Based in Heidelberg, Germany, the University Hospital of Heidelberg has a rich history of more than 600 years of education and research in medicine. Today, the medical faculty is driven by tradition, experience, and a deep founded responsibility to conquer the incredible challenges that 21st century medicine presents.

While the University Hospital of Heidelberg has a long and distinguished past, its vision into the future is what has brought the institution global acclaim. The University Hospital of Heidelberg is ranked number 10 among the top 50 teaching hospitals in the world, and is the only German hospital on that worldwide list. To maintain its prestigious ranking, the institution is committed to staying on the leading edge of innovation.

In 2004, Heidelberg opened a new three-story, 280-bed medical center focused on Internal Medicine with ICU and IMC units for cardiology and gastroenterology among others. All beds are monitored, even in non-acute wards, with either stationary or mobile monitoring.

Around the same time, the institution hired a forward-thinking IT director, Prof. Dr. Björn Bergh, who explains his vision for the hospital. “My goal was to set up an infrastructure that would be state-of-the-art, and at the same time be conceptually so open that by including a wireless network, it would maintain its functionality – even in ten years.” Dr. Bergh had been involved with several research groups in Germany and realized that wireless technology was the wave of the future.

**ACTING ON A CLEAR VISION**
While the hospital’s goal was clear, the way to achieve that goal was unclear – because a project of this scope and scale had never been done before.

Heidelberg sought the latest monitoring and networking technology available on the market. They wanted an Internet-based wireless solution instead of a proprietary telemetry-based solution. Finally, they wanted the existing hospital facility and the new building to have one integrated network.

The hospital outlined its needs to several patient monitoring vendors and asked them two questions. First, “Can your monitors run on an existing hospital network without requiring a separate network?” Second, “Can you do a completely wireless installation?”

Dräger Medical was the only patient monitoring vendor that could answer “Yes” to both questions. The others required a separate, dedicated network for monitoring. As a result, Heidelberg chose Dräger Medical as its monitoring vendor.

**HOSPITAL-WIDE STANDARDIZATION**
Heidelberg had been using patient monitors from five different manufacturers throughout the facility. For technical reasons and cost containment, Dr. Bergh wanted to standardize on one monitor for all applications and all divisions throughout the hospital – including its regular surgical and pediatric departments. The hospital wanted one modular, standard monitor that was small, flexible, and easy to carry.
But the hospital's clinical requirements didn't stop there. Prof. Dr. Eike Martin, CEO, explains. “In order to provide better care, we wanted to bring information from the HIS and imaging to the bedside. We needed to have more information available at all times, which called for the ability to integrate information.”

The hospital standardized on the Infinity® Delta monitor for all departments. In addition, every critical care bed in the hospital will be equipped with a second “smart” display. This combination of the Infinity Delta monitor and a smart display at the acute point of care is called the Infinity Omega solution. Using the smart display’s IT capabilities, physicians and nurses can access HIS applications, DICOM images, lab data, and critical care documentation – right at the acute point of care. “In effect, every PC in the hospital LAN becomes a window into the Infinity Network,” says Dr. Martin. “Clinicians don’t have to go into the ICU to check on the condition of a patient.”

In the new medical center, Heidelberg has 26 beds for cardiology, critical care and intermediate care, 26 beds for...
gastro critical care and intermediate care, and 22 beds for hematology critical care and intermediate care. Each of the 74 beds is equipped with an Infinity Delta monitor, plus a smart display to operate Infinity monitors and access HIS applications at the acute point of care. In addition, Heidelberg implemented 140 Infinity Delta monitors, 100 of which are operated in wireless mode.

**CREATING A SHARED INFRASTRUCTURE**

Historically, patient monitoring required its own separate network to provide security and performance. Dräger Medical is able to run its patient monitors on the hospital’s network because of new technology called Infinity OneNet – a VLAN-based shared infrastructure that runs patient monitors on the hospital’s existing network.

Heidelberg’s patient monitoring solution was a collaborative effort involving Dräger Medical, the adept IT team at the hospital, and third-party networking experts.

To help implement Infinity monitors on the hospital’s 802.11b (WiFi) wireless network, Dräger Medical brought in Anyware Network Solutions (ANS), a Colorado, USA-based wireless network consulting firm. To create a robust, secure and reliable converged network, ANS performed a comprehensive needs analysis and site survey, as well as a wired and wireless VLAN network design, product sourcing, installation and configuration, testing, and post-sales support. The implementation team set up 50 access points for the highest available throughput to handle all of the potential patient monitors and wireless client devices – such as 802.11b-compliant PCs, handheld scanners, and PDAs that the hospital wanted to run on the network. ANS chose Cisco 1200 series 802.11g access points to assist with its wireless VLAN strategy.

**OPTIMIZING QUALITY OF SERVICE FOR WIRELESS**

To provide Quality of Service (QoS), Dräger Medical and ANS brought in another industry expert, Packeteer, Inc., a WAN optimization company based in Cupertino, California. The team incorporated Packeteer’s application traffic management solution into the network. This industry-leading solution prioritizes “life-critical” information provided by patient monitors and gives it dedicated bandwidth.

Because of the expertise of Heidelberg’s IT staff, they were able to leverage the Packeteer IT staff so that it supports not only Infinity, but also monitors all applications traversing the network and prioritizes them to provide QoS. Dr. Bergh explains, “We wanted insight and control over all our network traffic because we were providing Internet access to patients and their guests, as well as clinical applications. Now we have visibility into the performance of all those applications and see how they impact each other, so we can align our business needs with our network resources.”

**THE BENEFITS OF MOBILE MONITORING**

Now that the new system is up and running at Heidelberg, Dr. Martin explains the benefits of mobile monitoring to the daily routine of physicians and care personnel. “An important aspect is the flexible implementation and use of mobile clinical IT workstation systems such as notebooks, sub-notebooks, tablet PCs and PDAs for physicians and nurses. These systems provide flexible access to relevant patient information – in and outside doctor’s offices, central reporting and clinical function areas. As a result, long searches for patient information and cumbersome patient records are things of the past.”

Dr. Bergh discusses how wireless monitoring technology aids in patient care. “In order to use monitors flexibly and in parallel, even in areas where monitoring is not mandatory,
THE CHALLENGE:
Create a wireless patient monitoring system for the whole hospital; run patient monitoring on the existing hospital network infrastructure

THE SOLUTION:
Install the Infinity® patient monitoring system and implement it on Infinity OneNet, a VLAN-based shared infrastructure that allows wired and wireless monitoring to run on the existing hospital network

THE RESULTS:
Standardization
– Contains costs and saves training time by allowing the hospital to use one kind of monitor for every department and patient acuity level

Wireless mobility
– Enables patients to move around freely within specified coverage areas of the hospital, which positively affects the therapy and recovery of patients

Shared infrastructure
– Allows the hospital to run wireless and wired patient monitoring on the existing hospital network

such as normal wards, the monitor can now go to the patient – and not vice versa. This has positive effects on the therapy and recovery of patients.”

According to Dr. Martin, “Monitored patients appreciate the increased comfort provided by wireless technology. Patients are able to move around freely, which is usually possible only with a classical telemetry solution. Now, the monitor travels with the patient, so patients are no longer confined to their beds.”

Dr. Martin concludes, “Another benefit is that our physicians and care personnel co-monitor the patient’s condition centrally, and are therefore able to react more quickly and accurately in emergencies.”

Dräger Medical is pleased to be part of this breakthrough solution at the University Hospital of Heidelberg that is advancing the state of the art of patient monitoring.

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