to other emergent storage technologies, such as software-defined storage (deploying storage intelligence as software while leveraging commodity hardware for the underlying infrastructure). These solutions provide considerable benefits over the traditional storage silos of the past, but the innovation is limited to the software, as the hardware technology is often standardized.

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[1] Source: ESG Research Report, *2017 IT Spending Intentions Survey*, March 2017.
[2] Source: ESG Research Report, *Software-defined Storage (SDS) Market Trends*, February 2016, and ESG Research Report, *2015 Data Storage Market Trends*, October 2015.
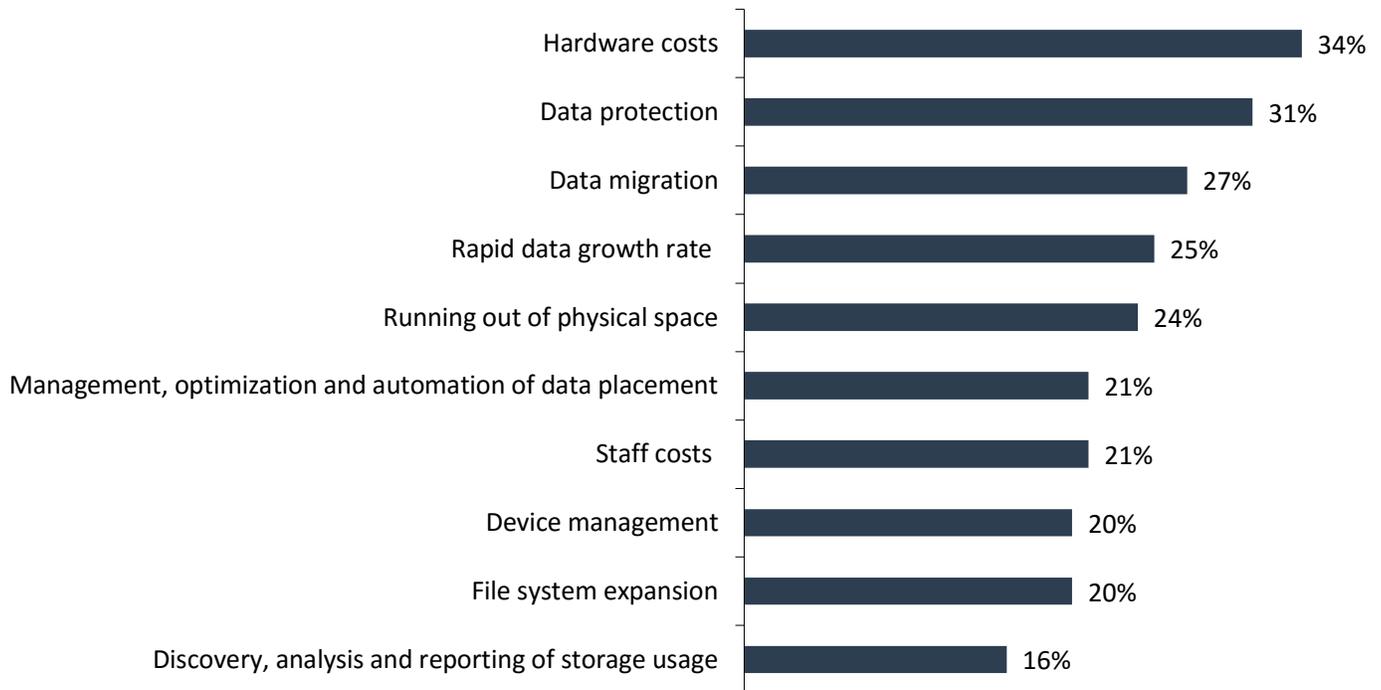
Dell EMC, a leader in enterprise IT and storage technology, is offering a third option with its latest hardware design for Isilon. For those not familiar with Isilon technology, it is a scale-out NAS solution that leverages a software-defined storage (SDS) architecture. Isilon already offers a software-only option with Isilon SDEdge. With Isilon's next generation hardware design, Dell EMC is delivering its OneFS technology with modular hardware innovation that combines the flexibility of SDS-based architectures with the efficiency benefits of hardware innovation. It is not a departure from SDS trends, but a next step.

The Pros and Cons of Data Center Redesign

As mentioned previously, IT organizations commonly struggle with the impact of data growth. In two separate ESG research studies, when storage decision makers were asked to identify the biggest challenges in terms of their storage environment, the most common response was the cost of hardware (see Figure 1).[3] While this data is not surprising given the increasing demands on storage infrastructure, this data only reveals one part of the story. The challenge of hardware costs encompasses more than just the price per capacity of the system.

Figure 1. Top Ten Most Commonly Identified Storage Challenges

In general, what would you say are your organization's biggest challenges in terms of its storage environment? (Percent of respondents, N=303, five responses accepted)

Hardware costs	34%
Data protection	31%
Data migration	27%
Rapid data growth rate	25%
Running out of physical space	24%
Management, optimization and automation of data placement	21%
Staff costs	21%
Device management	20%
File system expansion	20%
Discovery, analysis and reporting of storage usage	16%

Source: Enterprise Strategy Group, 2017

A closer look at the ESG research data reveals a more complete picture of storage infrastructure challenges: 24% of participants identified running out of physical space as one of their biggest challenges, 21% identified the management and optimization of data placement, 21% identified staffing costs, and 20% identified device management. In other words, data storage demands impact infrastructure costs on multiple fronts. In response, IT organizations have begun to investigate alternatives to the traditional storage ecosystems.

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[3] Source: ESG Research Report, *Software-defined Storage (SDS) Market Trends*, February 2016. All other ESG research references and charts in this solution showcase have been taken from this research report.

Why Hardware Architecture Matters

Addressing the challenges of storage infrastructure identified in Figure 1 requires innovation that extends well beyond the capabilities of software alone; it demands advancements in hardware as well. In recent years, the storage industry has seen a rise in the leverage of commodity hardware components as a means to reduce the cost of infrastructure. While this shift to commodity components has helped reduce costs, there is room for improvement. As the pace of data growth increases, hardware innovation is necessary to deliver the following benefits:

- **Infrastructure that keeps pace with data:** The challenges of data growth, data migration, file system expansion, and running out of physical space identified in the research point to a single idea: Storage infrastructure can't keep pace with the scale of data. The key issue is not only the scale; it is the pace of the scale. When new capacity is required, delays in designing the resulting solution, architecting the network, ensuring the necessary power and cooling, or even identifying the space required adds time and cost to the process. Storage hardware needs to make the activity of scaling as automatic as possible.

- **Easily managed and protected data:** Nearly one in three storage decision makers identified issues with data protection, while roughly one in five identified management of data placement, staffing costs, and/or device management as storage challenges. Once the infrastructure is in place, it needs to be dramatically simple to manage and protect. The net result of this simplicity should be an infrastructure that does not require administrators as it scales.

- **The elimination of design complexity and risk:** A factor that also directly impacts the cost of infrastructure is ensuring that all the components in the final ecosystem work as expected. This may seem obvious, but it is not trivial. In an ESG study of storage decision makers, 20% of respondents identified a key concern with SDS was the difficulty of validating the resulting combined hardware and software solution. Solutions that require do-it-yourself customization or even complex networking design introduce opportunities for issues to emerge, increasing the cost and the risk of the storage environment.

An ideal scenario would be a solution that leverages cost-effective commodity-based components, while delivering hardware tailored to meet the demands of the storage software. The resulting solution would also need to be able to be deployed and expanded quickly while allowing organizations to mix and match components to adjust the solutions as the demands or the technologies change. These concepts are some of the driving factors behind Isilon's 6th generation architecture, an efficient and powerful hardware platform designed to maximize the benefits of Isilon's software.

Isilon's Next Generation

Isilon's new generation hardware design is four rack units high (4U) and houses four Isilon nodes in a modular chassis. The individual Isilon nodes support multiple configurations: all-flash, hybrid, and archive (spinning disk). As a result, the architecture delivers the capacity, performance, and resiliency historically requiring four individual Isilon nodes networked together but now achievable in a single package. Also, as the new generation, the hardware works in conjunction with existing legacy Isilon deployments, extending the cluster's performance and capacity. The net result is a dramatic improvement in data center storage efficiency as well as ease of management and expedited deployment that extends existing Isilon storage investments. Some key capabilities of the 6th generation architecture include:

- **Transformational Infrastructure Design:** This new generation offers far more than density. It can dramatically simplify the complexity of infrastructure deployment and speed up the time to provision new capacity. The new design continues to deliver the benefits of a scale-out architecture. Admins can still mix, match, and automatically tier between nodes of different performance levels, density, and storage media types. The resulting solution delivers linear performance scalability. The difference is that the resulting solution is denser, simpler to manage,

and faster to deploy, while requiring less power per TB. Modular networking is also integrated in the new chassis design so that organizations can choose between Infiniband (IB) interconnects or 10GbE/40GbE IP networks.

- **Next-level Performance and Scale:** The new generation Isilon architecture is designed as much for performance as it is for scale. As flash technology components have declined in price, the benefits of flash have become accessible to a larger variety of workloads, including those served by scale-out NAS solutions. The result has dramatically altered the way businesses can leverage their file content. Recently, ESG Lab engineers were able to validate the performance and scale possible with the new hardware design. The four nodes in the 4U chassis tested supported 251,253 file ops with substantial throughput of 15.4GB/sec for reads and 7.7GB/sec for writes. The architecture is also massively scalable, designed to support scaling to 100s of PB in capacity.

- **Future-proof Architecture:** The promise of SDS-based technology has less to do with the ability to deploy storage intelligence as software and more to do with delivering hardware flexibility—the ability to easily evolve the hardware as demands or technologies change. The new generation hardware extends existing Isilon deployments, while also providing a multigenerational architecture designed to integrate future technologies. When demands change or new nodes become available, they can be deployed into an already deployed new generation chassis, speeding up the time to provision new capacity or to increase storage performance.

Dell Technologies' Isilon portfolio has become a leader in scale-out NAS technology predominantly on its software prowess. With its new generation hardware, Isilon now delivers a hardware architecture that further differentiates it from the offers of more traditional players in the space. Some critics, however, may claim that Isilon's new design is an attempt to increase hardware lock-in, while other SDS approaches that deliver technology as software would eliminate that lock-in threat. These claims, however, would be unfounded. SDS solutions delivered as software do not always deliver universal hardware flexibility. Often, the hardware options are limited to a few supported configurations in order to ensure that the final solution is validated and supportable. Also, industry-standard hardware providers typically leverage similar components and offer similar prices. As a result, selection of a vendor is often based on other criteria like serviceability and manageability, enticing organizations to stick to the same hardware manufacturer.

The Bigger Truth

As with any technology, the benefits that a solution provides should ultimately outweigh the methodology with which those benefits are delivered. While some solutions tout a commodity hardware design as a feature, it is the benefits that result from the combined hardware and software solution that really matter. Isilon's 6th generation hardware design combines the cost effectiveness of commodity components with the power of custom hardware in a simple and more efficient form factor.

As businesses become more reliant on data, the scale of data infrastructure intensifies. Complexities that were once trivial can quickly grow to become significant and costly issues. Each dollar or minute saved to expand storage capacity, increase performance, or upgrade the infrastructure becomes incredibly valuable at scale. This next generation of Isilon hardware is about delivering the massive level of performance and scale digitally dependent companies need to stay competitive, but it is also about solving the little problems that become huge issues at higher capacities. The hardware is efficiently tuned to the software, it can be deployed or adjusted quickly, it makes networking simpler, and it takes up very little power and space. Solving these challenges not only reduces the cost of infrastructure, but also frees up critical personnel to focus on more important business-critical tasks.