CASE STUDY

Lund University Hospital

Information lifecycle management solution saves herniated disks and torn ligaments on disk and tape.

Solution at-a-glance

Company
Lund University Hospital

Industry
Healthcare

Employees
7,700 hospital staff

Storage application
Digital archive of X-ray images

StorageTek® solutions
- L-Series™ L700 tape library
- T9840 tape drives
- DLT™ 7000 tape drive

Related solutions
- Systems integration from Sigma
- Servers from Sun Microsystems
- SAM-FS software
- PACS from GE Medical and Philips Medical Systems

Business results
- Patient images and files are available on disk or tape
- Patient images and files can be accessed directly from workstations throughout the hospital

An advanced heart-lung X-ray examination can produce images corresponding to one gigabyte of data. A CT scan can produce 700 images at half a megabyte each. With approximately 15,000 new digital X-ray images per day — one every 10 seconds — Lund University Hospital has one of Sweden's largest digital storage needs.

Business issues

Since 1998, Lund University Hospital has used digital technology for X-ray images. Instead of yards of storage shelves with X-ray images stored in the basement, the patients' images and files are available on disk or tape and can be accessed directly from 120 workstations around the hospital. This requires smart storage and cost efficiency.

"Previously, if X-rays were to be mailed or presented, we had to order them days in advance. Today, in principle, we can retrieve any examination within a few minutes from a workstation, and we can view the images directly. Of course, this is more flexible for those of us who work with it, but it is also of benefit to the patient," said Gudmund Svahn, hospital physicist, who is responsible for the digital image system at Lund University Hospital.

The solution

The StorageTek® concept of information lifecycle management (ILM) was something no one knew about in 1997 when Gudmund Svahn, together with system integrator Sigma, began to plan the storage solution for Lund University Hospital. Nevertheless, Svahn used these principles in his plan.

First the X-rays are stored on the hospital's 1.7-terabyte redundant array of independent disks (RAID). The images are recorded for one to two weeks on this relatively expensive disk system. Then they are automatically transferred to an easily accessible, but less expensive, tape storage system using a tape robot with T9840 tape drives. There the images are stored for 12 weeks and are almost as easy to access as if they had remained on the disk. After 12 weeks, the images are transferred to less expensive (and slower) digital linear magnetic tapes (DLT 7000).

"The retrieval period for images stored on disk is perhaps a few seconds. Images from faster tape in a T9840 tape drive can be retrieved within a minute. If the examination material is stored on DLT tape, it may take between two and seven minutes to retrieve it," said Svahn.

No manual work is required to transfer the stored images between the different media. Everything is handled by a software program which manages the files. The user doesn't see any difference. All the images are online at any time, but those that have not been used recently take just a little more time to retrieve.

"The system has been set so that, as long as the images are used often, they will remain on the faster disk. Each time an examination is retrieved, the timer is reset. In addition, most surgeries are planned and the storage solution is integrated with the surgery booking so that the needed X-rays are automatically transferred to the hard disk the day before the surgical procedure," according to Svahn.

Lund University Hospital has not performed any exact calculations on how much is saved (return on investment, or ROI), but has found that the new system clearly saves time and money. Previously, a large physical archive was required for all the images, as well as additional personnel to manage this system. Now most of these functions are performed automatically.

"It is difficult to calculate exactly how much less expensive it is to store on tape than on a hard drive," said Svahn. In order to create an exact basis for this question, there are many factors that must be considered such as depreciation, support, etc., but a quick overall calculation would still show large cost differences. Roughly, it could be said that one megabyte stored on a DLT magnetic tape costs SEK .07 to store, while a megabyte on a RAID disk costs SEK 2.70, a difference factor of 40."

In the X-ray department, every system must work every minute of the year. Therefore, the disk system has been doubled and there are two separate archives with magnetic tape units. If one robot should malfunction, the server will automatically switch over to the next one.

"X-rays are normally saved for 10 years, so the analog archive is beginning to shrink. Some of the most interesting examinations we have digitized, but primarily we archive only new examinations digitally," Svahn noted.

Lund University Hospital currently has an image data archive of 26 terabytes and the archive is growing at a rate of approximately 9 terabytes per year. Because duplicate archiving is implemented for safety reasons, we are really talking about a 52-terabyte image archive with growth of 18 terabytes per year.

Technical solution

Lund University Hospital uses RAID disk and equipment from Sun Microsystems for database and archive servers. The hospital has automated tape systems from StorageTek (among others, the L700), and uses many different magnetic tape storage units from StorageTek, including the T9840 tape drive and the DLT 7000 magnetic tape The hospital uses the software program SAM-FS to manage transfer of the files between the various storage media.

About Lund University Hospital

Lund University, founded in 1666, is the largest and most complete institution for research and higher education in Scandinavia. It is primarily located in Lund, Sweden. Today, Lund University has approximately 35,000 undergraduate students and 3,000 postgraduate students.

The University Hospital in Lund is a teaching and research hospital functioning on both regional and national levels. At present, the hospital has a staff of 7,700. The University's faculty of medicine, which carries out teaching and research, has 2,250 undergraduate students and more than 800 doctoral students.

Case study company: Lund University Hospital
www.lund.se

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Gudmund Svahn, hospital physicist responsible for the digital image system, Lund University Hospital

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ABOUT STORAGETEK®

Storage Technology Corporation (NYSE: STK), a $2 billion worldwide company with headquarters in Louisville, CO, has been delivering a broad range of storage management solutions designed for IT professionals for over 30 years. StorageTek offers solutions that are easy to manage, integrate well with existing infrastructures and allow universal access to data across servers, media types and storage networks. StorageTek's practical and safe storage solutions for tape automation, disk storage systems and storage integration, coupled with a global services network, provide IT professionals with confidence and know-how to manage their entire storage management ecosystem today and in the future.

StorageTek products are available through a worldwide network. For more information, visit www.storagetek.com, or call 1.800.275.4785 or 01.303.673.2800.

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