

**DataDirect Networks
xSTREAMScaler File Storage System for
Apple Final Cut Pro and Final Cut Server**

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The Challenge

The proliferation of digital content in post-production and broadcasting has caused a paradigm shift in the way content moves through the workflow. File-based workflows enable diverse applications and systems in an open, heterogeneous environment to share content, eliminating the need to copy, move or transcode content from one step to the next.

Consequently, open software applications such as Apple® Final Cut Pro® for editing, compositing and special effects, as well as Apple Final Cut Server® for Digital Asset Management are taking market share away from incumbent, proprietary products.

In order to take advantage of the benefits that file-based workflows can provide, a shared, open storage solution is needed. The storage infrastructure can make the difference between parallel, real-time workflows or introduce complexities and roadblocks that reduce instead of increase productivity.

When choosing a storage system to support parallel, digital workflows, it must:

- Natively support all applications and systems that are part of the workflow, including Apple Final Cut Pro and Final Cut Server
- Enable parallel workflows, allowing a large number of users on different systems to access content at the same time – without performance penalties and delays
- Provide flexibility in attaching applications and systems in the most economic way, including SAN and NAS attachments
- Scale to not only meet the current performance and capacity demands, but also allow growth without disruptive system upgrades

Storage Solutions for Final Cut Pro

Apple Final Cut Pro (FCP) has been instrumental in bringing digital, file-based editing into the mainstream market. For companies deploying FCP it becomes increasingly important to ensure that their storage systems natively support FCP and enable parallel workflows by allowing other FCP users – as well as other applications – to access the content at the same time.

There are three key aspects to a storage solution for Final Cut Pro:

Simplicity

Traditional workflow environments have used local or dedicated storage for Final Cut Pro. In the worst case every editing station has its own storage, thus requiring physical file transfers between workstations. Sometimes a shared storage system is used, enabling content sharing between the Final Cut Pro workstations. However –this is often where the sharing ends – the content needs to be brought in and out of the Final Cut Pro environment.

The xSTREAMScaler File Storage System from DataDirect Networks (DDN) provides dramatically improved simplicity for Final Cut Pro – all editing stations have direct, concurrent, real-time access to all the content it needs – while at the same time opening up the storage environment for all other workflow elements, such as ingest and play-out. This eliminates the need to manually move content in and out of the editing environment and promotes true collaboration between the creative teams.

Concurrency

In typical Final Cut Pro environments the storage infrastructure can support work on a small number of projects – or often only one project when high resolutions above ProRes HD is required. This leads to serial workflows, creative downtime and increased cost as multiple storage systems are being deployed to enable separate, parallel workflows.

The xSTREAMScaler File Storage System enables parallel, concurrent workflows, easily scaling to support 30 Final Cut Pro Workstations working in parallel on ProRes HD content, 4x 4K workflows in film post-production and beyond.

Scalability

Post-production data centers quickly reveal one of the factors driving unnecessary equipment cost – a collection of disparate storage systems from numerous vendors that were purchased as demands in capacity and performance increased. These systems cost administrative time, cause disruption in workflows as content is moved back and forth between them – and last but not least are the most inefficient way of using expensive datacenter space, power and cooling resources.

DataDirect Networks' xSTREAMScaler File Storage System enables customers in post-production and broadcasting to easily grow from 10TB to multiple petabytes in capacity, eliminating disruptive upgrades and outdated systems in the data center.

The xSTREAMScaler File Storage systems provide native SAN connectivity for Apple Xsan shared file system, including clients such as Final Cut Pro, as well as Windows, Linux and UNIX clients. This enables a seamless, digital workflow from ingest through editing, rendering and playout, all from one storage system. In addition the xSTREAMScaler system also provides LAN connectivity for Windows, Linux and UNIX clients that don't require the level of low-latency and highest performance that SAN connectivity can provide – at a much lower infrastructure cost.

As all of the attached systems and applications can access the complete range of content, regardless of Operating System or application used, unnecessary transcoding and copying of content is virtually eliminated, drastically improving workflows and accelerating revenue generation.

At the core of the xSTREAMScaler offering are DDN's award-winning streaming-optimized SAN storage systems, which are each capable of delivering unrivaled storage performance and supporting up to 30 concurrent Final Cut Pro workstations at ProRes HD resolution or multiple 4K concurrent streams from a single array. DataDirect Networks' xSTREAMScaler technology scales these systems incrementally within a single namespace to deliver scalable streaming performance – powering everything from the smallest boutique workflows to leading Broadcasting stations and Post-Production facilities.

DataDirect Networks xSTREAMScaler File Storage	
Capacity	Dozens of Petabytes
Performance	Up to 15GB/s and more
Native Support for Final Cut Pro	Yes, 30x FCP at ProRes HD
Native Support for Final Cut Server	Yes, including content migration
Integration with other systems, such as Ingest, Transcode, Play-Out	Yes, SAN support (MacOS X, Windows, Linux, UNIX), NAS (NFS, CIFS) and LAN Clients (Windows, Linux, UNIX)

DataDirect Networks Storage Arrays	DDN S2A6620	DDN S2A9700	DDN S2A9900
Capacity	Up to 120TB per array	Up to 1.2PB per array	Up to 1.2PB per array
Performance	Up to 2GB/s per array	Up to 3GB/s per array	Up to 6GB/s per array
Real-time Simultaneous Access 4k/2k/HD/SD Streams (actual)	0/3/5/30	1/7/11/59	4/17/26/142
Real-time Simultaneous Access	327/234/163/81	655/468/327/163	1,572/1,123/786/393
Archive Capacity 4k/2k/HD/SD Hours of Content (actual)	20/81/124/670	202/807/ 1,241/6,699	202/807/ 1,241/6,699
Archive Capacity 25/35/50/100Mbps Hours of Content (actual)	7,409/5,292/ 3,704/1,852	74,088/52,920/ 37,044/18,522	74,088/52,920/ 37,044/18,522

Storage Solutions for Final Cut Server

As media organizations are faced with the need to efficiently manage their increasing digital, file-based content, they must consider:

Scalability

Media companies have often been faced with challenges as storage systems for the media market were not designed to scale to the capacities that today's content demands. The dramatic increase in file sizes needed to support HD, 2K and 4K content requires scalable storage solutions that grow with the content, from terabytes to petabytes, without requiring disruptive equipment upgrades or systems from multiple vendors.

DataDirect Networks' xSTREAMScaler File Storage systems scale from 10s of terabytes to dozens of Petabytes in a single, homogeneous namespace. Built upon DDN's Silicon Storage Architecture™ (S2A™) storage arrays - the S2A6620 for entry-level and mid-level environments, the S2A9700 for high-capacity environments and the S2A9900 for the highest-performance requirements - the xSTREAMScaler File Storage system virtualizes the underlying storage infrastructure and provides a single, scalable storage space to all applications.

Automated Content Movement

Not all content is created equal. Somebody had to manually decide what content was needed in the active storage space (frequently accessed/shared content) and what content could be moved into a longer-term archive (infrequently accessed content).

The xSTREAMScaler File Storage systems automate the movement of content between active, highest-performance storage and inactive, inexpensive longer-term storage. The policies that drive the automated data movement are customizable to conform to the existing workflows, accommodating many projects at the same time. Fully compatible with Final Cut Server, automated data movement in the xSTREAMScaler system dramatically lowers cost by automatically freeing up valuable disk space for new projects while retaining inactive content on lower-cost storage for delayed access. At the same time the archive is fully transparent to all applications and users, eliminating the need for training or deployment of additional software tools.



DDN S2A9700 & S2A9900 SAN Storage Systems are capable of storing up to 600 hard drives, or 600TB in a single data center rack

Data Center Efficiency

The massive increase in content and the parallelization of workflows cause an increasing demand in optimizing data center efficiency. For most organizations, this starts with the use of data center space and the demand for higher density storage. For other organizations the concern is mostly with providing sufficient power and cooling for the equipment in the data center.

DDN's storage arrays enable cost-effective, long-term digital archiving and can provide up to 1.2PB

of storage capacity on only two datacenter floor tiles. This translates to over 800 hours of 2K content or tens of thousands of hours of broadcast-quality HD content. DDN's systems can store massive amounts of content in the lowest square footage available utilizing advanced features such as D-MAID. Using this disk spin-down capability, DDN dramatically reduces the amount of power and cooling required to store large content archives.

An increasing number of organizations choose Final Cut Server as the open solution to manage their digital assets and automate asset management tasks. DataDirect Networks' xSTREAMScaler File Storage systems natively support Apple Final Cut Server through high-performance SAN connectivity, ensuring that assets managed by FCS are made rapidly available and in real-time to all users.

Furthermore, with multiple storage tiers and innovative features such as D-MAID, the xSTREAMScaler file storage system is uniquely positioned to take advantage of Final Cut Server's ability to move content between storage tiers based on the status of projects and assets associated with them.

The Workflow

Apple Final Cut Pro and Final Cut Server, combined with scalable, centralized storage from DDN provide a powerful foundation for post-production and broadcasting workflows. The figure below illustrates a workflow environment based on DDN's xSTREAMScaler storage system, showcasing an environment that enables end-to-end digital workflows, virtually eliminating unnecessary transcoding and copying of content between heterogeneous systems and applications.

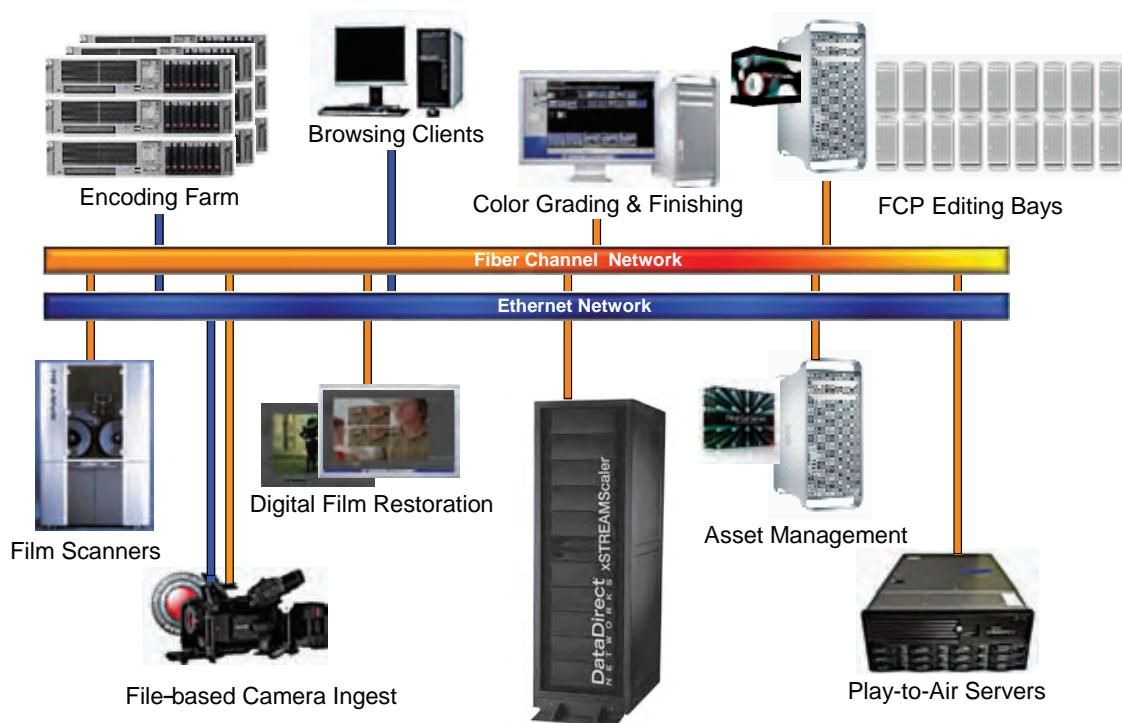


Figure 1: Seamless end-to-end digital workflow with DataDirect Networks and Apple Final Cut Server and Final Cut Pro

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