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For Enterprise-Wide Computing



Rick Cople, CTO of Community Health Network, found that migrating to a SAN (storage area network) and using storage management software were the keys to being able to resuscitate a dying network.

Avoid Network Flatlines

▲ Now that Community Health Network migrated its storage network to a SAN (storage area network) and added storage management software with remote mirroring functionality, it is able to keep its network alive 24/7.

by Jay McCall

We're all familiar with the phrase "code blue" — it means that a hospital patient's heart has stopped. At Community Health Network's (CHN's) (Indianapolis) hospitals, however, there was another kind of emergency — a code white. This code alerted employees to network downtime. Even though a code white could be predicted ahead of time, it still created its share of trauma. Hospital doctors, nurses, and clerks, for instance, had to try to predict what information they would need during the two-hour downtime and print patient files and other information in advance. Additionally, if information needed to be captured during a code white, it had to be written down on paper (hence "white") and later entered into the appropriate application. This resulted in extra labor and a greater chance of errors.

DAS Slumps As Network Scales

As CHN's facilities added new applications to their repertoire, such as a pharmacy system, a radiology information system, and a bedside documentation application, IT administrators had to guess how much storage would be needed to support a particular application. More often than not, the DAS (direct attached storage) network proved both inefficient and expensive. First, in a DAS network, administrators typically allocate 60% more storage than is immediately needed to create a buffer and to lessen downtime. Second, because of the inherent configuration of a DAS network — individual storage servers dedicated to individual applications — access times and system backup times become increasingly sluggish as the network grows.

In early 2000, CIO Ed Koschka and CTO Rick Copple decided to migrate the hospitals' networks to a SAN (storage area network) environment. This move would prove to be not only an immediate fix to CHN's code white and storage capacity planning problems, but a step toward another goal on the duo's plate: an all-digital facility.

Defibrillate SAN With Virtualization Software

CHN's SAN initially comprised an IBM Shark storage subsystem with Fibre Channel (FC) connectivity within the building where it was housed at the East Community Health facility. To get the maximum benefit from its SAN deployment, CHN added DataCore Software Corp.'s (Ft. Lauderdale, FL) SANsymphony storage management and virtualization software to the system. The software provided a fourfold performance acceleration to the health-

care network's SAN. "The read rate and caching capabilities of the virtualization software reduced our backup times from 25 minutes to 7 minutes," says Copple. "Additionally, our database consistency verification process went from 30 minutes to 10 minutes." Besides giving CHN's network a needed boost, the storage virtualization enabled the healthcare network entity to save money on its disaster recovery initiative as well. "Without the SANsymphony software, we would be forced to purchase a second IBM Shark subsystem," says Copple. "Because the software creates a platform-agnostic environment, we were able to use two IBM FASTT subsystems synchronously mirrored.

Installation Profile

Technology User: Community Health Network (CHN) (Indianapolis) comprises 4 hospitals, 6 immediate care centers, 3 nursing homes, and more than 60 other healthcare facilities. This month (February 2003), CHN will roll out The Indiana Heart Hospital (TIHH) — one of the world's few all-digital hospitals.

Problem: In the past, CHN's facilities used DAS (direct attached storage) to support various patient and clinician applications and databases. Every time the system was upgraded — to add new applications or more storage capacity — it would be down for a few hours at a time, causing the facilities to go into paper-only mode.

Solution: By migrating to a SAN (storage area network) environment and using DataCore's (Ft. Lauderdale, FL) SANsymphony storage management platform, CHN was able to double its storage usage efficiency from 40% to 80%, mirror data to a remote facility, reduce data access and backup times 300% and 357% respectively, and eliminate network downtime.

Photos by Shawn Spence Photography

▼	SAN (storage area network)
▲	Storage Management Software
▼	Disaster Recovery

“The read rate and caching capabilities of the virtualization software reduced our backup times from 25 minutes to 7 minutes.”

Rick Copple, Community Health Network

This is significantly less expensive than purchasing a second IBM Shark using PPRC [peer-to-peer remote copy] — a hardware-based disaster recovery and workload migration solution.” Using the built-in mirroring functionality of its storage management software, CHN is able to asynchronously mirror data over the IP (Internet protocol) network to a third FAS*t* subsystem that is located at The Indiana Heart Hospital (TIHH), 11 miles away. CHN, like many other enterprises, chose asynchronous mirroring for its disaster recovery site because of distance limitations and to better utilize its bandwidth (2 Gbps) between its data centers. Because synchronous mirroring requires confirmation from the host site before signaling I/O (input/output) completion to the requesting host, it is typically used only for high-bandwidth connectivity. “This was another reason we did not want to use our Shark for disaster recovery purposes,” recalls Copple. “Because the Shark uses a built-in PPRC protocol, we would have been forced into

synchronous mirroring, which adds an extra step to the mirroring process. The time required for this extra step would have introduced the potential for data loss in a disaster recovery situation.”

Between the two data centers, CHN stores 8 TB of data — 4 TB of live data and 4 TB of data that is mirrored in the event of storage server downtime. Using SANsymphony software’s GUI (graphical user interface), IT administrators are able to manage heterogeneous resources (e.g. servers running on UNIX platforms and servers running on Windows 2000 platforms) from a central console. This means the arduous task of having to do volume management on every application server is eliminated. Additionally, the storage management software eliminates having to



Optimize Your Pool With Storage Management Software

If your network uses DAS (direct attached storage), you’re probably familiar with the following scenarios:

1. Whenever you need to upgrade or add an application to the network, you have to schedule server downtime.
2. Your IT staff has to guess how much storage will be needed for each application and continuously monitor storage consumption to make sure they don’t underestimate.
3. IT support is needed to manage data replication at each server or at each storage subsystem.

Because of the many manual tasks associated with managing a DAS network, analysts such as Gartner cite that most enterprises effectively use only 40% of their storage resources and IT staff resources.

Storage Management, Virtualization Offer Real Savings

By migrating your network to a SAN (storage area network), you’ll be able to better allocate your storage from separate storage volumes to a single “pool.” However, to fully capitalize on the value of migrating to a SAN, you need to consider adding storage management software to the mix. For example, DataCore’s (Ft. Lauderdale, FL) SANsymphony allows administrators to add storage capacity, upgrade disks, resize volumes, and upgrade applications without shutting down any servers. Additionally, SANsymphony enables all

application servers within the network to be managed from a central console. And, besides providing a single view of all the available storage, DataCore’s software automatically calculates the rate at which storage capacity is being used and provides a prediction of when more storage capacity will be required. Not only is time saved, but administrators are able to add storage only as needed.



Another major time saving comes into play for enterprises that want to add disaster recovery functionality to their network. “Without virtualization software in place, enterprises such as ours would be forced into replicating data among identical storage subsystems and using more expensive connectivity such as Fibre Channel-to-IP [Internet protocol] converters at both sites,” says Rick Copple, CTO of Community Health Network (Indianapolis). “Because storage management software such as SANsymphony is not locked into using a single, hardware-based data protocol such as PPRC [peer-to-peer remote copy], enterprises can choose less expensive subsystems, from multiple vendors, to mirror their data. Additionally, enterprises can use less expensive intersite transmission protocols such as the native IP connections which are already in place.”

For More Info. On DataCore Software Corp.

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SAN (storage area network)

Storage Management Software

Disaster Recovery

Remember, Wireless Security Is A Must

Whether you are about to roll out a WLAN (wireless LAN) at one of the world's few all-digital hospitals (like Indianapolis-based Community Health Network) or at your warehouse or campus, security should be a top concern. Most non-proprietary (e.g. 802.11) access points are shipped with their security features turned off. Add to this the fact that many access points use an easily identifiable SSID (service set identifier), and you have a recipe for network vulnerability. To thwart eavesdroppers and hackers from sending spam from your ISP (Internet service provider) address or stealing sensitive data such as social security numbers and credit card information, there are a few steps you should take. At The Indiana Heart Hospital, CTO Rick Copple has several security initiatives in place.

"The first step we took to secure our WLAN was to change the SSID from its default value," says Copple. "Next, we secured our PCs, laptops, and tablets with password identification and time-out functionality. Finally, the 802.11 wireless data LAN is isolated from the enterprise via a CISCO VPN [virtual private network] Concentrator, which uses proprietary tunneling protocols from end to end." Access from the wireless LAN is limited via routing access lists to only the VPN Concentrator and DHCP (dynamic host configuration protocol) services. As a final precautionary measure, all wireless devices at TIHH will not have any data stored on the devices themselves, but will simply be used to access and input data to the network.

While no wireless network is completely immune to getting hacked, the sad reality is that more than 50% of wireless networks are totally open with no security in place, giving anyone with a laptop and network interface card easy access to their data. For more information on WLAN security, check out "The Lowdown On WLAN Security" in the December 2002 issue of *Integrated Solutions* magazine.

predict how much storage capacity is needed by giving administrators a centralized "pool" view of their storage. And, by employing specific network rules, IT administrators are automatically notified when the storage pool falls below a certain level.

Document Imaging Is Next Step To All-Digital

When TIHH opens its all-digital facility in a few weeks, it will be among the few paperless and filmless hospitals of the world. CHN's other four hospitals — all located in the Indianapolis area — will take a phased approach from paper to digital. "In the medical community there is a mindset that you have to generate and store paper," says Copple. "With proper training and patience, healthcare employees see the value of electronic data compared to paper-based data."

At CHN's other four hospitals, Copple and his IT staff will take a phased approach toward that goal of being all-digital. One technology that currently plays a key role in this transition is document management. CHN's hospitals use a FileNet document imaging solution, which includes Panagon capture software. Its document imaging solution is integrated with scanning hardware such as Kodak, Ricoh, and Fujitsu scanners and Kofax interface cards. With its document management solution in place, CHN is able to scan paper documents such as patient health records, patient financial service forms, and lab reports. "In all, we scan about 7.5 million documents per year, which does not include documents that are provided by outside electronic services," notes Copple. That

works out to an average of 1.88 million documents per hospital. When you think about the fact that that number will be cut down to nearly zero in one hospital, you can begin to see the time savings of generating documents electronically and keeping them electronic.

Integrated Patient Records Yield Safer Medical Diagnoses

One of the final steps in going all-digital in the hospitals will be to roll out digital X-ray machines that are designed to capture and present X rays on computers without the need to produce film. CHN has been working with GE Medical Systems and will use their PACS (picture archiving and communication systems) imaging solution to achieve a filmless environment as well as a paperless one. The final feature that will be available at TIHH will be a GE Centricity Information System, an electronic patient medical record technology that integrates patient information — including images, waveforms, and complete medical history — into a single electronic record that will span a patient's lifetime. Clinicians will more easily be able to view patients' medical histories and provide safer care while at the same time be able to spend more time with patients. □



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