Technology Brief

Visual Area Networks for Manufacturers: Universal Access to Advanced Visualization

A review of today's market dynamics is quick to reveal that time to market is paramount. It is the single most competitive advantage a company or industry can possess. Faster decision making further accelerates time to market.

SGI advanced visualization technologies support faster decision making by providing multidisciplinary teams with more accurate and complete information upon which to make more informed decisions early on in the product-development cycle. Visual Area Networking extends the power of advanced visualization and collaborative decision making beyond a single room and into the world of local- and wide-area networks that span campuses, communities, and continents.

Ultimately, the universal access to complex visualization graphics that Visual Area Networking enables will serve as the cornerstone for collaborative environments in which discussion, innovation, and decision making are more spontaneous and the ability to resolve engineering problems faster and with a greater degree attention to detail is significantly enhanced.

The Marketplace

The globalization of industries, in its effort to reduce product cost and realize greater economies of scale, has put design, engineering, and manufacturing far afield from one another. And while the disbursement of resources has been beneficial financially, it will now be the linking together of these resources that most impacts a company's future ability to remain competitive. To that end, collaboration is key. Doing so in real-time is essential.

For some time now, industries have relied on computer-based modeling and visual simulation—often on SGI platforms and equipment—to design and develop their products. Workstations have been successful in facilitating peer-to-peer and interdepartmental collaboration as well as localized decision making during detail design, but such interaction has been limited to individual parts and smaller subsystems.

The advent of the SGI® Reality Center™ facility further enhanced the ability to use SGI high-performance computing and advanced visualization technologies to extend to multidisciplinary groups collaborative real-time visualization in a fully immersive environment. At this level of visualization, participants were able to visualize and interact with the complete product and evaluate its functional behavior. As a result, they could make more informed product-development decisions and do so in far less time than was previously possible.

SGI Reality Center facilities bring people together in one location to collaborate on a design. However, with today's physically distributed design and engineering teams, it is not always easy to bring together the right people when needed. Scheduling demands, time commitments, and fluctuating travel itineraries can make it difficult for top designers to always be in the right design studio at the right time, such as when critical design and styling decisions must be made.

Visual Area Networking

Visual Area Networking is the conduit by which a larger universe of designers and engineers can gain access to and interact with the most complex simulations, imaging, and other 3D renderings, such as those used in design and styling reviews, MCAE visualization, and digital mockup. The data is stored, managed, and processed on a centralized SGI® Onyx® family graphics system. Designers and engineers, regardless of their locations and proximity to each other, can visualize and interact with the data using any client device—from tablets, laptops, and workstations to SGI Reality Center facilities—over existing standard networks.

Visual Area Networking extends the decision-making benefits of multidisciplinary collaboration fostered within SGI Reality Center facilities to the world at large—not just to select locales—and allows the immediate involvement of experts in the decision-making process, regardless of time and location.

Visual Area Networking enhances engineering productivity by allowing workgroups to access the graphics and compute power of an SGI Onyx family system using their existing desktop PCs or workstations as client devices, all without leaving the office.

OpenGL Vizserver™

The chief software component of Visual Area Networking is SGI® OpenGL Vizserver. OpenGL Vizserver enables an SGI Onyx family system to distribute visualization sessions to virtually any client device, whether it's a laptop, workstation, wireless tablet, or even a PDA. Graphics processing is handled entirely on the SGI Onyx family system; OpenGL Vizserver transports pre-rendered, compressed graphics over existing network infrastructures (Gigabit Ethernet, 100Base-T, ATM, T3, T1, and the Internet); the client machine simply decompresses and displays the image. The raw data remains secure on the SGI Onyx family system.

OpenGL Vizserver is application transparent—it runs any existing OpenGL® API-based application without modification. OpenGL Vizserver contains collaboration functionality, such as shared application control, that instantly turns existing stand-alone applications into collaborative applications.

According to Kent Misegades, president of CEI, "Our experience with OpenGL Vizserver has been impressive, and our software is well matched to the concept of remote visualization. SGI technology and VAN permit easier access to EnSight's powerful visualization feature set. As most of our customers are large scientific and engineering organizations with offices in different geographic locations, remote visualization is an important part of our product offering."

Collaborative Power of Visual Area Networking

Manufacturers can utilize the collaborative power of Visual Area Networking during scheduled review sessions by using OpenGL Vizserver to link an SGI Reality Center facility with a second SGI Reality Center facility or with another local or remote client device. This solution makes it infinitely easier for key engineering experts and top-level decision makers to be available when critical decisions must be made. Overall, it reduces travel costs, saves time, facilitates better and more informed decisions, and helps accelerate time to market.

Visual Area Networking also allows for spontaneous collaboration between individuals in and among different engineering groups. With OpenGL Vizserver, initiating a collaborative session between geographically dispersed users can be done as quickly as making a phone call. In this way, engineers can communicate while visualizing the same data from the same viewpoint, thereby enhancing their ability to identify and resolve design and manufacturing problems and optimizing their designs in less time.

Visual Area Networking for Engineering Workgroups—A Break With Tradition

Engineers don't usually have a daily need for real-time visualization. They spend up to 80% of their time on other tasks, including e-mail, writing reports, meetings, traveling, etc. They often have two systems on their desk: a standard PC or laptop and a high-performance workstation. Not only are they expensive to maintain, workstations still lack the ability to satisfy the most complex visualization needs. Engineers have to leave their office to access the power of an SGI Onyx family system to visualize their most technically challenging problems.

Visual Area Networking eliminates costly and continuous workstation upgrades by allowing companies to deploy less-powerful desktop systems that can gain access (via LANs and WANs) to a central SGI Onyx family graphics system when needed. With OpenGL Vizserver, engineers use their existing PCs and workstations as clients to interact with and view the data on the central system. This type of access also ensures the integrity of the data by eliminating redundant copies, version-control problems, and unauthorized access, all of which could negatively impact the product development cycle.

Overall, Visual Area Networking lowers the total cost of ownership, allows an SGI Onyx family system to be 100% utilized, and, because it's highly scalable, readily meets increasing end-user needs in multiple areas—memory, number of CPUs and graphics pipes, and I/O bandwidth. In addition, the need for travel or relocation to a site that offers high-end capabilities is eliminated, thus saving time and enhancing end-user productivity.

Visual Area Networking at Work

MSX International, a leading supplier of engineering services for automotive and other engineering-intensive industries, immediately recognized the advantages of Visual Area Networking for its operations and has been using OpenGL Vizserver in its MCAE group for over a year. "With OpenGL Vizserver, we can bring the compute and visualization power of our SGI Onyx 3000 series system directly to our engineers' desktops," said Iain Gibb, CAE manager at one of MSX International's U.K. sites. "Our engineers no longer require expensive desktop systems to do their work, and the quality of OpenGL Vizserver output, even on a laptop system, is sufficient to allow us to use visualization regularly in meetings and design reviews, thus improving productivity." MSX International will soon be using OpenGL Vizserver to improve collaboration between sites in the U.K. and, ultimately, to improve collaboration worldwide.

Accessing the Future

Visual Area Networking is delivering on SGI's commitment to providing future-driven solutions that solve real-world problems today and its promise to improve the way people work and organizations operate.

Instead of duplicating costly resources time and again, Visual Area Networking allows companies to use existing infrastructures to disburse information from a single, secure high-performance computing and visualization system to end-user workstations, desktop PCs, laptops, wireless tablets, and even PDAs—anywhere, anytime. This, in turn, provides the means by which organizations can resolve design, development, production, and manufacturing issues before they even have the potential to turn into multimillion-dollar problems.

Visual Area Networking, with its ability to provide universal access to complex images and large data sets, is leading the way in helping today's industries move beyond a position of information superiority to one of decision superiority—the ability to use advanced visualization to work collaboratively, act decisively, and move swiftly to market.

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