Optimizing management efficiency with
Dell/EMC NS storage

By Annette Cormier, Eric Cannell, and Brad Bunce

The Dell/EMC NS family of unified storage enables organizations to easily and cost-effectively consolidate both unstructured file-system data and structured application data into a single shared storage system—helping organizations control costs, streamline management, and enhance storage availability and performance.

Explosive growth in content, especially unstructured file-system content, can place a heavy burden on storage administrators in many organizations. Often, they deploy multiple storage systems to handle file-system-level and block-level storage, including network attached storage (NAS) as well as Internet SCSI (iSCSI) and Fibre Channel storage area network (SAN) arrays.

However, deploying and managing multiple systems can be expensive and complicated. Provisioning these systems can be costly, and managing them can require significant time and expertise—increasing the risk of data loss, poor performance, and downtime. Additionally, organizations often overprovision storage to meet service-level agreements, which can further increase storage costs.

An emerging approach to the challenge of managing multiple, disparate storage platforms is unified storage. Using a unified storage approach, both structured and unstructured data can be stored on a single shared system, helping avoid the need to purchase, deploy, and manage multiple storage platforms. However, for a unified storage system to be effective, it must deliver the performance, availability, and flexibility that organizations have come to expect from purpose-built storage such as Fibre Channel SANs.

To help organizations enhance the efficiency and manageability of their enterprise storage environments, Dell recently introduced the Dell/EMC NS family of unified storage systems. Dell/EMC NS storage arrays support integrated Common Internet File System (CIFS), Network File System (NFS), iSCSI, and Fibre Channel connectivity, and are designed for high levels of performance, flexibility, and availability. These arrays are also available with a wide range of features designed to streamline management, protect data, and optimize efficiency, capacity, and cost across mixed Microsoft® Windows®, Linux®, and UNIX® environments.

Consolidating data and file systems and scaling storage capacity

The Dell/EMC NS family of unified storage systems enables organizations to consolidate file-system and application data into a single shared storage environment. In particular, Dell/EMC NS
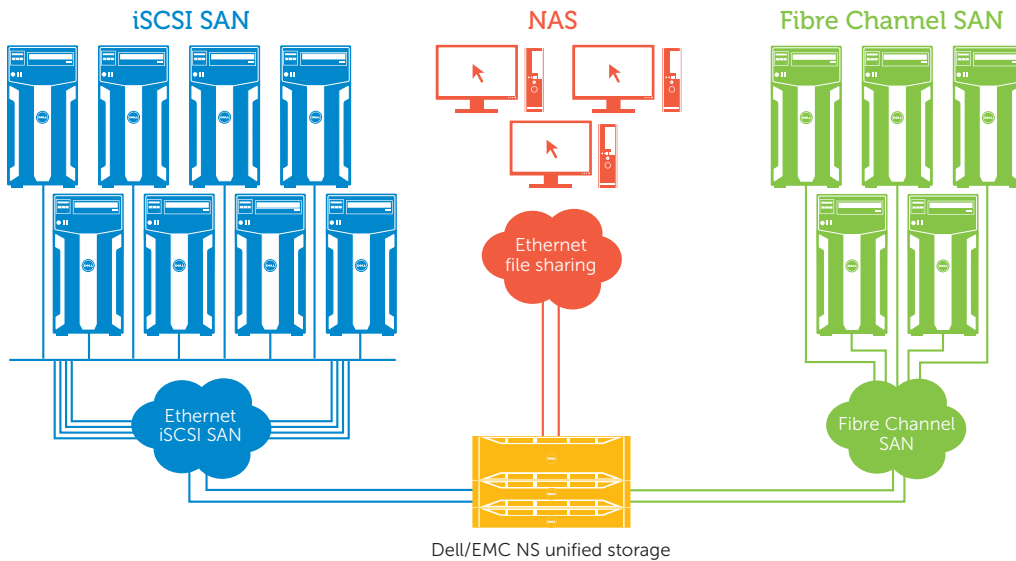
iSCSI SAN · NAS · Fibre Channel SAN

Ethernet file sharing

Ethernet iSCSI SAN

Fibre Channel SAN

Dell/EMC NS unified storage

Figure 1. Integrated protocol support in Dell/EMC NS storage

storage combines support for a range of industry-standard protocols—including CIFS in Microsoft Windows environments and NFS in Linux and UNIX environments, as well as iSCSI and Fibre Channel SAN connectivity protocols—that enable integration of both NAS file-based storage and SAN block-based storage (see Figure 1).

By supporting multiple file-system protocols, Dell/EMC NS storage can enable consolidation and file sharing across heterogeneous Windows, Linux, and UNIX environments. Dell/EMC NS storage also takes advantage of native file-system protocol features. For example, the CIFS protocol leverages storage-based file-locking capabilities required in enterprise database environments, and the NFS protocol delegates file and volume management to the NAS server to optimize host cycles for mission-critical operations. Dell/EMC NS storage can also be well suited for organizations that need to support Windows, Linux, or UNIX file-system storage as well as application storage for VMware® virtualization, Oracle® database, Microsoft SQL Server® database, Microsoft Exchange messaging, and other software.

In addition to supporting multiple connectivity protocols, Dell/EMC NS storage arrays also support a wide range of drive types to help provide targeted, cost-effective performance, including enterprise flash drives (EFDs), Fibre Channel drives, and Serial ATA (SATA) drives. EFDs offer extremely high-performance, low-latency storage that is well suited to highly performance-sensitive applications; Fibre Channel drives can offer reliable, high-performance storage; and energy-efficient, low-power SATA II drives can offer cost-effective, high-capacity storage for applications that are not performance intensive, such as archiving or historical data storage.

Dell/EMC NS storage arrays are also scalable, and can be easily expanded to support growth in capacity and throughput requirements (see Figure 2). The Dell/EMC NS-120 array supports a maximum of 120 drives, while the Dell/EMC NS-480 array supports a maximum of 480 drives. The Dell/EMC NS-960 array, expected to be available later this year, is designed to support up to 960 drives. These drive counts can be utilized for block storage, file storage, or both simultaneously based on specific requirements.

	X-Blades (data movers)	Control stations	Storage processors	Maximum number of drives	Maximum file storage capacity
Dell/EMC NS-120	1 or 2	1	2	120 across 8 enclosures	64 TB (32 TB per X-Blade)
Dell/EMC NS-480	2 or 4	1	2	480 across 32 enclosures	192 TB (64 TB per X-Blade)
Dell/EMC NS-960	2 to 8	1 or 2	2	960 across 64 enclosures	896 TB (128 TB per X-Blade)

Figure 2. Scalability specifications for Dell/EMC NS storage

Exploring information life cycle management efficiencies

Using multi-protocol, multi-tier Dell/EMC storage systems together with advanced features in Oracle Database 11*g* can help increase efficiency while maintaining high-performance operations and access. In this Webcast, Annette Cormier and Eric Cannell examine ways to align infrastructure costs with the value of information throughout its life cycle.

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Both block- and file-performance throughput can also be easily scaled. For block scaling, Dell/EMC NS storage arrays come with flexible, multi-protocol I/O ports that utilize the Dell/EMC UltraFlex™ architecture. With UltraFlex, I/O ports can support protocols such as iSCSI and Fibre Channel as well as expected technologies such as Fibre Channel over Ethernet (FCoE), and can be upgraded or expanded online for increased throughput without application disruption—for example, when moving from 4 Gbps to 8 Gbps Fibre Channel or from 1 Gbps to 10 Gbps iSCSI. File-system (NAS) access throughput can be increased as well, by adding additional X-Blades (data movers) to the storage array.

Optimizing for efficiency and extending cost-effective storage

In addition to providing scalable, high-performance unified storage for sharing file-system-level and block-level storage, Dell/EMC NS unified storage systems are designed to deliver additional efficiencies such as reduced capacity requirements, minimal power usage, and increased performance. Key features include the following:

- **Virtual provisioning:** To help ensure that end users do not run out of capacity, organizations often overprovision storage, which can

result in substantial underutilization of disk resources. Virtual provisioning, available on all Dell/EMC NS unified storage systems, enables storage capacity to be allocated simply and automatically on an as-needed basis as opposed to all at once, which can help dramatically increase disk utilization and lead to reduced power consumption costs.

- **Data deduplication and compression:** Duplicate and infrequently used files can consume extra capacity and network bandwidth during both storage operations and backup and recovery operations over a local area network (LAN) or wide area network (WAN). Data deduplication and compression features available with Dell/EMC NS storage can reduce data capacity requirements by up to 50 percent, helping to further reduce costs and optimize performance (see Figure 3).

- **Efficient drives:** Low-power SATA II drives and power-efficient EFDs help minimize energy costs in both high-capacity and high-performance situations. Low-power SATA II drives require up to 32 percent less energy than traditional 1 TB, 7,200 rpm SATA drives for efficient, high-capacity storage; EFDs require up to 98 percent less energy per I/O per second (IOPS) than Fibre Channel drives for efficient, extremely high-performance storage.

- **Tiered storage:** By enabling organizations to mix drive types within a single scalable storage system, Dell/EMC NS storage arrays help simplify the deployment and management of tiered storage and archiving infrastructures.
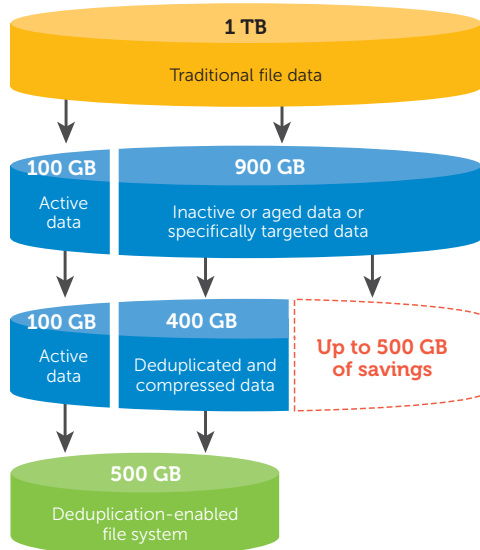
Deploying built-in capabilities and delivering high availability

The Dell/EMC NS family of unified storage systems incorporates an extensive range of built-in features designed to streamline management, protect data, and ensure availability. For example, the Celerra® Manager software included with all Dell/EMC NS storage systems is a Web browser–based tool that enables administrators to easily deploy, configure, and manage file-system and application-based storage.

The Celerra Provisioning Wizard, an integral part of Celerra Manager, enables storage to be

Figure 3. Reduced capacity requirements using data deduplication and compression features available in Dell/EMC NS storage
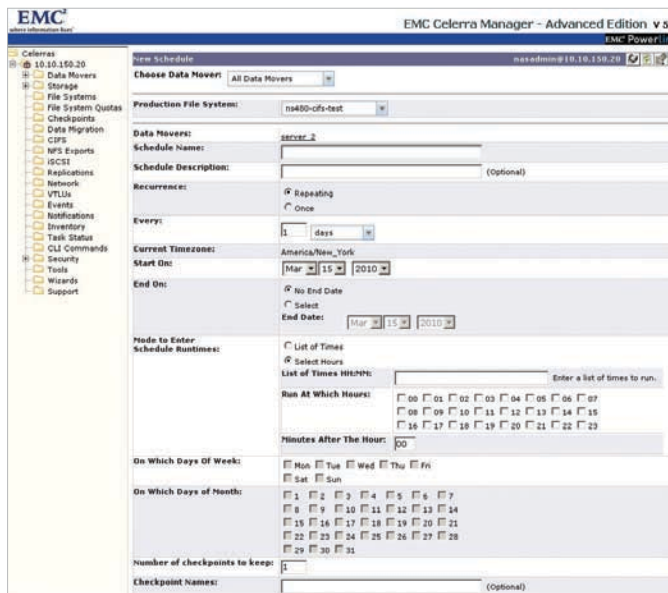
Figure 4. Automated replication and recovery available with Celerra Manager

deployed in just a few clicks. The Automated Volume Management feature in Celerra Manager enables easy provisioning and optimization of file systems based on workload; storage can be automatically provisioned and tiered across disk types based on workload type and policies.

The Celerra File-Level Retention (FLR) feature, available in FLR-Enterprise (FLR-E) and FLR-Compliance (FLR-C) versions, supports simple management of compliance and regulatory policies. For example, FLR is designed to protect files from deletion or modification until a specified retention date, enabling organizations to create a permanent, unalterable set of files and directories and help ensure data integrity. FLR also enables write-once, read-many (WORM) functionality on file systems for information governance, and meets the requirement of U.S. Securities and Exchange Commission (SEC) Rule 17a-4(f) regarding electronic storage of broker-deal records.[1] This requirement means that an FLR-C file system that has files in the locked state cannot be deleted.

Celerra Manager also offers robust integration with third-party backup, antivirus, and quota management tools. For example, the Celerra Event Publishing Agent (CEPA) provides integration with leading quota management software (such as Northern Parklife's Northern Storage Suite) that enables event notification following Celerra file and directory actions.

Comprehensive integration with VMware virtualization

Dell/EMC NS unified storage systems support comprehensive integration with the VMware vCenter™ platform for simplified management and protection of VMware virtualized environments. Using the VMware platform enables IT administrators to choose among the NFS, iSCSI, Fibre Channel, and FCoE storage protocols, and Dell/EMC NS unified storage enables them to support all of these within a single storage infrastructure. IT departments would typically begin a virtualization project with the protocol that most comfortably matches their skill sets—for example, companies that have Fibre Channel SAN infrastructures might carry out their initial deployments on Fibre Channel, while those that do not have Fibre Channel experience might opt for IP networking through either NFS or iSCSI. The Dell/EMC NS unified storage infrastructure would enable these organizations to deploy whichever of these protocols they prefer. Using VMware Storage vMotion™ technology or array

Enabling next-generation tiered storage

Bob Laliberte, senior analyst at the Enterprise Strategy Group, discusses how the EMC® Fully Automated Storage Tiering (FAST) technology available in some Dell/EMC arrays enables highly automated, dynamic, cost-efficient use of storage resources.

bitpipe.com/detail/ RES/1272658016_706.html

[1] For more information on SEC Rule 17a-4(f), visit sec.gov/rules/interp/34-47806.htm.

5 clicks Dell/EMC NS storage arrays help organizations to cost-effectively meet demanding service-level agreements and simplify management with easy-to-use unified storage that supports CIFS, NFS, iSCSI, and Fibre Channel protocols. The Dell/EMC NS family is not only easy to configure and use, but also enables organizations to provision file shares in less than five mouse clicks.

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functionality enables administrators to move virtual machine deployments between protocols. Celerra Manager enables end-to-end virtual-to-physical mapping of virtual machines to storage resources in a Web browser–based tool that helps streamline management of virtualized environments.

The VMware Site Recovery Manager Automated Failback feature enables end-to-end disaster recovery of VMware virtualized environments through a VMware vCenter plug-in, and the VMware View Storage Integration feature enables rapid provisioning of virtual desktops through an additional vCenter plug-in. VMware-aware data deduplication and compression features are also available with Dell/EMC NS storage arrays and provide comprehensive integration with VMware View, enabling data deduplication and compression of VMware virtualized storage.

Advanced data protection and high availability

To help maximize file-system and application uptime, Dell/EMC NS unified storage systems are designed for enterprise-level availability, and include advanced reliability capabilities such as RAID technology for drive-level data protection, redundant storage processors for continued operation in the event of a failure, and active/passive failover. Dell/EMC NS storage arrays also support the Data Access in Real Time (DART) OS, which offers dynamic failover to a hot standby X-Blade (data mover) to help ensure that data remains highly available and protected.

Dell/EMC NS unified storage systems also come with robust data protection software, including automated snapshot, replication, and recovery capabilities. Celerra SnapSure™ software can create application-consistent point-in-time

snapshots, including writable snapshots for test and development (see Figure 4). Celerra SnapSure also supports built-in automated recovery and utilizes pointer-based copy technology to help minimize disk space and enhance performance.

Celerra Replicator™ software supports automated, multisite replication. Replicator creates point-in-time read-only and read/write copies of production file systems or logical units (LUNs) on local or remote storage systems, and uses standard IP-based networks for maintaining consistent replicas between sites. Replicator is designed for simple administration using easy-to-define business policies, and includes features such as application-level recovery point objectives and customizable bandwidth usage schedules. Bandwidth throttling is also supported for situations when it is important to share network bandwidth with other applications. Acting as a synchronizing or orchestration tool, Replication Manager resides at the host and leverages integration with Microsoft and Oracle software to provide application-consistent replicas of Microsoft Exchange, Microsoft SQL Server, and Oracle Database data to help ensure that snapshots and replicas remain consistent for recovery operations.

Benefiting from consolidation on unified storage

Consolidating block- and file-level storage into a unified storage system has many potential benefits. The Dell/EMC NS family of unified storage combines scalable, flexible, high-performing storage with advanced efficiency, data protection, and management features that can help reduce total cost of ownership, enhance availability, and streamline the manageability of enterprise storage deployments. PS