Six O'clock News:
Building a High Availability, Final Cut Studio™ Broadcast Solution

> " We wanted a Final Cut Studio solution that would give us virtually 100 percent uptime. What we've found is that adding Vmirror to our all-Apple system enables us to achieve this goal and more, all at a very affordable price.
>
> **STEVE INGRAM, Chief Engineer, WCJB-TV**

KEY HIGHLIGHTS

Location: Gainsville, FL

Industry: Broadcast

The Challenge

-   Add high-availability to Final Cut Pro editing solution
-   Broadcast-"harden" solution to ensure suitability for play-to-air
-   Protect contents against unexpected loss of RAID storage

Benefits

-   Uninterrupted access to video contents
-   Continuous protection of stored contents
-   Greater editing productivity through higher performance
-   Simple, centralized administration

The Customer

WCJB-TV has provided North Central Florida with news, information, and entertainment since the station made its first broadcasts from a small building in north Gainesville, Florida. In 1976, Diversified Communications, owner and operator of television stations in the eastern U.S acquired the station.

From the station's earliest days when commercials consisted of 35mm still photos, programming came by microwave from nearby Jacksonville, and newscast footage on 16mm film was edited for play-to-air, WCJB-TV has since grown into a modern television station of 85 people. Today, the station boasts of one of the most experienced and best-equipped production facilities in North Central Florida. As an affiliate of ABC Television Network, WCJB airs five local news broadcasts every weekday along with ABC network and syndicated programming like "Entertainment Tonight" and "Inside Edition".

The Challenge: Bulletproofing Apple Storage

In 2006, to keep pace with new trends toward non-linear digital editing, WCJB-TV purchased Apple Final Cut Pro, Power Mac G5 (?) editing stations, Xserve server and Xserve RAID to complement the station's linear editing capability. In anticipation of a complete switchover to non-

linear editing and play-to-air directly from the Xserve RAID, Steve Ingram, Chief Engineer at WCJB, began researching alternatives to ensure that edited news content would be continuously available for editing and playout, as well as protected during and after use. Steve's rationale: in relying on the Xserve and Xserve RAID for the station's news broadcasts, the Final Cut Pro application, Xserve, and Xserve RAID systems would become "mission-critical" for the station.

Given this dependency on the Apple Final Cut solution, Steve Ingram evaluated the entire Apple system from Final Cut editing station to Xserve RAID for single points of failure that could interrupt editing or playout. He discovered that while Xserve RAID provided disk redundancy and a track record of high reliability, its two controllers are components that, in the event of failure, would not only stop editing and playout, but could potentially result in loss of stored contents.

The Solution: High-Availability, All-in-One Editing and Broadcast System

Proprietary editing and broadcast offerings from companies such as Quantel and Grass Valley were available as alternatives, but not only did these systems lack the flexibility of Apple's open architecture, but their prices were also well beyond the WCJB project budget. Steve consulted Apple Professional Services for recommended options, and learned that a dual-engine Vmirror appliance from Vicom Systems would provide the redundancy that WCJB needed for assured access, instantaneous failover, and protection of stored contents.

Vmirror is a purpose-built Fibre Channel appliance that transparently mirrors Xserve RAID data using high-performance hardware mirroring at a sustained, rated throughput of 350 MB/second. A dual-engine Vmirror appliance creates high-availability Xserve RAID storage by providing two independent, active-active data paths to mirrored sets of Xserve RAID data. This redundant approach ensures that no single component failure will introduce downtime or data loss, while also increasing performance by increasing access to stored data. Should a component fail, Vmirror's hardware logic will instantly fail over to the alternate data path and storage without interrupting host operation. The result: editing stations can access contents continuously, playout is assured, performance is increased, and stored contents are protected against unexpected failures of all key components on the data path, including switch, FC link, controller, HBA or disk.

High Availability Configuration. The base WCJB configuration consisted of five Final Cut Pro editing stations, Xsan software, and metadata controller, FC switch and six terabytes of Xserve RAID storage. To transform this configuration into a high-availability solution, a dual-engine Vmirror, second Xserve RAID, FC switch and second metadata controller were added to provide a fully redundant data path from network to storage system. In keeping with Vicom's recommended practice of separating metadata from data storage to minimize contention for disk access, thereby maximizing throughput,

WCJB chose to separate the 14 Xserve RAID disk drives into a total of four LUNs. Two LUNS are used for metadata, and consist of a two-drive RAID 1 array, while the remainder of disks comprise two LUNS reserved for file storage, each consisting of a five-drive, RAID 5 array.

Self-installation. A notable aspect of the WCJB-TV solution is Steve Ingram's decision to perform the Vmirror installation without outside resources, using only the Vmirror reference documentation. Both Vicom and Apple offer onsite installation services for a fee, and Vicom also provides technical training to partners to install Vmirror for end users. But after reviewing Vicom's documentation and obtaining Vicom's agreement to remotely monitor the planned installation, Steve Ingram decided that the station's Maintenance Engineer, Chris Ribe, had the necessary skills to install Vmirror by himself. After reading the documentation, Chris was able to configure the system, zone the switches, and install Vmirror in less than three hours, with no prior training and only periodic progress checks from a Vicom support engineer who monitored the installation from 3,000 miles away.

Figure 1. WCJB-TV Editing and Broadcast Solution [NOTE: diagram may not be entirely correct and needs verification – we have two different reports: WCJB-TV uses either 5 editing clients or 11 clients]
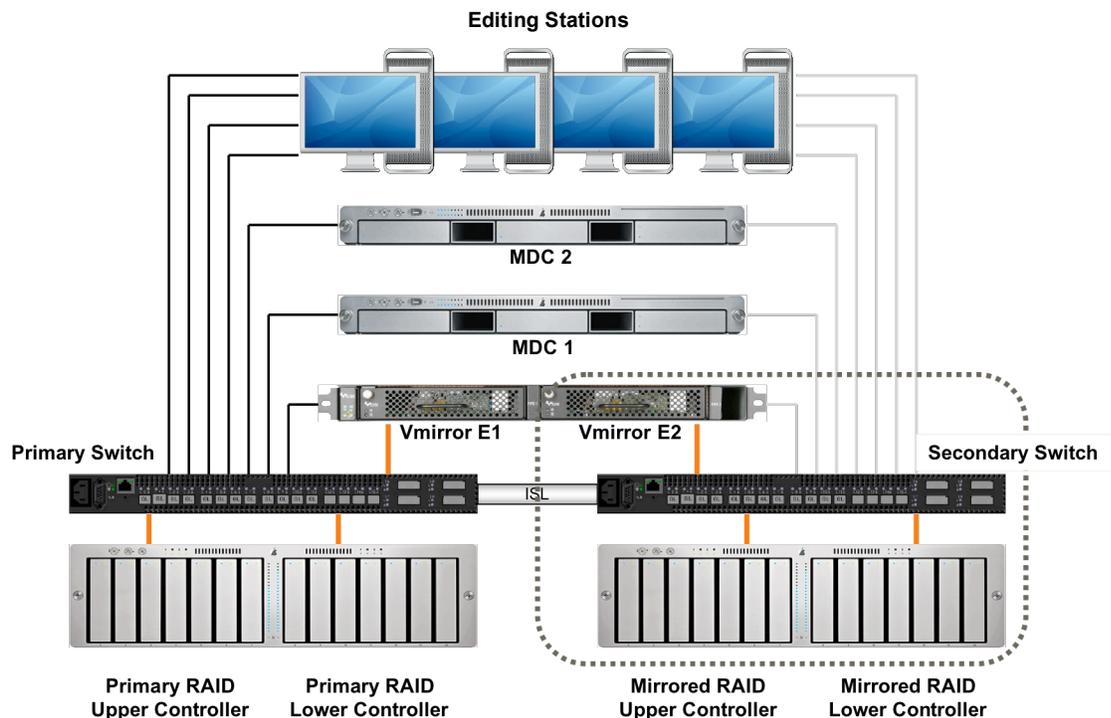
Business Benefits: Uninterruptible Playout and Continuous Protection of Contents

WCJB-TV has added several important advantages to its Final Cut Pro system, enabling the station to create a complete editing and broadcast system from Xserve, Xsan, and Xserve RAID components and software. Moreover, the entire system was built at a fraction of the price of proprietary newsroom and broadcast system alternatives. In addition, because all mirroring management is performed using intuitive GUI and the Vmirror appliance, management is both simple and centralized, unlike host management software which must be installed and configured on each host system.

By implementing Vmirror with fully redundant components and storage and built-in, instantaneous failover, WCJB-TV has installed a system that ensures ingest, editing, and playout will continue even if a key component — such as server, switch, controller, Vmirror, or RAID system — on the data path fails. Vmirror will also increase editing performance, thus improving overall productivity.

With testing complete and the system ready for live operation, Steve Ingram summed up his expectations and experience in using Vmirror by saying, "We wanted a Final Cut Pro solution that would give us virtually 100 percent uptime. What we've found is that Vmirror enables us to achieve this goal and more, all at a very affordable price."

Based on the demonstrated test results, WCJB-TV decided to purchase a second system for its affiliate station, WABI-TV5 in Bangor, Maine.