SPORTS BROADCAST COMPANY

SUCCESS STORY

Plays of the Day: Apple-Based, High-Availability, Video Post-Production

BACKGROUND: This account describes a large-scale, video post-production solution successfully implemented by a U.S. professional sports broadcast company in 2006. Branding and trademark restrictions prevented use of company name and testimonials, but the figures and descriptions used in this story accurately reflect the deployment and decisions behind it.

KEY HIGHLIGHTS

Location: U.S.A.

Industry: Broadcast

The Challenge

- Add high-availability to all-Apple Final Cut Pro solution to eliminate potential outages during time-critical, video ingest and post-production
- Meet or exceed performance needed for simultaneous support of 16 ingest, 16 playout servers and 10 editing stations

Vmirror Benefits

- Continuous access and protection of video contents
- Major cost savings over alternative video solutions

The Customer

In the United States and worldwide, professional sports has become synonymous with entertainment. For top sports leagues, business is more than about creating a winning team; it is also about packaging and selling the game for television consumption. As part of a major expansion initiative, the affiliated Sports Broadcast Company ("SBC") for a major professional sports organization decided to create a new video post-production facility that would receive simultaneous satellite video feeds, and then edit and package these for immediate distribution to television stations around the U.S. The planned operations were not only of considerable scope, but they also required uninterruptible, high-availability access and storage capacity for large video streams and edited content.

The Challenge: Continuous Ingest with No Dropped Frames

When operational, SBC's new West Coast facility would take video editing capabilities to new levels by ingesting live, simultaneous game feeds, packaging the game content with staff on 42 editing stations, and then delivering finished highlights DV and HD for with near immediate distribution.

SBC became familiar with Apple's Final Cut Pro's video editing capabilities through more than a year of video editing experience with an 18-terabyte Apple video SAN used in its graphics department. As a long-time customer of video broadcast solutions from an industry-leading provider, SBC was impressed with FCP's powerful capabilities and intuitive ease of use, and invited Apple to participate in a 7-figure bid to equip the new West Coast facility.

High Performance with Continuous Availability. In SBC's post-production solution, uninterrupted system access and content protection were paramount. The principal objective of the new facility was to meet growing expectations by viewing audiences that news and sports be delivered as high-quality, edited content in near-real time. For SBC's planned operations, dropping even a single frame during game feeds would create delivery delays and possible loss of game coverage.

To meet these needs SBC required a total systems solution that could withstand losses of disks, SAN, or system without compromising required throughput or data integrity. Consequently, more than high performance and RAID-protected storage were needed from Apple's Xserve/Xsan offerings — guaranteed access and content protection was also required.

The Solution: Faster, More Flexible, High-Availability System at Lower Cost

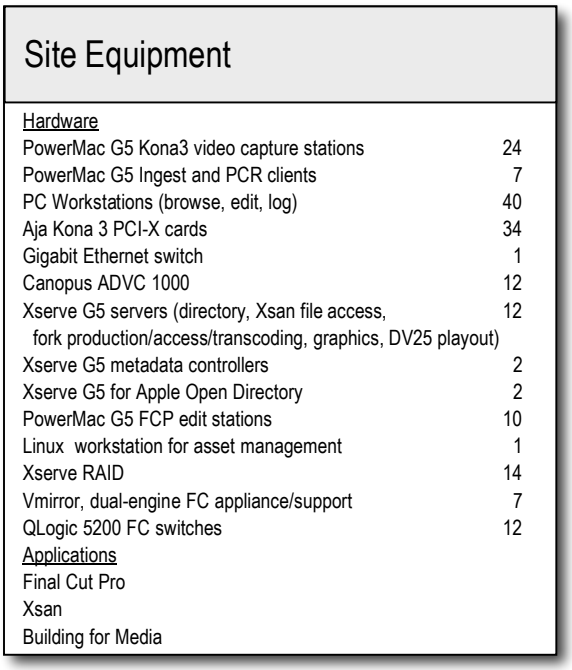
SBC undertook its search for its video post-production solution with a plan to install a fully operational system prior to the beginning of its season in 2006. Apple responded by explaining that it had qualified a high-availability (HA) Xserve RAID solution using Vmirror™, a Fibre Channel-based hardware-mirroring appliance from Vicom Systems. Based on Apple's recommendations, SBC decided to test the HA solution backed by integration services provided by Apple Professional Services (http://www.apple.com/consulting).

With only two months remaining for installation and operational verification, the Apple/Vicom solution and team were put to the test — installation was accomplished in just two weeks. Because the Vmirror portion of the solution had undergone only preliminary testing, the HA response of FCP editing stations, Xserve servers, Xsan, Xserve RAID and Vmirror appliance were verified one-by-one through simulated outage of systems and components on the data path.

Following a month of initial testing and only two months before scheduled operations, SBC decided to deploy a new post-production solution using Apple FCP for editing, Building for Media to manage ingest and playout, PowerMac/Kona video capture stations, and Xserve servers, Xsan, Xserve RAID, and Vmirror to provide HA and data protection.

The rules for Vmirror "sizing" relative to attached Xserve RAID are based on required throughput. For maximum throughput, one Vmirror engine (175MB/sec rated throughput) is recommended for one Xserve RAID. Thus, for maximum performance needs for applications like uncompressed HD video, one dual-engine Vmirror appliance is required for each mirrored Xserve RAID. For lower throughput requirements, a dual Vmirror appliance will support up to two mirrored Xserve RAIDs. In the case of SBC, whose application requires both HD and DV video, seven dual Vmirror appliances were used to support 14 Xserve RAIDs.

Figure 1. SBC Video Post-Production Installation



Site Equipment

Hardware	
PowerMac G5 Kona3 video capture stations	24
PowerMac G5 Ingest and PCR clients	7
PC Workstations (browse, edit, log)	40
Aja Kona 3 PCI-X cards	34
Gigabit Ethernet switch	1
Canopus ADVC 1000	12
Xserve G5 servers (directory, Xsan file access, fork production/access/transcoding, graphics, DV25 playout)	12
Xserve G5 metadata controllers	2
Xserve G5 for Apple Open Directory	2
PowerMac G5 FCP edit stations	10
Linux workstation for asset management	1
Xserve RAID	14
Vmirror, dual-engine FC appliance/support	7
QLogic 5200 FC switches	12
Applications	
Final Cut Pro	
Xsan	
Building for Media	

No Frame Drops. The challenge of high-availability video applications is that the *entire solution* — Xserve systems, Xsan, switches, Vmirror, and Xserve RAID — must not only deliver high performance, but also must be able to failover anywhere in the data path without dropping a single frame. For Apple systems, while performance is a proven strength, uninterruptible operations were clearly new requirement.

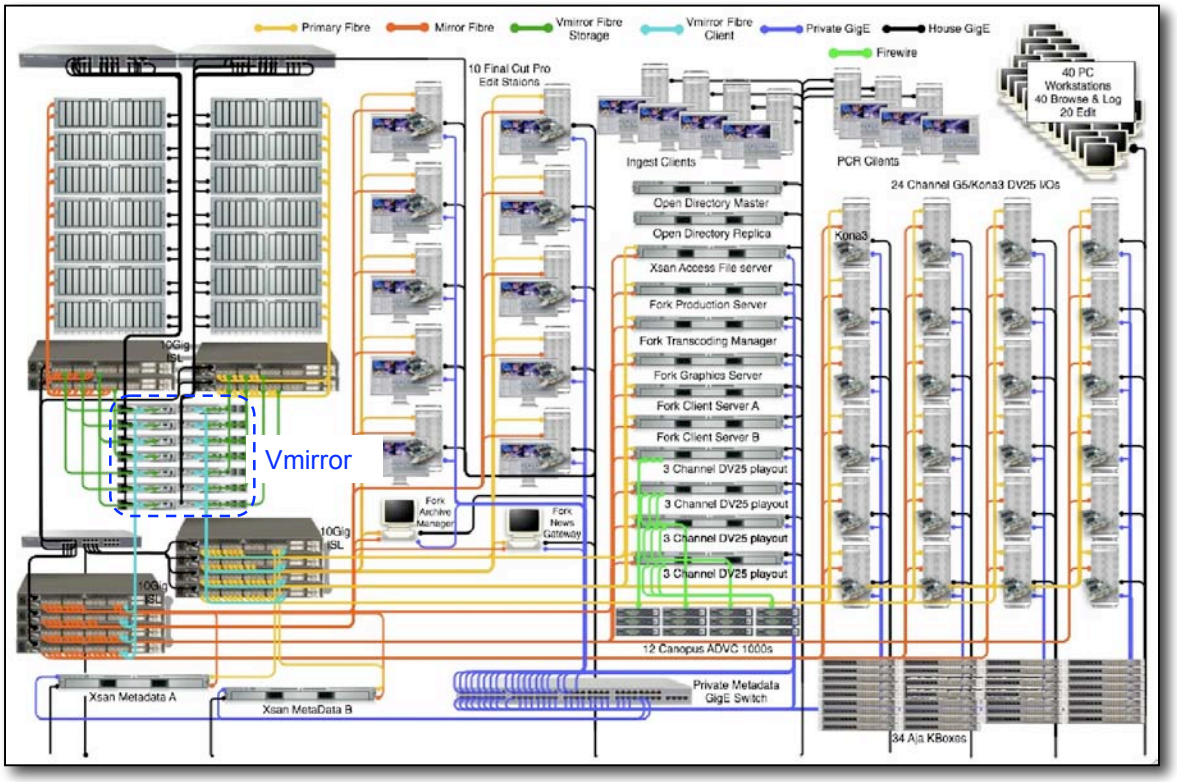
Vmirror transforms Xserve RAID into high-availability storage by providing multi-path access with instantaneous failover to mirrored video data. In addition, because Vmirror reads from both primary and mirrored storage volumes, it also increases overall read performance by 20-60 percent. Final testing demonstrated that video ingest and editing could be performed, uninterrupted and without loss of content in the event of disk, system, or SAN component loss. The advantages of hardware mirroring were also demonstrated by performance testing.

Performance testing showed no loss on write rate compared to Xserve RAID only and a 30% increase on read rate.

For the Professional Services team, the SBC deployment loomed large. Not only was the project schedule tight, but also SBC was its first deployment of a high-availability video solution using Vmirror. According to the Apple Engagement Manager, “Vmirror was much easier to deploy than we expected, especially considering this was our first-ever installation with the product. “

Following system tuning, a full configuration of 16 ingest and 16 playout servers, 10 FCP editing stations running 3-4 streams each and one stream of DVCPRO100 ran uninterrupted on multiple test runs, meeting SBC's final acceptance criteria.

Figure 2. Broadcast Co's Post-Production System



Business Benefits: Improved Business and IT Operations, Better ROI

SBC’s video post-production operations went operational on-time in 2006 and have run successfully since the first week of operations. Apple Professional Services delivered a high-availability, Apple-based

FCP and Xserve/Xsan infrastructure on schedule and in time to support Broadcast Co's 2006 sports season. The money spent by SBC for its Apple solution provides superior editing and high availability for a lower cost than an incumbent solution *without high availability*. On the strength of this success, SBC immediately purchased a second solution of similar scale for its headquarters facility.

This opportunity clearly demonstrates the clear benefits of adding Vmirror to an Apple video SAN configuration. For one, Vmirror increases performance and protects stored data with an additional level of redundancy. Vmirror also provides FCP applications with "enterprise-grade" access and availability. Finally, when combined with price-performance advantages afforded by Apple storage systems, customers can now purchase broadcast-quality video solutions at less than half the costs of alternative solutions.

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