The IT infrastructure in complex institutions like a university hospital has to be able to meet particularly high demands. Applications at Saarland University Hospital (UKS) in Homburg, Germany, range from management applications for the organ donor database to diagnostic imaging systems, which must make data available during surgical procedures. After meeting these requirements successfully for several years with a central storage solution from Hitachi Data Systems (HDS), UKS addressed exponential data growth, in 2012, by extending the existing Hitachi SAN environment with 2 Hitachi NAS Platform 3080 systems. These systems have provided the UKS with an additional 100TB of reliable and cost-efficient capacity.

Since 2004, the UKS has operated a modern IT environment with a separate storage pool and blade servers. The facility was therefore able to meet the demand for maximum cost efficiency along with performance and availability. These key requirements still apply today. What has changed, however, is the massive data growth the UKS IT processing center, Center for Information and Communication Technology (Zentrum für Informations und Kommunikationstechnik – ZIK), and its employees must handle. In 2004, 22TB of capacity was installed, which was impressive for the time. However, it was not long before this capacity became unable to cope with demand.

The data growth also had an impact on performance. There was particular need for faster storage in the SAP-based hospital information system (HiS). As many as 3000 employees access the systems at the same time. For that reason, the UKS acquired 2 Hitachi Adaptable Modular Storage (AMS) 2500 systems from Hitachi TrueNorth Partner Cristie in 2010. Since then, the systems have been running reliably in production services and have taken over many routine tasks.

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Ralph Hastenteufel
Center for Information and Communication Technology
Saarland University Hospital
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storage tasks, such as supplying the ESX Server. The AMS symmetric active-active controllers generally increase system performance and can take over the functions of the failed controller in the event of a fault. Since they were installed, they have been providing the required level of reliability along with high-level performance and capacity.

SAN Storage Environment Expands to NAS Systems

Since the introduction of AMS, the data volume had increased by a factor of almost 14 compared to 2004 levels. In 2012, it was delivering around 300TB of SAN capacity with maximum availability. With this level of growth, it was foreseeable that future volumes would no longer be able to be managed exclusively in SAN. The UKS not only makes storage available to the hospital facilities but also to the university’s medical and dental faculty, which generate relatively large amounts of unstructured data, such as documents and images. However, the main growth drivers are still the diagnostic imaging procedures, which the UKS stores in the picture archiving and communication system (PACS).

“Most patients have X-ray images. There are also images from magnetic resonance imaging (MRI), ultrasound, infrared, video recording and so forth,” explains Ralph Hastenteufel, who is responsible for the SAP, server and storage management at the UKS Center for Information and Communication Technology (ZIK). “All images initially migrate to our PACS and remain there for 2 to 3 years, after which they are archived on audit-compliant storage systems and tapes. This is the ideal time frame for follow-up treatments, but the volume of stored data in the PACS alone is increasing by around 20TB per annum. And the rate of growth is increasing with each new modality generation as the information density of the devices also continues to increase.”

UKS Chooses High-Capacity HNAS

These areas of tremendous data growth prompted the IT team, before 2011, to begin to plan for the acquisition of a powerful new high-capacity NAS system in order to extend the existing Microsoft® Windows® NAS installations and Hitachi Adaptable Modular Storage. After initial market screenings, it quickly confirmed that this type of system could be well integrated into the IT infrastructure design. Once the IT team had obtained comprehensive information about the solutions available on the market, a Europe-wide invitation for network attached storage proposal was issued. During the open bidding procedure, Cristie was able to fight off the competition with its HDS offer, and the UKS placed an order in July 2012.

In August and September, the ZIK, Cristie and HDS installed the HNAS system. The final technical operations were performed in October. The migration of the PACS data to the new NAS was completed by the UKS in March 2013.

The Technology in Detail: PACS Migration at the UKS

Availability is the decisive tactical component for the ZIK, as otherwise surgeries cannot be assigned and laboratory values are not accessible. For this reason, there was no option of downtime during the PACS migration. The ZIK, Cristie and HDS resolved the migration process as follows: The PACS was divided into 30 LUNs. Each LUN had 1TB of capacity and was defined as read-only, while the connected 6 servers migrated the data. Connecting these proved extremely challenging because some of the imaging modalities and their associated server software are proprietary; in other words, they were designed without using established standards. Failures in these connections can represent significant costs; for example, expenses occur if operations have to be postponed.

After the transfer to the new system, only the data path had to be changed. This meant that although write access was not possible at times during the migration, the data was available at all times throughout the entire process because there was no need for downtime.

“The migration was not easy for the reasons outlined above, but everything worked to our satisfaction,” explains Hastenteufel. “The collaboration with Cristie and HDS progressed very smoothly. This was true for the entire project, from preparing the proposal, including allowing for price continuity, through to training and support. The HNAS 3080 meets our expectations for high standards of product quality, based on our experience with the AMS series supplied by HDS.”

NAS: Even More Important in the Future

Since commissioning Hitachi NAS Platform 3080, the ZIK has acquired more than 100TB of additional storage capacity. This offers a high level of availability and is distributed over 2 locations that are several hundred meters apart: the container data processing center and another building. Mirroring over the 2 sites is performed by Hitachi TrueCopy over a multiple redundant

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fiber optic line. A 3rd location on the site also acts as an additional control to verify faults and initiate automatic failover. One item on the ZIK wish list is to be able to perform this function in both data processing centers in the future.

Many other departments at the UKS generate unstructured data. In the case of psychiatry, some particularly volume-intensive video files accrue. The ZIK has therefore started planning to connect areas beyond the PACS: “We receive NAS requirements every month. We mostly have to make storage available at very short notice. Since we have very efficient IT overall, this naturally lends itself to consolidation of the file servers. Thanks to the HDS systems and the excellent collaboration with Cristie and the HDS staff, I am able to view the forthcoming tasks with a degree of equanimity,” is Ralph Hastenteufel’s positive conclusion.