Technology Brief

Visual Area Networking: Universal Access to Advanced Visualization

Solving the biggest problems in science and industry requires the best minds. However, people are increasingly globally mobile or in locations remote from an organization's advanced computing resources. Today, scientists and engineers can log on to a central computer to gain access to data. But to manipulate the data, each user must have a copy of it. To store, process, interact with, and visualize the data, users require very powerful computer systems and very high bandwidth networks. Visual Area Networking introduces the concept that the data is stored and processed in one place but can be accessed and manipulated by people using any client device, either by themselves or collaboratively across existing networks.

SGI's introduction of Visual Area Networking makes advanced visualization technology available to larger numbers of people, no matter their locations. Enabling the most complex computerized simulations and imaging to be controlled, manipulated, and viewed via handheld or other thin clients means that engineers and other professionals no longer will need to travel to access the visualization supercomputing technology they require. Visual Area Networking delivers the kind of accessible power that, until now, has been limited to those who can afford to build advanced computing resources. It literally puts high-performance computer power into the hands of surgeons, scientists, engineers, and creative professionals, no matter where they are.

Visual Area Networking enables people to comprehend extremely complex data in the fastest possible manner, visually. Better decisions are enabled by combining people, process, and data with common visualization data sets across multiple disciplines. Surveyors determining a pipeline route accomplish far more when visualizing the photo-realistic, 3D terrain on a computer screen than when studying written coordinates and then transferring them to paper contour maps or photographs. The same photo-realistic, 3D terrain can be simultaneously viewed by life scientists to study the habitat and ensure ecological safety. This level of comprehension has been limited to only a few, until the advent of Visual Area Networking.

The scalable power of this advanced visualization technology from SGI is literally put into the hands of surgeons performing operations on the battlefield and geologists analyzing strata from drilling platforms in the North Sea. Additionally, the collaboration capabilities of Visual Area Networking allow diverse teams of people to visualize and interact with data in ways never previously possible. A team of oil exploration specialists can collaborate on the same visualized data set, even if one scientist is in Saudi Arabia, another is in the Gulf of Mexico, and the third is in Houston.

A critical advantage that Visual Area Networking brings to various industries is the ability for multiple groups to work collaboratively on the same data in real time with all involved parties able to make and view updates at the same time. Separate groups within an organization often do not interact with one another but rather work with their own segments of data and then pass them around the organization. Changes made on one piece of the product can have dramatic effects on the work that other areas of the organization, such as the different components of automobile design teams, have done. Visual Area Networking allows every person involved to have immediate access to the data at any given time on any device, even if they are working in a location far removed from the organization's headquarters.

For example, if a person sitting at a workstation in Detroit makes a change to a truck design, the sales executive preparing to meet a customer in Germany can view the alteration as it happens using her handheld device or a laptop computer. At the same time, a safety expert in Tokyo could recognize a potential conflict between necessary safety precautions and the new design change, allowing him to address the conflict on his laptop while touring the factory where the truck is to be built. Again, the sales executive would be aware of those changes as they happen and could relay those details to the prospective client.

Other potential industry implementations of Visual Area Networking include:

Energy—A worker on an oil rig off the California coast could have direct access to an SGI® Onyx® 3000 series visualization system in her company's Houston office using her personal digital assistant (PDA) with a wireless connection.

Medical—A surgeon could safely use a desktop in a sterile operating room to see and manipulate a medical scan using 3D volume rendering on an Onyx 3000 series system located in the basement of the hospital.

Sciences—An astronomer in Arizona could process and view data about a pending discovery being gathered by a telescope at night in Australia while continuing his work during daylight hours.

Defense—An army sergeant could use his wireless tablet PC to view pure, photographic detail of enemies over a hill in front of him via data taken by an Unmanned Aerial Vehicle (UAV) and processed by an SGI® Onyx® family system on the fly back at the command post.

Today, the combination of advanced networks and increasingly powerful hardware and software opens up visualization in ways never before possible. Technological convergence is finally taking place, but the

convergence is not merely entertainment on a personal computer across a phone line or cable TV. This type of convergence combines the increasingly small, portable computing devices such as handheld PDAs and wireless tablet PCs with supercomputing done on large, distant systems. Users need not know how to run scripts or execute commands. Instead, they can work in a familiar manner on a familiar machine in a familiar setting. In many cases users may not even know they are utilizing the power of an advanced graphics machine. And they can even do so from a wireless device.

Visual Area Networking represents a shift from focusing only on advancing the power needed for the most precise rendering to include consideration of the location and availability of visualized data sets across the network. Visual Area Networking is driven by two core technologies developed by SGI: the SGI Onyx 3000 visualization system series and a new software component called OpenGL Vizserver™ 2.0. OpenGL Vizserver 2.0 enables a single SGI Onyx 3000 series system to distribute visualization sessions to virtually any client device, whether a laptop, workstation, wireless tablet device, or, in the future, a PDA. SGI Onyx 3000 series systems generate complex 3D graphics, rich 2D imagery, and superior high-resolution video for the world's fastest, most realistic visualization.

Since its founding 20 years ago, SGI has repeatedly changed the way people think of and use graphics. Whether developing and testing new designs for automobiles or airplanes or determining troop deployment strategies for the military, SGI® technology helps people solve real-world problems using complex graphic simulations and manipulations.

Just as networks have enabled collaborative computing to become a reality, so Visual Area Networks extend the paradigm by bringing visual computing resources into the mix. At SGI we believe that Visual Area Networking opens new application possibilities that promise to change the way people work and organizations operate. We believe our advanced visual computing products and technologies place us in the vanguard of this evolution. This "visualization anywhere" concept is going to change not only how creative professionals, engineers, and scientists use the technology, but it will also change who uses it, where they use it, and which devices they use to access it. Simply put, Visual Area Networking democratizes access to advanced visualization technology.

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