



CASE STUDY

Prime Focus Makes Clash of the Titans 3D in Just Eight Weeks with Fusion ioMemory™ Solutions

Under a tight deadline, innovative studio replaces disk arrays on projection systems to greatly improve productivity and system reliability.

Summary of Benefits

- **2-4x more** shots per day
- **20x heavier data load support** enables 2k+ stereo playback
- **More shots** reviewed each session with review cycles between sessions
- **Eliminated hours of work** sequentially loading footage for review
- **Highly scalable performance**
- Eliminated hours spent defragmenting drives
- **Removed risk** of RAID crashes and cost of restoration time
- **Much easier** to implement than disk arrays

The Challenge

Visual entertainment companies, like Prime Focus, that convert regular film to stereoscopic (3D) are reaping the benefits of the recent surge in 3D popularity. When Warner Brothers challenged Prime Focus to convert “Clash of the Titans” to 3D in just eight weeks, they were quick to accept, even in the face of the Hollywood community’s skepticism. No stranger to innovation, Prime Focus was confident they could find a way to deliver quality work under the incredibly tight timeline.

At Prime Focus’s California office, artists checked work into a central server. Three times a day, they copied “reels” or segments of footage to projection workstations for review sessions with supervisors and studio heads. The review sessions were critical to give artists feedback necessary to remain continuously productive. Turnaround times for typical VFX projects can vary significantly, but with only eight weeks to finish “Clash,” Prime Focus artists would have to work more efficiently than ever.

Prime Focus’ proprietary View-D™ process greatly improved conversion speeds and quality. However, they still needed to eliminate the following pipeline bottlenecks:

1. Due to limitations of the Windows networking file system, Prime Focus had to copy data to the arrays in separate streams that had to be carefully sequenced to ensure adequate playback performance. The 3D work required at least double the resolution of standard film work (at least 2K resolution), compounding this problem.
2. Copying from multiple network streams caused the playback station disks to quickly become fragmented. Administrators had to defragment disks regularly, which took them offline.
3. It was not possible to write data to the playback station’s disk arrays and play back footage at the same time. This limited productivity in two ways:
 - a. Data had to be fully copied to the arrays before a review session could begin.
 - b. It was not possible to quickly cycle changes. Even minor changes might need to wait several hours for the next review session.

The SanDisk® Solution

Quadrupled Productivity

Sean Konrad, Project Manager for the conversion, told us, “With typical VFX projects, we complete about 20-30 shots per day. The Fusion ioMemory™ ioDrive® cards scaled our data load capabilities by about 20 times. This improved our productivity about 2-4x.”

The ioDrive cards made this possible by delivering the following improvements:

1. The ioDrive cards copied data as fast as the streams came across the network, in parallel, and without requiring sequencing to ensure good playback. Prime Focus could copy between 50 to 60 shots in just 30-45 minutes. Sean told us, “You don’t have to write frames contiguously. You can be reading and writing at the same time, and writing eight frames simultaneously. I couldn’t even guess how much slower the RAID arrays would perform.”
2. Prime Focus could play back footage and write at the same time. This meant they could start review sessions as soon as they had enough shots to review. It also made it possible to conduct mini reviews between major sessions, ensuring that artists did not get stalled waiting for feedback. Sean told us, “In the last four weeks of the project, we doubled the number of playback machines because we found our editorial staff could simultaneously work on three reels and do quick, mini-reviews, in between the thrice daily reviews. We even added a second ioDrive card to some of the machines to play back two reels simultaneously from the same machine.”
3. They could play back footage at high resolution with sound - without sequencing work. Sean told us, “The write speeds are great and the speed, in general, is pretty incredible. We haven’t tested it yet, but I have a feeling the ioDrive cards could support 4K serial playback without any problem.”

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**Sean Konrad,
Project Manager for
Stereoscopic Conversion,
Prime Focus**

Eliminating Disk Maintenance and Improving Reliability

One of Prime Focus’ primary reasons for replacing their disk arrays with ioDrive cards was to ensure that disk array problems did not threaten their schedule.

Disk defragmentation rendered machines unavailable for review sessions for about two hours—precious time Prime Focus could not afford to lose. Additionally, Prime Focus did not want to risk failures in disks or RAID controllers that could require hours to restore.

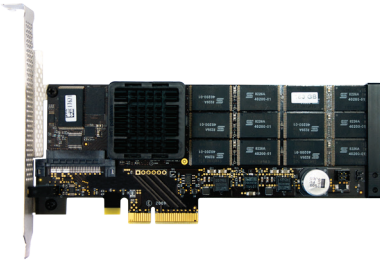
Sean told us, “We had 60 artists working in the LA office. Suppose the review session for a segment that 40 artists were working on was delayed by 2 hours due to an array going down and needing to be rebuilt or because a defrag took too long. This could potentially translate into 80 hours of lost work for artists who were waiting on feedback. This was something we simply could not afford.”

SanDisk’s ioDrive cards did not need to be defragmented and had no RAID controllers to fail, virtually eliminating maintenance as a threat to their schedule.

Easy Implementation

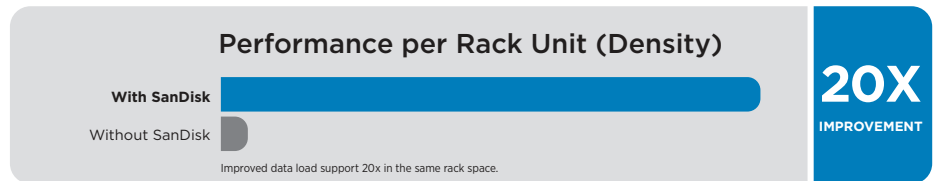
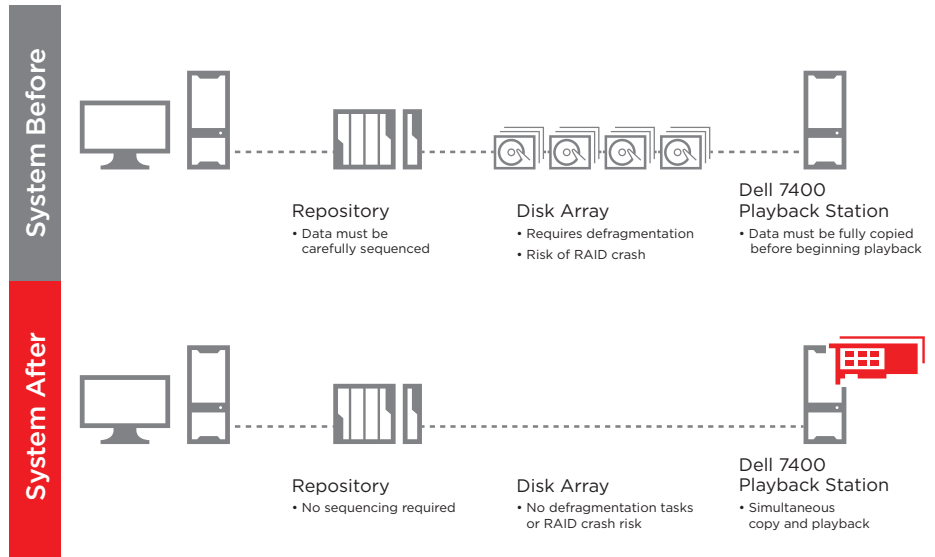
Prime Focus had no spare time to design and architect a complex system that could achieve their efficiency goals. Administrators simply plugged the ioDrive cards into the PCI slot of their playback station and configured them, after which they appeared just as any hard drive would.

In fact, Sean told us, “It took absolutely no time to set this up. The IT department figured out a workflow that allowed machines to be up and running in under an hour, whereas tweaking RAID array distribution can really bog down production. We had the idea to add three machines on a Thursday, and by the following Monday they were in full production.”



Fusion ioMemory™ - ioDrive®

System Overview



Summary

Implementing Fusion ioMemory solutions gave Prime Focus the following benefits:

- **2-4x more** shots per day
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Sean told us that Prime Focus couldn't be happier. "The ioDrive cards really helped us meet a tough deadline. Each review session covered far more shots and we could continue cycling work in between sessions. We don't have to worry anymore about defragmenting disks, rebuilding RAIDs, or swapping out disks. We are buying many more cards to implement throughout our different locations."

About the Company

Prime Focus is a Global Visual Entertainment Services Group. With facilities in L.A., New York City, Vancouver, Winnipeg, London, Mumbai, Goa, Hyderabad, Bangalore and Chennai, Prime Focus operates across 3 continents and 5 time zones. Prime Focus specializes in providing creative and technical services for the Film, Broadcast, Commercials, Gaming, Internet and Media industries, operating across the entire Visual Entertainment Services sector, in every major market and at every stage of the project's development. Prime Focus offers a unique proposition – a state of the art infrastructure and "Global Digital Pipeline™" working across three continents, giving access to industry-leading worldwide talent and global workflows, and allowing clients to realize substantial time and cost savings.

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At SanDisk, we're expanding the possibilities of data storage. For more than 25 years, SanDisk's ideas have helped transform the industry, delivering next generation storage solutions for consumers and businesses around the globe.

The performance results discussed herein are based on internal Prime Focus testing and use of Fusion ioMemory products. Results and performance may vary according to configurations and systems, including drive capacity, system architecture and applications.

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