

SANS – The Future of Data Storage and Backup

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What would you do if your current practice management server crashed? Most administrators would respond, “My IT person says we are fine—he backed up all our data last night and he says we can be up and running in no time at all.” While the administrator may be correct in his assessment, does he know what was backed up and what “no time at all” really means?

Though there are many options to backing up and retrieving your data, I believe some are better than others. This article describes an innovative approach we have taken at Eye Surgical Associates—an approach that we believe is “best practice” quality. This approach, called Storage Area Network (SAN), promises to retain best practice status for system backup in the future as costs for its implementation continue to

decrease. This article will describe a SAN and how it works, the benefits of using a SAN, and how a SAN greatly enhanced the backup and retrieval of information in a clinical setting.

What Is a SAN?

The technical description of a storage area network (SAN) is “a collection of computers and storage devices, connected over a high-speed optical network and dedicated to the task of storing and protecting data ... in layman’s terms, it is a high-speed way of storing and retrieving large portions of your data” (*Sifting through SANs*, 2009).

The high-speed network consists of optical fiber cables and switches that use light waves to transmit data with a connection protocol known as a Fibre Channel. Note the spelling: the “-re” (rather than “-er”) denotes the fiber optic cables used in

a SAN and differentiates them from the optical cables used in other networks, such as the internet (*Sifting through SANs*, 2009).

How Does a SAN Work?

Here’s what makes a SAN different from other types of storage: It uses a network to create a shared pool of storage devices. The network “allows sharing of data between different network servers, is used to move data among the various storage devices, and provides a fast connection medium for data backup and restoration and data archiving and retrieval” (*Sifting through SANs*, 2009). The storage devices in a SAN are located in a single room, and connections between devices can be over long distances.

Traditionally, computers are networked together through Local Area

continued on page 18

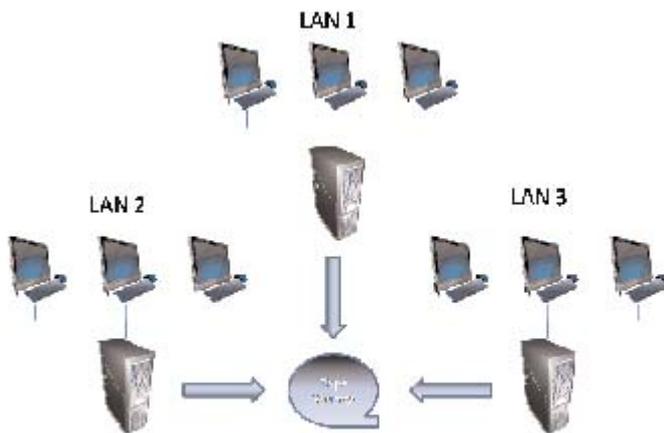


Figure 1. LAN diagram



Figure 2. SAN diagram

Networks (LANs). The data are stored in each of the computers housed within the LAN. While this was a monumental jump from the traditional ways of computing back in the mainframe era, it has led to “islands of data” throughout the network. In a LAN, most of the data is backed up and stored on tape—routinely, one hopes. Figure 1 displays a traditional LAN setup.

SANs, on the other hand, use a disk array, a device where all the disk drives are stored in a dedicated storage unit. Using Fibre Channel protocol, all servers connect to the storage device over a high-speed network. This enables access to disks over a network. The SAN gives clinics the ability to connect servers to that storage from anywhere on the network and the ability to consolidate access to data storage (*SANs for Dummies*, 2009).

Understanding that the data are of primary importance in your clinic and putting a SAN in place to back up that data lessens the importance of the servers—i.e., servers become more peripheral to the data stored in the SAN. If, for instance, a server in your LAN goes down and you have not backed up your data, you can buy a new server but your data are lost. Backing up to a SAN allows you to replace the downed server and quickly retrieve the data back to a new server. Figure 2 displays a typical SAN configuration.

Why Look to a SAN: Benefits of a SAN

According to *SANs for Dummies*, the benefits of using a SAN in the clinic setting are many. A SAN usually has a high return on investment (especially in larger clinics), lowers the total cost of ownership of computing, and has a pay-back period of

months instead of years. Specifically, a SAN does the following:

Removes distance limits. Fibre Channel SANs exceed the maximum length of normal cabling (25 meters) for connecting storage devices.

Offers greater performance. Large amounts of data can be recovered or backed up in seconds (compared to hours or days).

Increases disk utilization. The same physical disk can be accessed by more than one server, which lets you allocate the free space on those disks more effectively.

Increases file availability by using multiple access paths. You get unlimited “replays” without degrading performance.

Defers disk procurement. Because you can use disk space more effectively, no space goes to waste, thus you don’t need to buy disks as often as you used to.

Uses less space. Because you don’t need to buy big servers with room for a lot of disks, you can buy fewer, smaller servers, thereby creating a smaller footprint.

Introduces new disaster recovery capabilities. SAN devices can mirror data to another location. This can make your data safe if a disaster occurs. This ability also eliminates tape for daily backups and minimizes system downtime from disk or server failures, viruses, or human error.

Supports online data recovery. By using online mirrors, you can instantly recover your data if it becomes corrupt.

Promotes better staff utilization. Fewer people can manage more data.

Allows you to test new software and patches on actual data before releasing it to production. This cuts time and reduces the risk of implementing a flawed product.

Case Study: Implementation at ESA

Eye Surgical Associates (ESA), which has multiple locations and uses multiple healthcare providers, was looking for a solution to regularly backing up its data. Its existing information technology network had to oversee and include all of the following:



Figure 3. SAN mutual backup

- Eye Surgical Associates: eight providers, 13 off-site clinics, a practice management system, planned electronic medical records
- Sutton Ryan Dermatology: five providers, a practice management system, planned electronic medical records
- The Eye Group: A management services organization that assists in the computer needs of six off-site clinics. It uses the same practice management system that ESA uses.
- Lincoln Surgical Hospital: An eight-room, 16-bed, surgical specialty hospital performing more than 9,000 surgeries each year with a complete hospital system including electronic medical records.
- Lincoln Surgery Endoscopy Center: A two-room endoscopy suite performing 2,500 surgeries each year. Uses the same system as the hospital.
- Large orthopedic clinic: A 10-provider orthopedic provider that uses an imaging center and an off-site medical records archiving system.

The IT department had employed a back-up system that took, on average, 9 to 11 hours to backup (not including the offsite orthopedic clinic). This process was very tedious and time consuming and at times fell to the bottom of the IT department's priorities. The ultimate frustration came when the clinic practice management system performed an unsuccessful update and it took two weeks to rebuild to a

previous level of functionality. This failed update had a detrimental effect on scheduling as well as on collections. We had not implemented an EMR at the time, but if we had, it would have been almost impossible to be down that long.

When faced with a long-term decision to meet our storage and backup needs for all of our facilities, we explored the feasibility of a SAN. Though the price tag of \$150,000 appeared too costly, we looked at the other alternatives of tape backup and offsite backup as being too labor-intensive and not fully meeting our needs. So we opted for the SAN.

Implementing the SAN yielded the following benefits:

- A snapshot of the network is taken every 60 minutes, thus securing a complete backup in case of system failure. This backup, which amounts to two to three terabytes of data, takes under five minutes.
- Upgrades are tested before implementation. If the update fails, we can return to a complete system within minutes.
- Backup can be monitored remotely from any network connection that includes the internet and phone devices.

While still doing a complete tape backup every day, our long-term plan is to network with the orthopedic clinic and have our SANs backup each other's data (see Figure 3).

SAN Summary

While the cost of a SAN may be prohibitive to some smaller clinics, larg-

er clinics will benefit from using this technology. As with most innovations, there may be a time in the near future when the costs will decrease so that more clinics can take advantage of the SAN technology. An option for smaller clinics is to do what we have done: combine servers and applications to spread the costs over different clinics. Another option is to contract with SAN vendors to lease space on off-site servers. In any case, regardless of the size of your practice, using a SAN will allow your clinic to demonstrate "best practice" quality for storage and data retrieval. ■

Resources

AllSAN: All about Storage Area Networks. (N.D.) Retrieved 10/20/09 from <http://allsan.com/>.

Sifting through SANS. Dummies.com. Retrieved 9/28/09 from www.dummies.com/how-to/content/sifting-through-sans-storage-area-networks.html.

Poelker, C. and Nikitin, A. (2009). *Storage Area Networks for Dummies.* New York: For Dummies (Wiley Publishers).



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