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## Storage Area Network: Leveraging Data Access for New Enterprise Applications

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### Introduction: Panning Gold from the SANs

Storage Area Networks (SANs) are emerging as the next killer application for network computing, bringing together large repositories of data and high-speed data access technologies. In fact, SANs are rapidly becoming the medium of choice for a wide variety of applications, from graphics-intensive data processing that requires fast access to large digital images, to centralized network backup, to data warehousing and centralized database access.

Storage Area Networking promises to drive sales of high-performance network servers, workstations, and support software. According to Strategic Research, the SAN market for hardware, software, and services is expected to grow from \$3.5 billion in 1998 to \$14.8 billion by the year 2000.

Most vendors are approaching SAN technology from an enterprise point of view, working to streamline the network plumbing to optimize network backup and improve overall network performance. SGI is approaching the SAN market in a different way. Leveraging SGI's edge in supporting high-performance imaging, which requires the ability to move large segments of data for computer animation and related applications, SGI is approaching SAN solutions as digital data sharing, optimizing data handling rather than fattening the pipe. This technology will leverage into the enterprise space and give SGI a time-to-market advantage. Using the company's Fibre Channel Storage Area Network solutions and, more importantly, SGI's expertise in providing professional network design and support services puts the company in a unique position to deliver SAN hardware and software solutions in an emerging market where real-world SAN implementations are hard to find.

"Storage Area Networks are a strategic market direction for SGI, presenting a unique market opportunity and some real business challenges," said Anne Vincenti, Storage and Networking marketing director of the Computing Systems Business Unit (CSBU). "SANs allow our customers to integrate both secondary and tertiary storage into a centralized management infrastructure, using networking and storage management techniques to create a multi-platform environment to share disk space and data across a fabric. However, SAN solutions are not plug-and-play systems. To be effective, they require a level of technical sophistication and service that few companies can offer. That's why the market potential is so huge for SGI - there are few competitors who can both offer SAN technology and the expertise to effectively support it."

### What is a Storage Area Network?

Storage Area Networks offer the advantages of gigabit data rates for high-speed data sharing between servers and storage devices. They can be built as switched- or shared-access networks, but no matter what the architecture, SANs offer customers the advantages of scalability, fault recovery, and a level of diagnostic capability beyond most of today's conventional network designs. Customers are rapidly discovering that the cost and complexity of [creating an SAN infrastructure] [www.data.com/tutorials/building.html] can pay for itself in the reduced costs for high-speed data access and network management.

A SAN makes sense whenever data integrity and high-speed access are required. Smaller workgroups, for example, may benefit from an SAN infrastructure where mission-critical data is involved, such as

visualizing seismic data or in a post-production house. SANs can also help larger network infrastructures where the challenge is providing high-speed access to large data segments. It's merely a matter of aligning business objectives with the design possibilities.

SANs are generally made up of servers (hosts), storage devices (tapes and disk arrays), and interconnectivity hardware such as switches and hubs. The entire infrastructure is built around [Fibre Channel] [<http://whatis.com/fibrecha.htm>], a technology designed to transmit data between devices at data rate up to 1 Gbps (one million bits per second). Fibre Channel not only offers the advantage of high-speed access, but it can support devices up to six miles away using fiber-optic cabling. Conventional Fibre Channel systems use ordinary coaxial copper or twisted-pair cabling.

The objective of an SAN design is to take the load off of the servers and transfer it to the enterprise fabric. (Something akin to Sun's concept of "the network as the computer.") Servers have historically carried the burden of transferring data to and from the network. Now servers offload data transfer responsibilities to the SAN.

Among the features that make SANs attractive to IS personnel are the mechanisms built into Fibre Channel that simplify administration. SNS (simple name service) provides automatic discovery of all devices on the switch fabric. Registered State Change Notification (RSCN) delivers updates on configuration changes, which is particularly useful for switch fabrics to add new devices and facilitate fault recovery.

Fibre Channel can integrate a wide range of protocols, so you can build SANs that can accommodate even the largest data centers. And SANs allow you to share storage among all servers in the environment, running a mix of operating systems, such as IRIX, UNIX, and Windows NT.

"The initial vision of SANs includes switches that proved dynamic any-server to any-storage connections and building-wide, neighborhood-wide, and campus-wide topologies," according to a recent [IDC report] [[www.fusion.com/news/buzz/0928san.html](http://www.fusion.com/news/buzz/0928san.html)].

#### Emerging Uses for SAN Systems

SANs are emerging as an alternative solution for various applications where high-speed access to data is crucial. According to Dwight Gibbs, chief technical fool at the online financial advisor, [The Motley Fool] [[www.fool.com](http://www.fool.com)], his Web servers were getting bogged down because each server had to store the same information to service customers. Gibbs has invested \$15,000 in a SAN infrastructure so he can move his graphics files and static HTML data to a storage area network to improve access time and save the cost of replicating servers.

Gibbs has been experimenting extensively with SANs and is impressed with the technology, but he is not ready to commit his entire network to a SAN infrastructure. He believes the technology is too immature. "Building a SAN is not trivial. It's an expensive decision," he says, requiring high-priced hardware, controllers and a lot of expertise from the vendors.

Other users are more willing to take a gamble on SAN technology. [Bellagio Hotel] [[www.zdnet.com/pcweek/stories/news/0,4153,387053,00.html](http://www.zdnet.com/pcweek/stories/news/0,4153,387053,00.html)], the newest Las Vegas resort to spring up from Mirage Resorts, Inc., has adopted a SAN strategy to centralize backup of Windows NT networks. The Bellagio SAN has a Fibre Channel link between two data centers set miles apart to simplify data backup and disaster recovery, and guarantee 24/7 operation.

[U.S. West Dex] [[www.zdnet.com/pcweek/stories/jumps/0,4270,387057,00.html](http://www.zdnet.com/pcweek/stories/jumps/0,4270,387057,00.html)], publishers of the White Pages and Yellow Pages for 14 states, has also adopted SAN technology to handle data backups of 200 GB of data per day. With that much data to store every day, SAN was the only approach available to reduce backup time.

#### The SGI Advantage in SAN

While early adopters like Mirage Resorts and U.S. West are turning to SANs to optimize data storage for mission-critical applications, SGI sees its market is broader than simple backup strategies. SGI's strategy is to deliver complete, high-performance, scalable SAN solutions for IRIX and Windows NT servers and workstations. SGI has a distinct advantage in the SAN market because of its ability to leverage third-party solutions and apply design and support expertise, as well as provide leading SAN hardware and software. Unlike other SAN suppliers, SGI brings a depth of experience in Fibre Channel storage and scaleable servers, along with proven solutions offered through development, strategic partnerships, and OEM relationships.

According to Vincenti, there are basically two kinds of SAN strategies: disk sharing and data sharing. Enterprise applications, like those adopted by U.S. West and Mirage Resorts, are being driven from the enterprise space to optimize tasks such as high-speed backup. Data sharing, on the other hand, is being driven by the need for high-speed data access, as in the need for digital media services.

SGI is currently the only provider approaching the digital media market with SAN solutions. Where most SAN solution providers, such as Compaq and Dell, are approaching SANs from the enterprise, they aren't shipping products today. SGI is applying the same technology to tackle the digital media space, which offers a much better market opportunity, as well as an enterprise solution. In fact, SGI is the only provider in the market who can offer true SAN interoperability with workstation support. SGI is leveraging its expertise in digital media serving and bringing it to the enterprise, rather than the other way around.

SGI has unique experience in moving large graphic files around a network for applications such as computer animation. By leveraging the company's experience in digital media and deploying data warehousing and decision-support solutions, SGI is able to offer complete SAN solutions and the technical expertise to make them a reality for customers with mission-critical applications. [Digital Film Works] [[www.sgi.com/newsroom/press\\_releases/1998/december/san.html](http://www.sgi.com/newsroom/press_releases/1998/december/san.html)], for example, is using SGI's SAN technology for image-intensive applications such as computer animation and post-production.

According to Dataquest, a leading industry analyst firm, media servers offer an ideal complementary technology to SANs, since both media serving and storage area networks require file sharing, data streaming, and storage management. That makes SAN an ideal growth strategy for SGI, particularly since SGI's core customer segments – oil and gas, entertainment, government, scientific imaging, data warehousing, pharmaceutical, and pre-press – all have an immediate need for SAN technology. These digital media customers have applications that require heterogeneous file sharing that cannot be satisfied with conventional client/server structures.

“Our goal is to deliver high-performance, scalable SAN solutions for Windows NT, IRIX, and Linux,” said Vincenti. Using SAN, our customers can share data over a Fibre Channel matrix using Windows NT or IRIX workstations. Our other key strategy is to leverage our experience in the digital media space moving large data segments around, and carry that into the enterprise. Most SAN vendors are approaching SAN technology from the enterprise point of view, so we see that gives SGI a distinct advantage.”

Vincenti adds that the challenge in implementing a cohesive SAN solution for customers is that currently there is no Fibre Channel standard, which limits interoperability. “This is not plug-and-play technology,” notes Vincenti. “We want to make sure customers know this is a phased process. This is not a technology play for SGI, but a solution play to solve business problems. SAN implementation takes a lot of know-how as well as superior technology.”

SGI will be demonstrating its SAN solutions at the National Association of Broadcasters ([NAB]) [[http://www.sgi.com/newsroom/press\\_releases/1999/march/pre\\_nab.html](http://www.sgi.com/newsroom/press_releases/1999/march/pre_nab.html)] convention being held in Las Vegas this April. At NAB, SGI demonstrated how its SAN solutions can support state-of-the-art applications developed by strategic partners running on a working Storage Area Network. The objective of the NAB demonstration is to show broadcasters how valuable SAN systems can be in post-production applications, particularly for broadcast customers.

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