Dell Fluid File System Solutions

A foundation for a unified storage strategy

Beyond File Servers and Traditional NAS

Unstructured file data constitutes a massive portion of IT storage environments—and it continues to grow out of control, overwhelming many organizations. Whether it's content such as emails, office documents, photos, video and audio files or medical images, the capacity needed for file data continues to increase much faster than for block storage. But just adding disks or relying on legacy technologies to support that mountain of file data won't help.

Traditional approaches to handling file growth have proven costly, hard to manage and difficult to scale. File servers offer the easiest way to add file capacity but they have rigid scalability limitations, they create silos of hard-to-access data and they require time-consuming, manual upgrades. Legacy NAS devices may be easier to manage but they handle data growth by aggregating individual disk drives behind one or two large controllers, prohibiting scale-out and requiring forklift upgrades across generations to expand capacity. Lastly, the clustered file systems, mostly used in HPC environments, are too complex for a general NAS user.

But there is another solution that addresses the growth of data: platforms that unify file and block storage, scaling out performance and capacity without sacrificing simplicity. Dell's file storage technology, Fluid File System (FluidFS), establishes an efficient and future-proof foundation for a long-term unified block and file storage strategy. It provides a flexible architecture that supports simplified, non-disruptive physical and namespace scalability, eliminates data silos and optimizes performance. With its resilient hardware and shared block infrastructure, FluidFS adds powerful NAS capabilities across the Dell storage portfolio.

The Dell Difference

Scale-out unified storage from Dell™ is built for the future. FluidFS technology:

- Extends NAS capabilities across Dell's primary storage arrays, Compellent and EqualLogic

- Achieves best-in-class performance with near linear performance scaling and low CAPEX

- Scales capacity and performance non-disruptively without forklift upgrades

- Removes scalability limitations associated with traditional monolithic NAS architectures

- Ensures efficiency by leveraging a shared infrastructure for block and file data

- Helps align the cost of storage with the usefulness of data with policy-driven deduplication

- Supports business continuity through a resilient, purpose-built hardware architecture

- Lowers overall storage TCO

Dell FluidFS Product Portfolio

Dell Compellent FS8600

Dell Compellent Storage Center 8000 with the FS8600 NAS appliance

Enterprise-class scale-out NAS with Compellent's operational efficiencies and advanced features

The FS8600 NAS appliance shares a back-end infrastructure with Dell Compellent Storage Center, enabling the creation of a virtualized storage pool for both block and file and extending key Compellent attributes to NAS. Among those are: automated storage tiering, which lowers costs by migrating data to less expensive disks; thin provisioning, which optimizes capacity allocation; perpetual software licensing, which helps to keep the TCO low; and award-winning Copilot support program. The FS8600 is supported on the Compellent SC8000 and SC4020 and currently scales to 3.2PB of capacity in a single namespace.

Dell EqualLogic FS76x0

The back of the Dell EqualLogic FS76x0 with two redundant, active-active, hot-swappable controllers

Simplified and versatile NAS appliance for scale-out unified storage on EqualLogic

The FS760 and FS7610 NAS appliances leverage a shared infrastructure with the EqualLogic PS Series arrays, extending many efficiencies of the SAN platform to NAS. The FS76x0 series optimizes file access performance and hardware utilization while eliminating capacity constraints, all within a single namespace for easy administration. A unified management interface for all block and file storage streamlines and simplifies administration. Robust data protection with snapshots, replication and NDMP backup— are all part of an all-inclusive software delivery model that provides future enhancements at no additional cost. The FS876x0 series scales to 512TB of capacity in a single namespace.

Dell FluidFS use case scenarios

Enterprise file server consolidation

Consolidating a siloed, segmented environment with a mix of Windows and Linux file servers or legacy NAS onto a single file storage system is the most commonplace usage scenario. Services that reside on file servers with a single access protocol, SMB or NFS, including user home directories, print, video and audio, CAD files, Web server or software development, can now be served from a single, multi-protocol NAS platform. By leveraging FluidFS, access to all files can be consolidated under a single namespace, eliminating data silos and high administrative costs, simplifying management and improving performance and scalability.

Media and entertainment

The media and entertainment industry relies on file storage for projects such as film rendering and movie production, where large files need to be sent easily between the project teams, and rendering and compositing must be achieved in large, concurrent projects with a minimal number of failed renders and dropped frames. Storage infrastructure can help manage, store, and provide access to rapidly growing libraries of media content for distribution channels, media formats, and consumption models. FluidFS provides a high performance, scalable platform to consolidate numerous workloads into a single, scalable volume with highly concurrent access to digital content from a single file system.

Medical records archiving

Primary storage systems in hospitals and medical clinics are bulging with electronic records and images. As PACS servers write millions of files into storage at ultra-high speeds, storage performance degrades, slowing down access and retrieval by doctors and causing downtime. When leveraging the FluidFS platform, the digital records can be written at very high throughput rates while the file capacity can be scaled-out to keep up with the growth. Rarely-accessed records can be automatically tiered down to less expensive disk, with archiving to the cloud as a longer-term option. FluidFS is certified with major ISV partners like GE Centricity and Agfa IMPAX.

Virtual desktop

When user data is stored alongside OS and applications in VDI, the desktop Virtual Machine (VM) size grows over time, leading to additional capacity requirements, slow data access, high latency, and an overall degraded user experience. The environment can be optimized by separating the user data from desktop VMs by placing the VMs on block storage for best performance and user data on file storage for availability and granular backup. Dell's unified storage platform with FluidFS guarantees that a single shared pool of block and file storage can grow and scale non-disruptively and on-demand, making data easier to manage and to protect.

"The Dell Fluid File System will allow us to scale out the file server across multiple appliances within a single namespace, and get dramatically better performance. This is a major breakthrough for us that will definitely help control costs." Fritz McCall, Director of Computing Facilities, University of Maryland

Dell FluidFS: Performance, scalability and efficiency

FluidFS offers an optimal combination of performance, scalability and cost efficiency for environments with file-intensive user shares, highly available NAS and unified storage, and virtual server environments with extensive NFS data and enterprise-level storage consolidation projects.

Efficient block and file solution

A unified storage platform eliminates overhead and complexity of separate block and file solutions, enabling:

- A single pool of storage which eliminates the need to carve spindles
- Extension of cost-reducing SAN efficiencies, such as automated tiering, to NAS
- A unified management interface
- Innovative software licensing for best TCO
- VMWare VAAI API and vCenter plug-in

Optimized capacity and performance

In the FluidFS scale-on-demand model, performance and capacity scale without forcing a platform rip-and-replace with:

- Linear performance scaling with a highly advantageous performance per dollar
- A scale-out architecture that supports a single namespace across up to 4 dual-controller appliances
- Incoming connections automatically balanced across client ports and all controllers in the cluster
- Capacity expansion of up to 3.2PB of storage

Cost optimization

Aligning the cost of storage with the usefulness of data is assured with:

- Keeping only the busiest data on high-performance storage with automated tiering
- Policy-driven, variable-block deduplication
- A single intuitive UI to manage block and file data

	Compellent FS8600	EqualLogic FS76x0
Product core values	Self-optimized, enterprise-class virtualized storage with industry-leading tiering, highest efficiency and scalability	Uncomplicated, versatile virtualized storage with multi-generational compatibility
File-sharing protocols	SMB/NFS	
Scale-out NAS	Single namespace across up to 4 dual-controller appliances, up to 3.2PB capacity	Single namespace across up to 2 dual-controller appliances, up to ½ PB capacity
Shared back-end system	Compellent Storage Center SC8000 & SC4020	EqualLogic PS Series
Connectivity	Client: 1GbE, 10GbE Back-end: 8Gb FC, 10Gb iSCSI	Client: 1GbE, 10GbE Back-end: 1Gb, 10Gb iSCSI
GUI Management	Compellent Enterprise Manager	EqualLogic Group Manager

Next Steps

To learn more about Dell Fluid File System solutions, go to www.dellstorage.com