

Medical Research Facility Uses iSCSI to Deliver High-Availability Storage Networking



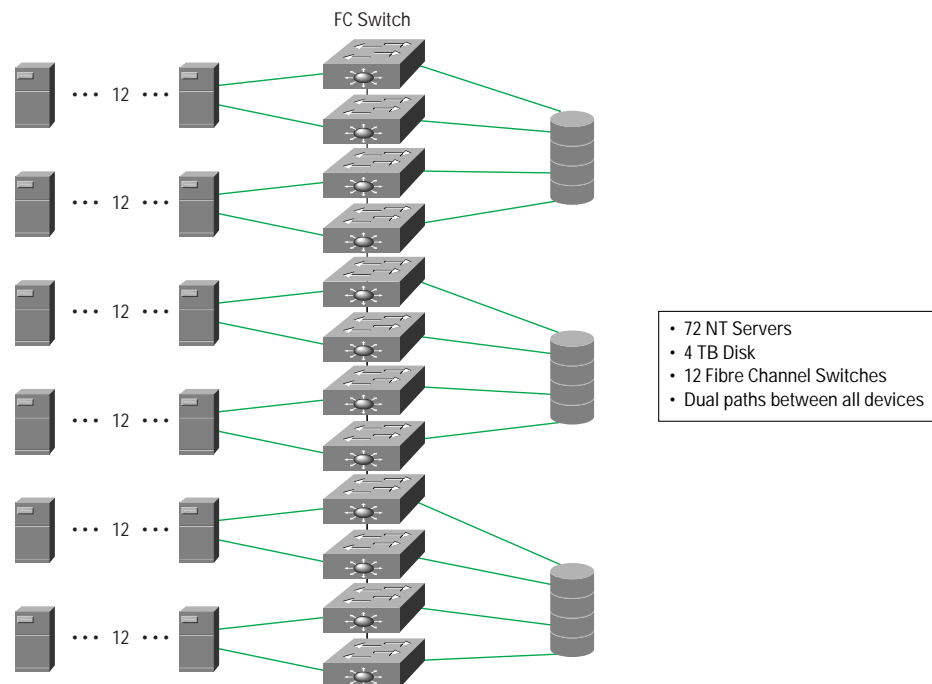
Success starts with the right tools to get the job done. A major medical research facility faced a challenge. Like so many organizations, its database was growing exponentially. Hundreds of users were networked into a powerful server farm made up of 72 servers that shared a very large, 4-terabyte (TB) database.

Understanding that it was crucial to install a storage network that would support their performance and cost needs as well as grow with them in the future, the researchers compared a Fibre Channel-only approach with a hybrid approach that coupled an Internet Small Computer Systems Interface (iSCSI) storage network based upon Cisco's Catalyst 6500 gigabit Ethernet switch and SN 5420 storage router using Fibre Channel for storage access. Both configuration alternatives provided redundant gigabit paths from every server to the facility's 4-terabyte (TB) database.

iSCSI Storage Network Brings Scalability to Fibre Channel

The Fibre Channel-only alternative required a mesh of Fibre Channel switches (Figure 1). This approach involved stacking a large number of switches and could require multiple hops through the switches to reach the right storage array.

Figure 1 Mesh of Fibre Channel Switches



Although the Fibre Channel approach met the basic access requirements, that fact was overshadowed by a high probability of congestion on the inter-switch links. In addition, the architecture cost exceeded the medical research facility's budget allocation.

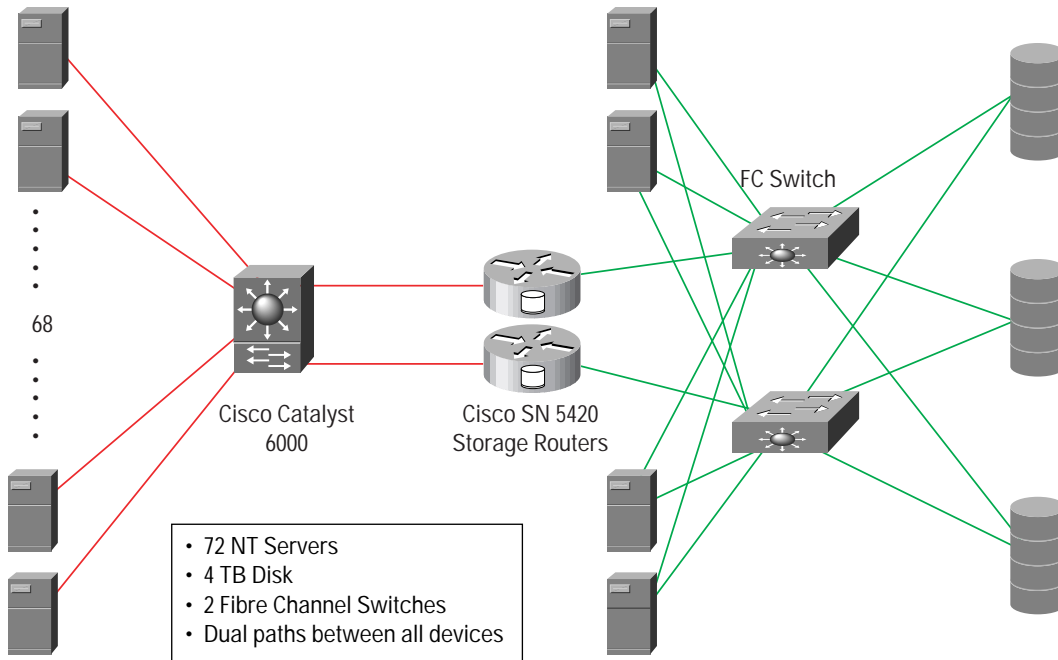
Cisco Storage Routers Deliver the Affordable Solution

As the researchers discovered, iSCSI offers an affordable and scalable storage network for server and storage consolidation. Cisco's Catalyst 6500 provides a highly-available data center class gigabit Ethernet switching/routing platform to meet the scalability, performance, and robustness requirements for connecting the servers to storage. The Cisco SN 5420 storage router delivers redundant iSCSI paths to a pair of Fibre Channel switches. iSCSI takes advantage of the connection-oriented TCP protocol for reliable service. Ethernet was already part of the IT network and meant trained personnel were on board and a simplification of the storage networking installation (Figure 2).

This iSCSI solution takes into account that SCSI is both a physical interface and a storage protocol. Applications have standardized on the SCSI protocol to communicate with storage devices. In between the application and the storage device is a transport system. First, there was the SCSI parallel interface. This was followed by Fibre Channel, and now iSCSI, a proven storage protocol, operates over a proven transport system: TCP/IP and gigabit Ethernet.

Cost was an important factor in choosing iSCSI from Cisco. Because the research facility already had TCP/IP and gigabit networks installed, the iSCSI solution fit their budget and met their storage networking needs.

Figure 2 Highly Available iSCSI and Fibre Channel Approach to Storage Networking and Storage Access





iSCSI for Storage Networking and Fibre Channel for Storage Access

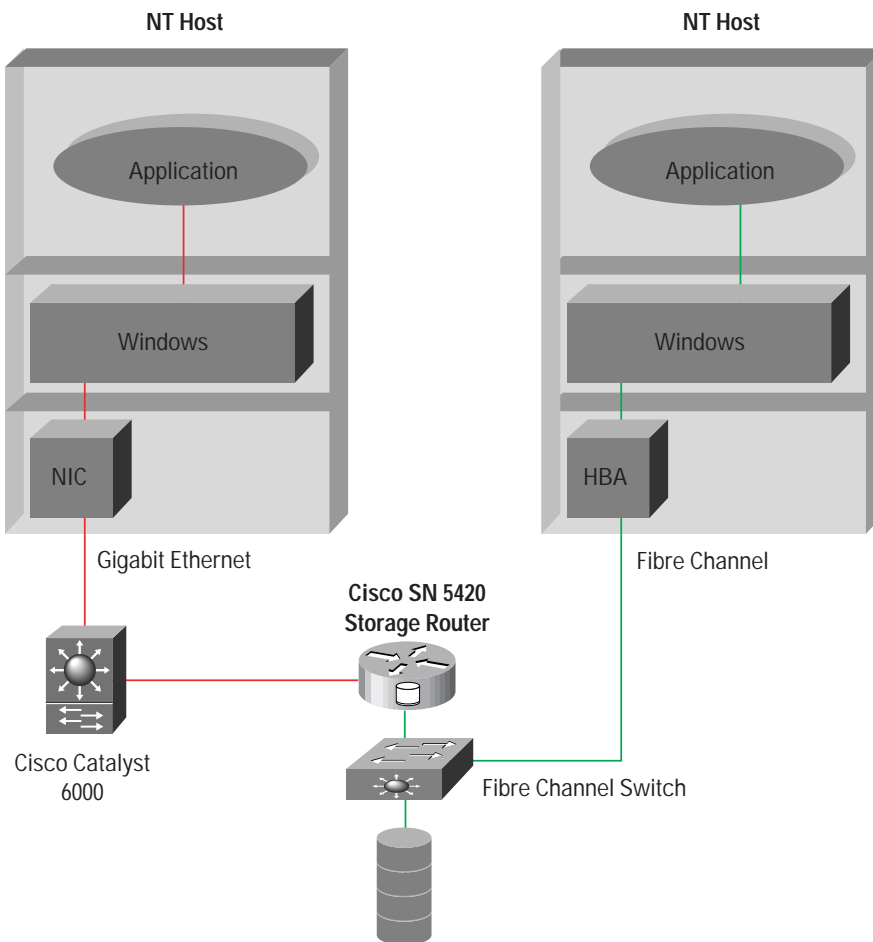
Not only did the Cisco Storage Router provide the means to meet the budget constraints of the research facility, it allowed the storage performance to be tuned to meet the facility's requirements. For the medical research facility, storage access was the principle need. Given that the solution would include high-performance servers, the researchers determined that it was important to directly connect those servers to the Fibre Channel switches. This ability to tune the system was critical in meeting both the cost and performance needs of the facility.

The end result uses the scalability and cost advantage of iSCSI via gigabit Ethernet for storage networking and retains Fibre Channel for storage access. This hybrid approach permits the medical research facility to take advantage of lower capital costs and meet their operational needs.

Application Transparency

The applications interface with the generic SCSI layer in the NT host and cannot distinguish the difference between iSCSI and Fibre Channel. This transparency gives the medical research facility complete flexibility in architecting their storage network.

Figure 3 Storage Appears the Same to Applications Whether iSCSI or Fibre Channel Attached



Major Benefits Comparison

Benefit	iSCSI and Fibre Channel	Fibre Channel Only
Reduced capital expenses	• More —provides server and storage consolidation at a lower cost.	• Less —Fibre Channel is a more expensive technology.
Improved staff efficiency	• More —can use existing Ethernet and TCP/IP expertise. No need to configure Fibre Channel as a network.	• Less —requires complicated Fibre Channel network to manage. New skills.
High availability	• Yes —all the way from the servers to storage.	• Yes —all the way from the servers to storage.
Highly scalable	• More —Gigabit Ethernet and TCP/IP scale to thousands of nodes in an uncomplicated way.	• Less —scales, but does not scale easily for a large number of network nodes.
ROI	• Quick —lower cost means faster ROI.	• Yes —provides ROI, but not as soon.
Flexible system architecture	• High —makes economic sense for all classes of servers.	• Lower —applies mainly to high-end servers.

Unrestricted Research...The Time Is Now

iSCSI is long overdue. The SCSI protocol needs the reliable transport that TCP/IP provides. iSCSI running on gigabit Ethernet is an affordable solution that provides the performance, growth, and flexibility that customers demand. The future of storage networking uses protocols and networks that are trusted and understood. There has never been a better time for customers to transition to iSCSI and capitalize on the training and knowledge they already have.



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