

White Paper

Dramatically Improve the ROI of Virtualized Server Environments Using the Fujitsu Storage ETERNUS DX

By Mark Peters, Senior Analyst

October 2013

This ESG White Paper was commissioned by Fujitsu and is distributed under license from ESG.

Contents

The March of Virtualization	3
Strength in Numbers	3
Virtual Server Challenges	4
Utilizing Underutilized Capacity	4
Decreasing Downtime	4
Feeding the Big Data Beast.....	4
Storage: An Anchor around the Neck of Server Virtualization.....	4
Enter Storage Virtualization.....	5
Creating an Efficient Storage Infrastructure is Key	5
Advantages of a Virtualized Storage Pool	5
Storage Can Help—or Hinder—ROI Improvements in VM Environments	6
Fujitsu: A Credible Competitor	7
ETERNUS DX – Sophisticated Storage for a Virtualized World.....	7
Improving Your VM ROI with Fujitsu ETERNUS DX.....	8
The Bigger Truth	9

All trademark names are property of their respective companies. Information contained in this publication has been obtained by sources The Enterprise Strategy Group (ESG) considers to be reliable but is not warranted by ESG. This publication may contain opinions of ESG, which are subject to change from time to time. This publication is copyrighted by The Enterprise Strategy Group, Inc. Any reproduction or redistribution of this publication, in whole or in part, whether in hard-copy format, electronically, or otherwise to persons not authorized to receive it, without the express consent of The Enterprise Strategy Group, Inc., is in violation of U.S. copyright law and will be subject to an action for civil damages and, if applicable, criminal prosecution. Should you have any questions, please contact ESG Client Relations at 508.482.0188.

The March of Virtualization

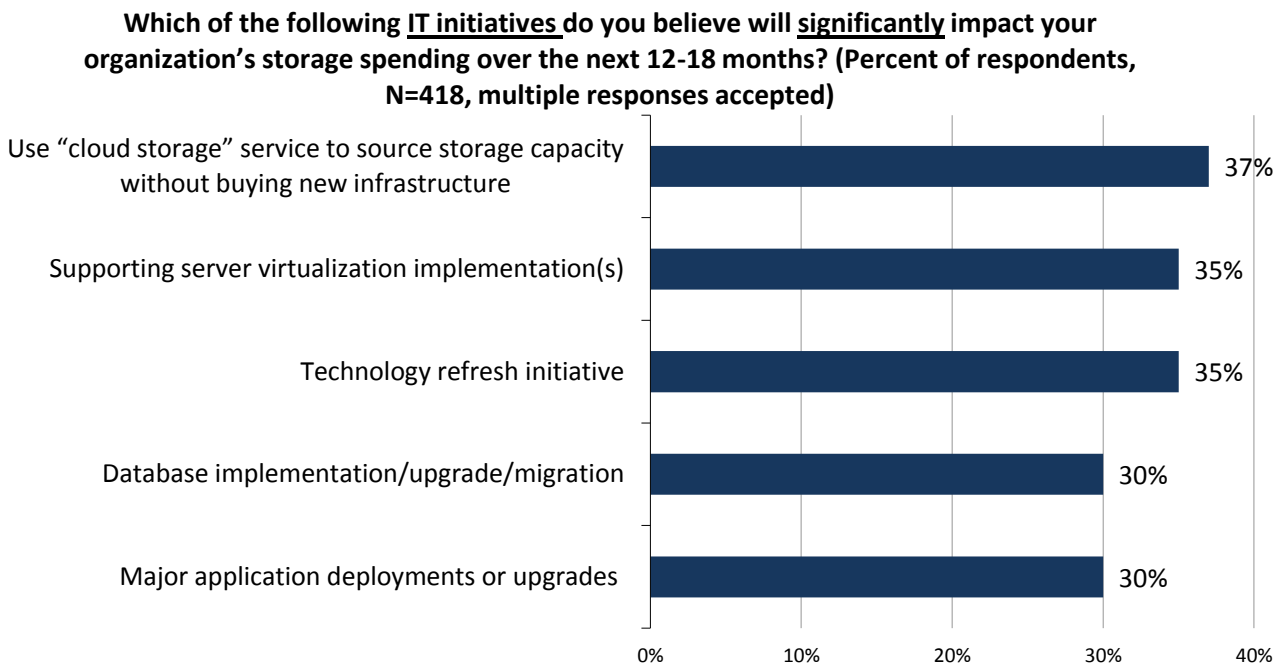
Server virtualization—consolidating multiple application workloads on individual server hardware and being able to move VMs between physical machines without impacting performance—has changed the IT world. VMs can be spun-up in minutes to address a particular need, and organizations can save significant amounts of money by not having to buy, manage, buy licenses for, and provision as many physical servers. Server consolidation goes hand-in-glove with server virtualization, and enables organizations to be more flexible, mobile, responsive, and frugal. Utilization rates invariably improve, equipment purchases go down, maintenance and software licensing costs drop, and energy consumption declines. Server virtualization has made offsite replication affordable for many organizations for the first time because they no longer need to build identical, duplicate infrastructure silos. Equally important, organizations can keep applications available longer and scale quickly and easily. Succinctly stated, server virtualization has provided the mother of all ROIs!

Strength in Numbers

The impact of this disruptive, transformational technology can be dramatic and valuable: Server hardware needs can be reduced by 50%, 60%, even 80%, enabling both capital and operational cost savings. Not surprisingly, server virtualization—which only a few years ago seemed thrilling, unusual, and even somewhat geeky—has become a staple of the data center, where it is now in turn supporting modern industry trends like mobility and converged infrastructures. As this advanced market has grown and matured, the server virtualization pie, once owned almost exclusively by VMware, is being slowly but surely divvied up among a host of challengers, including Microsoft, with its surging Hyper-V hypervisor, and Citrix, with its Xen-based technology.

At this stage, some of the virtualization hype has died down as people increasingly view virtualization as valuable, but not quite so sexy, technology. Do not be deceived, however, as ESG research among North American data storage professionals indicates, that among IT initiatives expected to significantly impact storage spending over the next 12-18 months, supporting server virtualization implementations (35%) ranked as the second most-cited by respondents, with using cloud storage services to source storage capacity without buying new infrastructure (37%) the most popular response provided (see Figure 1).¹

Figure 1. Initiatives Expected to Significantly Impact Storage Spending over the Next 12-18 Months



Source: Enterprise Strategy Group, 2013.

¹ Source: ESG Research Report, [2012 Storage Market Survey](#), November 2012.

Whether or not this is due to a perfect storm—this technological innovation matured at the same time as budgets declined or remained flat—it has surely and sharply increased the focus on creating more efficient IT infrastructures.

Virtual Server Challenges

Utilizing Underutilized Capacity

If a technology was ever begging for an ROI story with a happy ending, it is storage. Consider, for example, the simple, wanton wastefulness of poorly utilized storage resources. Storage arrays often operate below their optimum utilization value—60-70% capacity is viewed as reasonable—but it is not uncommon to find utilizations as low as 20%. As a result, unused capacity is locked in one subsystem, while another array runs out of capacity. It's akin to pouring money down a drain; we just don't see it that way because it is "the way things have always been."

For the most part, organizations have been addressing the challenges of various business needs simply by adding storage capacity. If you need copies for analytics, you get a server (physical or virtual) and some storage. Adding infrastructure stacks for testing and development, remote replication, backup, etc., seemed like a good idea at the time, but has resulted in parallel silos of infrastructure that keep growing, yet are mostly poorly utilized. As a result, storage has remained expensive, complex, proprietary, and incompatible, with all kinds of advanced features—snapshots, replication, tiering—that are array-specific. If you want Vendor A's replication technology, then you must have its machine because the functionality works only in its box. This is a great ROI story—for vendors.

Decreasing Downtime

The lower levels of availability that inefficient storage often causes represent another expensive, and frankly irresponsible, obstacle to users. When a problem occurs within an inefficient storage infrastructure, it can take longer to resolve. With downtime costs exceeding \$5 million per hour in some industries, such as those that run trading environments, and constant pressure to control storage expenses occurring across all industries, the rewards for being more efficient are immense, and growing daily.

Feeding the Big Data Beast

The other reality that makes increasing efficiency so important is the continual, unyielding, exponential growth of data volumes. This comes both from natural application growth and from new workloads generated by social media, web 2.0 applications, and the constant creation of video, audio, photo, and similar content types. With a smartphone in every pocket and tablet computers (business as much as personal) in many laps, the ability to create and consume content is ever present. You would have to be living in a cave not to realize the implications of all this data being collected every minute by websites and barcode readers—data that organizations slice and dice in different permutations to identify what their customers need (or more accurately what their customers might buy!) at any given time.

Storage: An Anchor around the Neck of Server Virtualization

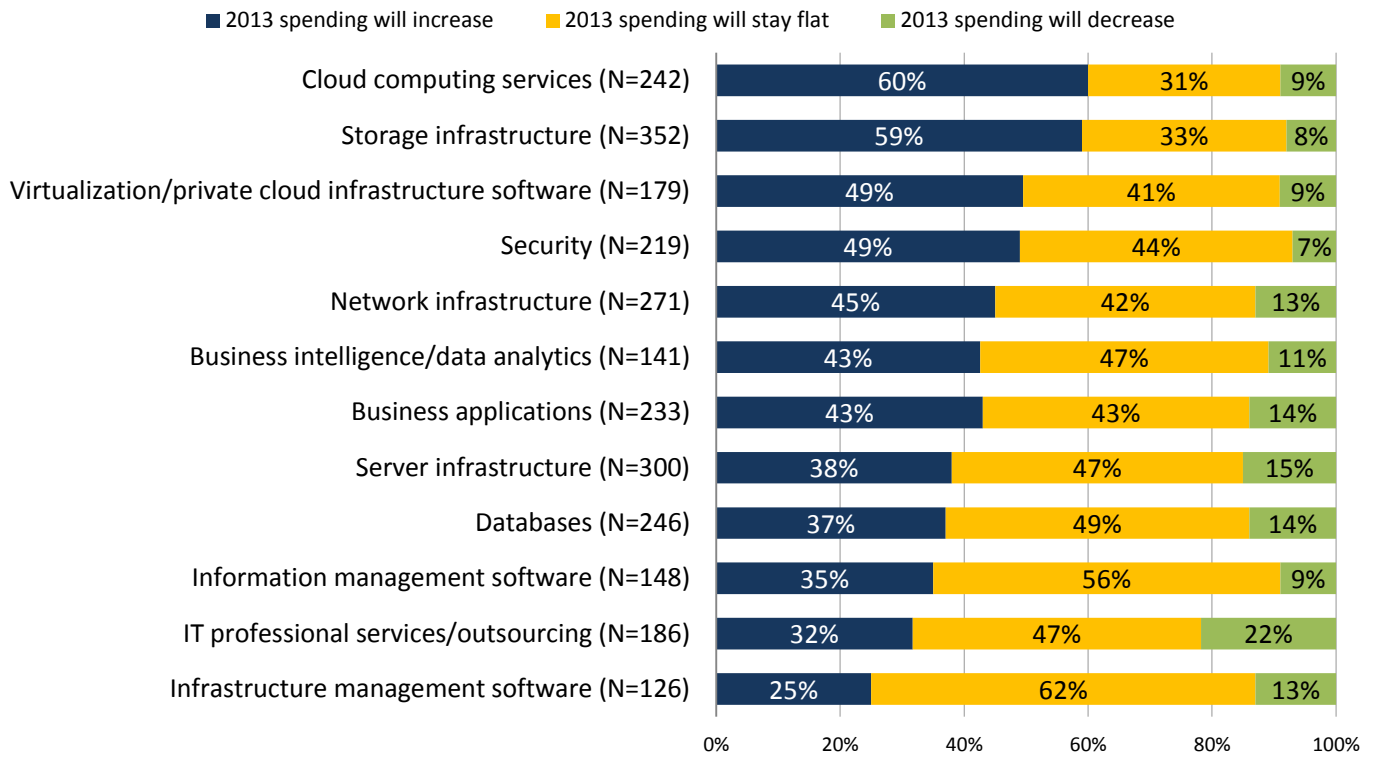
Despite its many gains, however, server virtualization is still not perfect. For example, while it may enable users to move a running application between servers, the related storage does not automatically go with it. Virtualizing the compute side, but not the storage side prevents the complete agility and true utility-like resource provisioning that users are looking for. Unfortunately for IT, users are becoming accustomed to accessing an application server almost instantly, which results in ever-higher service level expectations. If the storage cannot match what the servers can do, those service levels cannot be met. In short, if companies are experiencing roadblocks to virtualization expansion, physical storage implementations are often the culprit.

Nonetheless, ESG research results make it abundantly clear that users are enamored of server virtualization, and see it playing a mission-critical role in the future of their companies. In other words, it is essentially becoming the

“norm” and so the surrounding issues (such as with storage) simply have to be addressed. Specifically, in the ESG research shown in Figure 2, 49% of respondents expect their spending on this technology to rise in 2013 over 2012.²

Figure 2. 2012 to 2013 Spending Change in Specific Technology Areas

To the best of your knowledge, to what extent will your organization’s 2013 IT spending for each technology listed below change relative to 2012? (Percent of respondents)



Source: Enterprise Strategy Group, 2013.

Enter Storage Virtualization

Creating an Efficient Storage Infrastructure is Key

The combination of storage virtualization with compute virtualization is necessary to optimize IT environments. While each can exist without the other, the results will not be as good; in other words, having full virtualization is one of the best routes to an IT organization achieving a “plateau” of efficiency and effectiveness. The storage necessary to achieve this “plateau” level of a fully virtualized data center must be flexible, sharable, scalable, self-managing, self-healing, and able to handle today’s higher I/O and throughput density demands. Storage arrays should be centrally managed, use less hardware, and be able to provision services quickly and efficiently. Storage virtualization can help turn the tide by creating these more efficient storage infrastructures that then enhance server and client virtualization and help users increase the ROI of their VM environments.

Advantages of a Virtualized Storage Pool

With more storage required to meet escalating demands for capacity and various service levels, storage virtualization can ease the pain and the cost. Consider the following sample of benefits:

- Reclaiming stranded storage capacity.** Unused capacity now becomes part of the virtual storage pool and is available to any servers, users, or applications accessing the pool. In addition, when storage is no longer needed, it becomes part of the pool again to be used elsewhere.

² Source: ESG Research Report, [2013 Spending Intentions Survey](#), January 2013.

- **Consolidating storage management.** Storage virtualization centralizes management of all storage resources, eliminating multiple tools and processes for different arrays. Pulling storage management together under one umbrella makes the environment more reliable, providing less opportunity for administrative errors.
- **Advanced software features.** With storage virtualization, high-end features (which are also very often economically efficient, too) such as thin provisioning, snapshots, and remote replication that come with the storage system can be shared with arrays that don't have those features. This approach can extend the useful life of storage devices as well as maximize their ROI. In many cases, it can also prevent or at least delay additional storage purchases.
- **Green operations.** By improving utilization and reducing the number of physical machines, storage virtualization reduces data center floor space, power, and cooling requirements.
- **Non-disruptive migration.** Data movement is one of the most common and disruptive storage tasks. It is done for many reasons, perhaps the most common of which is to address performance problems. Storage virtualization enables data to be moved non-disruptively, turning an irksome but necessary task into something to be welcomed.
- **Decreased total cost of ownership.** Storage virtualization replaces a fragmented environment—in which silos of SAN, NAS, virtual tape, etc., all operate with separate storage networks and management tools—with a centralized, flexible storage pool. Equipment, management, energy, maintenance, and licensing costs are reduced, while storage is used more efficiently.

Storage Can Help—or Hinder—ROI Improvements in VM Environments

Users have a wide variety of tools and techniques at their disposal when it comes to improving the ROI of their virtualized server environments. Storage is intertwined with each of these, and of course, its interoperability with virtualization environments is critical.

- **VM density and storage performance:** Simply stated, the more VMs you can hang off a physical machine—in other words, the greater your VM density—the fewer hosts you need to buy and the better your ROI can be. Vendors are constantly upping the ante in this category. Of course, beyond sheer compute power, one of the most crucial gating factors to supporting more VMs on each physical machine is having sufficient storage performance to support the higher I/O—both in terms of speed and bandwidth. Raw storage “horsepower” counts to a degree in this regard (and this is one of the reasons for the increasing use of a judicious amount of solid-state storage), but it is the management sophistication that delivers much of the difference and that can turn storage from being an ROI hindrance to an ROI enabler. A combination of reliable, high-performance storage (probably enhanced with some flash, as it is with [Fujitsu](#)) and virtualization integration is a pragmatic route to optimizing a user's resource utilization...which, of course, is another way to say, “improving the ROI.” Users can also implement many policies and procedures—including SLAs—to increase storage performance. Charge-back and provisioning models are two examples. On a higher level, Microsoft's Virtual Machine Manager (within System Center) and VMware (with vCenter Server) monitor performance and physical host resources, the number of VMs, and their behavior. A storage performance challenge is dealing with the “I/O blender” effect that virtualization creates, in which VMs drive up both performance needs (due to random I/O) and also capacity. Due to the ease with which new VM systems can be brought up, latent demand is freed up, increasing capacity and performance needs. Of course, this simply reaffirms the need for a high-performance, scalable storage system in order to continue to deliver strong ROI in the face of increasing demands.
- **Management – Flexible capacity, and VM integration:** The simple, integrated management of storage resources and capacity is an important factor for improving ROI. Capacity planning is about sizing equipment and facilities to handle fluctuating demands. Flexible capacity planning reduces service delivery, recovery, and infrastructure build-out times, allowing servers and applications to be added quickly. Integration with VM management is about saving money and enhancing ease of use by having a single point of administration and management through the integration of storage and virtualization applications. The key points are not only that storage policy and provisioning can be set by the needs of the VM

characteristics/policy, but also that the same IT systems administrator can monitor and control both parts of the IT equation. Again, this is just another way of expressing that ROI can be improved where this integration is provided, and ROI can be constrained or reduced where it is not. To give a practical example, you can set a policy from a VM based on the need for “platinum” or “silver” (etc.) storage performance because it supports a heavy transaction or non-mission-critical system respectively. Systems and their admins get to communicate in the language of VMs without translating to LUNs or other technologies. It’s simply, “Give me 40GB of platinum storage—automatically—for this VM.”

- **VM integration with storage replication for data protection and disaster tolerance:** This is an extension of the “VM integration with storage management” concept, but it deserves special attention because of the criticality of protecting data. Furthermore, as density and/or maturity increase, VM SLAs invariably become more demanding (more “work” and data on each system means greater exposure if anything goes wrong) and, therefore, create a greater need that elevates the issues of, and needs for, data protection. Integration of the management (and in this case, data protection) across VMs and storage is not only seamless, and most likely to produce effective results, but is also pragmatic from an ROI perspective inasmuch as central management and control saves time and money. Much as VM providers promote consolidation and cost containment as key drivers/advantages for their solutions, they also talk about the advantages of VM environments for disaster recovery (DR) and business continuance (BC). Vendors have provided some of this via their own sets of “auto-magic” DR/BC levels. For instance, a particular 40GB system might need “platinum” recovery or three local replications hourly, while other VMs will be far less demanding. It’s about ease and operation of management, but it only works with a flexible—virtualized—storage underpinning.
- **Increasing VM ROI with Microsoft Hyper-V:** During the past few years, Hyper-V has evolved from its low-priced newcomer status into a serious competitor: the more expensive VMware vSphere. As more users develop heterogeneous, multi-hypervisor sites, Hyper-V—which is compatible with Fujitsu’s ETERNUS DX Disk Storage System—is wedging its way into more data centers. In this rapidly maturing environment, users want a storage system that works with leading virtualization hypervisors as well as physical servers. Why else is the Hyper-V interoperability important? In addition to the pure competitive element that Microsoft is chasing with the product, Hyper-V is becoming a strong contender in terms of the richness and completeness of its feature set, and is a manifestation of Microsoft’s broader enterprise aspirations. While the number of new VMware installations is not declining, the adoption (and, importantly, planned adoption) of Hyper-V shows a strong tendency for users to adopt dual hypervisor strategies. For Fujitsu ETERNUS DX, this is important because it can operate in either environment, but is most likely to deliver its highest ROI improvements—up to a doubling—as users move to the “virgin” or new virtualization implementations, which are more prevalent with Hyper-V.

Fujitsu: A Credible Competitor

ETERNUS DX – Sophisticated Storage for a Virtualized World

Fujitsu has been a strong and high-quality storage “player” for decades. Perennially successful in Japan, it has used various routes to market in the rest of the world, and has benefitted from some productive OEM relationships. Over the last few years, the company has focused more on storage as a part of a larger, bundled, systems integration project. There has always been a smaller direct storage sales effort, and Fujitsu is now embarking on a significant effort to grow its share. This is partly because of market opportunity and partly because it has a suitable product portfolio...even users who have not personally experienced Fujitsu’s product quality are unlikely to need much persuading of Fujitsu’s product capabilities.

In the virtualized storage world, the broad attributes of Fujitsu’s ETERNUS DX disk system product are allowing it to increase its competitive profile and create a bigger seat for itself at the storage systems table. In so doing, the Fujitsu product meets all the ROI benefits noted above, and the vendor is boldly proclaiming its inherent ability to provide double the VM ROI to users who have not yet moved from legacy storage in their VMware environments.

This, of course, appeals to cost- and ROI-conscious users who want the best of all worlds when it comes to their enterprise storage. That quest for best of breed extends to hypervisors, and Fujitsu has covered its bases there with both VMware and Hyper-V compatibility, which opens up doors to the growing number of data centers that have become multi-hypervisor environments.

Based on a unique and consistent system design, ETERNUS DX is a seamless family of disk storage systems ranging from entry-level systems up to enterprise class. The major design principles of ETERNUS DX are compatibility and modularity. All models utilize the same types of disks, disk shelves, racks, cables, and other components. Only the controller module is model-specific. The idea is to minimize operational, training, and migration efforts and costs. Furthermore, this family concept allows upgrading from a smaller model to a bigger one simply by changing the controller module. All other components can be reutilized.

The ETERNUS DX product family has a flexible design that allows customers to choose the appropriate configuration according to their needs. Furthermore, the configuration can be easily changed if requirements change in the future. Various types of disk drives, host interfaces, and form factors are supported in order to ensure the balancing of capacity, speed, and costs according to users' requirements. The flexible system controller upgrade to a higher model, accompanied with the capability to plug disks from one system into another—even while carrying data—ensures smooth migrations and an impressively high degree of investment protection.

Because requirements for storage differ according to the type of data and the frequency of its usage, various types of disk drives need to be supported in order to allocate the right disks for each type of data. Some data is mission-critical; it has to be accessed immediately to avoid revenue loss, productivity degradation, or to drive customer satisfaction and competitive differentiation. This data must invariably be stored on disks with very high performance, such as solid-state drives. On the other hand, some types of data do not require very high performance or access, but still need to be stored, often for long periods; such data is best stored on more cost-efficient, high-capacity disks such as “nearline” SAS disk drives, enabling the user to optimally balance speed, capacity, and costs.

The ETERNUS DX disk storage systems support solid-state drives for the highest access speeds, in addition to high-performance online disk drives and high-capacity, low-cost nearline disk drives. Both 2.5” and 3.5” types are provided and can be selected as required. SAS /nearline /SSD disks can be mixed in the same 2.5” or 3.5” drive enclosures. This means that additional drive enclosures do not need to be purchased for each drive type, thus leading to more flexible drive expansion and extended cost savings.

Improving Your VM ROI with Fujitsu ETERNUS DX

Fujitsu's ETERNUS DX has all the key elements of a sophisticated storage system, which makes it a good match for virtualized environments:

- Ability to improve capacity utilization
- Multi-vendor compatibility with VMware, Microsoft, and others
- High availability for real-time processes
- High reliability through redundancy and RAID protection
- Flexibility—including the reutilization of most components when upgrading
- Cost reductions—including minimizing operation, training, and migration efforts. These OPEX reductions are overtaking CAPEX as a market driver for virtualized environments
- Future-proof, scalable architecture

Moreover, Fujitsu claims it can help users to double the ROI of their virtual data centers based on the key areas of performance, management, data protection, and choices for virtualization (that include Hyper-V). Each of these areas becomes more critical, more complex, and more in demand as VM density increases. Fujitsu's ETERNUS DX optimizes each of these following key value areas, allowing users to increase their VM density:

- Performance—helps to eliminate storage bottlenecks, which are typically created as large numbers of applications force VM operations to frequently access (especially, write to) disks.

- Management / Integration—allows users to manage storage and VMs from a single view.
- Data Protection / Availability—can drastically reduce system failures. In a highly consolidated VM environment, the impact of even a single failure can affect many more applications and users.

Of course, enabling users to increase their VM density by optimizing performance, management, and data protection is a good thing. This, in turn, allows users to achieve higher levels of consolidation and cost savings, increases business productivity and flexibility, and ultimately provides more business value and agility.

Simply stated, if a user switches from plain vanilla, “non-sophisticated” storage to ETERNUS DX, then she can make dramatic improvements to her overall VMware or Hyper-V environments, whether measured in terms of performance, flexibility, or cost. While Fujitsu does not claim to be unique in this assertion, it is staking—and publicizing—this straightforward and eye-catching (but also credible) claim for its sophisticated ETERNUS DX. It is refreshing to see Fujitsu take this more assertive marketing stance because it has long had exceptional engineering credibility and extremely capable products.

The Bigger Truth

No one can deny the incredible and valuable impact of server virtualization on the IT industry; during the past five or more years, it has created a massive, indiscriminate ROI along with efficiency that has probably changed the IT industry more profoundly than any new technology since the PC in the early 1980s. As a result of its ubiquitous, pervasive impact, it is now entrenched as a staple in data centers, where it has become even more powerful and influential by forming the foundation for the proliferation of private, public, and hybrid clouds. Once the sole domain of VMware, other players such as Microsoft and Citrix are innovating their entrees to this lucrative market.

Even though the server virtualization juggernaut has been so highly beneficial to corporate computing, it has not been without its challenges, a large number of which can be attributed to storage:

- Applications moved between servers are not always accompanied by their related storage
- Big data overwhelms the largest storage repositories
- Storage CAPEX is getting prohibitive
- Disaster recovery plans are fragmented
- Limited I/O bandwidth leads to IOPS congestion
- Scalability is limited

The flexibility and ease of configuration offered by the Fujitsu ETERNUS DX can help to address these issues and ease the pain points. IT can thereby enable those server-virtualized organizations that have not yet moved off of legacy storage infrastructures to realize significant—potentially even double—ROI for their VMs. This is built on a benefits base that includes heterogeneous compatibility with multiple data types, comprehensive data protection, high reliability, low power consumption, and the promise of significant advantages against more entrenched—but less innovative—competitors. Fujitsu is a capable player in the storage industry based on the strength of its engineering quality, ability to improve capacity utilization, and high-availability offering—and because it provides its customers with the ability to be agile and efficient, while focusing on business productivity rather than just the systems underneath. With its solid genetics and market suitability, ETERNUS DX looks set to turn a few heads.



Enterprise Strategy Group | **Getting to the bigger truth.**

20 Asylum Street | Milford, MA 01757 | Tel: 508.482.0188 Fax: 508.482.0218 | www.esg-global.com