3 STEPS TO ENDING THE PRIMARY STORAGE NIGHTMARE

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Storage is at the heart of most IT professionals' daily struggle, and its challenges are keeping them up at night. The problem is that the organization is asking primary storage to do too much; meet performance expectations, keep up with capacity growth, retain data forever, recover rapidly and of course adhere to budget realities. IT planners need to rethink their storage strategy and not only look for storage systems that can better meet these challenges but also work with other technologies to ease some of the burdens on primary storage.

UNDERSTANDING THE SOURCES OF PRIMARY STORAGE CHALLENGES

The first primary storage challenge is keeping up with the performance challenges of the organization. Users and application owners are not only expecting real-time application response they are wanting to build denser operating environments, which means more users per application, more virtual machines per hypervisor host, and more containers per DevOp environment. At the same time, the organization is looking for a faster response to analytic and reporting requests. Once again, "real-time" is the mantra for decision support tools to take action faster.

The increase in demand for performance leads to the rapid transition of storage systems that were hard disk-based, to hybrid systems, to all-flash arrays. Given the insatiable appetite for performance, even an all-flash storage system may not be able to meet today's organizational performance demands. All-Flash vendors are leveraging technologies like NVMe to raise the performance bar even higher.

The second primary storage challenge is keeping pace with the never-ending demand for capacity. Business is now data-driven, collecting data from machines and devices as well as users and applications. The more data a decision support tool has access to the more valuable its insights. While most of this data is seldom or even never accessed, when the organization needs a portion of the data, it doesn't want to wait for answers. As a result, most organizations are managing data growth through the purchase of additional primary storage systems. This storage sprawl consumes data center floor space, increases storage costs and further complicates the storage management process.

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In addition to the capacity demands, driven by the amount of inputs and internal data retention demands, there are also external demands placed on organizations by governments or regulators. The organization now has specific, legally binding requirements to retain data for long periods of time.

To balance the rapid access requirements with capacity requirements demands a new type of storage system based on very dense (high capacity) solid-state drives (SSD). Modern flash systems can now store petabytes of data in a few rack units.

The fourth requirement is the increase in recovery expectations. Users and application owners now expect IT to recover applications and data no matter what the type of outage. Storage system failures, ransomware attacks and complete data center disaster need mitigation within minutes. Days or even hours for recovery are no longer acceptable. The total dependence on a digital world has made the cost of downtime incredibly expensive.

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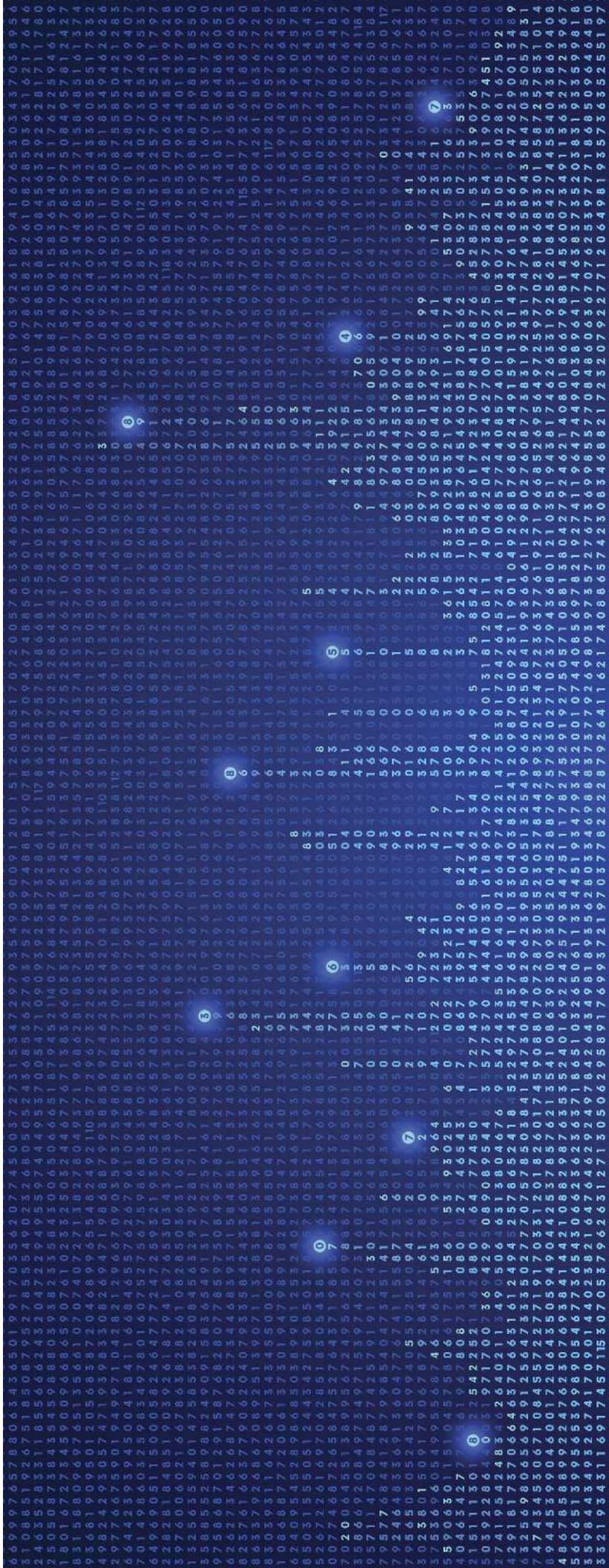
The final requirement is to meet all of the prior requirements while staying within budget. Their supervisors ask IT professionals to do more with the same (or less). Meeting the budget requirement requires more than just deduplication and compression, which while important, are not enough. Organizations need a single storage system that can satisfy both the extremely high-performance requirements of applications and the rapid access requirements of analytics processes. These systems need to manage tiering internal and automatically.



TRADITIONAL TIER 1 STORAGE VENDORS ARE OUT OF STEP

Tier 1 storage vendors have abandoned the one storage system for the enterprise approach, which was standard in the early 2000's. Instead, they now provide specific solutions, which typically consist of a storage system for high-performance applications, a storage system for less critical applications, a storage system for unstructured use data, a storage system for IoT or Devices data, and a storage system for data protection. Additionally, there is a need for an off-site version of all of these systems in case of a disaster.

The growth in the number of systems in the data center is out of control and is it is unreasonable to expect IT to manage this overly complicated storage infrastructure. IT needs to get creative to find a new way to meet all these demands on fewer systems while lowering costs.

FLASH TO FLASH TO CLOUD—THREE STEPS TO ENDING THE PRIMARY STORAGE NIGHTMARE

Step 1 – Intelligent Use of High-Performance Flash

There is no denying that flash solves a lot of performance challenges the data center faces, but just throwing flash at the problem is expensive and doesn't fully take advantage of its capabilities. The data center has two discrete flash use cases. The first is high-performance flash to meet the performance demands of applications and hypervisors loaded down with users and virtual machines. NVMe, a protocol designed specifically for memory-based storage, is ideal for the extreme performance use case but is overkill for other primary storage needs like rapid data access, data retention and disaster recovery. These additional use cases can benefit from a more intelligent application of flash technology and maybe the integration of hard disk technology as well.

High density, SAS-based flash is more appropriate for the rapid access and retention use cases, but rather than acquiring two storage systems, the organization should look for a system that combines the two and intelligently moves data between NVMe and SAS-based flash tiers. This hybrid approach leverages NVMe as a read/write shock absorber and SAS as the retention tier. However, unlike hybrid systems of old that mixed flash with hard disk drives, users will notice almost no drop off in performance when accessing data from the less expensive tier. Intelligent and automatic data movement between the tiers, reduces the storage management burden on IT, enabling the system to, essentially, tune itself.

Step 2 – Hybrid Array at the DR Site

The next step is to meet the disaster recovery requirements of the organization. The problem is once an organization commits to all-flash, they are almost always forced to use an all-flash system at the DR site since most storage system provided replication tools require a similar (if not identical) system as the target. The requirement is that both systems have to run the same storage software. If the vendor only has all-flash arrays in their product line up, then this forces an all-flash DR site.

Even if the organization can replicate to a hard disk-only system at the DR site, they should be careful not to do so. Once the organization has a taste for flash performance, they expect it. Additionally, developers build applications around the assumption that flash performance will always be at their disposal. Failing over to a DR site that is hard disk-only may not only result in user complaints, some applications just may not work.

Ideally, the organization should look for a storage system that leverages the classic hybrid design, flash, and hard disk. While the delta in performance between flash and hard disk may no longer be acceptable to the production data center, it is ideal in a disaster. It is possible to size the flash tier to run the mission critical applications, giving them the flash performance they require, while other data can be tiered to flash as needed. Most importantly, the use of hard drives lowers the cost of having a system at the disaster recovery site since the chances of its use are so much lower. If the vendor can provide the same storage software across these different platform types, they can replicate between these dissimilar but more cost-effective systems.

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Step 3 – Archive to Object/Cloud Storage

The next step is to implement a system for the long-term retention of data. Deciding what data to move to this tier is different from in the past. The old practice of moving data based solely on its last access date, while a good start, is no longer enough. Organizations also need to determine how quickly that data is needed, if and when a user recalls it in the future. If the data is feeding a form of real-time analytics process, then it may better serve the organization to keep that data on high-density flash. If the recalling process can wait a few minutes for the data or if it can access data directly from object/cloud storage, then this very cost-effective tier of storage is more appropriate for that data.

Step 4 (Optional) – Second On-Premises Storage System

As an option, many organizations are deciding to implement a secondary system, on-premises. This secondary system could be similar to the DR system, a hybrid solution with a mix of flash and hard disk drives. Its purpose would be to protect the data center from minor disasters that impact the organization but not the entire data center. The data center could use this system for immediate recovery from a storage system failure, data corruption or ransomware attack. It could also use this system for running reports and performing test/dev work. Lastly, the second system could be the primary source feeding the data protection process.

STORAGESWISS TAKE

A flash to flash to cloud strategy allows the organization to meet all of its needs without breaking the budget. Production performance is satisfied for now and in the future with NVMe-based flash while meeting access needs with cost effective, high density SAS flash. The data movement capabilities of flash automatically handle management of the two data types. The organization can then leverage object storage to reduce not only primary storage capacities but also lower the cost of DR systems. IT delivers all of these costs savings and performance without sacrificing its ability to recover rapidly from virtually any type of disaster.

ABOUT US

Storage Switzerland, LLC

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George Crump is President and Founder of Storage Switzerland. With over 25 years of experience designing storage solutions for data centers across the US, he has seen the birth of such technologies as RAID, NAS and SAN. Prior to founding Storage Switzerland he was CTO at one the nation's largest storage integrators where he was in charge of technology testing, integration and product selection.