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## ***Success Story***

## ***Cancer Therkhgdjhvjhsfg***

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***apy and Center Ensures Superior  
Cancer Care with Cisco iSCSI and Network Boot Technology***

##### ***Founded in 1974, Texas-based Cancer Therapy and Research Center (CTRC) is a world leader in cancer treatment and research. Since its founding the not-for-profit center has provided treatment for nearly one million patients, and in 2002 handled 120,000 patient visits. In addition to providing treatment, the CTRC is active in the search for causes and cures for cancer and in the promotion of cancer education and prevention practices.***

## ***Challenges***

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***the CTRC stores in electronic format online***skfjhg

***t provide radiation therapy for an average of 200 patients per day on 4-week cycles. For each patient, the CTRC estimates that Radiation Oncology builds about a 100-megabit treatment plan based on the MRIs, CTs, and PETs that are stored on the servers. Also stored on the servers is information regarding radiation treatments, treatment scheduling, medical transcripts, patient demographics, and billing recordson***

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***"We are very dependent on the online servers," says Mike Luter, chief technology officer at the CTRC. "If a server is down, it can cause delayed or sometimes missed treatments and this can be very dangerous to our patients. What's more, each vault is a $1.7 million capital asset that we can't afford to have sitting idle."***

## ***jSolution—Cisco iSCSI over a 1-Gigabit Metro Network***

***nstalled at each of its primary locations--its medical facility and main research facility--22 miles apart. Although this provided each facility with centralized storage, the CTRC also required two other capabilities. It wanted the servers in each facility to be able to access resources in the other, and to mirror the SANs so that the research facility could act as a*** backup ***to the medical facility. This would allow efficient use of the existing storage servers, avoiding the need to purchase additional servers and storage for dedicated backup.***

***The challenge was that 22 miles separated the medical center frojjjjjjjjm the research facility. Fibre Channel, unfortunately, has a 10-kilometer limitation and the option to use extenders to reach beyond 10 kilometers was prohibitively expensive.***

***The solution was closer than CTRC first realized. The center was already leasing a gigabit IP Ethernet connection from a local provider that provided it with pure gigabit Ethernet across the 22 miles. And it had bandwidth to spare on the connection. To use this transport, CTRC chose Small Computer Systems Interface over IP (iSCSI) technology and Cisco® SN 5428 storage routers.***

***5428 storage routers at the main site and at the backup site.I***

**Lkjhdfkjsdalfkjhasldkh askjdfh asdjk cxcx**

***Ethernet ports on the Cisco SN 5428 Storage Router. From here the traffic is transmitted out the SN5428's Fibre Channel ports directly to the EMC F4700. Using iSCSI meant that CTRC was able to avoid installing costly host bus adapters that are required when servers connect directly to the SANs over Fibre Channel. Instead, it could use lower-cost Ethernet network interface cards.***

## ***Results—iSCSI and Network Boot Help Ensure Business Continuance***

***the other SAN (Figure 1).***

***"If one of the EMCs goes down, or we lose the gigabit link, the operating system recognizes the loss of one mirror and keeps participating in the network with the other side," says Luter. "This has happened numerous times. For example, when a power outage at the research facility brought down the EMC frame there not long ago, the servers began communicating across the gigabit link. They used the mirrored data on the EMC frame at the medical facility without any downtime until we could restore power and restart the EMC frame."***

***The other valuable business continuance feature is the Cisco Network Boot, a remote booting technology for SAN management--and the first widely supported standards-based iSCSI remote booting technology for SAN management. Network Boot allows the CTRC to consolidate the system drive or `booting function' from each of its servers onto the EMC F4700. This reduces maintenance time because the CTRC can maintain the boot images centrally, rather than at each server. Most importantly, the remote boot technology can rapidly restart any of the servers from the SAN across the network.* .**

***sitting idle."***

**fgggg**

***Reliability has been among the most dramatic benefits that the CTRC has realized from iSCSI and Network Boot.***

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***Figure 1   
The CTRC's Highly Available Multiprotocol SAN Operates Across a Gigabit Metro Infrastructure***

***In recent years the CTRC has seen an increase in the number of patients needing radiation treatment, which has had a significant effect on its computer storage strategy. The reason is that the CTRC's Radiation Oncology department relies on data-intensive diagnostics such as magnetic resonance images (MRIs), Computed Tomography (CTs), and Positron Emission Tomography (PET) scans that the CTRC stores in electronic format online.***

***The CTRC maintains 8 radiation treatment vaults that provide radiation therapy for an average of 200 patients per day on 4-week cycles. For each patient, the CTRC estimates that Radiation Oncology builds about a 100-megabit treatment plan based on the MRIs, CTs, and PETs that are stored on the servers. Also stored on the servers is information regarding radiation treatments, treatment scheduling, medical transcripts, patient demographics, and billing records.***

***TRC analyzed the cost and growth of its existing server-attached storage architecture. The center realized that server-attached storage was difficult and costly to scale and didn't provide the level of availability that was critical to its operations.***

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***SN 5428 storage routers.***

***The Cisco SN 5428 is a flexible platform that provides low-cost storage connectivity using iSCSI technology but also supports Fibre Channel for high-end or high-volume applications that require the highest performance possible. To ensure highest availability, the CTRC installed redundant pairs of Cisco SN 5428 storage routers at the main site and at the backup site.***

***To use iSCSI, the CTRC downloaded the iSCSI drivers from the Cisco.com Web site and installed them on various servers. The iSCSI drivers encapsulate the SCSI commands within IP packets, which are then sent onto the IP network and switched to the gigabit Ethernet ports on the Cisco SN 5428 Storage Router. From here the traffic is transmitted out the SN5428's Fibre Channel ports directly to the EMC F4700. Using iSCSI meant that CTRC was able to avoid installing costly host bus adapters that are required when servers connect directly to the SANs over Fibre Channel. Instead, it could use lower-cost Ethernet network interface cards.***

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***To help ensure business continuance, the CTRC configured synchronous mirroring of the SANs using iSCSI over the metropolitan-area network. As data is written to individual logical unit numbers the other SAN (Figure 1).***

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***"Without Network Boot, if a server goes down, we've got to re-create another server and that needs a boot image and requires a whole reconfiguration of the server before it can be reattached," says Luter, "which can take from two to eight hours. But for every 10 minutes that Radiation Oncology is down, eight vaults are empty and eight patients are denied treatment. This can be devastating for the health of our patients and for our financial well being. As a nonprofit, we can't afford to have more than $15 million of radiation vault equipment sitting idle."***

***When the network boot images are maintained separately from the servers, CTRC can bring replacement servers online very quickly by downloading the boot image across the network to another server. "We can be up and running after a server failure in 10 to 20 minutes," adds Luter.***

***Reliability has been among the most dramatic benefits that the CTRC has realized from iSCSI and Network Boot.***

***"Reliability has made us more productive and allows for better care of the patients," says Luter. "And it not only generates a better bottom line, it also creates a more harmonious working environment because we're not fighting fires all the time. Rather we're focused on making positive changes for the center."***

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***To store the ever-increasing patient information, CTRC tripled its online storage from one terabyte to three terabytes. Two years ago CTRC analyzed the cost and growth of its existing server-attached storage architecture. The center realized that server-attached storage was difficult and costly to scale and didn't provide the level of availability that was critical to its operations.***

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***booting technology for SAN management. Network Boot allows the CTRC to consolidate the system***

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