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Canon Design Center

Distributed Design Review with Visual Area Networking

Canon Inc. is a leading manufacturer in Japan and the company's Design Center has been working to streamline the design development process for cameras, printers, and copiers using a "Design VR System" built around an SGI® Onyx® 3200 graphics supercomputer. The new Design VR System enables the Canon Design Center to improve the efficiency of conventional design reviews and has created the company's unique "Take-out VR" system. The Take-out VR system is built using SGI® Visual Area Networking (VAN) technology and allows a wide variety of participants from the development and sales organizations in remote locations to review product designs in a collaborative environment. The Take-out VR system, which started experimental operation in 2002, has helped Canon's Design Center expand their activities and improve their workflow.

Operating Benefits Achieved with Visual Area Networking

The improvements to the Canon Design Center's workflow include easier collaboration and improved data security and data management.

Traditionally, Canon undertook product design reviews by gathering all of the reviewers from each of the related business units and sales companies at the Design Center in Shimomaruko, Tokyo, where the Design VR System is located. To improve the efficiency of the conventional design review process, Canon studied the feasibility of conducting design review from the remote locations of the business units and sales companies.

In order to deliver the remote design review capability, the Design Center selected the SGI VAN solution to implement the Take-out VR system, which delivers the capabilities of the centralized

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Success Story

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Design VR system to the remote locations. This advanced solution sends high-quality, high-resolution images of the design review from the SGI® Onyx® system to the remote locations while at the same time allowing the remote users to interactively control the applications running on the Onyx system. Canon achieves a large reduction of the time and expense associated with design reviews, because participants no longer need to travel to the Design Center Site. The new remote and collaborative design review process is resulting in shorter product development cycles and the potential for greater profitability.

The Canon Design Center is already planning for a future in which more designs will be undertaken in a collaborative fashion on a global basis. The VAN solution's ability to link sites will support Canon's business goals by connecting virtual teams that integrate development, engineering, and sales around the world. The Take-out VR system is the first step that may one day make it possible for any designer to work from one location and at the same time collaborate with colleagues from all over the world and immediately incorporate their feedback into the development process.
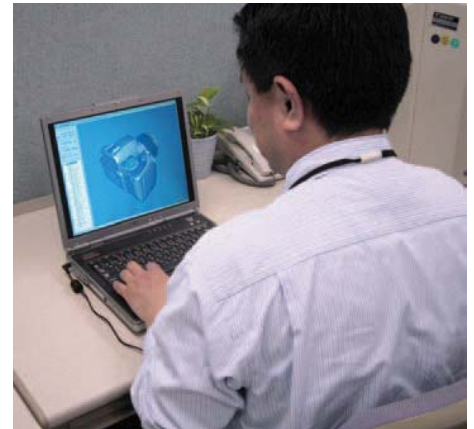
The Design Center is also using VAN in its daily operations to realize benefits not considered in the original decision process. One of these benefits is improved data security and management obtained by remotely controlling the SGI Onyx system. Increased security is possible because a VAN solution only transmits a stream of 2D images to a remote site and not the underlying data that is used to generate the images. Data management is also simplified, because there is no need to distribute original data to multiple sites involved in a design review. With the Take-out VR system, no extra work is required to protect critical data and it cannot be inadvertently left behind at a remote site that was involved in a design review.

The SGI VAN solution is a key component of the day-to-day operations where it both improves the direct workflow and also contributes to Canon's bottom line in various indirect ways.

VR Room Opened in the Design Center

In 1994, Canon centralized its three separate design sections for camera, office equipment, and computer peripherals into one location at its headquarter in Shimomaruko, Tokyo, and established the
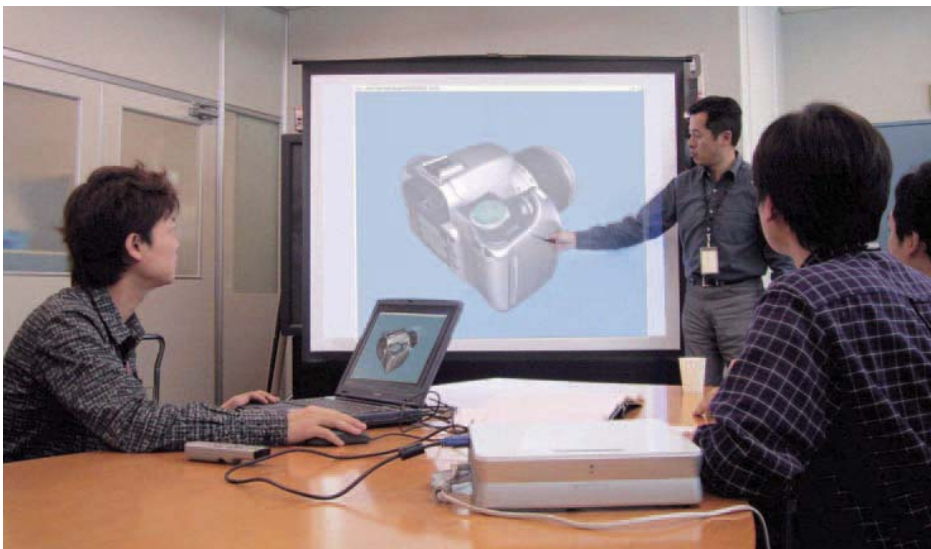
Canon Design Center. The center's staff consisted of approximately 170 people who are responsible for designing all Canon products from consumer to office, including user interfaces.

The Design VR system started its operation in summer of 2001 with the goal of delivering "better products with a faster time to market." The objective was to build a system for early and quick evaluation of the three factors of design (exterior, form, and usability). The SGI Onyx 3200 advanced visualization system was selected to deliver advanced realism and real-time graphics. This system was coupled with a large projector, 3x4 m wall-mounted screen, and VR software. With these components, a VR room was opened in the Shimomaruko Design Center for a digital design review environment.

After the initial setup, the design VR system was further upgraded with SGI VAN technologies. Mr. Kikuo Yoshizawa, manager of Production Department 1 in the Canon Design Center's Production Division, said, "The Design VR System was very effective and it was used for a number of projects, but one of the problems was that the participants from the related sales companies and business units had to come to the Design Center for design review. We found OpenGL Vizserver when we were considering a way to share the design VR system with remote locations to conduct design reviews away from the Design Center."

OpenGL Vizserver™ computing solution was installed at the Design Center in November 2002 and made it possible to distribute and display the highly detailed image data from the results of the real-time rendering conducted on the Onyx 3200

system using the Take-out VR system at the various remote client systems. The Take-out VR system has been successfully utilized for visual collaboration by the Design Center since that time.

Driving Product Design Towards Environmental Simulation
The Take-out VR allows the Canon Design Center to conduct design reviews using full-sized digital mockups at the remote locations with only a notebook PC connected to the company's WAN and a small projector. Mr. Yoshizawa indicated that the inclusion of remote collaboration within the design process seems to change the design methodology itself. "By using the Design VR System, we could no longer satisfy ourselves by simply looking at the product itself via CG. We wanted to know what it would look like if placed our printer in the office or in the study room and also how our product would be attractive if placed at the shelf space of the computer shop along with the competitor's products. We extended the design review into the field of environmental simulation. We are striving to enable this state-of-the-art simulation any where, any time."

Improving the Speed of the Entire Design Process
The Design VR System improved the quality as well as the speed of each design process. Mr. Yoshizawa said, "Currently, most designers used CAD for product design. Therefore, digital data is created in the very early stage of the product development. By visualizing them and by adding color, texture, and feel to them, we can review them earlier. We can replace 2D sketches or concept designs which were only in the mind of the designers with visual images that anyone can understand. Moreover,

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The SGI VAN solution, composed of OpenGL Vizserver software and the SGI Onyx 3200 advanced visualization system installed at the Canon Design Center, has achieved remote collaboration with real-time rendering of design VR and will be bringing unprecedented dramatic changes to their design process.

Mr. Yoshizawa said his industry will continue to benefit from Visual Area Networking. "In the manufacturing industry to date, we have been able to shorten the production process by advancement of technology and also reduce costs and improve accuracies. However, the collaborative environment realized by the Visual Area Networking proposed by SGI Japan brings significant improvements in productivity along with creating new possibilities in this industry. The new possibilities will contribute not only to the design process but also to a wide variety of fields for improved productivity."

SGI Visual Area Networking Solutions
Visual Area Networking enables remote individuals and distributed collaborative teams to leverage the scalable visualization, compute, and I/O capabilities of SGI Onyx systems. OpenGL Vizserver is a core component of an SGI Visual Area Networking solution where it delivers scal-able visualization capabilities and collaboration capabilities to any existing desktop device via standard TCP/IP local or wide area networks.

OpenGL Vizserver enables remote users to visualize large-scale data sets, which is not possible with standard desktop systems. It also provides collaborative decision-making support from long-distance remote locations and delivers workflow improvement through centralized data management.

OpenGL Vizserver distributes the results of real-time rendering as a stream of image data from an SGI Onyx system acting as a graphic server to client systems. The client systems then display the results locally, delivering the highly realistic images produced by the SGI visualization system. Client devices can range from multi-screen immersive environments to wireless tablet computers.

A key feature of OpenGL Vizserver is that it works with existing OpenGL® applications, turning them into collaborative powerhouses. These applications need not be modified to work remotely or in a collaborative environment with a mix of IRIX®, Linux®, Solaris™, and Windows® OS-based clients. OpenGL Vizserver supports multi-user collaboration and stereo 3D visualization, bringing new benefits to a wide variety of fields requiring cross-functional team collaboration.

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