Navigating the Brave New World of Storage

**Abstract:** Today’s IT and business demands place added pressure on storage infrastructures to deliver dramatic new levels of flexibility, performance, and cost efficiency, eclipsing any traditional design specs. Many in the industry are suggesting that a more “software-defined” world for storage is the whole answer; although software-defined storage is certainly an important part of meeting these new needs, it may not be enough. This brief, commissioned by Hitachi Data Systems, examines what mission-critical, smarter storage systems should encompass in order to “deliver” against contemporary-market, business, and technology challenges.

**The Emerging IT World...**

Perpetual change and persistent data growth are the constant companions of most IT departments. They remain among the top challenges that organizations have to deal with year after year, according to respondents to ESG’s annual IT spending intentions research. But for the most part, the problem has been primarily a matter of scale: Organizations have had to figure out how to store gigabytes to terabytes to petabytes to exabytes and beyond in whatever new and exciting box was available. Today, things are different. The focus is squarely on specific business requirements like: continuous uptime, rapid responsiveness in this age of instant communication, and the ability to deliver real, actionable insight from enormous collections of data. And, of course, all of this has to be done while toeing a strict budget line.

This new reality is driving how we all do business. The “cloud” continues to color so many conversations, not just because it is the latest hype (although clearly that is one reason), but rather because it often proves to be the most efficient way to get a lot of business tasks done. Cloud-based deployments offer a consumption and delivery model for enterprise IT, not just for managed service offerings. When it is done right, a cloud infrastructure gives the line-of-business managers what they want (easy access to applications and data). It gives IT what it needs (the agility to respond quickly without disrupting the business). And it gives finance what it demands (lower costs with streamlined usage that’s based on actual need instead of expectations). That’s a simplified, high-level view of the cloud, but you get the picture.

**...Mandates Storage Transformation**

So, what are the implications for IT and data centers? You certainly do not have to dig deep to see that most IT organizations are going to need to transform themselves. And that starts with embracing a move to on-demand services. The requirements for speed and responsiveness in today’s business landscape mandate a level of fluidity that was never expected, or even much contemplated, in the past. The essential components for this transformation include not just cloud deployments, but also asset virtualization (servers, networks, storage, and applications) and consolidated, automated infrastructure management. It is difficult for humans to manually keep pace with this kind of environment. Automation is therefore no longer a “nice to have,” but rather a “must have.”

In addition, there really is no such thing as a “data center” anymore, at least not a traditional one with four walls. IT is increasingly being delivered through on-demand services that leverage infrastructure both inside and well outside the walls of the traditional data center. This is the only way to simultaneously optimize operating and capital expenditure (OpEx and CapEx), flexibility, and security. None of which, by the way, is optional today.

Asset virtualization is an essential cog in the cloud machine. Virtual servers and networks can be set up on demand and in real time, and the same must be true for storage. What good is the ability to have fast access to everything else, including servers, networks, and applications, if the data on the storage can’t be accessed just as quickly? Storage has to

---

be as fluid and virtual as the other resources. Put succinctly, the half-century-old storage “box” paradigm no longer makes the grade.

The upshot of all this is that businesses need, and now expect, greater flexibility, responsiveness, simplicity, and speed. Once business users got a taste of what was possible with instant communications, mobile devices, speedier processors and networks, and flash, their expectations of IT soared. New capabilities have led to higher demands, which in turn lead to new capabilities, and so on. Remember the days of prioritizing? When you were told to pick two out of three features: fast, inexpensive, or good, but not all three? Nowadays, IT is expected to deliver on all points equally. A look at ESG’s 2014 spending intentions research demonstrates this. As the details in Figure 1 show, the top five most-cited considerations for justifying IT expenditures are about getting more (return on investment [ROI], business process improvement, and security) for less (reducing OpEx and CapEx), with close to equal weight, especially for the top three.²

![Figure 1. Top Five Most Important Considerations in Justifying IT Investments Over the Next 12 Months](image)

The Demands on IT and Storage

These changes and increased expectations have a direct impact on IT in general and storage in particular. How organizations respond to these changes, or fail to, will likely be key to dictating their success going forward.

First, IT needs to do a better job of serving the business. You might say, “Well, of course, that’s obvious.” But it is going to take some effort. It starts with building more agile infrastructures, with virtualization on all levels. Cloud deployment models will make a difference, but, in addition, organizations are looking for such capabilities as show-back and chargeback to ensure alignment with financial and business goals. IT has to deliver on not just the business manager’s objectives, but the CFO’s as well.

IT is also going to look at new ways to roll out infrastructure more quickly, and will consider capabilities such as application-focused infrastructure (think easy-to-deploy templates with built-in policies) and converged infrastructure platforms that are pretested and preconfigured with guaranteed service level agreements (SLAs). There’s also an opportunity for IT to look at what services it should be delivering in a private cloud compared with leveraging an

² Ibid.
external cloud-based solution. Today, you can look at whether your money is better spent on capital equipment or on managed services.

Second, as previously mentioned, the overall needs are clearly in focus: Things like agility, high availability, and automation are dictated by the business today. Why? Because you can’t get the job done without them. What if you need to add 10,000 users, fast? Or to increase production for the holiday season, work around the clock for six weeks, and then return to a normal state? Or somehow get quick insight on all the sales data you are gathering (so that it is worth gathering!) to tweak an offering or respond to competitive threats just in time? If your infrastructure can’t adjust to changing business needs, if you can’t handle rapid application deployment, or if you can’t deal with massive data volumes of many types, you are in trouble. And if you have to shut down production operations for data protection, data migrations, maintenance, or even a disaster, there is no possibility of delivering what the business is asking for. There is plenty of evidence that the cost of downtime per hour in most industries today is simply not affordable.

Automation is required because human beings just cannot keep up with the speed and volume of applications, data, and flexing business demands that are in play today. The performance and availability SLAs for mission-critical applications are essentially beyond what IT managers can do on their own. Only through automation can they meet today’s flexibility and scalability requirements with any reasonable certainty and within any reasonable budget.

The “Price of Admission”

Consequently, certain capabilities are now considered essential for IT generally and for storage specifically; they are, if you will, “the price of admission.” Companies must have continuously available applications and data, prompting them to implement technologies like active-active systems (within and between sites) and advanced replication. Performance expectations are soaring, and the abilities to deploy flash as a storage tier and to automatically move data around to optimize performance dynamically are indispensable. Of course, automation and tiering help to drive efficiencies that are equally germane, since performance and availability must be delivered at the lowest total cost.

Is storage relevant across these needs? Absolutely. Nobody cares if a server is available if they can’t access their information. You can have all the redundancies you want in your host and network infrastructure, but without highly available data, you’ll quickly find yourself—to use a colloquial phase—up the creek without a paddle; or, in a more formal phrasing, your business simply won’t be able to make forward progress. The same goes for performance: Multi-GHz processors and 10Gb networks mean nothing without high-end storage performance. Storage I/O can be a primary cause of system performance bottlenecks, particularly in virtual server environments where the aggregation of various workloads creates an “I/O blender” effect that can strain traditional storage systems. And management capabilities—like moving data to the fastest, most efficient storage tier automatically, consolidating storage management across data types and locations, optimizing by application and service level, etc.—are absolutely necessary for any type of cloud deployment.

Not Just for the Largest Enterprises

What we are describing is a pretty powerful set of capability requirements for any IT environment, and software plays a key role in all of it. But don’t be fooled into thinking that the only winners in this “brave new storage world” are going to be big companies with deep pockets that are willing to dive headfirst into the deep end of 100% software-defined storage. There is actually wide applicability to organizations across the spectrum.

Why is software definition - of any sort - not just for those large enterprises? Because this is a lot more than just throwing money at the problem. These new types of infrastructures, built on virtualization and cloud computing, help organizations to save money and become more efficient. While this is a laudable goal for any organization, the fact is that many midsized organizations are in at least as much, and maybe greater, need of efficiency. Because midsized companies may have a lower tolerance for difficult times (for example, less cash on hand, thinner margins, and so forth), consolidation, virtualization, and automation can make a big impact on OpEx savings. (OpEx was in a virtual dead heat for the most-cited spot on our list of considerations that justify IT investments in Figure 1.) Similarly, virtualization and thin provisioning can mean dramatic improvements in storage utilization, increasing both ROI (the other half of that

3 While these are HDS’s semantic themes, they are right on target. And besides, no vendor owns these concepts—they apply to everyone!
research dead heat) and CapEx savings. Tiering only adds to these savings opportunities: IT can place only the data that needs high performance on the fastest flash or disk tiers, with the rest on less expensive media types. There’s certainly an argument for having enough equipment to provide continuous availability, but here again, with a tiered strategy, you only have to undertake those costs for your most critical data.

**Equal Partnership**

So where does that leave the storage infrastructure if so much is being defined by software? Administrators are almost certainly interested in the flexibility that software-led strategies can add, as long as they have some risk tolerance for new approaches. And there is little question that software definition adds valuable, integrated, and automated capabilities that storage professionals never dreamed of before.

But ultimately, an equal partnership of software functions and hardware foundations makes the most sense. Your software capabilities need to maximize the hardware that they’re on, meaning that what hardware you deploy does make a difference. Think of it this way: You can have a fancy-car-engine management system with computerized ignition timing, precise fuel injection, engine optimization, variable valve control, and so forth. But are you going to put that on your college moped? Or even your 1980s Yugo? Such a combination is unlikely to yield an optimized transportation solution!

Hardware matters, and certain hardware features remain important. Performance is one of them: The hardware has to be able to handle the SLAs and other policies that come into play, especially with multiple consolidated applications. Scalability is also critical, particularly in cloud environments (whether on-premises or public), where you need hardware that can easily scale up and down to support whatever your business requires. Also key is trust in both the hardware and the vendor. How does the storage deal with combining data protection and active-active system functionality? Or security? Or disk drive options? Is the vendor support there for you as needed? And don’t forget efficiency and costs. Can the hardware help you to meet your objectives and still create efficiencies to save money?

**The Bigger Truth**

Many vendors, analysts, and even IT users talk about storage and the move to software-defined from hardware-defined, and that’s all very interesting. Undoubtedly, software is a big contributor to what is possible today. But the real change that has taken place is this: In the past, IT did all the defining, and today the business does more of the defining. Think about it. Until recently, you had to be down for eight hours every night because IT had to run backups, and that was that. Need more production time? Too bad, backups come first. Need a new application tomorrow? No way. IT decreed that you could have that application three months from now, once they ordered a new server, had it delivered, set it up, tested it, and configured storage LUNs. They were not being obstinate; they were merely being realistic.

Today, things are quite different. If the business requires 24/7 operations, IT can use snapshots and active-active systems so that production continues while backups are done. If you want to start using a new analytics application to respond to a sudden change in market conditions, IT can launch it as a virtual machine in minutes. Want proof that the business is doing more of the defining? ESG research with large and small companies shows the increasing influence of line-of-business stakeholders in the IT purchase process. In large part, ESG finds this influence is because of the proliferation of cloud computing models (again, whether on-premises or not) and IT consumerization. If that is not business defining IT, then nothing is.

But it is also true that the enablers permitting the business to do the defining are the advances in storage hardware and software, and the ability of the two to operate as partners in delivering what the business needs. In the past, software was basically there to make the hardware work. It is what connected the storage to the rest of the infrastructure. But that concept has truly shifted. There are those who talk about software and hardware as a zero-sum game: If software is the focus, then hardware must be less important. ESG doesn’t believe that. Hardware remains just as important as it always was. It’s just that we’re finally seeing the power of software, too.

---
