



This is a message that no one would ever want to receive. University Hospital Basel selected Siemens Virus Protection to reduce the risk of receiving such bad news and to permanently protect its medical systems against viruses, worms, and trojan horses. Now, physicians can concentrate on the hospital's patient care and efficient therapy for complex cardiac, vascular, and metabolic diseases.

By Christian Bernhart



Virus Protection to Safeguard Both Patient Care and Systems

Early in the morning just before seven, the first outpatients arrive at the University Hospital Basel, Switzerland, for radiological examinations. People who work during the day appreciate the early morning and after-hour appointments. Just past the main entrance at the address of Petersgraben 4 in Basel, they take the escalator downstairs and proceed to the registration at the left, where the clinical staff is already waiting for them. The University Hospital operates 40 clinics and institutes, and is equipped with 680 patient beds. The entire lower floor is devoted to radiology, a unit that is furnished with state-of-the-art imaging systems.

350 Patients per Day

The radiological technician (RT) has already booted up the first magnetic resonance imaging (MRI) and computed tomography (CT) workstations. The day's schedule for the normal flow of radiolo-

gical examinations on some 350 patients was set a day in advance. The patients are identified during registration, sent to the appropriate waiting area, and taken from there to the examination as quickly as possible.

More Security for Larger Capacity

In addition to the 140 outpatients from the hospital's clinics and referring physicians, the RTs bring another 210 inpatients to the radiological examination stations. At 7:45 a.m., the first patient is being examined at the angiography station. Here, cardiologists have two systems to examine arterial vessels. In addition, therapy is performed on cardiac, renal, and brain blood vessels. In the two standard radiography rooms, the first patient examinations began at 7:00 a.m. By midday, up to 120 radiographic diagnoses are already available.



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Franz Buffon,
Director of IT, University Hospital Basel, Switzerland

The Siemens imaging systems in radiology deliver 10,000 fully digitized patient images per day at a volume of 18 gigabytes, which are processed at five workstations and then forwarded. In addition to system quality, operating reliability is the primary objective, explains Professor Wolfgang Steinbrich, MD, Director of the Institute for Diagnostic Radiology. “Today, our capacity is designed such that the systems always have to function.” Take CT, for example: To manage today’s number of examinations six years ago, the hospital would have had to purchase four systems. But thanks to fast technology and increased patient throughput, two CT systems are currently sufficient. “If one system were down, however, the disaster would be that much greater,” reflects Steinbrich. He starts to talk about Siemens Virus Protection that was installed on all 27 Siemens systems. When he learned of the special Siemens Virus Protection for medical systems, he did not delay in purchasing it. He reasoned that his computer, connected to the Internet and the hospital’s administrative network, always operates with a virus protection program as well.

Security without Interruption

Highly complex medical systems need this type of protection to an even greater

extent, especially given the fact that the technology is far more complex than that in a PC, as Steinbrich quickly determined. For the radiological systems used in examinations and therapy, it is not just a question of protection against viruses, worms, and trojan horses. Much more is required to protect patients against safety relevant events possibly resulting from attacks, and to ensure the systems run without interruption.

This is enabled on the one hand by well-trained experts. A full-time RT is responsible for the smooth flow of examinations from 7:00 a.m. to 7:00 p.m. Inpatients fill the time between outpatient appointments, emergency cases are examined in two radiography rooms on the ground floor next to the emergency room, and polytraumatic cases go for diagnosis and initial surgical intervention to the multi-functional image-controlled intervention room (MII). The room is equipped with CT and MRI systems, and is operational around the clock.

Siemens Virus Protection ensures long-term, reliable operation discretely in the background, barely noticed by the trained experts. Early in the morning, when the systems are reset or booted up after being off for the night, Virus Protection reports in on a regular basis: “A new virus pattern file is available for your virus scanner. This will allow the identification of new viruses

on your computer. We recommend that you perform the installation immediately.” Clicking ‘install’ is all that is needed to equip the systems with the latest virus patterns.

Special Scanner

Siemens Virus Protection is certainly not a standard product. Virus protection technology for medical imaging systems is far more complex than that for conventional PCs. For this reason, Siemens relies on the know-how of the well-known company Trend Micro, Inc. “It is important to understand,” explains Andreas Lang, who is responsible for MRI systems at Siemens Switzerland, “that Siemens does not simply use the standard scanner as it can be purchased from Trend Micro by private users without testing it on a product-specific basis. Additionally, Siemens development departments cooperate closely with Trend Micro to avoid any unintended adverse effect on medical system security.”

For example, on interventional systems, the virus scanner is specifically configured to switch off briefly during critical phases of diagnosis and therapy, and then switch back on. As a result, Siemens avoids a critical behavior that may happen with improperly configured commercial scanners. As part of their continuous monitoring



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Christian Kluth,
Director of Medical and Operational Technology,
University Hospital Basel, Switzerland



Summary

Challenge:

- Danger of a virus, trojan horse, or worm infection in a hospital IT network
- System shutdown during complicated, computer-supported treatments
- Security of image and patient data jeopardized

Solution:

- Virus scanner installation of the thoroughly tested virus scanner Trend Micro™ OfficeScan™ to continuously monitor the system for malicious attacks
- Ongoing automatic remote virus scanner updates of the latest validated virus patterns and scan engine
- Fast virus elimination in the event of an infection through continuous Event Monitoring of the system, the customer enjoys preferred and rapid expert assistance while getting the system back online again
- Security hotline: Siemens UPTIME Service Center
- Regular proactive monitoring, careful assessment and validation on a product-specific basis of hotfixes released by Microsoft

Result:

- Secure workflows throughout the Radiology Department
- Protected patient and image data
- Immediate help for problems that occur on short notice

of information, these units automatically react to a virus by immediately stopping the data flow.

Tested for Operational Safety and Reliability

The security provided by Siemens Virus Protection extends beyond the specialized scanner. The patterns that Trend Micro sends to customers on a regular basis to detect new viruses and worms are not simply taken for the medical equipment. First, the Siemens Virus Competence Center tests whether the patterns could have a negative impact on the operational safety of the systems. Once thorough testing is completed, Siemens transfers the patterns directly to the users' systems. Now they are ready to detect new viruses and worms. But what makes the 'real protection?' The workstations used by physicians, cardiologists, and RTs to process images and generate diagnostic reports run with the Windows® operating system. As such, they have to rely on updates from Microsoft®. That is why Siemens Virus Protection includes the provision of tested Microsoft hotfixes that are relevant to the software used in their medical systems.

Automatic Feedback

Siemens Virus Protection at University Hospital Basel is not only active during the installation of new virus patterns. All systems are linked to Siemens online via an encrypted virtual private network (VPN). When a critical situation arises, Siemens is often the first to know what the problem is. Rolf Aepli, who is responsible for angiography systems at Siemens Switzerland, explains it this way: "Technically, our systems are equipped to report directly as soon as they have a stomach ache." Another advantage: The tested virus patterns reach the individual systems directly via the specific Internet Protocol (IP), saving time. The Virus Protection processes are reviewed in a protocol every month by Christian Kluth, Head of Medical and Operational Technology of the University Hospital Basel. Detection of a virus in a system is recorded as well. "To date, we have fortunately not received any messages indi-

cating a virus," states Kluth. But how high does he classify the risk of a medical system infection, given the fact that the information flow of the systems connected to the radiology information system (RIS) network is separate from the administrative network of the University Hospital Basel?

Kluth notes a recent example just before the installation of Siemens Virus Protection, where the speed of data traffic for an imaging system dropped significantly. The hospital's internal IT department determined that this system had released a virus that flooded the network with useless data. The experience showed Kluth that one can never assume a clean network. "Such an assumption would be as incorrect as someone going on the Internet and demanding that it take steps to remain free of viruses." For this reason, Kluth believes that device manufacturers should not assume that operators, and specifically university hospitals, can guarantee a clean network. "With its Virus Protection, Siemens has set a new standard," says Kluth with certainty.

Network Risks and Memory Sticks

In the foreseeable future, RIS data at University Hospital Basel will be managed via a picture archiving and communication system (PACS). This will enable physicians to simultaneously compare images from the RIS with patient data from the hospital information system (HIS) when making evaluations. It will also increase the interfaces between the individual networks, and therefore the risks. Other possible sources of infection include data transfers from memory sticks or connected laptops. For Franz Buffon, the Head of IT at the University Hospital, this represents a particular challenge to the university because researchers and professors worldwide visiting for conventions and symposia can enter data into the hospital network via a computer or laptop. Scanners on the administrative hospital network eliminate some 11,000 viruses daily. Recently, the hospital IT department decided that PCs or laptops would not be allowed to run on the network unless previously validated. In addition, the user



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has to be authenticated via a user name, password, and perhaps soon via fingerprint, before logging on.

Trust as a Prerequisite

The RTs in Radiology on the lower floor of the hospital rarely look at such considerations during their busy day. By now, it is midday. The radiological technician responsible for scheduling takes a short break, although the work within the department continues. Looking at an on-screen monitoring system, she sees that the department is on schedule. Thirty patients have been diagnosed via MRI, another 33

via CT. Sixteen patients have undergone therapy in angiography, and 117 patients have been X-rayed. Fortunately, there has been no interruption in the work using the reliable systems. Should a virus infection occur, it is the task of the Siemens experts to make the system operational again. The direct online connection to Siemens meets the requirement of being able to intervene immediately and correct the situation. This direct connection between the University Hospital and Siemens requires trust and long-term cooperation. As Franz Buffon explains, "We are glad to have found a competent and reliable partner with Siemens to

implement this innovative and proactive solution."

Christian Bernhart works as a scientific journalist in the areas of medicine and technology. He is also editor for University Hospital Bern's visceral medicine topics, and writes for well-known daily and weekly newspapers, as well as German magazines like Bild der Wissenschaft.

Further Information

www.siemens.com/virus-protection