



# UH GHENT SENDS CARDIOLOGICAL ALARM INFORMATION

## VIA A CISCO WIRELESS NETWORK TO NURSING STAFF FOR RAPID EVALUATION AND REACTION

«IT IS IMPORTANT THAT OUR UNIVERSITY HOSPITAL HANDLES INFORMATION AND ITS ACCESSIBILITY IN A WAY THAT TAKES FUTURE EVOLUTIONS INTO ACCOUNT. GOOD PATIENT CARE NEEDS THE SUPPORT OF INNOVATIVE INFORMATION AND COMMUNICATIONS TECHNOLOGY. WITH THE WIRELESS APPLICATIONS WE DEVELOPED ON THE BASIS OF OUR CISCO NETWORK WE WANT TO BE A TRENDSETTER FOR OTHER BELGIAN HOSPITALS.»

*Bart Sijnave, Department head ICT, University Hospital Ghent*

### EXECUTIVE SUMMARY

#### BACKGROUND

The University Hospital of Ghent (UH Ghent) dates back to 1835 when a law designated the Burgerlijke Hospitaal van Gent as the training hospital for medical students. It was not until the Dutchification of the University of Ghent in 1932 when the first steps were made to erect a university hospital. In 1953 the final stone of the academic hospital was laid. Since that time it has steadily grown into one of the biggest health centres of Flanders with almost 5,000 employees and more than 1,100 beds for multiple and single day admissions. On average, UH Ghent conducts 365,000 consultations, 300,000 days of hospitalisation, 33,000 overnight admissions and 24,000 day admissions every year. In 21 operating theatres, around 26,000 operations are conducted annually.

Since 1987 UH Ghent has been a public institution under the guardianship of the Flemish Minister for Education and it obtained its own corporate capacity in the form of a semi-public enterprise (parastatale B). A recent reorganisation has responded to the current aspiration to focus on patients. Or in other words: not the patient needs to adapt to the structure and organisation of the hospital but the hospital should be able to track the patient and cater to his needs thanks to a flexible organisation. Besides patient care, education and scientific research are also key at the University Hospital.

#### CHALLENGE

A number of years ago the University Hospital of Ghent was looking for a solution to make patient records electronically available on the different wards. After seeing a patient, nursing staff and doctors needed to go back to the central office of the ward every time to update the patient record on the desktop. They were looking for a way to eliminate errors, the amount of time lost and the irritation this caused.

UH Ghent also wanted to use technology to support the hospital's modern mission which specifies that the patient -and the personal care a patient needs- must always be key. The infrastructure supporting this therefore needs to be sufficiently up to date and powerful. More than ever seconds count, especially in the care of patients in the risk zone.

#### SOLUTION

The first step toward modernising patient care was taken in 2004 when eight wards gradually switched to a wireless network. With a laptop doctors and nursing staff are now able to consult patient records from anywhere on these wards.

Gradually the realisation grew that this wireless network had many additional applications: besides better patient care a patient's stay in the hospital could be made a lot more comfortable. The resulting innovative pilot projects lead to a number of specific realisations.

For instance, patients who need continuous and strict monitoring, such as heart patients, benefit greatly from a flawless wireless alarm system. Now, an alarm signal is sent instantly over the wireless network to the Cisco Wireless IP Phone 7920 of the nursing staff. At the same time relevant information about the nature of the alarm is provided which allows the nursing staff to take the appropriate action immediately.

Moreover, convalescing patients will be able to move around the ward freely. A little device they carry on them regularly sends signals to the Cisco aerials, allowing these patients to be located at all times and immediately pinpointed when they are in need of assistance. The device can also be used to trace all kinds of machines and medical equipment. Expensive and scarce devices can therefore be shared more efficiently between wards.

Finally, a wireless network enables patients to use a laptop within the hospital walls. Playing games to kill time or working remotely via VPN will soon be possible everywhere at the UH Ghent.





## EXECUTIVE SUMMARY (NEXT)

### RESULTS

Patient records can be consulted everywhere in the ward now via the wireless network. Medical staff no longer has to record observations on paper and then go to the ward's central office to update the patient's record on the desktop. The network therefore eliminates a lot of redundant tasks and saves precious time, while reducing the risk of human error.

Instead of blindly expanding the wireless patient record consultation network to all 35 hospital wards, UH Ghent, together with Cisco and IT partner Dimension Data, began looking for new, additional opportunities. This resulted, among others, in a wireless alarm system in the cardiology ward which is already commonly used every day. Twenty heart patients can be flawlessly monitored by it. The system sends an alarm with useful medical information and the electrocardiogram within a second to the nurse who can then take the appropriate action.

Nursing staff is less tied to the monitoring console in the intensive care unit, and it gives patients enormous peace of mind knowing they are under constant supervision and will receive immediate assistance if and when required.

A modern university hospital such as the UH Ghent needs to provide high-quality care to its patients every day. The previous example shows that a wireless network often can provide a solution to the many needs facing a hospital.

Some years ago, the question was raised at the University Hospital of Ghent how to reduce the number of needless hours spent updating patients' medical records. Observations made by a doctor or a nurse at a patient's bedside were first recorded on paper or a clipboard. Only later, after the patient rounds, was this information entered into the computer in the ward's central office. The number of kilometres travelled to update or consult information is barely imaginable. The IT department of the UH Ghent felt this situation left a lot of room for improvement and began the installation of a wireless network, so doctors and nurses could access their medical records from any location on the ward. This was the beginning of a project that would deliver far more improvements than could have been anticipated at its inception.

In order to provide the best possible patient care, UH Ghent was looking to use the most advanced and future-oriented infrastructure available, not only in the domain of medical equipment and techniques but also in the domain of IT infrastructure. Education, training and scientific research -also key tasks of a university hospital - also form part of this project and need the support of the most modern IT applications.

«It is important that our University Hospital handles information and its accessibility in a way that takes future evolutions into account.» says Bart Sijnave, head of the ICT department at UH Ghent. «Good patient care needs the support of innovative information and communications technology. With the wireless applications we developed on the basis of our Cisco network we want to be a trendsetter for other Belgian hospitals. It is also important that we evolve towards a single universal technology and away from all those different applications that have been in use over recent years.»

Doctors and nursing staff already have access to a wireless Cisco network in eight of the hospital's wards. As a result, they no longer have to walk backwards and forwards to the central desktop to update their patients' medical records. Furthermore, the network completely satisfies the strict medical regulations with regard to redundancy and security.

«People who work with our wireless system are incredibly enthusiastic,» says Frits Dumortier, head of Infrastructure at UH Ghent's ICT Department.





«Gradually, the need has arisen here at the IT Department to get more out of the existing infrastructure. Together with Cisco, which supplied us with the wireless network and network integrator, Dimension Data, we went in search of other interesting wireless applications.» As a result, patients now enjoy an improved level of service in terms of medical supervision, but also in terms of comfort. They will all, for example, soon be able to access the internet from their beds throughout the hospital.

### WIRELESS HEART MONITORING

Several wireless applications are currently already in use. The most impressive is perhaps the wireless alarm system at the nursing unit of the cardiology ward. In the event of an alarm, the ambulatory electrocardiograph sends a wireless message to the nurse's Cisco Wireless IP Phone 7920. Emergin software rapidly converts the data sent by the cardiograph into a code which can be read by the Cisco network. A second later, the message arrives at the user's device. The entire process proceeds considerably faster than the existing system, in which messages could take up to 15 to 20 seconds to arrive. As an additional feature, the nurse also simultaneously receives very useful information regarding the patient's medical condition. An image of the electrocardiogram and information about the oxygen concentration and blood pressure also instantly appear on the screen. That way, the nurse can immediately monitor the patient's status.

«In a medically critical environment such as the electrocardiography ward, every second can be crucial», says Erik Billiet, head of the Biomedical Technical Department, which monitors more than 12,000 of the hospital's medical devices. «Patient safety is of course a primary concern of ours. That is why we need a reliable monitoring system that allows us to react quickly.

Thanks to our new wireless alarm system, nursing staff are able to evaluate the patient's condition much more efficiently and thus take the necessary action immediately, even before they reach the patient. This gives our patients enormous peace of mind. They know they are under constant supervision and that they will receive immediate assistance if and when required. Our nursing staff also enjoy a greater amount of freedom of movement, without compromising the needs of their patients.»

If a nurse does not react to an alarm within a few seconds, it is transferred to another device and/or repeated. The system has also been installed so that several alarm levels can be set according to various algorithms. It is obvious that a temporary technical malfunction requires less urgent intervention than a patient with a heart problem.»

Early 2007, the University Hospital of Ghent will also install the same wireless monitoring system for the stroke unit and the epilepsy department. Bart Sijnave: «The coming two or three years will see the addition of yet more services where patients require urgent medical monitoring. To allow this wireless alarm system to work seamlessly, we will need more than twice the current number of aerials to be able to consult the medical files wirelessly.»

It is already clear that the wireless alarm systems are an excellent tool for improving patient care.

### LOCATING PEOPLE AND DEVICES

A system will also be put into place at UH Ghent in early 2007 to assist in pinpointing the location of people and devices using the reliable wireless Cisco network. Certain patients who are allowed to move about the ward but still require medical monitoring are given a wireless device with a specific code. «This device sends regular signals to the Cisco aerials, so that in the event of a medical alarm, the patient can be located immediately,» explains Erik Billiet.





The possible applications in a hospital for such a locating system are enormous. For example, the locating system can be employed to monitor incoming and outgoing movements at the psychiatric or geriatric wards. Nurses can also use the application as an urgent paging system: with a touch of a button they can request assistance. The system therefore works in both directions.

«After all, what works for people can also work for devices», says Dirk Ketels, team leader Networks & Telecom at UH Ghent. «That way, we'll be able to trace a device when it is urgently needed. Moreover, this also makes it easier to share expensive devices between two wards. Medical practice often shows us that it is not always possible to keep track of the use of a particular device.»

#### **MANY MORE FUTURE POSSIBILITIES**

UH Ghent's IT Department expects that the applications of the wireless Cisco network will increase exponentially in coming years. That will not only benefit patients and the quality of care they receive; the administration at the hospital itself can also expect significant improvements.

