



Solution Brief

Go beyond traditional file servers

Grow capacity without diminishing returns on performance.

DSFS offers an optimal combination of performance and scalability for environments with file-intensive user shares, highly available NAS and unified storage in SMB and public sector deployments, and virtual server environments with extensive NFS data and enterprise-level storage consolidation projects.

Traditional approaches to handling file data growth have proven costly, hard to manage, and difficult to scale effectively. Dell Scalable File System (DSFS) is designed with a flexible architecture that enables organizations to scale linearly, without diminishing returns on performance. The DSFS architecture is enterprise-class and standards-based. DSFS supports multiple protocols including CIFS and NFS, and incorporates innovative features for high availability, performance, efficient data management, and data protection.

High utilization of storage hardware

DSFS separates users' data and access from the underlying hardware configuration so that servers, CPUs, cache memory, and disk drives are optimally utilized. As data gets written, it is distributed across internal file servers, and eventually to all disks connected to the storage cluster.

Seamless file sharing among heterogeneous clients

DSFS provides fully interoperable multi-protocol file sharing for UNIX, Linux, and Windows® clients using standard CIFS and NFS file access protocols and authentication methods (Active Directory, LDAP, NIS).

On-demand virtual storage provisioning

DSFS enables administrators to provision storage as needed, so that capacity can be allocated independently of physical storage configuration.

Speedy restoration of large volumes of data

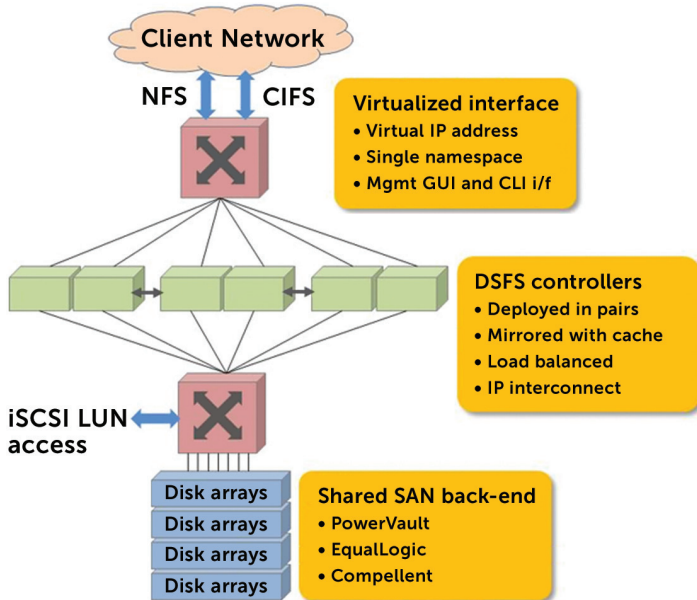
DSFS helps administrators recover large data sets (terabyte scale) easily, eliminating long file copies and the need for free space for the recovery process. It enables end-users to restore previous versions of files directly, without contacting IT.

Simple and easy management

Managing terabytes of NAS storage is made simpler with DSFS administrative functions. From installation and initial configuration to ongoing monitoring and storage operations, all functionality is provided via easy-to-use screens and wizards.

DSFS solution architecture

DSFS's active-active controllers are deployed in pairs and provide high-availability and redundancy. DSFS systems typically consist of DSFS nodes and the underlying storage arrays. DSFS nodes are based on x86 hardware and store file data on conventional storage arrays (from a single storage array to SAN configurations with multiple controllers). This enables organizations to balance cost/performance and optimize compatibility with existing infrastructure. In a DSFS cluster, any single controller can fail without affecting data availability or causing data loss, even if write operations are in-flight.



Non-disruptive capacity scaling

In a scale-on-demand model, you don't need to provision excess capacity in anticipation of future growth. This makes scale-out solutions ideal for organizations that expect rapid growth over time or phased consolidation of applications. DSFS-based products support non-disruptive capacity expansion. Additional arrays can be added to a cluster, and those LUNs will be seamlessly mapped into the file system's virtual volume without downtime.

Performance optimization and scaling

All nodes in a DSFS clustered system support active I/O, providing high intrinsic performance without exotic protocols or the need to distribute application load across multiple filers. Load balancing sends client requests automatically to the node with the least-current workload. Network traffic is load balanced across the cluster. Storage platforms using DSFS are also load- and capacity-balanced in the back end arrays. For example, write traffic is load balanced across LUNs, and capacity is monitored to insure balancing across them.

High availability

DSFS cross-cluster reliability is achieved through a variety of mechanisms including a high speed cluster interconnect, write cache mirroring, failsafe journaling, and data integrity checks to insure data store consistency.

Optimization for large and small file sizes

DSFS has no limit on file share size and is optimized for both large and small file sizes to ensure performance, reliability, and optimal capacity efficiency for specialized workloads.

File system operation in failover mode

Any write to one node cache in a DSFS cluster is mirrored to the peer node before the operation is acknowledged. In the case of node failure, all affected cache is dumped to local on-disk servers and the failed node is detached from the cluster. The cluster is put into Journal Mode, which triggers the mirror to be written to a journal file. DSFS client load balancing makes migration to failover nodes transparent.

Snapshots

DSFS incorporates redirect-on-write snapshots instead of the copy-on-write solutions typical of other file systems. This approach requires only one I/O operation and delivers higher write performance.

Asynchronous Replication

DSFS allows fast and reliable snapshot-based replication of any number of file systems to a peer (local or remote) site. NAS configurations are replicated, enabling continuous access to data in the case of a disaster or site failure to assure business continuity.

Quotas

DSFS allows quotas to be set at the User and Group levels, and enabled or disabled without disruption.

Product integration

DSFS is being implemented in a number of Dell storage solutions that serve the needs of small, midsize and large organizations. The first two products that incorporate this technology are:

- The Dell™ PowerVault™ NX5300 works with PowerVault MD32x0i and MD36x0i series arrays to provide an easy-to-manage unified storage solution for entry level deployments.
- The Dell™ EqualLogic™ FS7500 system works with EqualLogic PS Series arrays to offer a high performance scale-out unified storage solution. It is currently the only scale-out unified storage solution optimized for SMBs.

Learn more at Dell.com/FS7500 and Dell.com/NX3500

