Extreme Networks Supports Wireless Mobility at Patient Bedside for St. Johannes Hospital

Extreme Networks® Meets High Availability and Resiliency Requirements of Hospital Network, Speeding Patient Care

St. Johannes Hospital in Troisdorf-Sieglar, Germany, with just over 400 staff members, has more than 182 beds and treats approximately 8,800 inpatients and as many outpatients each year. The hospital introduced both Gigabit Ethernet at the core and switched fast Ethernet at the edge in 1998. This meant that the hospital already had some infrastructure components required for its Picture Archiving and Communication System (PACS), to allow for digital medical imaging, which it subsequently began to implement.

The Challenge

The Hospital Information System (HIS) was looking to create a virtually paperless hospital operations chain in addition to its existing implementation of PACS. Ideally, the intent was to have all patient information processed and stored digitally and made available to its staff whenever and wherever needed. The latest goal in making the hospital completely digital was to introduce mobile rounds with the use of Wireless Ethernet and laptops at patients' bedsides. This capability would mean the availability of all relevant patient information at each patient's bedside with each bed check. At the same time, the new infrastructure solution would have to support the hospital's mission-critical life-saving applications, all of which are bandwidth-intensive.

The Solution

In order to allow the use of mobile ward rounds in a hospital environment, a resilient network architecture is necessary to support the required high network availability. The hospital has chosen Extreme Networks for its infrastructure, with the redundancy provided by Extreme Standby Router Protocol (ESRP), a hot-standby failover mechanism for Layer 2 and Layer 3 IP networks. ESRP enables higher resiliency in IP-based networks.

To prevent a single point of failure, the active core of the Ethernet network at the hospital consists of four core switches in a redundant configuration. The core connects the servers in the data center to the network. Extreme Networks Summit® X450 and Summit 5i SX high-performance Layer 3 Gigabit Ethernet switches are used as core switches. At the edge, 15 Summit 200 switches ensure 10/100Mb/s fast Ethernet access. Finally, a second remote server room is connected to the core network to allow disaster recovery in case of fire or other disaster.

High-Availability for Mission Critical Apps

The hospital's network must remain up and running at all times. It's imperative that there be a failover mechanism in place in order to ensure life-saving applications remain active. In the network at the St. Johannes Hospital this task is performed by ESRP. ESRP controls redundancies centrally on core switches. This method is suitable both for Layer 2 and for Layer 3 redundancy strategies and requires no client configuration on the redundantly connected edge switches.

The Challenge

St. Johannes Hospital in Germany was looking for a complete network solution that would make a difference throughout its facilities, providing a high availability network featuring a wireless Ethernet LAN to support mobile rounds for diagnostic information entry at patients' bedsides.

The Solution

Extreme Networks provides a comprehensive core and edge network solution, and features resiliency protocols that provide the availability and failover capabilities the hospital demands, allowing the network to recover services in less than 50 milliseconds in the case of a fiber connection outage.

The Benefits

- The new network has improved patient care by reducing the time it takes to access patient diagnostic information.

- Mission-critical applications are supported by a redundant network design, as well as ESRP and Ethernet Automatic Protection Switching (EAPS).

- Extreme Networks Summit WM wireless controllers support mobile ward rounds for the hospital staff.

- Built-in security features of Extreme Networks Altitude™ access points mean that if an Altitude becomes detached, network configuration information is not present on the access point.

- The hospital is poised to deploy additional applications and switches with current Extreme Networks infrastructure.

The four Extreme Network core switches form two redundant pairs in the data center, and failover occurs independently for each pair within just three seconds. The failover is triggered either by a link down on an uplink port of an edge switch or with the malfunction of a primary core switch. If needed, shorter voice-class switching times are achievable with Extreme Networks Ethernet Automatic Protection Switching (EAPS). With EAPS, failover switching times of less than 50 milliseconds are achievable.

Managed Wireless LAN Enables Mobility

Mobile access to patient records or to the hospital information system in the hospital is realized with the Extreme Networks infrastructure with the use of a wireless LAN and laptop PCs. Access to the network and associated resources must be guaranteed in the local ward round area, in particular at the patients' bedsides and in the corridors of the hospital wing where the wards are located. Support for mobile access to the data network is realized by a Summit WM100 and 20 Altitude access points located in the hospital wing.

Through access domains in the Summit WM, system administrators can manage the various access categories for users, groups, devices or applications. Access Domains contain parameters such as IP addressing, authentication procedures, network access policies as well as encryption method and Quality of Service (QoS) parameters. Authentication can take place using RADIUS servers through web-based network login, MAC-based login or IEEE 802.1x. Each Altitude access point can support up to 16 wireless access domains.

With support for mobile ward rounds, specific instructions can be recorded electronically at the time of patient bedside visits, and appointments can be arranged in real time with the relevant diagnostic departments. Electronic Patient Records (EPR) ensure that everyone involved in a patient's treatment has access to the latest reports and processes at any time, heightening the quality of care provided to each individual. Additionally, in business terms from the hospital's perspective, the process chain is also improved and efficiency is increased to improve patient satisfaction.

Total Security: Core, Edge, WLAN

In terms of network security, all Layer 3 routing occurs in the core of the network, utilizing Extreme Networks Summit X450 and Summit 5i SX switches. This means that neither traffic nor devices—such as PC clients, access points, IP phones, etc.—that connect into Summit 200 edge switches can cause disruption to the core network, resulting in a more stable infrastructure.

In addition, in contrast to traditional access points, the Altitude access points do not store sensitive configuration or security information about the network. If an Altitude is separated from the network, it immediately loses all its configuration parameters so unauthorized individuals are not able to obtain this information. After being switched back on, it automatically searches for the nearest Summit WM and obtains from it the current software and all necessary configuration data.

Finally, in terms of wireless security, IEEE 802.11i and WiFi-Protected Access (WPA1 & 2) are supported by the Extreme Networks system. The access domains concept enables the implementation of fine granular network access. Finally, the Altitudes can work as sensors, thereby enabling the solution to scan for rogue access points and peer-to-peer networks.

System integration with Gordion

Gordion is a system integrator and consultant located in the west of Germany. The organization has been providing network solutions since 1991 and supports medium and large size networks up to 5,000 ports. Gordion is a certified Extreme Networks Gold Partner and supports the designing and implementation as well as the maintenance of St. Johannes Hospital's wireless mobility network.