WHITE PAPER

FUJITSU Storage Virtualization with DataCore

ETERNUS DX DISK STORAGE SYSTEMS AND DATACORE SANSYMPHONY STORAGE CONSOLIDATION AND AUTOMATION SOLUTION FOR HIGHEST AVAILABILITY OF DATA IN HETEROGENOUS NETWORKS IN REALTIME (TRUE CLOUD STORAGE ARCHITECTURE)

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PRIMERGY SERVER VIRTUALIZATION PLATFORM

PRIMERGY Industry Standard Servers, e.g. the PRIMERGY RX300 based on Intel® Xeon® processors, fit excellent as virtualization platform. Besides iSCSI and SAS interfaces, they connect to the most popular Fibre Channel networks with up to eight ports. This ensures short response times and allows double security of transfer paths. CPU power and memory size scale flexibly to support modern consolidation scenarios with many virtualized servers on only a few physical systems. In server virtualization scenarios, e.g. with VMware, Citrix or Microsoft Hyper-V, storage consolidation is a top requirement.

ETERNUS STORAGE CONSOLIDATION PLATFORM

ETERNUS DX60/DX80/DX90 entry-level disk storage systems are reliable and secure Data Safes. Easy to install, configure, operate and maintain, they integrate well with host operating systems, multi-vendor servers, network infrastructures and backup solutions.

The disk storage systems flexibly scale to 48 terabyte with 24 drives in ETERNUS DX60 or to 240 terabytes with 120 drives in ETERNUS DX80/DX90. Different models can either be attached to hosts via Fibre Channel, iSCSI or SAS connections. ETERNUS DX80 is optionally available for high-speed Fibre Channel transfer rates of up to 8 gigabit per second. On top of the range, all ETERNUS DX90 offer four or eight Fibre Channel host ports to connect more servers and to supports asynchronous and synchronous storage-based replication between two sites for business continuity.

Different drive sizes and types can be mixed and matched, secured by all relevant RAID levels and a check code, which ensures data integrity within the system (Data Block Guard). Disk drives are rebuilt at the earliest signs of failure to reduce recovery time and to better protect the data beyond RAID (Redundant Copy).

Administrators can dynamically move data (RAID Migration) to serve different performance and capacity requirements, spin drives down to save energy (Eco-mode) or encrypt data to prevent unauthorized access (Data Encryption). In the event of power outages, the content of the cache is secured to flash memory (Cache Protector). Backup copies are always at hand via the included eight snapshots and clones, which can be optionally upgraded to 512 with ETERNUS DX60 and to 1024 with ETERNUS DX80/DX90.

BENEFITS OF STORAGE MANAGEMENT

Fujitsu's storage management software ETERNUS SF reduces total cost of ownership by managing the operation of ETERNUS DX disk storage systems throughout the data's lifecycle. For today's complicated storage environments, ETERNUS SF helps to achieve business continuity and optimizes storage resources in complex IT environments.

ETERNUS SF Express is bundled with ETERNUS DX entry-level disk storage systems to simplify storage system management and maintenance. The software helps to monitor system health and performance of multiple ETERNUS DX60/DX80/DX90 disk storage systems with one centralized console. In addition to that, ETERNUS SF Express manages Advanced Copy functions of the storage system for snapshots and clones as well as the remote replication feature of ETERNUS DX90 with a simple management console.

HIGH AVAILABILITY OF DATA WITH ETERNUS DX

For high availability of data, storage can be consolidated on reliable, fast, scalable and easy-to-manage ETERNUS DX disk storage systems. Local snapshots and clones guarantee easy backups and fast restores with planned downtime for updates or unplanned downtime if anything goes wrong.

A higher level of availability can be achieved by storing data on two sites for business continuity. For redundant storage, data can either be replicated through server hosts or directly between storage systems. All ETERNUS DX60/DX80/DX90 entry-level disk storage systems support server-based replication with PRIMERGY DuplexDataManager® or third party software like DataCore SANsymphony in multi-vendor infrastructures and backup solutions.

Alternative storage-based replication can be used in homogenous storage environments with ETERNUS DX90 to unburden servers and to centralize replication management. In this case, the storage management software ETERNUS SF Express and Remote Copy Licenses enable asynchronous as well as synchronous read and write replication processes directly between the storage systems. This is the most economical solution to achieve redundant storage in Fibre Channel Storage Area Networks.

STORAGE VIRTUALIZATION WITH DATACORE

DataCore SANsymphony storage consolidation and automation adds an independent storage virtualization layer to optimize the availability of storage. It is the perfect solution for overall data center virtualization including stretched architectures and offers the ability to mirror data over distances with active/active access. This removes the remaining Single Point of Failure of regular storage architectures without mirroring functionality and makes it possible to move the data to every storage device in the network in realtime (true cloud storage architecture) for highest availability. For ETERNUS DX60, DX80 and DX90, DataCore SANsymphony adds synchronous data replication solutions with transparent failover functionality and failback logic between sites (i.e. without server downtime).

Even replication between storage systems from different vendors and migration to ETERNUS DX is easy to implement with this solution. With DataCore SANsymphony, you are able to generate cross system snapshots for example to create point-in-time copies from one ETERNUS DX system to another.

Adding the DataCore virtualization layer gives you the ability to scale multiple independent ETERNUS DX systems. The advantage is that the ETERNUS DX can act as one global storage pool that can be expanded virtually to any size far beyond the capacity of each single storage unit. In addition, DataCore SANsymphony improves the performance by serving many virtualized servers with data on storage systems in the SAN.

Overall, our pre-tested and qualified solution with ETERNUS DX storage, PRIMERGY servers and DataCore SANsymphony, maximizes the flexibility and interoperability of complete storage infrastructures customized to individual customer needs.

CUSTOMER VALUE PROPOSITION

Virtually everything depends on storage. Server and desktop consolidation, in particular, place extraordinary demands on it. Especially when it comes to advanced functions such as workload migration, load balancing, fail-over and disaster recovery, server virtualization is completely dependent on highly available (HA) shared storage. In most cases, high expenditures on IT-infrastructure need to be made to put such a storage infrastructure in place.

DataCore's storage virtualization software together with ETERNUS DX storage systems and PRIMERGY RX server systems delivers a radically simple, high availability solution to meet shared storage requirements for clustering and virtualization environments. The software abstracts your storage into idealized, virtual disks comparable to virtual machines. It pools and mirrors disk blocks across available devices, independent of the actual hardware model and supplier. In the process, it speeds up I/O response and throughput using extensive SAN-wide caching.

From a central console, you can continuously provision, share, clone, replicate and expand virtual disks among physical servers and VMs.

DataCore™ yields the highest availability, fastest performance and fullest utilization from your storage assets, making it an essential element of your Fujitsu Dynamic Infrastructure deployment.

QUESTIONS TO ASK

1. How many more users or workloads will be stopped when one of your newly consolidated servers has to be taken out of service?
2. How frequently are you forced to stop applications to maintain, upgrade, reconfigure or expand your storage configuration?
3. How difficult is it to schedule and coordinate these outages and migrations, especially as more users aggregated by virtualization depend on the same physical servers?
4. How do you increase the availability of your online storage resources to minimize these costly disruptions?
5. What portion of your disaster recovery plan are you unable to implement and why?
6. Do users complain that their disks seem to be running out of space or run slowly? What alternatives are you considering to address this issue?
7. In which case did your existing storage network (SAN) not supply sufficient capacity?

DATACORE OFFERING

Key Features

- **Highly Available (HA), Shared Virtual Disks**: Delivers fault-tolerant, shared, virtual disks across physically separate arrays by synchronously mirroring I/Os over the SAN. Automatically fails over when equipment is taken out-of-service (intentionally or otherwise), quickly resynchronizes mirrored pairs when the resources are restored and automatically fails back to the original active-active HA I/O paths.
- **Thin Provisioning:** Minimizes capacity consumption and maximizes disk utilization by only allocating space to non-zero writes. Virtual capacity can oversubscribe physical pool, but warns if more disks need to be added.
- **Online Snapshots:** Offers rapid, low impact, instant point-in-time snapshots and full LUN cloning which is Thin-Provisioned.
- **Disaster Recovery (DR):** Maintains up-to-date disaster recovery images at a remote site through asynchronous remote replication over standard IP WANs.
- **High-speed Caching:** Speeds up storage performance by factors of 2X or more through high-speed, SAN-wide, external caching that taps the power of x86 servers.

Key Differentiators

- Most effective way to get the highest availability, fullest utilization and fastest performance from existing storage assets. Comprehensive set of integrated and scalable virtual LUN management, I/O processing and data protection functions supplied as packaged software. Spans all storage assets despite differences between manufacturers and models.
- Takes full advantage of existing storage devices and seamlessly accommodates the addition of new disk arrays into the virtual storage pool.
- Significantly accelerates application response (rather than degrading it) by extensively caching disk I/Os.
- Runs on physical servers and virtual machines to accommodate wide range of needs.
- Employs the same, centralized commands and administrative interface across all types of storage devices.
- Virtualizes storage resources for all the major server operating systems, hypervisors, server and OS virtualization solutions. Underlying network servers can be replaced at anytime with higher performing and more cost-effective ones while preserving software investment and best practices.
- License upgrades are calculated as the difference between the two list prices. Unlike hardware-embedded products, DataCore's software is fully portable to faster machines without becoming obsolete.

ARGUMENTS FOR OUR HIGH-AVAILABILITY SOLUTION

- Emphasize the severity and urgency associated with their exposure to single points of failure.
- Position DataCore as a must-have software component to get the fullest use, highest availability and fastest performance from their existing storage assets.
- Always propose HA configurations. Single node implementations may be easier to get in the door, but they do not avoid single points of failure.
- Do not position the DataCore solution as a head-on competitor to someone else's storage equipment. Rather, leverage storage equipment already in place to reduce costs. Note that you are able to easily integrate Fujitsu hardware into multi vendor infrastructures.

SYSTEM REQUIREMENTS

- DataCore software is installed on standard x86/x64 servers (physical or virtual) running Windows. The servers become "universal storage controllers" on the SAN.
- Two DataCore storage controllers are required for high-availability (HA) or disaster recovery (DR). Additional DataCore storage controllers may be configured for larger workloads, greater scalability and better resiliency in SANsymphony™ N+1 redundant configurations.
- Internal disks drives or external disk arrays are connected to the DataCore servers via IDE/ATA, SCSI, SATA, SAS, iSCSI, Firewire, Fiber Channel or other disk interface supported by the DataCore storage controllers.
- The DataCore storage controllers and their virtual disk pool are accessible over the storage area network (SAN) through iSCSI/Ethernet, Fiber Channel (FC) and Infiniband connections from each client computer.
- Supports Windows, Unix, Linux, NetWare and MacOS clients. Also supports any of the major hypervisors and server virtualization solutions.

FREQUENTLY ASKED QUESTIONS:

Won't the storage virtualization software further reduce performance?	On the contrary, DataCore software accelerates I/Os by using standard x86/x64 servers as powerful network based I/O caches dedicated to the virtual storage pool under its control. Many examples of the speed up are available at www.datacore.com. By the way, it gets even faster and more cost-effective when you decide to substitute newer and faster x86/x64 servers over time. Additionally, you can swap them out non-disruptively while another redundant server covers the workloads.
Other vendors are telling me to stay away from software solutions that are not tightly integrated with hardware at the factory.	Of course they would. They prefer to lock you into their hardware and firmware which only works within the confines of their specific product. Consider instead, how having DataCore software control and manage all your storage devices, giving you the freedom to add or replace equipment without being locked into any one model or brand. Any new skills and best practices that you develop while using DataCore software continue to be valuable as you add new Fujitsu ETERNUS DX disk arrays to your infrastructure or upgrade older ones.
But I'm looking to have one solution that handles block and file services.	Our recommendation is to treat your file servers as consumers of the virtual disk pool, rather than having conflicting block and file services on the same device.

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