What Fusion-io Can Do For Film

Fusion-io devices offer incredible read and write performance as well as industry leading low latency IOPS. Applications installed on the ioDrive/ioXtreme launch in seconds and large files load quickly; sort through folders of images and documents with speed and agility to greatly increase productivity.

COMPOSITING / TRACKING

Imagine what you could do as a compositor with fast read speed and low latency. A single io-memory device allows compositors to work in real-time at resolutions up to 2K (film)—with two cards you can reach 4K (with proper graphics performance) in real-time. The ioMemory devices provide unparalleled performance.

Compositors are frequently constrained to use RAM for playback, which severely restricts the length of sequence that can be played in real time. Compositors typically only have 8 to 32 GB of RAM, limiting them to only a few seconds of playback. Fusion-io extends that cache by 80GB to more than 1.2TB.

Fusion-io devices give artist more interactive effects and manipulation in well multithreaded applications. Typically tracking is limited by your system's I/O capacity. Adding high throughput Fusion-io cards in your computer puts the bottleneck back on the CPU (or GPU), dramatically accelerating your process.

VIDEO EDITING

We provide fast playback capabilities that allow editors to work in full resolution. To date, throughput limitations have often required editors to work with half-resolution proxies before final processing. Fusion-io allows the editors to work more interactively and in full resolution.

What's more, editors usually have large external disk drive arrays that are costly, noisy, generate lots of heat and are subject to stability issues as well as critical failures. Due to large capacity requirements editors get the best results from Fusion-io drives by using them as a new tier of memory that works as a midpoint between RAM and storage. Use the device to house temporary renders or files currently in use. This extends playback ability from your RAM to your "RAM + Fusion-io" giving you a much greater caching space.

FUSION-IO®

IMAGE EDITING / PAINTING

For image editing, or "Photoshop work," Fusion-io products provide a super-fast "scratch" disk or storage-based temporary processing space. We have conducted many tests and found significant benefits for artists working on files that overflow the available system memory. This ranges from photographers editing images to film matte painting artists working on very large digital paintings as well as digital images destined for print or publicity.

Whether you are sorting through thousands of photos or painting new backgrounds for Middle Earth, Fusion-io will make it happen significantly faster.

PLAYBACK

Playback is an essential part of every production pipeline and is usually done on an editing station or system specifically configured for this task. Due to the large amounts of data needed for playback, systems usually include a large local RAID array where content is aggregated in order to be played sequentially. Data must be copied onto the array in a specific order to facilitate sustained playback speeds. The advent of stereoscopic production has added even more stress to the customary pipeline requiring a second stream to be simultaneously projected, doubling system throughput requirements. Additionally, stereoscopic effects are best perceived when an image is in motion (not on a still frame), dramatically altering the playback requirements on the artist's workstations for many facilities.

Fusion-io products provide the necessary throughput required for stereoscopic playback and even allow for more interactive adjustments due to the extremely low latency and the ability to read and write simultaneously. An artist's workstation equipped with an ioDrive Duo or two ioXtremes/ioDrives becomes a high-powered playback and compositing system. Fusion's ioDrives are easy to install, provide faster throughput than most raids and most importantly do not require sequentially written data, allowing for much simpler load up.

Normally all the footage for a review session would have to be loaded sequentially onto the raid array before the session starts which is intensely time consuming. The ability to read and write simultaneously to the ioDrive makes it possible to start a review session before all the data is on the device. During playback, data can be written to the device in the background. That means that content flagged for fixes at the beginning of the session can be worked on and recopied to the drive before the session ends enabling "same session" updates with the director.

ENCODING / TRANSCODING

Video content is produced in many different formats for a variety of delivery mechanisms, from QuickTime videos to flash and Blu-Ray. The conversion of source data into different formats and resolutions is a large part of the broadcast pipeline. Videos will often be encoded to different resolutions and formats (like QuickTime movie trailers for instance). Encoding can be done in software or hardware and both require lots of information to be read, processed and output.

Fusion-io products provide unrivaled throughput and incredibly low latency allowing the applications to fully saturate the CPU and accelerate encoding/transcoding. If the transcoding is hardware based, generally the bottleneck is getting the data to the encoding chip. With Fusion-io products, conversion time is greatly decreased by giving the device unconstrained I/O. Fusion-io's small form factor and easy installation/monitoring is another huge plus for this industry, allowing devices to be bundled easily.

3D CONTENT CREATION

Many engineering firms deal with huge CAD files. Loading and saving these files can be very time consuming and in many cases, opening files that overflow your available RAM can cause an application crash. When dealing with large 3D models like manufacturing data sets such as entire planes or complex buildings, speed can be critical. The low latency of the Fusion-io devices allows parts to load in parallel, massively decreasing load times.

ioMemory's high throughput and low latency can accelerate any "load on the fly" situation as well as regular save and load operations. By using a Fusion-io device as a "scratch" or temporary file location you can essentially extend the amount or RAM available to the application (as long as the application supports disk caching). 3D artists are starting to preview their rendered work locally especially for stereoscopic production. Our products turn artists' workstations into capable playback stations. Applications like Autodesk Mudbox and Pixologic Zbrush save a massive amount of information with every stroke, which can become extremely heavy to undo. Using a Fusion-io device to store this information gives artists the flexibility to undo and redo almost instantly.

PROCESSING ACCELERATION (RENDERING/CUDA)

CUDA is NVIDIA's parallel computing architecture that enables dramatic increases in computing performance by harnessing the power of the GPU (graphics processing unit).

Current GPUs have 512 CUDA cores and you can easily have 3 GPUs in one machine, that's over 1500 cores to feed data to as well as save data from. For image processing like encoding/decoding or image analysis, you need to stream massive amounts of data into the GPU's and save the results. Slow I/O can become a critical bottleneck making it impossible to take advantage of your full processing power unless you can find a way to feed those cores. Fusion-io devices provide unrivaled throughput and latency allowing CUDA GPU's to work at peak performance.

PIPELINE/PROJECT MANAGEMENT

Asset management is also a major part of any production. This involves tracking massive amounts of data, revisions and notes as metadata. You must be able to sort through the metadata and queue the content for use quickly. Since this part of the pipeline affects every artist multiple times a day, having a slow "backend" can dramatically impact productivity.

With Fusion-io's high throughput and low latency devices you can host the metadata (database part) on our device and benefit from super-fast responses. Using Fusion-io ioDrives in playback stations as well as on the server for "hot data" and fast networking provides the best results and a much more efficient infrastructure.

DATA INTEGRITY

Fusion-io devices include a variety of proprietary software features, which create the equivalent of a triple redundant RAID 5 configuration on the card. The ioDrive contains 24+1 NAND memory chips, 24 are RAIDed for speed while the 25th is used by a feature called "FlashBack Protection". If a certain threshold of bad blocks form on a particular chip it will automatically be decommissioned and the 25th chip will step in and take over. Since the ioDrive is over-provisioned, the loss of the sector is unperceivable by the user. The ioAdministrator tool identifies these "lost sectors" and allows for early failure detection and replacement of the module/card. An added benefit of NAND memory is that though a sector becomes read only when it fails the data is recoverable, making it a perfect solution for mission critical data. Fusion-io brings you the best combination of speed and security of any NAND based device.

DATA ACQUISITION

The ioDrive has a write speed of 600MB/s and the ioDrive Duo of 1.2GB/s. This allows the device to capture at an extremely high speed making it ideal for high speed and high resolution camera data as well as data transcoding/encoding. Since the card is easy to install and move from machine to machine, cards can easily be rearranged depending on the task at hand.

DATA DUPLICATION

Data duplication from one card to another is extremely fast since they reside on the PCI express bus and provide massive read and write throughput. Data can also be mirrored between two cards (even in different servers) for data security. This high throughput allows for a quick duplication for division of tasks or backup purposes.

FIO AS SHIPPING CONTAINER AND ARRAY

A single ioDrive Duo can hold 1.2TB of data and is non-volatile. This makes the Fusion-io card an ideal "tape" and "tape deck" as the card can be loaded with data, easily shipped across the globe and simply plugged into another machine and played. Thus the Fusion-io card can host the necessary production software (playback/compositor) data and provide the necessary throughput eliminating the need for data transfers at the destination. You can in a sense ship the playback device with the simple need of a generic entry-level host pc.

SHARING RESOURCES

Leveraging products like the NextIO VStor allows resources like Fusion-io cards and GPU's to be reassigned as needed to different systems in the studio. This allows studios and artists to simply "switch" the data from one system to the other thus replacing transfers usually done through Ethernet by a 6GB/s connection. This combination of products allows a studio to quickly convert from 8 systems each using an attached card to one theater playback machine taking ownership of 8 ioDrives. This kind of flexibility allows a studio to stay more malleable and adjust to the current phase of a project or even a daily schedule (ioDrives used for local caching could be re-assigned to the render farm at night).