Accelerate Your Enterprise Storage for the Cloud Era

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IT deployments are shifting rapidly to cloud models that enable digital transformation. IDC says "Cloud First" will become the new mantra for enterprise IT, noting that the major innovations taking place in IT today are not possible without the cloud as a foundation. By the end of the decade, IDC predicts that enterprise spending on cloud services and related hardware, software and management will exceed $500 billion, more than three times what it is today.[1] Other research projects that more than 50% of all workloads will be running in a cloud environment within two years.[2]

If you're in IT, don't make the mistake of assuming that all or even most of this growth will be centered on public cloud services. It's not even close. The reality is that **every** IT investment going forward must be either in support of the cloud or built on a cloud-enabling platform. Cloud is not a specific solution, but a way of operating. If "Cloud First" is the new mantra of enterprise IT, then all data centers must aspire to be cloud-like—melding together commodity hardware with software and automation to deliver simplicity, agility, elasticity, resiliency, security, self-service capabilities and resourcing pooling.

1   "IDC Predicts the Emergence of 'the DX Economy, in a Critical Period of Widespread Digital Transformation and Massive Scale Up to 3rd Platform Technologies in Every Industry," IDC, Nov. 4, 2015
2   "State of the Market: Enterprise Cloud Report 2016," Verizon, Nov. 9, 2015

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"At LinkedIn it's all about the member—member experience is really important to us. So, for us, site speed and response times are really important. After deploying flash we had seen phenomenal response time improvements. Queries, which would take 30 milliseconds, were taking like 2 milliseconds. I don't need to worry about that anymore. We unlocked the bottleneck that was there. It definitely helped us solve the problem of scale."

– Neil Pinto, VP, Product Engineering Operations, LinkedIn

As you look across the data center infrastructure, it is easy to see that technology innovation is at the heart of this transformation, from server virtualization to network fabrics to software-defined everything. However, nowhere has the need for innovation been more critical than in the storage systems that are at the heart of the modern data center. Far too many of today's data centers are built on storage architectures that were designed more than 20 years ago for spinning disk drives and client-server computing.

These antiquated storage models won't do in the cloud era. IT leaders have begun to recognize this new reality and are increasingly embracing new architectures centered on flash-based storage, in particular all-flash storage solutions. According to IDC, the all-flash market reached almost $1.6 billion in 2014—two years earlier than anticipated.[3] And in a recently published IDC MarketScape 2015-2016 Report, all-flash arrays are expected to dominate primary storage spending in the enterprise by 2019.[4] Fueling that growth are the inherent performance benefits of flash storage, as well as lower costs and ease of use and management.

Organizations are also quickly realizing that all-flash storage can be an important factor in driving business growth and agility—as can be seen in the comments from IT leaders that are sprinkled throughout this article. Companies can process more transactions in shorter

3 "Flash-Based Storage is Growing Faster Than Anticipated," Bloomberg Business, Aug. 12, 2015
4 "IDC MarketScape: Worldwide All-Flash Array 2015-2016 Vendor Assessment, IDC, December 2015

time frames; leverage the benefits of big data analytics; deploy new applications and services faster; improve the performance of a wide range of applications; and generally increase productivity and customer goodwill.

> "As we started putting more and more critical applications on flash, we found that...By being able to put in low power utilization, less space, the overall operating expense drove down dramatically, which is essentially paying for the introduction of more and more flash into the environment."
>
> – Jack Hogan, CTO, Lifescript

A New Storage Model for the Cloud Era

The move to flash storage is proving to be an interesting and critical decision point for IT teams as they survey the vendor landscape. Many of the legacy storage vendors—those with the antiquated architectures—have focused on designing solutions that protect their investments and existing platforms. This has given rise to "hybrid" solutions that combine flash with legacy spinning disk drives. The problem is that these solutions don't adequately address the challenges of the cloud era.

While hybrid solutions provide some level of performance improvement over spinning disk arrays, their performance gains are limited. More importantly, they don't deliver the simplicity, elasticity and other characteristics required of cloud computing models. They were not built for the cloud and, perhaps unsurprisingly, it turns out that starting with an architectural model that is 20 years old is a woefully inadequate prescription for a new era.

The leading hyper-scale cloud services providers were among the first companies to recognize the need for flash storage and modernized architectural models. Companies such as Amazon Web Services, Microsoft Azure and Google have fully embraced all-flash solutions—in a custom manner—for their Web-scale and software as a service (SaaS) infrastructures. These companies have not only come up against the limits of spinning disks, but they have also realized the need for extensive use of flash to deliver the quality of service their customers have come to expect.

The same challenges facing these hyper-scale cloud vendors are now confronting enterprises as they embrace hybrid and private clouds. Fortunately, there are next-generation storage vendors that have been born of the cloud era and, from the beginning, have recognized the critical role that all-flash storage would play in enabling the transformation of the data center to modern cloud models.

These companies are endeavoring to bring the lessons of Web-scale and SaaS approaches directly to enterprises for use in their own environments. One example is Pure Storage, which has been involved in building cloud solutions from its inception. Pure has helped build public cloud solutions for the likes of LinkedIn, Workday, ServiceNow and Intuit, and has helped thousands of enterprise customers in all industries use all-flash storage to gain competitive business advantages and data center efficiencies.

As a result, Pure has been innovative in developing new architectural models for storage that are much more aligned with the needs of enterprise IT in the cloud era. Even if you are building a platform that is not specifically "cloud," you can take advantage of storage solutions that give you cloud-like capabilities, including: simplicity in deployment, management and upgrades; elastic scalability; lower total cost of ownership (TCO); higher availability of business-critical applications; dramatically improved performance, and accelerated speed to value enabled by much greater agility.

Key Storage Characteristics for the Cloud

So what are some of the features, functions and innovations that define how well a storage platform (or, frankly, any other IT infrastructure) matches the needs of enterprise IT in building cloud platforms? Here are the key characteristics to demand from your solution:

- **Real Simplicity:** Everything about the storage solution should be designed with simplicity in mind, and specifically simplicity for cloud-like services. The solution should be easy to deploy, scale and maintain. It should make it easier to support service-centric IT for resource pooling and chargebacks. Backup and recovery should be simpler and, when it's time to upgrade, you should be able to easily swap older technologies and replace them with newer technologies, all online and without any impact on performance.

- **Speed and Performance:** This is table stakes for flash storage. If you're not looking for a solution that delivers orders-of-magnitude improvements in speed and performance, you are probably not looking at flash and probably not doing anything cloud-related—which could mean it's time to re-evaluate your entire approach to IT. The key in evaluating speed and performance for your flash solution is to understand how it will actually work in your environment. If you are running an application on all-flash storage, does it actually get faster? Do users experience a difference? Can business managers leverage performance improvements to boost sales, profitability and/or customer service?

- **Agility:** Business agility is the leading driver for adopting cloud solutions, according to a study by the Harvard Business Review. More than 30% of respondents said agility was their primary reason for pursuing the cloud, followed by increased innovation (14%), lower costs (14%) and elastic scalability (13%).[5] It naturally follows that a more agile infrastructure will be a necessity for a more agile business. For storage, this means a solution that is not only simple to deploy and manage, but one that also delivers non-disruptive upgrades, longer lifecycles and much simpler scalability—allowing IT to grow capacity and/or performance where and when they are needed.

5   "Business Agility Drives Cloud Adoption," CIO, July 18, 2014

- **Lower TCO With Predictable Costs:** One of the most perpetuated myths about flash storage is that it is more expensive to deploy than spinning disks. While this may be true in some cases, innovative all-flash solutions can deliver fairly significant TCO improvements versus HDDs. These improvements are the result of several factors. For one, the cost of solid-state drives has declined significantly during the past few years due to much higher volumes. Leading all-flash vendors have also developed techniques to reduce the amount of storage required to purchase and hold data. These techniques include data deduplication and compression that serve to reduce the amount of all-flash required by a factor of 2-3x or more when compared to disk-based storage (including hybrid arrays that mix flash and disk).

> "The management overhead with spinning disk is significant, and it only grows as your data expands. It's an unwinnable battle. Flash has provided a solution. It's time to step away from that war and get into a solution. Now we can actually focus on value-adding pieces, and we don't have to worry about storage anymore. That management overhead is gone."
>
> **– Brent Allen, Director of Infrastructure, Skullcandy**

In addition, innovative new architectural models (such as Evergreen Storage from Pure) can eliminate the need to repurchase, redeploy and migrate capital-intensive equipment. This model significantly extends the lifecycle of the storage solution and minimizes costs involved in upgrades, maintenance and migrations. In addition, IT can take advantage of much more predictable storage costs for now and the future.

The concept of Evergreen Storage is an architectural model that was designed specifically to fit the needs of enterprises building cloud solutions. With this model,

> "(Our all-flash solution) de-dupes and compresses a huge amount of data. The data reduction is unbelievable. And it still performs—faster than anything else . . . I've used. It would have taken us almost three years of budget investments to achieve this if we hadn't had data deduplication and compression."
>
> **– Olivier Le Mao, Systems Manager, ESSEC Business School**

customers can upgrade with new controllers and SSDs without any disruptions, performance degradations or expensive (and risky) migrations. Costs are much more predictable because the pricing model uses a subscription-based maintenance contract, eliminating the need for a forklift upgrade every three or four years.

In cloud environments, the business benefits of this model can be significant: lower TCO, easier and more accurate budgeting, greater agility, less downtime, lower risk, the ability to free up IT resources, and faster time to value in deploying new applications and services. In addition, using this model enables you to make your entire infrastructure more cloud-like, while still maintaining the control and security of an on-premises solution.

Taking the Next Step

Having the right storage platform is critical to the success of any enterprise cloud endeavor—whether it is for private

cloud or a hybrid cloud; for SaaS or platform as a service environments; for internal consumption; or for offerings provided as a service to external customers. All-flash storage is a starting point, but for IT decision-makers it is important to think beyond basic speed and performance. You want an architectural model that will support your long-term cloud goals and protect your investment over time. This means a platform that not only utilizes all-flash storage, but also enables simplified management and deployments, elastic scalability, resilience, lower TCO and all of the other key benefits that go into supporting a successful long-term cloud strategy.

Pure Storage has been a leader in providing innovative all-flash storage solutions for cloud environments since the company's founding. In addition to providing solutions to major public cloud providers, Pure has developed new models that are changing the ways in which enterprises can successfully and cost-efficiently leverage storage for private and hybrid cloud environments. These new models can be seen in innovations such as Evergreen Storage, as well as advances in compression and deduplication.

If you are looking at transforming or upgrading your data centers to be more cloud-like and cloud-enabling, it is critical that you look at modernizing the storage platform as one of the most important steps. Making the right storage decision today could have a significant impact on your future.

Please visit Pure Storage at **www.purestorage.com/cloud** to learn how an all-flash storage platform can support and enable your business-critical cloud initiatives.