sony pictures imageworks

Sony Pictures Imageworks: Intel® Solution Services Wins Rave Reviews for Speeding Artistic Production

SOLUTION SUMMARY

Challenge	The RISC-based servers and database that manage the internal production workflows at Sony Pictures Imageworks* had reached the limits of their capacity. A trend toward larger jobs and the need for faster turnaround dictated the need for a new system. If the resulting slowdown in response times continued, it would jeopardize productivity and could potentially compromise the quality of the artistic work that 600 dual Intel® Xeon™ processor-based Dell servers convert every night to high-resolution images. Although Imageworks needed to improve performance and preserve reliability, the company wanted to do so without increasing costs.
Solution	Sony Pictures Imageworks, an award-winning visual effects and computer animation company, contracted Intel® Solution Services to overhaul its production management system. Intel Solution Services developed a proof-of-concept for an Intel® processor-based cluster to replace the existing RISC-based UNIX servers and Oracle8*i** database. The new Intel architecture combines clustered Dell servers with Microsoft Windows* 2000 running Oracle9*i** Real Application Clusters (RAC).
Database servers	The servers that Intel Solution Services originally deployed in its proof-of-concept included two Dell PowerEdge* 6650 two-way servers with Intel® Xeon™ processors MP at 1.60GHz and 4GB of main memory. The production system consists of Dell PowerEdge 2650 two-way servers with single Intel Xeon processor MP configurations at 2.80GHz.
Operating system	Microsoft Windows 2000 Advanced Server
Databases	Oracle9i RAC Release 2
External storage	One Dell PowerVault* 220S Ultra SCSI disk drive subsystem attached to each server
Performance measurement tools	Oracle Enterprise Manager, Microsoft Windows Perfmon, Oracle Statspack
Applications	CUE, TIMECARD, PTS, ITS
Intel® Solution Services practice provided	Advanced Data Center

Business Challenge

DIGITAL VISUAL EFFECTS AND ANIMATION STUDIO SEEKS INCREASED PRODUCTIVITY, EVALUATES NEW MISSION-CRITICAL PRODUCTION MANAGEMENT SYSTEM

Hollywood film studios know that special effects can be a powerful draw for audiences. A successful effects-laden feature can generate hundreds of millions of dollars in revenue and, in the process, become woven into popular culture. When the international blockbusters *Spider-Man** and *Harry Potter and the Sorcerer's Stone** called for eye-popping computer-generated

imagery, the filmmakers turned to Sony Pictures Imageworks for unparalleled artistry. From its headquarters in Culver City, California, Imageworks specializes in creating state-of-the-art digital animation and breathtaking visual effects. The company recently won its first Academy Award* for its animated short film *The ChubbChubbs!** and a fourth Academy Award nomination for Best Visual Effects for *Spider-Man*.

To work its cinematic sorcery, Imageworks employs hundreds of world-class visual effects artists and animators who create, edit and manage the tens of thousands of frames that make up a typical film. Tight deadlines and the artistic staff's valuable time make the company's production management system—a central repository of production workflow data—critical to Imageworks' success. When artists have to wait to receive a partially completed frame, character drawing or background, they lose valuable production time. A failed production management system and the resulting production delays can cost a company hundreds of thousands of dollars. When all goes well, the production management system quickly routes materials to the production pipeline and spots pipeline bottlenecks, thus avoiding cost overruns while helping to meet deadline commitments. But when the number of artists or the amount of material grows dramatically and overburdens the production management system, artistic efficiency and productivity suffer. And artistic quality could be compromised—after all, the more time artists can devote to the work and the more versions they can create for filmmakers to review, the better the result. Bringing filmmakers' vision to the screen and creating new experiences for audiences around the world is Imageworks' mission and core business.

Imageworks recently faced just such a challenge when the mounting demands of an enviably high-profile production slate threatened to overwhelm its production management system. When multiple terabytes of digital images in one recent blockbuster film threatened to jam the company's electronic production pipeline, the system often operated at 90 percent of capacity. "As the system nears saturation, response times can reach the point where they could begin to undercut the quality of service to our users," says Bill Villarreal, vice president of technical operations.

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Mike Wilson
Project Manager and Lead Engineer
Database Group
Sony Pictures Imageworks

DIGITAL TECHNOLOGY IS ESSENTIAL TO EFFICIENT MOVIE MAKING

Artistic production begins on desktop workstations. There, artists create the first version of every frame or shot in low resolution. After adding successive higher-resolution layers of 3D and 2D digital artwork to each frame, artists pre-visualize the low-resolution result. When they think everything looks right, the aggregated digital dataset goes into a vast rendering farm of some 600 dual Intel® Xeon™ processor-based Dell servers for numeric-intensive conversion to high-resolution images overnight. When artists return to their desktops the next morning, they can view yesterday's completed work in film-quality full motion. During the screening of dailies, the director reviews the work in progress, making changes to some shots and giving final approval on others. This is an ongoing process until the visual effects work is delivered.

In 2002, Imageworks recognized that its production management system needed upgrading. It was built around clustered two-way RISC-based servers that host UNIX and Oracle8*i**. Performance was paramount; money was an issue; and reliability was essential. The Intel approach looked very attractive. Plus, Imageworks had a very favorable experience with the Intel architecture-based Dell servers used in the rendering farm. The critical question confronting Imageworks was whether it should stick with a UNIX*-based platform or switch to a much more cost-effective Intel architecture-based platform? Villarreal and his staff needed to decide quickly.

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Bill Villarreal
Vice President of
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Business Solution

INTEL® SOLUTION SERVICES DELIVERS RESULTS

For help in selecting the right architecture for its production management system, Imageworks turned to Intel Solution Services' consultants. According to Villarreal, "In prior engagements with us, Intel Solution Services had always delivered top-notch consulting services that produced significant business benefits." Adds Mike Wilson, lead engineer of the database group at Imageworks, "Intel Solution Services has taken the time to understand our industry. They've learned how our division differs from some of the other units within Sony. This insight into our problems enables them to develop better IT solutions for us."

To help make the decision between UNIX and an Intel architecture-based system, Imageworks asked Intel Solution Services to develop a proof-of-concept for a two-way cluster of Dell PowerEdge* 6650 servers running Microsoft Windows* 2000 and Oracle9*i** RAC. It would be a failover configuration, in which each side in the cluster backs up the other in case one fails.

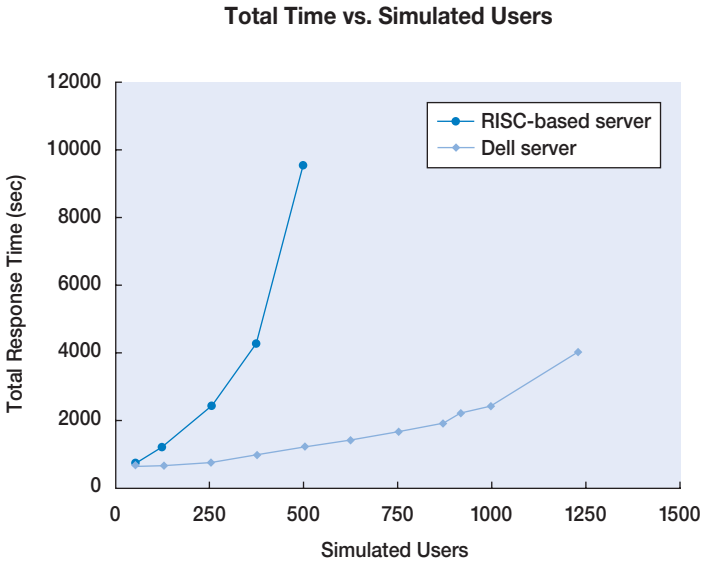

Figure 1: Intel architecture-based platform responds much better to growing workloads than RISC-based platform.

To increase the useful life and scalability of its production system, Imageworks installed two Dell PowerEdge 2650 servers with single Intel Xeon processor MP at 2.80GHz in place of the 1.6GHz Dell PowerEdge 6650 servers that were tested. To minimize costs, Imageworks opted to purchase single-processor configurations. The headroom of having two-way clusters will enable additional growth without having to change the servers.

A PROOF-OF-CONCEPT ADDRESSES STABILITY CONCERNS

"The decision to replace RISC-based servers with Intel architecture proved to be an intelligent and sound approach, partly because Intel Solution Services built a solid proof-of-concept," Villarreal said. But at first, the choice of an Intel platform for such a mission-critical application carried some perceived risks; some considered the proposal to be unconventional. As Wilson explains, "Nobody ever got dismissed for using Oracle with UNIX." The combination of the two has a well-known history.

The Imageworks staff had confidence that the Windows/Dell cluster provided the processing power to run Oracle. But could the Oracle on Windows solution match the scalability and availability of the Oracle on UNIX solution? With years of experience in using Intel architecture-based servers in the rendering farm, Wilson says, "Long ago I learned to trust the stability of Microsoft's operating systems on Intel architecture-based servers." But for the proposed configuration to win approval, he and his team would have to prove the Oracle on Windows solution had the necessary scalability, reliability and availability.

To prove the effectiveness of Windows and Oracle on the Intel platform, Intel Solution Services compared the existing solution to the new Dell clustered configurations. The benchmarking process pitted two Dell PowerEdge 6650 servers against a single RISC-based server. "We installed Oracle9*i* RAC on the RISC-based cluster, tuned and configured it, and loaded a copy of a typical Imageworks production dataset," Wilson recalled. "We then did the same to our Dell/Windows/Oracle cluster."

Intel Solution Services devised a test to judge the relative processing power and scalability of the RISC-based and Dell servers. Simulating an increasing load of queries to the production management system's database, the test began with 50 concurrent active users and progressively added increments of 50 users. Intel Solution Services then recorded response times for the two competing configurations until the simulated workload exceeded Imageworks' typical requirements by 100-fold.

TESTING PROVES THE SCALABILITY TO SUPPORT CRITICAL APPLICATIONS

The test results showed that an Oracle/Windows solution on Dell outperforms the proprietary UNIX solution, as Figure 1 illustrates. "The Intel Xeon processor MP-based system bore the test's unreasonably heavy workload without even breaking a sweat, while the RISC-based configuration became unresponsive," Wilson says. Based on the findings, he estimates the PowerEdge 6650 servers to be three times faster than the RISC-based servers. With the Dell machines costing much less than the RISC-based servers, the Intel configuration delivers many times the price/performance of the RISC-based system.

"The RISC-based UNIX system started going nonlinear at about 250 concurrent active users," Wilson reports. "In other words, the addition of just one new user after the first 250 lengthened system response time to simple queries by 10 seconds." With the Dell configuration, by contrast, responsiveness remained linear, even when the testers increased their simulated workload to 1,000 concurrent users.

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To rate the RISC-based and Dell clusters in reliability and availability, Imageworks and Intel Solution Services developed a failover test to see how well the surviving RISC-based or Dell server took over for its failed companion. The goal was to ensure that a server can suffer catastrophic failure without disruption to users or loss of data. In the test, engineers deliberately caused a server to fail as it processed database queries.

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According to Wally Pereira, a senior technical architect with Intel Solution Services, “When we intentionally stopped and then restarted one of the two clustered Dell servers, our data came right back. The system showed no delay at all in resuming service. So if the artists were using the server that happened to go down, they wouldn’t have noticed any difference.”

Wilson agrees. “Users would automatically be migrated to the other server in the cluster,” he said. “The Intel Xeon processor MP-based system with Windows and Oracle provides transparent application failover.”

IMAGEWORKS STRIKES GOLD ON THE SILVER SCREEN

With the increased speed of the new production management system, “artists don’t necessarily finish their shots any sooner than they did in the past,” Villarreal explains. “But the system helps them refine the quality of their work by enabling them to produce more versions of a shot per day than they did before.”

LESSONS LEARNED

- **Don’t make decisions based on past perceptions.** Technology moves quickly. A conventional wisdom that might have been true a year ago could easily prove false today. Take the question of which architecture offers the best reliability and availability. At one time, UNIX servers might have been more reliable and available than Windows—but no more. Now, Windows on Intel architecture equals UNIX in terms of reliability and availability. At a time when controlling costs is key, Intel processor-based servers hold significant price/performance advantages and are ready to be used for mission-critical applications.
- **Choose IT consultants who understand your business.** IT consultants need a thorough understanding of technology. But that alone hardly guarantees a successful consulting engagement. One trait that distinguishes the best consultants is a willingness to listen to their clients, learn their business, probe for their needs and then deliver recommendations that perfectly fit the situation.
- **Good testing makes good IT projects.** A rigorous test that simulates realistic conditions offers a reasonably fast and easy way to gauge the effectiveness of a proposed new system or product. That principle holds especially true when a proof-of-concept faces intense skepticism, and it challenges accepted ideas about how best to solve a familiar problem.

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