

High-Performance Storage for Media & Entertainment Based on Western Digital Ultrastar® Data60 and Rozo Systems Software



Challenge

Customer existing high-performance storage solution is based on aging, costly solution relying on SAN connectivity that creates silos.

Solution

Transition to a modern software-defined solution that can be deployed on industry-standard hardware (x86 servers, Ethernet switches) and leverages Western Digital's Ultrastar Data60 storage platform. The solution is high performance, reliable, scalable and cost effective.

Key Results

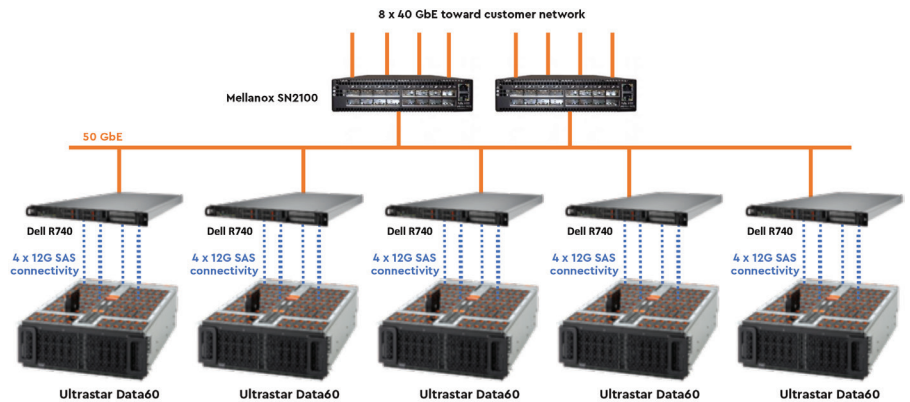
- Gained 3.6PB¹ of high performance storage that supports all M&E workflows
- Flexible infrastructure that is easily scalable to 10PB or more
- Elimination of the Fibre Channel network
- Cost-effective storage leveraging best-of-breed components

Company Profile

Fox Film is a global leader in Media & Entertainment with businesses in film, television and sports. As the digital revolution reshapes all aspects of the entertainment industry, Fox is at the forefront, embracing new technologies. Fox produced many movies that have become modern classics, including what may be the best musical of all time, ground-breaking science fiction, and epic romances and tragedies.

Unique Storage Requirements of Media & Entertainment Companies

Media and Entertainment (M&E) workflows combine video editing, adding visual effects, sound mixing, color correction and other stages of content creation on its way to TV, big screen or CDNs. New video resolutions, computer-aided modeling and visual effects keep driving the need for storage systems with higher capacity and performance.



All post-production workflow begins with processing and keeping videos on montage workstations. High capacity, high performance storage is extremely important for the montage process. Furthermore, creative work is collaborative and storage-centric: teams operate with hundreds of terabytes of data, growing to multiple petabytes of data with the adoption of 4K and 8K formats. Everyone needs a comfortable work environment: with fast access to video materials, reliable storage, simple management of data distributed over multiple volumes. The modern video production infrastructure should also support any OS on its client workstations (macOS®, Windows®, Linux®). To minimize acquisition and support costs, storage resources need to leverage the industry standards: x86 servers for compute, Ethernet for connectivity, and NFS/SMB for access protocols.

¹ One megabyte (MB) is equal to one million bytes, one gigabyte (GB) is equal to one billion bytes, one terabyte (TB) equals 1,000GB (one trillion bytes) and one petabyte (PB) equals 1,000TB. Actual user capacity may be less due to operating environment.

"The team, who has been using the storage, are very happy with performance!!!!"

Ben Davitt
Associate Director of Engineering, Fox Film

Compute

- x86 servers with RozoFS® software running on Linux
 - Dual processor Intel® Xeon® Silver D4114
 - 96GB DDR4 memory
 - Dual boot drive 120GB SATA SSD
 - Network card dual port 50GbE
 - Storage/RAID controller
- Client nodes running any OS
 - Can run on the same servers as RozoFS storage software

Storage

- Western Digital Ultrastar Data60 storage platform populated with Ultrastar DC HC520 (12TB) 3.5-inch SAS drives
- Metadata storage on Ultrastar SN260 (1.6TB) NVMe SSDs
 - Dual drives in two servers for redundancy

Network

- Mellanox® SN2100 Ethernet switches, two for redundant configuration
 - Back-end network of 2x50Gb/s per storage server
 - Front-end network: 20 * 10Gb/s or 5 * 40Gb/s ports available per switch

Modern Storage Solution Based on Industry-Standard Hardware

Fox Film has been relying on a legacy shared disk file system for its storage infrastructure. However the Fox team felt that the legacy solution was getting outdated because it creates silos, requires an additional Fibre Channel network and is very expensive to acquire and maintain. A new solution was architected around the Western Digital Ultrastar Data60 platform and RozoFS software that took away these bottlenecks by delivering a high performance solution based on Ethernet connectivity only with a path for capacity expansion.

The architected solution consisted of five Western Digital Ultrastar Data60 storage platforms combined with servers running RozoFS scale-out NAS software provide a high performance distributed storage solution. A patented erasure code guarantees high availability of data equivalent to triple replication with only 60% overhead – close to a 50% savings in data size.

The Ultrastar Data60 storage platforms are populated with Ultrastar 12TB Helium drives (DC HC520) providing 720TB of raw data storage, with the ability to easily scale out in the future if needed. A minimum of four servers is required to help enable full data protection. The initial cluster consisted in five servers and platforms for a total raw capacity of 3.6PB, representing a usable capacity of 2.25PB.

RozaFS Scale-Out NAS Software

RozaFS is a software-defined storage solution delivering high performance storage on hard disk and flash storage media, often matching competitors' performance on flash using more cost-effective hard disks. RozaFS delivers the performance of traditional SAN systems, together with the ease-of-use of modern NAS architecture. RozaFS is easily deployed in the private, hybrid or public cloud as a service as it relies on industry standards. It enables customers to optimize their workflows by moving storage resources between private and public clouds. It runs on industry-standard x86 servers and Ethernet network equipment that can be combined with the Western Digital Ultrastar Data60 storage platform. RozaFS uses the a patented erasure code that delivers transparent, seamless failover and achieves up to 65% storage savings compared to traditional triple replication. RozaFS configurations scale from a base set-up of four servers to petabytes by simply adding individual servers. The software automatically spreads the load out on all storage elements.

"The Western Digital Ultrastar Data60 platform combined with RozoFS software helps our customers remove the constraints of traditional storage arrays while providing a solution that scales in both capacity and performance. By selecting the Western Digital storage platform, we have the flexibility we need for our media and entertainment customers, helping us engage with major movie studios and post-production houses across a large range of company and project sizes."

Jeff Spalla
Principal IT Architect

Ultrastar Data60 Provides Big Performance and High Density in an Extremely Cost Effective Solution

Given the large scale of the Fox Film project, storage pricing was critical. Initially, the solution was architected using x86 servers with on-board storage. The cost of this approach was prohibitive so the parties involved chose Western Digital's Ultrastar Data60 platform for storage. It delivers high performance, reliability, scalability and warranty terms at a very cost effective price. Two unique technologies IsoVibe™ and ArcticFlow™ both contribute to long-term reliability and reduced drive failure, enabling a five year limited warranty on the entire platform. The Ultrastar Data60 are combined with Dell R740 servers and Mellanox SN2100 switches. The storage on the Dell servers is limited to metadata storage on dual Ultrastar SN260 (1.6TB) PCIe SSDs on two servers for full redundancy. The Ultrastar Data60 storage platform delivers excellent performance with HDDs by leveraging the four mini SAS connections per enclosure and the ability to partition the drives in four zones that can be accessed in parallel to increase the number of spindles accessed in parallel. With support for sixty 20TB drives, Ultrastar Data60 storage platform delivers 1.2PB of storage capacity in only 4U of rack height making it one of the highest density solutions on the market.

Modern Storage Solution Delivers High Performance

Performance tests measured the throughput provided to the application on a single node and in aggregate. While individual storage nodes can write at 4.35 GB/s, the actual data write rate is 2.9 GB/s because of the overhead of erasure coding for data protection. In read mode, individual nodes are delivering 8 GB/s. In aggregate mode, the cluster hits the limits of the backend network but still delivers an output close to 21 GB/s for the five nodes. CPU load on the tests averages 30% indicating that most of the CPU resources are still available to run the end-user media applications.

These performance numbers exceeded the expectations of the Fox Film team and enable the storage system to support all M&E workflows. After only a few weeks of using the system, Fox Film is already considering adding three additional Ultrastar Data60 storage platforms.

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