



Small Business Case Study

Intel® Xeon® processor technology and
Intel® Centrino® mobile technology

Powerful solutions that bring data to life



Case Summary

Arius3D creates perfect three-dimensional colour copies of real-world objects using specialized and proprietary laser scanning technology. When a museum showcases priceless artifacts for students, it needs to ensure the original is protected from undue damage; when a movie director wants to film real-to-life action footage, perfect models can be an effective replacement for the real thing. Creating these perfect models requires significant processing and storage capacity, as well as fast processing capabilities to effectively assemble the scans. Arius3D uses a combination of desktop computers with Intel® Pentium® 4 processor technology and servers with Intel® Xeon® processor technology to gain the required speed and storage. With a small staff doing all business development, the company looked to the inherent flexibility of wireless technology using Intel® Centrino® mobile technology to keep staff agile and responsive to client needs..

Challenge

Arius3D creates perfect digital copies of real-world objects, allowing museums, schools, the entertainment industry and even manufacturers to capture objects in near microscopic detail. The technology also allows for perfect colour reproduction that is independent of ambient light. With these perfect replicas, researchers and scientists can examine, manipulate and analyze objects without having them leave their protective storage areas. Since Arius3D three-dimensional objects exist digitally, they are not subject to the same threats as museum artifacts such as fire, water and even environmental damage for generations to come. A further application for the models is in the entertainment industry where movies and games require more lifelike reproductions to enhance the viewer's experience.



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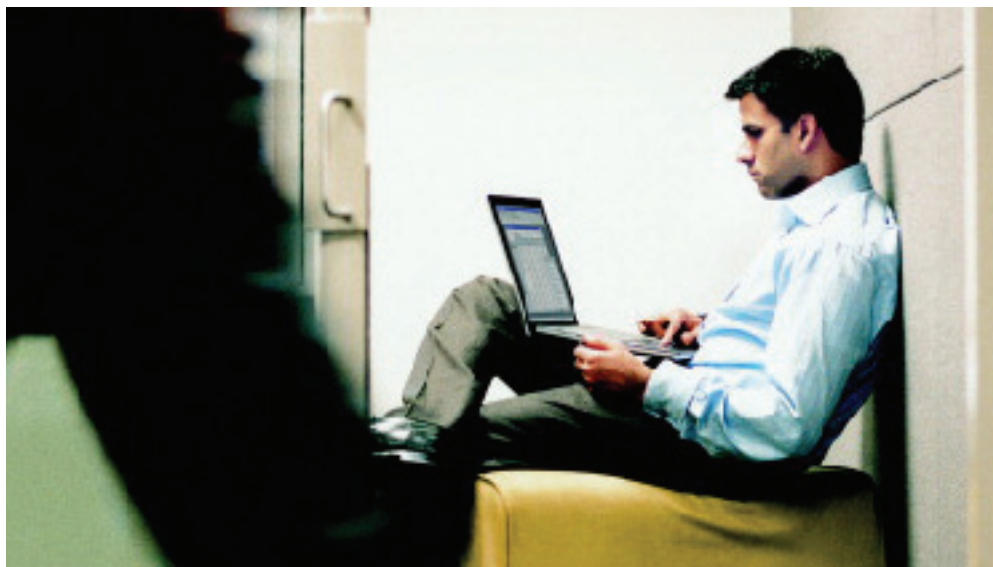
Company co-founder and president David Breukelman sees a tremendous opportunity for this technology to bring real-world objects to the masses. With an opportunity to allow people to manipulate and interact with objects at a museum, Arius3D started work with some of the world’s best-known museums including the Canadian Museum of Nature in Ottawa and The Royal Ontario Museum in Toronto. “Our business is that we create the world’s best images,” says Breukelman, noting they need the best technology and processors to make those images possible. The Arius3D lasers pinpoint both co-ordinates and RGB colours to create an exact replica. A scan used to replicate a 56cm by 45cm by 30cm bust of the French explorer Samuel de Champlain by Alfred Laliberté (1930-1950), which resides permanently at the McCord Museum in Montreal, Canada, resulted in a digital object of 100,885,459 individual points requiring 866MB of storage. To display that image back to the screen requires intense processing power and high-end graphic capabilities, says Don Cocca, Director of Technology. “We need the capacity to store and manipulate that information. Pure processing speed and video throughput is very important to us.” Coupled with the immediate speed and storage challenges are future plans to create a full-scale, commercial library of images that businesses, researchers and scientists can access through web-based downloads.

Solutions

To address the dual needs of robust storage and retrieval, and high-end, fast graphics, Cocca looked to a combination of Intel®-based solutions. At the desktop, Cocca found the speed and hard-drive capacities were increasing rapidly and that Intel® Pentium® 4 processor technology provides the needed high-end graphics and visualization technology. Cocca chose the IBM Netfinity X* series with dual Intel® Xeon® processor technology to ensure the scan data is safe, protected. Backup of the data is important because losing one scan means upwards of eight hours of lost man-time across numerous employees since multiple people work on any one object at a time.

Key Advantages

In an industry where the quality of the scanned images is the benchmark of their business, Cocca looks for the most effective ways of moving large datasets around with ease, while maintaining high file quality and integrity. The combination of desktop speed and high-end graphics made possible with the Intel® Extreme Graphics chipsets, allows Arius3D to deliver their laser-scanned images in sharp quality, with fast rendering, smooth motion and extreme detail. Since the company is growing rapidly, and plans are underway to build an extensive scanned image library, having a scalable storage capacity is increasingly important. “I know Intel® and Microsoft*-based solutions will work with our software, which makes support easier and



integration to the desktop seamless," says Cocca. "Our top priority for the server platform is reliability."

Cocca is impressed with the speed and processing capabilities of his desktop computers with Pentium® 4 technology. "The Pentium® 4 machines were running at 3.6 gigahertz, which gave us the speed we needed and with the dual Intel® Xeon® processors in our servers we can run multiple tasks on our servers easily."

Wireless Site Visits

In addition to the large file requirements of the company, Arius3D is a growing technology company with a small staff. The office has enabled a wireless LAN to provide more versatility for people to move around the office for presentations and it provides the added benefit of easily adding personnel as needed.

Inside Arius3D, there are multiple notebooks with Intel® Centrino® mobile technology because Cocca saw advantages to the internal wireless chipset, as well as the extended battery life. Cocca adds that with a graphically intense application, they also needed to be certain their notebooks could handle the graphics with ease. Staff uses their notebooks with Intel® Centrino® mobile technology to effectively demonstrate the graphically intense scanning technology.

"I am out of the structured technology environment of the office two out of every five weeks," says Breukelman. "With wireless, linked by Intel® to global standards, I have the mobility to collaborate and participate in virtual meetings. It is really important for me to be able to easily stay in touch."

Hands-On Education

At the Royal Ontario Museum, Arius3D and the curators have developed a hands-on museum experience for children. After a museum tour, the children are brought back to a classroom with 16 touch screens. By accessing the scanned images of specific objects, the students manipulate the objects themselves while the curator explains the lesson.

This is a powerful educational tool says Breukelman, who notes the education method allows all students to get a positive experience whether they learn orally, visually, or through hands-on interaction. He says they have already heard from teachers that this method has stuck with the students in a more powerful way than previous oral tours where not every student can get as close to an object.

In addition to providing a more hands-on experience at museums, real life three dimensional images will enhance a student's experience in school. Breukelman says students can log onto the Arius3D servers, powered by Intel® Xeon® processor technology, to examine and research fossils, for example. Schools are limited by budget constraints on how many actual fossils they can buy, and images in textbooks aren't as compelling as the real thing. With a scanned 3D high quality image, students can access and have that

perfect, shared experience of touching, rotating and viewing the fossil in their own time.

The Canadian Museum of Nature (CNM) will be featuring animated scanned real fossil bones in the presence of the real specimens as an educational technique to allow children to replicate the action that researchers take when they connect the bones and trace the flow of blood vessels. Animated scans will show walking skeletons and then walking dinosaurs for a dramatic and compelling effect. This approach in gallery and on the web allows the CMN to serve audiences in the physical building and virtually across the country. An added benefit to the scanning of artifacts is that museums can use the scans to track the effects of the environment such as light on an object and compare it a year later to see if there's been any deterioration. By providing exact reproductions, museums will be able to share more of their collections with the public without risking damage.

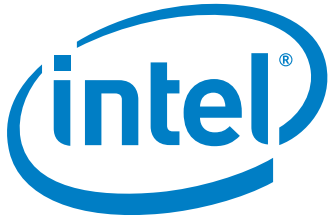
Virtual Bank of Images

Arius3D is already working to fill a database of high quality, real to life, scanned images. It is the goal of Arius3D to "have Arius3D images in every home and at the forefront of consumers' minds," says Breukelman, adding that customers are demanding more real life images. With the costs of on-location filming increasing, accessing real life images from a bank like the one being constructed at Arius3D will become increasingly cost-effective. As Arius3D populates the library, the company will rely on its server capacity and processing speed made possible by Intel® Xeon® processor technology to deliver the high quality scans to customers. "In the next three years, we will hope to populate an image library of critical mass with tens of thousands of images," says Breukelman, noting these high quality graphic images will be important assets to the entertainment industry, game developers and other visual media who need access to perfect replicas but can't afford onsite photo and video shoots.

Arius3D has already contributed to film projects including The Matrix, where Arius3D images allowed filmmakers to create very real effects with the faces and hands of the actors playing Agent Smith and Keanu Reeve's character, Neo.

Bodies and Bones to Perfection

Arius3D is also exploring commercial applications for scan technology including manufacturing applications to accurately view metal stresses and changes, as well as dramatic applications in the medical field where access to cadavers and bone samples is becoming more difficult. With a library of digital skeletons and different bone, organ and tissue samples, medical students will have access to even more high quality samples that they can easily see and interact with over their wireless-enabled notebooks or from computer stations in the schools.



Future Uses

As the demand for numbers and sizes of images increases, Cocca sees the need to move into 64-bit technology including the new servers powered by Intel® Itanium®2 processor technology. "We will need access to faster computers with even greater storage capacity," says Cocca, adding the 64-bit technology should allow them to deal with life-size real life objects at full scanning capacity and full size, not a quarter at a time. Arius3D is also working with architects to bring touch-screen technology to all museums to allow visitors to see even more of their collections as a real-to-life visual scan. Cocca says they are also working with a company right now to provide tours on PDAs and using the scan technology to allow visitors to manipulate the Arius3D images of artifacts on screen. "We are giving everyone access to priceless works of art, and allowing everyone to interact with them," says Breukelman. "Without our technology, some of these artifacts would have never been available to them. Our reason for being is to image the real world and reach out and touch everyone, just a little bit." Find out more about a business solution that is right for your company by contacting your Intel® representative, or visit the Intel® Business Enterprise website at intel.ca/business or its industry solutions specific sites at intel.ca/business/bss/industry



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