How to Meet the Data Protection Challenges of the All-Flash Data Center

Moving to all-flash data centers requires a greater focus on resiliency in data center storage solutions.
A TRANSFORMATION IS UNDERWAY in data centers around the globe as organizations transition from legacy storage solutions to all-flash storage arrays. However, companies must be mindful that putting more storage capacity in a smaller space increases the need for high-resiliency in their storage solutions.

To be sure, all-flash provides significant benefits in the data center, starting with a lower cost per input/output per second (IOPS) as compared to traditional disk-based storage systems. Flash also offers the opportunity for storage consolidation because of its greater capacity, scalability, and predictably high performance.

Companies also get greater efficiency with flash storage systems, with the ability to store more data in a smaller footprint, creating opportunities for consolidation of storage systems because of real-time data reduction. And all-flash systems are easier to manage, with little need for load balancing and tuning to remove I/O hot spots.

But the move to all-flash data centers does not come without some challenges and an element of increased risk of data loss. The idea that flash storage can handle more data in a smaller space means companies are putting more volume, hosts, hypervisors, and applications on a single piece of infrastructure. It’s similar to the move to virtualization years ago, when companies began running increasing numbers of applications on a single server outfitted with multiple virtual machines (VMs).

While such consolidation is great from a resource utilization perspective, it increases the risk of data loss. The idea that flash storage can handle more data in a smaller space means companies are putting more volume, hosts, hypervisors, and applications on a single piece of infrastructure. It’s similar to the move to virtualization years ago, when companies began running increasing numbers of applications on a single server outfitted with multiple virtual machines (VMs).

As organizations move to all-flash data centers, they need to adopt advanced recovery tools that can provide data protection without sacrificing the superior performance they seek from their flash investment. In short, flash arrays require organizations to put a greater focus on lowering data loss risk and increasing array resiliency.

Drivers for all-flash
Businesses increasingly view their data as a corporate asset and are constantly trying to extract more value from it. For many companies, effective use of data can even be a competitive differentiator.

Recent surveys of CEOs and IT decision makers by Frost & Sullivan find that 65% of businesses believe managing data growth is important to business success. And nearly half (45%) say competitors’ use of data and analytics holds the greatest potential to disrupt the industry.1

Against that backdrop, businesses are looking for their storage solutions to deliver on a range of requirements, Frost & Sullivan finds.2 First, they must be able to deal with multiple file types and formats, including fast-growing unstructured data. Storage solutions must allow access to the same data from multiple applications, including latency-sensitive and high-performance apps that require near real-time performance.

Data must always be available, which means a data protection solution must support more aggressive recovery point and recovery time objectives (RPOs/RTOs) with all-flash. Storage systems must also recognize that data is increasingly subject to continuous analytics, and support the various business intelligence platforms companies are adopting.

All-flash data center requirements
All-flash data centers going forward need to factor in the following requirements:

The first necessity is application acceleration or superior I/O performance. Originally, performance was the main reason customers were interested in flash; now it’s table stakes. Whether for databases, containerized applications, or traditional or emerging apps, a flash storage system should deliver faster and more predictable response times than traditional storage solutions.

Operational simplicity is another requirement. The flash storage solution must be managed along with the rest of the data center infrastructure, from whatever management tool the organization already uses, fitting in seamlessly without adding an extra burden.

The flash solution should also offer investment protection. At a base level, that means it should support technologies such as in-line data compression and deduplication, enabling companies to maximize utilization of flash media. But it should also be able to work with advanced technologies such as non-volatile memory express (NVMe), which reduces latency and increases IOPS. Emerging storage-class memory technology (also known as persistent memory) is another consideration, as it promises great leaps in speed and data resiliency. The point is: Customers must ensure their chosen flash storage solution comes with a roadmap that gives some comfort level that it will keep up with advances in storage technology over time.

Finally, the all-flash storage solution must provide a high degree of risk mitigation, with support for data replication and recovery systems that offer complete protection, and can meet the RPOs and RTOs that the business requires to ensure near-continuous data availability.

All-flash challenges
Ensuring data availability is probably the greatest challenge associated with all-flash data centers. It

1. Frost & Sullivan, Global CEO’s Perspectives on Growth, Innovation, and Leadership, 2016
In searching for a data protection solution that can meet these various challenges, companies should consider several criteria.

First, to ensure good performance, the data protection solution should support storage snapshots for rapid backup. Traditional full or incremental server backups typically only happen once per day and can be a drag on performance. In high-availability environments, storage snapshots provide more frequent, point-in-time copies of data that enable organizations to meet tight RPOs and fast RTOs. Because they are dealing with relatively small amounts of data, snapshots and differential snapshots won’t affect application performance.

Be aware, however, that storage snapshots typically reside on the same storage array as your data. To provide full protection, they must be moved or replicated to another storage system in case of a major storage array malfunction or catastrophic site loss.

While storage snapshots may be a first line of defense against data loss, the data protection solution should also provide full backups for longer-term protection. Typically, such backups must flow through the application and backup server, which can impact both application and network performance.

Rapid, granular restores are another criterion. Storage snapshots will help, especially because they are stored in a native, ready-to-go format. Traditional backup systems change the data format during the backup process, which means it must be restored for recovery. Keeping a native VM image eliminates that requirement and reduces RTOs to minutes or even seconds, including for applications running in virtual environments. The data protection solution should also enable highly granular restores, down to the file or object level.

Data deduplication capabilities are essential as well. An effective solution will offload storage snapshots and full backups to a deduplicating storage appliance. Such appliances can reduce backup storage requirements by 20 to 40 times, depending on workload, freeing up capacity on flash arrays. This strategy enables you to keep more recovery points for longer periods of time for an additional level of protection in cases of audit, e-discovery, or malware attacks.

Finally, capabilities including high availability and disaster recovery functions should be integrated with the data protection solution. This is easier to achieve when all the components fall under a single architecture. It should include tools to ensure data is protected on additional storage systems, as well as at secondary or even tertiary sites, if necessary. In short, look for a vendor strategy that goes beyond simply providing a high-performance all-flash array.

Providing effective data protection

Best-of-breed partnership

Hewlett Packard Enterprise (HPE) provides fast all-flash storage arrays, and its partnership with Veeam Software enables the company to bring enterprise-level resiliency to customers with all-flash data centers.

For its part, HPE offers Tier 1 3PAR StoreServ All-Flash primary storage systems along with the HPE StoreOnce System for secondary storage, which delivers extremely high performance and class-leading deduplicating efficiency. The two are tightly integrated to minimize complexity and reduce total cost of ownership. HPE solutions support application integration, which accelerates performance and deduplication efficiency while minimizing RTOs for applications such as Microsoft Exchange, Active Directory, SharePoint, SAP HANA, Oracle, and SQL.

On their own, HPE solutions are highly resilient and secure, but by integrating Veeam software, they deliver another level of data protection (see Fig. 1). Veeam provides availability for virtual, physical, and cloud-based workloads with several important capabilities.

First, it is critical to ensure virtual machines can restore service-level objectives of less than 15 minutes for all applications and data. Veeam also supports automated disaster recovery (DR) orchestration, following a predefined DR plan, as well as automated DR testing. Veeam supports cloud data management, providing availability for workloads across cloud and remote locations to maximize IT investments while increasing flexibility. It also delivers proactive monitoring, reporting, testing, and documentation to ensure organizations meet their business and regulatory requirements.

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Sherif Darwish
Head of IT infrastructure,
Gatwick Airport
Thanks to joint engineering efforts going back to 2011, Veeam is tightly integrated with multiple HPE storage platforms, making it simple and transparent to move data among HPE’s StoreServ 3PAR and StoreOnce Systems, even in a highly virtualized, all-flash data center—without sacrificing performance.

HPE & Veeam in action
Consider the results London’s Gatwick Airport has seen with the HPE-Veeam combination. Mindful that any downtime would result in passenger delays and perhaps data loss, the airport seeks to maintain 24/7 availability across its two data centers, which house a mix of virtual and physical servers. If any VM fails in one data center, a mirror image in the other data center takes over. But Gatwick wanted to be able to recover the original as quickly as possible to restore redundancy and resiliency to its operation. Restoring VMs with traditional backup tools could take hours or even days.

The airport now uses Veeam to back up 250 VMs between its data centers, taking advantage of Veeam’s deduplication and compression capabilities and the deduplication of HPE StoreOnce to conserve storage. Together, the solutions back up 30TB of data to 4TB of space on a single HPE StoreOnce appliance.

Most important, the solution offers the fast restores that Gatwick was seeking. “If one of our VMs fails, we can restore it instantly with Veeam to become resilient again,” says Sherif Darwish, head of IT infrastructure at Gatwick Airport.

Restore instantly
Another HPE-Veeam customer, the PGA Superstore, has also made significant use of deduplication, enabling it to keep 180 days’ worth of backups, up from 14 previously.

Perhaps the greatest benefit is that the Veeam-HPE solution essentially runs on its own, with little hands-on attention from IT staff, says Michael Anderson, director of IT for PGA Superstore. That enables his IT staff to work on customer-facing solutions that deliver a business benefit.

“Veeam running so well in the background is something we can’t live without,” Anderson says. The HPE-Veeam combination is a validated, tested solution for protecting all-flash, hyper-converged virtualized data centers. It’s also market-proven, as nearly 50% of StoreOnce customers also use Veeam software.

Companies are rapidly moving to all-flash environments, which bring a variety of benefits, but also some significant challenges with respect to data protection. The HPE-Veeam partnership helps address those challenges, offering data protection that delivers business benefits.

Veeam certainly helps PGA Superstore IT staff meet the expectations of its business executives. As Anderson puts it, “With a solution like Veeam, we know we can tell them that ‘it just works.’”

For more information, visit https://www.veeam.com/hpe-storage-solutions.html