

## Success Story

### SGI Technology Drives Faster Parallel Processing of HD, 2K, 4K for Deliverables



Ascent Media Group Photos by John Benson Photography

## Ascent Media Group Runs Speedy and Secure with SGI Servers, Storage and Networking

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Chief Technical Officer, Media Management  
Services, Ascent Media Group

To enable one of the world’s most secure film and TV post production facilities, Ascent Media Group (AMG), a long-time customer of Silicon Graphics, selected SGI® server, storage and networking technology as the heart of a new state-of-the-art facility in Burbank, Calif. An industry leader in content creation, post-production and distribution of film and television, AMG purchased the SGI hardware and software to deliver faster parallel processing of 4K and other high-resolution formats as part of their data-centric production network solution, known as ProdNet. The solution offers AMG’s studio clients ultra-secure methods for accommodating a large variety of deliverables. With content piracy estimated at \$3.5 billion annually, the 100,000-square-foot building, which was gutted to the walls, has been rebuilt to be one of the most modern, most secure, all-digital facilities in the world. SGI Professional Services worked hand in hand with AMG,

to design and integrate the ProdNet system, which is dedicated to manufacturing, repurposing, and distributing large media assets in huge volumes, with no concession to bandwidth limitations.

Ascent Media Group’s deliverables include digital intermediates in HD, 2K or 4K resolution for a host of Hollywood blockbusters, post-production and satellite delivery of television programming as well as digital cinema masters, multi-language versions for home video, DVD, and a variety of entertainment content for the exploding market in wireless mobile devices. With studio clients requiring more efficient post-production workflow for film releases and—in another effort to combat piracy—reduced time-to-market for home video and DVD releases, AMG searched for a partner to facilitate these requirements. AMG chose SGI to provide equipment and services as SGI has



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had considerable success in achieving efficiencies and increased productivity in designing and deploying state-of-the-art Digital Intermediate facilities in Hollywood, London, Madrid and other cities worldwide. SGI products, solution design and services specifically address the problems of faster turnaround in a 4K data-centric media environment.

“The statistical advantage that we and SGI created with ProdNet is the increase in speed overall. From the time the film is put up on the telecine or scanner to the time the DVD is completed, we have basically reduced the time-to-market by half,” said Kevin Sanders, chief technical officer of Media Management Services for Ascent Media Group. “When we were initially designing ProdNet, one of the things we decided on immediately was the necessity to accommodate the extreme varied bandwidth and storage required by all our different departments. We have used SGI technology for many years and are well aware of SGI’s track record throughout the media and entertainment industry, which means SGI is more than familiar with the robust system integrity requirements and all-or-nothing deadlines of this business. The advantage of ProdNet



is the ability to do several jobs concurrently instead of one job at a time. The technology that achieves this is parallel processing, powered by SGI CXFS-based metadata servers strategically designed to power the heart of the I/O, and SGI TP9500 storage. It is capable of being dynamically allocated from one department to another as needed. Instead of doing the processes in a linear fashion, workloads can all be stacked on top of each other and be done in parallel. The DVD can be working on the same title and the same files as audio, telecine, the language localization services. All the various departments in this building can access that same title asset at the same time. SGI truly understood our needs and partnered with us in this process.”

### Working in 4K, the Standard for Digital Intermediate

Working in 4K resolution presents a number of challenges. Since 4K resolution is 4 times the size of 2K, the ability to work in 4K, especially in real time, demands huge bandwidth because of the amount of information that has to be read and then recorded. While doing restoration and effects work, real time is not as critical, except during the viewing of a particular scene once the work is finished. Doing 4K color correction, however, it is imperative to actually see the image in real time as the colorist plays it back, as the operator is actually doing the work.



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“Resolution is a tool, just like the camera is a tool,” explains Sanders. “4K resolution is a method of capturing detail. For instance, in effects works, 4K is able to capture a great deal more detail than 2K or HD. The detail information is critical for properly blending the composite together. It’s also essential when you’re doing restoration of features because that detail information is critical for grain matching and things like that. Also, when you’re capturing in 4K, the ability to create a better, lower-resolution image is also captured in the details. And, to be able to define edges is critical when you’re doing a down-conversion or a compression for a DVD, home video, etc.”

Another problem created by using 4K is the storage and management of that large amount of information. “Moving files very quickly from one department to another becomes quite a challenge,” adds Sanders, “so the speed of any storage device that you have ends up becoming critical: the I/O capability of a SAN or a NAS becomes one of your greatest bottlenecks. Meticulous planning is required in creating an environment in which you can do 4K work. The challenges that you face include the file system being able to open and close that many very large files at, for instance, 24 frames a second, and making sure the files open and close exactly on time. A millisecond late in opening a file disrupts the continuity. Being able to guarantee that kind of delivery from a storage system through a network is extremely challenging to any file system. The SGI InfiniteStorage CXFS system is very innovative in its approach to that problem. It becomes quite an effective solution for this type of digital imaging.”

SGI® InfiniteStorage CXFS™ shared file system was a major delivered product component for AMG, particularly in the telecine department, where each frame must be handled as an individual file as



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opposed to a portion of a larger file. The frames add up to 24 files for each second of film. In addition to these enormous numbers of files, the file sizes range from moderate to large, depending on whether they are high-definition, 2K or 4K resolution.

One of immediate benefits of SGI’s robust server, storage and networking systems is evident in the AMG Media Management 4K suite, which use the first commercial implementation of Quantel iQ and Quantel’s new Pablo, a complete color-grading suite expressly designed for digital intermediate work. Sanders reports, “With the interface that we have with the SGI storage and ProdNet, we are getting feeds and speeds between the Quantel iQ, our SGI TP9500 storage system and ProdNet that are faster than either Quantel or SGI has seen anywhere else.”

### Data Management with CXFS

SGI InfiniteStorage CXFS shared filesystem is also of huge importance in managing the data in its many forms.

“You’d be amazed at exactly how difficult it is to manage the data, and not just the 4K,” says Sanders. “As the data transitions into the other resolutions and formats required to deliver the products that result from a 4K production, they all require the high resolution at a very low bit rate. And

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the only way you can achieve that is to be able to process that detail information correctly. The ability to manage the storage and the network and the I/O capability, to match each one of the workflows that are required to take a project from 4K all the way down—to High-Definition DVD disks such as HD DVD or BluRay, and then Standard-Definition DVD and then down to the video-on-demand and cell phone type of resolutions—requires a lot of different operating systems and file systems. The equipment that we're using, which is the SGI equipment, allows for that so that the configurations of operating systems and file systems can be fairly seamless during a project from beginning to end. CXFS filesystem allows you to use just about any file system or operating system on the interfaces to the equipment.”

At the core of AMG's ProdNet are three SGI metadata servers based on SGI® Origin® 350 technology, each one with 8 CPUs, acting as the SGI InfiniteStorage CXFS servers for the storage system. AMG has a total of 20 SGI Origin 350 servers. ProdNet was fully up and running in September with one SGI® InfiniteStorage TP9500 storage system; a second SGI InfiniteStorage TP9500 and a recently installed TP9300 storage system which is coming online shortly, gives AMG a total 100TB of enterprise class storage in addition to 80TB in local caches around the facility.

SGI InfiniteStorage CXFS shared filesystem delivers the ability to share data, natively, at Fibre Channel speeds with other operating systems. AMG machines run Windows®, Linux®, Solaris®, and Mac OS® X. The SGI Origin 350 metadata servers are used for CXFS SAN-attached storage for the more higher-end devices that need the performance of CXFS Fibre Channel-connected file systems as well as for SAMBA and NFS connectivity, allowing data access via standard networking techniques. All three SGI InfiniteStorage systems connect into Brocade director class Fibre Channel switches. Foundry Networks' sFlow is used for real-time network management controls, which also supports ProdNet's security. The ProdNet system is designed to be fully redundant with no single point of failure anywhere.

ProdNet's advanced network security web was developed following extensive research and consultations with such agencies as the Motion Picture Association of America (MPAA), Society of Motion Picture and Television Engineers (SMPTE) and government law enforcement agencies. The entire facility is monitored 24 hours a day by a file-based video surveillance system. Assets are constantly tracked during operations, using barcode scans to and from all locations. ProdNet is strategically designed to allow seamless collaboration across all departments within the facility while simultaneously

unplugging the entire infrastructure from the outside world. Because Internet bandwidth is routinely used for illicit trafficking in movies and other copyrighted works, no department at AMG's new facility can access the Internet; the facility has multiple intrusion detection systems, real-time heuristics that map all normal production use, and access to functional areas is monitored and strictly based on log-in profiles. The SGI infrastructure was designed with this in mind.

SGI technology, with CXFS shared filesystem and scalable storage, gives Ascent the ability to grow its infrastructure and grow its digital pipelines, relying on SGI to expand performance, bandwidth, and computational requirements as needed, or all at the same time. Ascent Media Group is now perfectly positioned for the secure digital workflow of today and the growth of tomorrow.



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