SUCCESS STORY

NBA ENTERTAINMENT

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NBA Entertainment's Digital Slam Dunk

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In Secaucus, N.J., a massive digital workflow and archive management system is changing the face of sports entertainment. Installed at the headquarters of NBA Entertainment (NBAE), the digital facility – one of the most extensive of its kind in the world – enables producers and engineers to capture, catalog and store every play from every game played throughout the league. The system is also an essential component of the NBA's initiative to digitize and preserve 60 years of historical footage currently residing on film and video tape.

It is, quite literally, where the league's past meets its future. As the Emmy Award-winning entertainment production and programming division of the National Basketball Association, NBAE produces several weekly television shows, including NBA Access with Ahmad Rashad, NBA Matchup, NBA Action, WNBA Action and NBA All-Access. NBAE also creates exclusive content for NBA TV, NBA.com and WNBA.com. NBAE also packages NBA and WNBA games along with highlight and lifestyle shows for distribution to more than 210 countries worldwide.

The NBAE facility was born of the league's unique vision for globally leveraging its content. Years later, after being implemented with solutions and expertise from SGI, it portends a new era for sports entertainment. It's an era in which footage of any memorable moment can be accessed easily and quickly, and then repurposed for distribution on broadcast television, the Internet, IPTV, mobile devices – even gadgets that have haven't been invented yet.

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A Streamlined and Accelerated Workflow

Launched in 2006, the state-of-the-art Digital Media Management facility has enabled NBAE to simultaneously ingest footage from up to 14 National Basketball Association games, edit the archival content on the fly, provide full game broadcasts, clips and other NBA content to 214 countries worldwide.

Today's system streamlines and accelerates the previous workflow that brought content to 26 editing workstations. That solution bound an editor to a particular workstation, and drastically slowed the process of sifting through footage to find the best clips for a highlight reel or Internet feature. Compounding the problem was NBAE's need to manage high-volume bursts of content, which in turn must be edited, repackaged and repurposed under tight broadcast news deadlines.

The original workflow had another crucial limitation: a limited asset management environment forced editors and producers to choose which material could be absorbed and retained – rather than archiving all available content.

Working with Mike Rokosa, NBAE's vice president of engineering, and with Snell & Wilcox Canada, Inc., SGI designed an environment that enables networked editing from a 48TB SGI® InfiniteStorage Storage Area Network (SAN). The system allows any editor to access his or her content from any workstation. Without significantly modifying its editing infrastructure, NBAE has leveraged the SAN to dramatically improve the productivity of every editor.

Key to the SAN environment is SGI® InfiniteStorage Shared Filesystem CXFS™. Now in its fourth generation, CXFS provides the software infrastructure to allow simultaneous shared access to digital archives—large files are shared, not moved, and all editing stations have direct access to all data. SGI also deployed a 3,000-slot StorageTek® SL 8500 robot system to host a nearline storage archive for content accessed less frequently than that stored on disk.

To further enhance workflow, SGI implemented its InfiniteStorage Data Migration Facility (DMF), which transparently migrates files from online storage to near-line storage based on user-defined criteria such as time of last access. DMF automatically keeps more frequently requested content on faster, more expensive spinning disk arrays, while moving rarely needed material to cheaper tape storage.

A Year Ahead of Schedule

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NBA Entertainment

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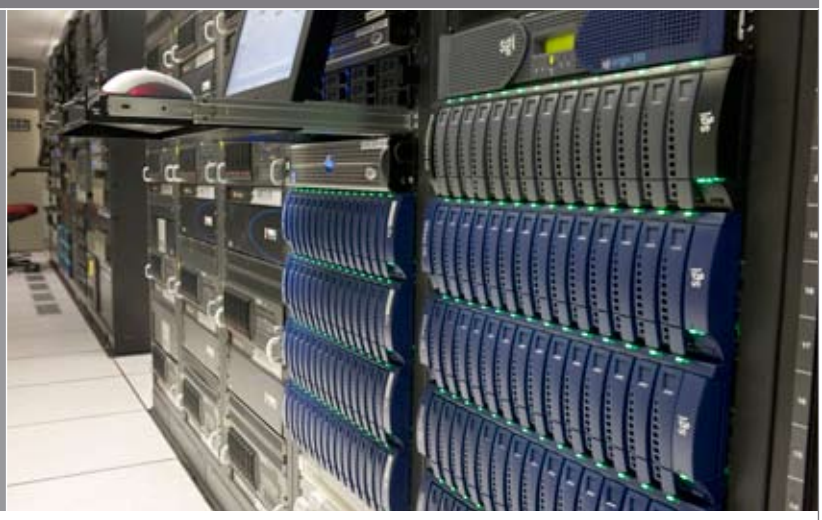

Photo Courtesy of NBAE/Getty Images

Once the system was in place, says Rokosa, NBAE saw usage spike to unexpected levels. In its first year, NBAE ingested more than 45,000 specific assets into the SGI system – the equivalent of 30,000 hours of content, or 1.5 Petabytes (PB) of data.

With that pace of productivity, Rokosa says, the deployment has been something of a slam-dunk. "The new system gave us a much greater ability to ingest and serve the video, and then make it available to our user community. That in turn spurred on a greater demand for archive requests. We knew we would have to expand it eventually, but we didn't expect it to happen this soon."

It's a good problem, says Rokosa, because it underscores how the SGI asset management system has transformed the workflow at NBAE. "With more material going into the archive, we have even more demand to return the material on the user side," he says. "Before, an editor might have used what was convenient, because they didn't have the time to wait for all this material to be ingested to the workstation. But now, they can use precisely what they want to use because they don't have to wait."

A closer look at the NBAE facility reveals just how valuable those time savings can be. For each game, NBAE uses a combination of nine cameras – some high definition (HD) and some standard definition (SD) to record every moment of a game. These ultimately are logged as more than 500 different time-stamped events, which are sent on video tape to NBAE facility in Secaucus. Once encoded, the new game content represents 6 to 8 Terabytes (TB) of data added to the archive every week. Some of that material is immediately repurposed and sent to news networks and team offices for highlight reels and other purposes. Still more content ends up on NBA.com and other broadband sites.

'We Just Get the One Minute"

"The ability to do partial file restoration was a key differentiator for SGI," adds Rokosa. "SGI Professional Services was able to do it, and they were able to do it correctly, and this has proven to be a lynchpin in allowing us to manage this content."

Rokosa says partial file restoration, enabled by Hydrogen Archive Catalyst® software from Silex Media, has been essential to NBAE's productivity. "Each game represents three hours of material split into 400 or 500 instances. If we had to store each one of those instances as a separate asset, the database would be unwieldy. With the system SGI set up, we're not forced to go into the archive and bring back the three-hour product just to get one minute. We just get the one minute."

Meanwhile, NBAE is looking to streamline its workflow further by launching an initiative to ensure new content is encoded before it ever reaches the production facility. Already, NBAE has begun to acquire the HD broadcast cameras that were already on site in every NBA venue to capture the action from isolated angles. "Instead of shipping video tapes back to our facility, we'll encode cameras on site and then transmit the digital content to New Jersey," says Rokosa. "That will give us the ability to meet today's demanding HD market by replacing SD with an HD-capable format."

That strategy, notes Rokosa, offers another benefit. "This will free up our encoding facilities here in New Jersey so we can concentrate on digitizing and archiving historical NBA content."

NBAE originally expected to take up to seven years to digitally catalog and store the league's total archive, which dates back to 1946. But by way of these additions and advances in the content management systems and the streamlining of the archiving workflow the league hopes to meet its goals in less than four years. That's 400,000 hours of history preserved in a fully indexed digital archive.

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"We have to preserve that archive before the original source content begins to fail," explains Rokosa. "All this means a lot more data coming into the system at a much faster rate."

100,000 Assets a Year

It also means effectively doubling the storage and archiving system.

"This has been so successful that two years of storage capacity has been consumed in half that time," Rokosa notes. "When users make requests for certain high-resolution files, those files have to go from spinning disk to the environment on the requestor's platform. We've been seeing an increase in those requests, so we needed more storage."

It wasn't long, then, before Rokosa called again on SGI Global Professional services to grow the archive management infrastructure. NBAE's goal: To ingest and archive 90,000 to 100,000 assets a year.

To accelerate the facility's move into the second phase of deployment, SGI added a second, 3,000-slot StorageTek SL 8500 robot system to streamline access to 3.2PB of nearline storage.

SGI also expanded the system's Fiber Channel network fabric from 128 ports to 192 ports, and added three SGI® Altix® 450 servers powered by 48 Intel Itanium 2 processor cores and 48GB of memory. The servers run Novell SUSE® Linux Enterprise Server 10. "These new Altix 450 servers allow us to better handle the push and pull of user traffic," explains Rokosa. "When you're talking HD bit rates compared to SD, the difference is huge in terms of the demands placed on network I/O."

High-performance primary disk storage has grown as well with an additional 16TB InfinteStorage 4500 RAID array. A new SGI InfiniteStorage NEXIS NAS 1000 system has upgraded the facility's low bit-rate content browsing capabilities, a set-up that allows editors to rapidly surf indexed material. And a new 210TB SGI InfiniteStorage 4000 system for secondary archival disk storage keeps up to 30 seasons of content within quick and easy reach of editors.

Staying Ahead of Demand

For Rokosa and NBAE, scaling out the facility isn't so much about keeping up with demand as it is about staying well ahead of it.

"We're trying to build as much growth-protection in this build-out as we can," he says. "As a league, the NBA has always been a leader in the digital marketplace. We need to be able to present to our fans our games and players in all the formats and to all the platforms. And as an international brand, we have to be as nimble off the court as we are on the court."

Part of that agility involves eventually giving NBA teams and broadcast partners direct access to the NBAE archive. "With the SGI system, we can now bring more users into the game, and that means giving our partners access to the library so they can reap some of the same benefits we have," Rokosa adds. "There's no reason a team should have to duplicate our efforts."

Throughout its implementation and expansion, NBAE has relied on the expertise of SGI Professional Services. "SGI has stepped up from day one, and everything they've done has been a class act," says Rokosa. "They've supported us every hour of every day, and they've been creative in finding solutions to questions we haven't even asked yet."

When it comes to measuring ROI, Rokosa says he simply has to survey the impact the new SGI system has had on the NBAE facility.

"Since we've started this path of centralized storage, with desktop-based search and retrieval, we have not increased the number of edit stations here or the number of staff, yet we've still managed to dramatically increase the amount of product we've pushed through," he says.

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And in a business that places a premium on productivity every minute of every day, that puts NBA Entertainment in a league of its own.

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