Eye on Innovation

SGI NEWS

Media Edition

Volume 1: August 2003

Image courtesy of SWR

SGI Is Changing

The company that pioneered 3D graphics, the company branded as a Silicon Valley supercomputer icon, has come through the Internet bubble with a restructured media group completely focused on broadcast and production. And SGI is moving quickly to help its customers, both new and old, wring new efficiencies out of their operations.

SGI is now a new force in broadcast operations, having just put on air the most advanced television stations in Denmark (DR) and Germany (SWR). And SGI's recent digital infrastructure deployment at Georgia Public Broadcasting is one of the most advanced and integrated operations in the United States. We discovered that the broadcast world not only wanted to move from analog to digital formats, but more importantly, wanted to move from digital islands to fully integrated and streamlined operations. Customers wanted broadcast workflows built around open digital infrastructures that leverage information technology advances, as well as the latest in open video standards. We know how to do that. In fact, enabling our users to move and share large amounts of media has been one of our core competencies for a decade now. When it comes to open standards, SGI is leading the adoption of MXF, the wrapper that lets manufacturers interoperate. Our MPEG server with MXF record-and-playout capability is going into stations in France, Germany, and the Czech Republic today. Our competency in moving big data and the advent of increasingly robust broadcast standards, declining storage costs, and increasing network speeds have all converged to enable broadcasters to take full advantage of the digital age.

Recently, we announced a new visual workstation called Silicon Graphics® Tezro™. In effect, it will give Discreet and other software companies much more throughput and power in a desktop (or 2RU) workstation. Our announcement of Tezro with two streams of HD instead of one and 10-bit-per-channel graphics and video output quality, packaged in a smaller and much more economical system, will cause quite a buzz this month.

We have also announced InfiniteStorage, the ability to extend storage and a single filesystem across all clients in a facility regardless of OS—SGI® IRIX®, Linux®, Windows®, or Mac®—in extremely high-bandwidth requirements and with practically infinite expandability. Major broadcasters, post, and film mastering houses are adopting the infrastructure, because it will enable their businesses to grow and is secure and reliable. The technology has been well tested in over 200 locations and is now ready for media applications.

SGI has changed! Talk with us and find out for yourself. We hope you appreciate the industry information packed into this newsletter. Stay tuned, as we will be bringing this to you every quarter.

—Chris Golson
Senior Director, Media Industries

PS: Oh yeah, we haven't forgotten graphics. Recently, we announced a revolutionary approach to high-end graphics. We call it "scalable graphics." It harnesses the power of multiple graphics cards to perform in a single computer on a single complex 3D graphics scene or animation. Stay tuned for what we are doing with scalable graphics in media. For more information go to *www.sgi.com/industries/media*.

In This Edition

IT, the Real Digital Revolution

By Charles A. Steinberg

The transition from analog to digital has been well documented during the last 10 years. What hasn't been as widely understood is that this was a transition from analog to digital video infrastructure and an adoption of digital transmission. It has not been the giant leap forward into the information age that many other industries have taken. That is about to change. Now, both the film and television industries are poised to take that leap into the information age. The real digital transition is beginning now, with the advent of scalable broadband information technology (IT) solutions. Major film, video post-production, and television broadcasting companies are adopting high-performance, digital infrastructures. In Hollywood alone, Warner Bros., EFILM, and Ascent Media are moving from format-dependent digital video storage and networking to format-independent data infrastructures. To put it simply, these infrastructures create, manage, and deliver digital video as open-standard data files. And once a media asset—whether it's shot on film or video—is "just a file" on an open-standards IT system, it can be more easily moved to where you want it and mastered how you want it. In a nutshell, transitioning to a digital infrastructure means being able to produce content faster, cheaper, and better.

For years now, the Holy Grail has been a digital infrastructure that could manage and deliver media as cheaply, as flexibly, and as fast as the digital islands could create and manipulate it—in other words, many times faster than traditional methods.

Today, we can now move media as data much faster than we could ever move media as videotape or film. And that is fundamentally what's allowing the IT transition to occur.

Digital IT Advantages

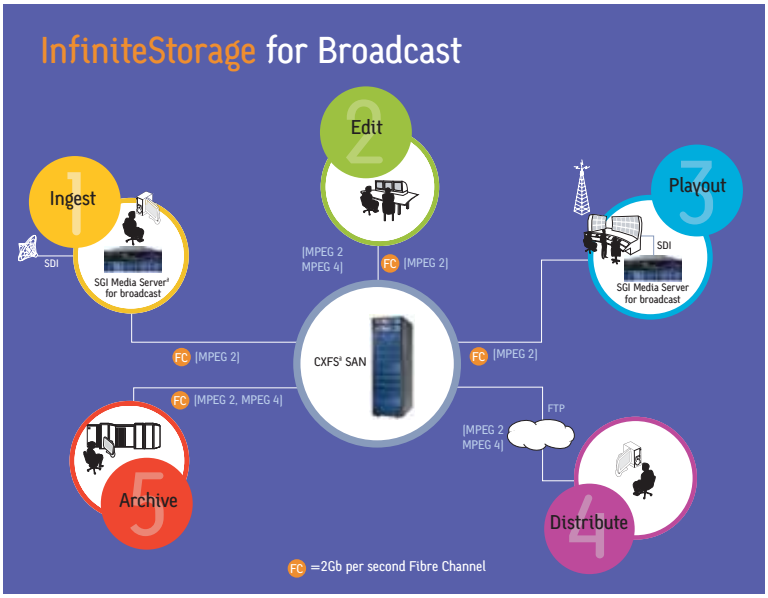
Once a media asset is a file, it can be converted to whatever you want much more readily and often without compression or recompression. In IT, going from a file to a format—be it 35 mm, HD, DVD, or NTSC or PAL videocassettes—is only one process, because it is taken from the same universal master. With digital IT, cost efficiencies include being able to use common data routers as opposed to dedicated video routers. Open storage and networking standards such as Gigabit Ethernet and Fibre Channel can be employed instead of more expensive, dedicated formats such as SDTI. And, of course, these networks move media around much faster, at 30 or 40 times speed, as opposed to a tape format, which moves at four times speed maximum.

Moving to IT not only opens up vast networking and storage possibilities, but is also a move away from proprietary manufacturers, proprietary filesystems, proprietary storage, proprietary networks, and single-vendor applications —the vertically integrated one-company model. Moving to IT means moving to open filesystems, the latest storage and networking technologies, and the ability to choose the best applications for the job. Moving to IT means the freedom to use different operating systems—IRIX, Linux, Windows, Mac OS® X—in a best-of-breed multiple-vendor environment. This model has won out every time in the computer business for many years.

In effect, the digital video "revolution" was in a holding pattern, waiting for IT infrastructure to become robust and scalable enough to deliver the bandwidth capacity and open-systems architecture for the true digital revolution: moving media as data (and in the not-so-distant future, delivering "film" to theaters as data). We now have achieved that through storage, network, and computer system bandwidth and through robust, shared filesystems, scalable computer architecture, and software media management tools and systems.

The companies that will succeed in the film and video industries' transition to digital IT are those companies that have a deep and historical understanding of the digital video domain and the broadband and scalability strengths in the IT domain. These companies have been in the business of providing guaranteed rate playback, whether it's 24, 25, 29.9, or 30 frames per second, or whatever you need.

The impact of the digital IT revolution in the film and television industry could have as significant an impact as the Internet has had on our daily lives. This leap forward will not only streamline the creation, management, and delivery of film and television, it will move the two worlds closer than they have ever been and it will help us invent new ways to create and deliver content.



Bio:
Charles A. Steinberg is a member of the board of directors of SGI. Steinberg served as president of the Broadcast and Professional Company of Sony Electronics, Inc. Prior to joining Sony in 1988, Steinberg was with Ampex Corporation for 25 years, serving in positions including president and CEO and chairman of the board.

SGI® InfiniteStorage for Production

Excerpted from *Digital Infrastructure for Production* White Paper by Jim Farney

Media Industry Requirements

Digital media content is growing and growing. Video post facilities and film special effects and mastering houses are creating and/or converting more of their content into digital formats. More digital processes are being introduced into filmmaking (e.g., digital intermediates), and more versions of media assets are being produced: film, DVD, VHS, D-cinema, pay-per-view, broadcast, video-on-demand, Internet, and so forth.

With facility customers continuing to demand lower prices and, in many cases, fixed project costs, the facility must turn to more efficient digital infrastructure solutions in order to remain profitable.

As large media facilities transition to a data-centric model, a new digital infrastructure is called for to overlay the existing video-centric (or film-centric) infrastructure. This infrastructure becomes more important as the tools migrate from purpose-built, specific-resolution black boxes to high-performance, general-purpose computers running media applications. Instead of distributing a specific standard and resolution of video, the facility distributes data, which can embody all variations of electronic media (spatial resolution, colorspace, bit depth and type, frame rate, compressed/uncompressed). The digital infrastructure must enhance workflow, create efficiencies, be utterly dependable, and be both flexible and scalable enough to allow the business to grow, explore new opportunities, and thrive. The unique hardware and software of SGI, coupled with the company's 20 years of direct experience in media, offer precisely this digital infrastructure.

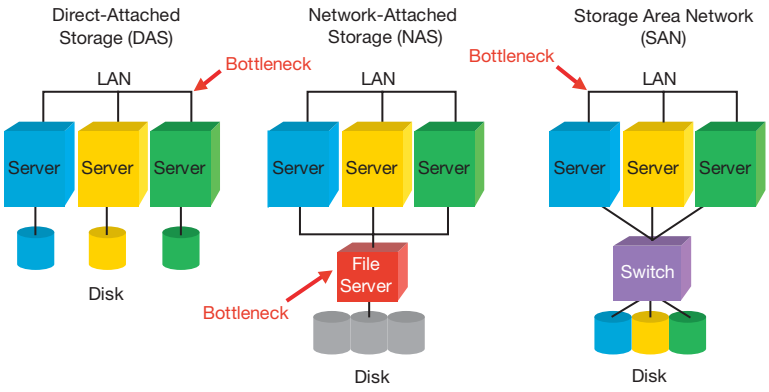
Our data management strategy is based on providing high performance, total modularity, and reduced complexity. The key to optimum performance is flawless integration among the computational server, visualization engine, and storage bandwidth, to ensure that neither bandwidth bottlenecks nor scalability constraints will limit the production facility's ability to innovate. Modularity ensures that customers purchase only the capabilities needed and that they can trust that the solution will easily integrate, scale, and transfer to evolving infrastructure architectures. When it comes to data management, our goal is to reduce the complexity in a media environment.

SGI provides the ultimate in infrastructure solutions by combining industry-leading shared-filesystem technology (CXFS™), unrivaled bandwidth, scalability, high-availability tools, hierarchical storage management, the SGI® Data Migration Facility (DMF), and reliable backup capabilities.

The SGI® digital infrastructure consists of a highly scalable shared storage system with a common, shared filesystem, accessed by high-speed datapumps (servers) pushing and pulling data through efficient distribution systems linking all of the facility's resources, including legacy infrastructure and connections to the outside world. SGI offers multiple options in each of these areas, allowing customers to choose what is needed now while remaining confident that they can expand on the original infrastructure base without tossing anything out and with virtually no limits on growth. The storage options include direct-attached storage (DAS), network-attached storage (NAS), and storage area networks (SAN) with real-time file sharing. Filesystems include the world's most powerful: XFS® (extended filesystem) for stand-alone SGI environments and CXFS (clustered extended filesystem) for shared heterogeneous environments that include computer systems from both SGI and other manufacturers. Server

[Continued on page 4]

Figure 1 (below) shows the three storage architectures available today—DAS, NAS, and SAN—and their respective data access bottlenecks. In response to this, SGI has developed the CXFS shared filesystem for SANs, which delivers simultaneous high-speed shared access to data from multiple computers and multiple processes within a workflow. CXFS combines the shared data access of NAS with the scalability and performance of a SAN.



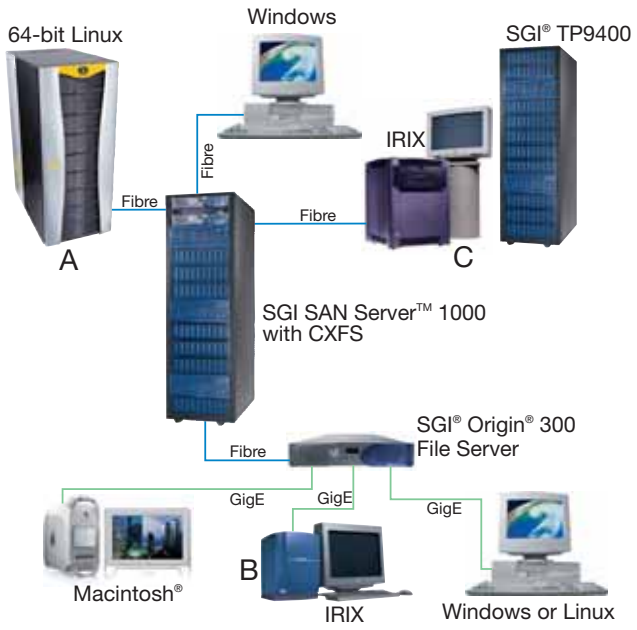


Figure 2: At SGI our priority is to ensure that customers' information is completely secure and instantly available.

options range from powerful two-processor file servers to massive computational systems of up to 512 processors. And SGI offers the customer the flexibility to make appropriate choices of the best networking infrastructure through an impressive range of networking mediums and protocols, from Ethernet (and Fast Ethernet, GigE) to HIPPI, ATM (OC3 and OC12), Fibre Channel, and the high-performance GSN (Gigabyte System Network), capable of moving nearly a gigabyte of data each second over a single network connection. SGI has the knowledge and expertise to craft powerful and appropriate solutions from our hardware and software offerings, as has been proved time and time again in top media facilities around the world.

Filesystems

SGI filesystems XFS and CXFS constitute critical pieces of the infrastructure puzzle. These filesystems provide a powerful solution unmatched by any other filesystem in use today.

XFS is a robust, high-performance, 64-bit filesystem able to massively scale files up to 9 million terabytes and filesystems of 18 million terabytes. To put these numbers in perspective, a typical movie at 2K resolution is 2TB (2000GB), meaning a single filesystem could accommodate 9 million feature films at the highest quality level used today. XFS delivers nearly the I/O performance of a raw filesystem, and when coupled with GRIO (guaranteed-rate I/O), provides powerful solutions for real-time record and playout of HD video and even 2K film files.

CXFS adds to XFS the capability of sharing the filesystem and storage directly with other SGI servers and with other operating systems, including Windows NT®, Windows® 2000, and Sun™ Solaris™. Additional variants of UNIX®, as well as 64-bit Linux and 32-bit Linux, will be delivered soon, and other operating systems are under consideration. Sharing the data means unnecessary data motion is eliminated, thus reducing network traffic, congestion, and replication of storage. This shared filesystem is the key that unlocks the full potential of the SAN, permitting workflows in a media facility that foster speed, efficiency, creativity, and client satisfaction, as well as freeing up the facility to push through more work and drive up revenue.

The Data Access Bottleneck in Conventional Storage Architectures

In high-performance computing environments, the limits of NAS and SAN became apparent in that neither provided sufficient access to data that media facilities require. We describe this as "the data access bottleneck" (see figure 1).

Hybrid Storage Strategies

In the real world, rarely if ever will only one type of storage suffice in a large media facility. Combinations exist because each type of storage has benefits over the other types in certain applications. The most powerful model (see figure 2) is one with a CXFS SAN at the core. This centralized storage repository is accessed by CXFS clients both directly (A: expensive, high-performance tools such as film scanners) and indirectly through network-attached file servers (B: less expensive, lower-performance tools such as paint systems). In cases where high-speed, guaranteed-rate I/O is required, media clients will also have direct-attached storage systems used to stage the data (C). An example is Discreet® stone® storage. With few exceptions, SGI system building blocks can be redeployed in different roles when circumstances require. Or, more likely, they can retain full functionality when other parts of the infrastructure puzzle are added as requirements grow. Whether infrastructure is built out with all the elements in place in the beginning or with elements added as dictated by needs or budgets, SGI provides the most complete, future-proof, end-to-end storage and data management solutions for complex creative workflow environments.

Read the full white paper at *www.sgi.com/pdfs/3437.pdf*

Discreet and Silicon Graphics Partner to Deliver SGI® InfiniteStorage Solutions

"We want the ability to have only one copy of our content and to share access to it from any platform we choose. The SGI CXFS shared filesystem enables us to do that."

—Phil Mendelson,
Senior Vice President of
Engineering,
Ascent Media

SGI has formally joined Discreet's infrastructure sparks® partner program. As part of the agreement, Discreet and SGI are qualifying key elements of the SGI InfiniteStorage solution, including the SGI SAN Server™ family and SGI® CXFSTM shared filesystem, to work with Discreet's systems and software product lines. This initiative will combine the power of Discreet systems with the flexibility of the SGI open digital infrastructure for greater workflow efficiencies in visual effects production and film intermediates.

"The extension of our relationship with SGI represents a significant advance in Discreet's ability to deliver high-performance, open-infrastructure solutions that drive substantial client value for high-end film and HD workflows," said Martin Vann, vice president of Worldwide Sales and Marketing for Discreet. "Together, we'll provide an agnostic, multiplatform, multi-OS solution that offers unparalleled flexibility by bypassing the proprietary barriers and performance limitations of the vendor-specific SAN solutions currently used in post-production and broadcast."

The agreement also encompasses global co-marketing and sales of the SGI InfiniteStorage solution. Discreet, working with SGI, will resell SGI SAN solutions worldwide as an integral part of its high-performance infrastructure products designed to target a growing demand for robust, highly scalable shared storage environments. This demand is being fueled by the increasing complexity of modern post-production projects combined with the rapid transition to high-resolution digital film and television formats including the emerging digital intermediate market.

"Discreet creative systems are the most powerful in the industry," explains Chris Golson, senior director, Media Industries, SGI. "Our InfiniteStorage solutions will bring a new level of flexibility and cost-effectiveness to environments where teams of creatives can benefit from simultaneous realtime access to content. Integrating SGI InfiniteStorage solutions with Discreet systems will give facilities an immediate competitive advantage in scheduling and efficiency."

The SGI InfiniteStorage environment enables high-speed sharing of media assets between IRIX® OS-, Windows® OS-, and Linux® OS-based systems connected directly to the SGI SAN Server family. Mac OS® X clients are currently supported via file serving with a direct Fibre Channel access option available later this year. As a result, InfiniteStorage systems near-term will provide a unique high-performance shared storage environment for Discreet's backdraft® workflow software and the new realtime lustre digital film color grading system. Also, large-scale, multi-seat software environments using 3ds max™ and combustion® software will be able to share files through either NAS or SAN connectivity. Discreet also plans to add standard file support to future versions of its inferno®, flame®, flint®, fire®, and smoke® products, enabling them to read and write data directly to the SGI CXFS filesystem.

Phil Mendelson, senior vice president of engineering at Ascent Media's Creative Services, one of Discreet's largest systems customers, explains, "We are very excited about this new collaboration between Discreet and SGI. As we move more of our workflow to file-based and networked architectures, we want the ability to have only one copy of our content and to share access to it from any platform we choose. The SGI CXFS shared filesystem enables us to do that, facilitating access to data from IRIX, Windows, Linux, and Mac hosts as though it were on local storage. This is a cost-effective advantage, in terms of storage, bandwidth, and workflow."

Discreet Supports Silicon Graphics Tezro Visual Workstations

"Tezro offers a level of interactivity and responsiveness that is extremely high compared to other systems on the marketplace."

—Marc Petit, Vice President, Systems Product Development, Discreet

Discreet, a division of Autodesk, Inc., announced that it plans to support the recently announced Silicon Graphics Tezro visual workstation for upcoming releases of its flame® and flint® visual effects systems, its smoke® nonlinear editing and finishing systems, and the backdraft® media management and background I/O system.

The Silicon Graphics Tezro workstation is designed to eliminate many of the bottlenecks inherent to typical digital video systems by allowing data to be transferred between the various components at much higher rates. It incorporates the bandwidth and capabilities for real-time data transfers of greater than 2K resolution as well as the integrated ability to handle high-quality video I/O and graphics.

The new Tezro workstation features a scalable architecture with configurations ranging from one to four 64-bit RISC processors, up to seven integrated PCI-X slots, and 8 DIMM sockets for up to 8GB of memory. Of key significance to the digital media industry is the high-speed internal bus bandwidth that provides data rates that are up to 60% faster than on the Silicon Graphics® Octane2™ workstation. The Tezro workstation also incorporates powerful SGI® VPro™ V12 graphics and the 10-bit DMediaPro™ HD/SD video I/O subsystem. According to Mark Petit, Discreet's vice president of systems product development, "Tezro offers a level of interactivity and responsiveness that is extremely high compared to other systems on the marketplace."

The high bandwidth and advanced VPro graphics of the Tezro workstation can deliver up to two real-time streams of uncompressed HD (1080i and1080/24p) at 10-bit component with superior 4:4:4 (RGB) sampling as well as playback at 2K or higher resolutions, making it one of the highest performing online workstations for high-quality HD and film post-production.

mental images ports to SGI® Altix™

"We have found it very easy to port the 64-bit version of our rendering software, mental ray, to the Altix platform."

—Rolf Herken, President and Director of R&D, mental images

The award-winning SGI family of 64-bit Linux OS-based servers and superclusters promises to take film rendering to the next level. SGI engineers have developed the most powerful rendering servers and superclusters ever applied to the task of effects and animation rendering. Hear what early access software developers are saying about this new system.

"We have found it very easy to port the 64-bit version of our rendering software, mental ray, to the Altix platform. Within two weeks from the delivery of the machine, we were able to certify the current version 3.2.4 of mental ray for Altix. We are seeing an exceptionally effective scaling of the performance of our parallel application software with the number of processors," says Rolf Herken, president and director of R&D, mental images.

SWR Commissions SGI as Prime Contractor

Südwestrundfunk (SWR), the second-largest station of Germany's public broadcasting network, ARD, has decided to further expand its digital newsroom innovation goals. SGI was commissioned to deliver, in the role of a prime contractor, a server-based news production and playout environment for SWR's location in Stuttgart, after successfully installing a similar solution for the regional studio in Mainz (which went on air in February 2003). The digital news infrastructure will transform the tape-based news production processes to a nearly paperless, highly integrated, and streamlined workflow from ingest to transmission. Central to the solution are two SGI Media Server for broadcast systems for ingest and playout. Material also will be accessible in MPEG-1 for browsing and rough-cut editing. Acting as a systems integrator, SGI® Professional Services will work with subcontractors SGT and Pinnacle Systems to include best-in-class software solutions for news production, media management, browsing, automation, and nonlinear editing.

Image courtesy of SWR

InfiniteStorage for Tippett Studios

Tippett Studios, the renowned Northern California film effects facility, recently won a substantial contract for the production of special effects shots for an upcoming blockbuster.

After considering several storage vendors, Tippett decided to go with SGI because of the good relationship the two companies have established over the past eight years and the flexibility that the SGI® CXFS™ shared filesystem offers. Tippett still relies on SGI for parts of its production pipeline, but has migrated to Linux and Mac for content creation, compositing, and rendering. Tippett understands the value of using the CXFS shared filesystem to tie its various IRIX and Linux systems together and also understands the advantages of a flexible infrastructure that puts the control back into the hands of its IS team. The company's previous networked-attached storage solution had proved too inflexible in the face of a rapid-fire production environment.

© Blockbuster Entertainment/Tippett Studios

SGI worked with Tippett to design a SAN configuration that met the studio's I/O requirements, had no single point of failure, and fit into tight budget guidelines. The system could also be configured to handle both NFS and Samba® traffic. The new equipment purchased includes two four-processor SGI® Origin® 350 metadata servers, two 16-port Brocade® Fibre Channel switches, and 14TB of SGI® TP9500 storage.

Another compelling advantage of going with SGI was that Tippett was also able to leverage its current SGI infrastructure and add it into the SAN. This included a recently purchased SGI Origin 300 file server that manages Tippett's tape robot, an SGI® Origin® 2100 server being used as a backup metadata server, and an SGI® TP9400 storage array. All of this existing infrastructure and the new SGI equipment is being controlled by the new software environment provided by SGI, which includes the CXFS shared filesystem, SGI® Performance Co-Pilot™ performance monitoring tool, and SGI FailSafe™ high-availability software. For service, Tippett is taking full advantage of SGI Managed Services to install and implement the system and has chosen a three-year FullExpress™ 7x24 support contract.

[More customer innovations on page 8]

Media Edition

Eye on Innovation

CUSTOMERS

CUSTOMER INNOVATIONS

Image courtesy of Colour Systems

Reader's Digest and Colour Systems

"We selected SGI largely because of Dalim Software's recommendation. They let us know that they'd been working with SGI for some time, and that SGI had built up a reputation with Dalim Software customers as basically not going wrong."
—Dominick Duffy, Technical Director, Colour Systems

Colour Systems Ltd., a leading premedia design, digital management, and workflow solution company, uses SGI® Origin® servers, with Dalim Software and Xinet workflow software. With the resulting system, Colour Systems Ltd. is now bringing all European editions of *Reader's Digest* into a centralized, electronic workflow, which expedites every step of the prepress process.
www.sgi.com/company_info/successes/industry/production.html

Shaw Brothers Studios Remastering Center

"...we were able to run all of our reels of film through the system, running on the Silicon Graphics Octane2 system, in an automatic mode, eliminating a lot of the 'interactive' work—sometimes more than 50%—that our staff would have done manually otherwise."
—Thoma Thurau, Chief Engineer, Shaw Brothers Studios

The largest commercial digital film rejuvenation and remastering project in the world is under way at the Shaw Brothers Studios Remastering Center in Hong Kong, and SGI technology is an integral part of it.
www.sgi.com/company_info/successes/industry/production.html

Image courtesy of Stars Digital

SGI and Xinet Deliver the Power and Speed for Digital Prepress

"From the installation date, the SGI Origin 200 server has been running 100% of the time—that's three years and six months of continuous, 24/7 use—and we have had no crashes, no freezes, or any hardware faults of any kind. During the entire time, we've had about 20 to 25 users connected throughout our 24-hour day, five days a week."
—David Ewers, Systems Director, Stars Digital (a subsidiary of Leo Burnett Advertising)

Stars Digital in London chose SGI hardware and Xinet networking, prepress, and asset management software. The result was stable and efficient workflow with the ability to provide asset management services to customers.
www.sgi.com/company_info/successes/industry/production.html

Image courtesy of Danish Brodcasting

Danish Broadcasting: Building Tomorrow's Newsroom Today

SGI digital workflow solutions are currently being deployed around the world, and SGI and Danish Broadcasting Corporation (DR) are now building the international broadcast industry's most advanced, completely integrated digital news system.

As of May 21, 2003, the three-hour broadcast goes live every morning at 6:30 directly from the digital news production and archival system supplied by SGI.
www.sgi.com/company_info/successes/industry/broadcast.html

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