


St. Luke's Episcopal Hospital Upgrades to Cisco Aironet to **Improve Patient Care**



St. Luke's Episcopal Hospital of Houston, a teaching and research hospital providing care for more than 200,000 patients each year, has teamed with Cisco Systems to make a good system even better.

Earlier this year, the administration at St. Luke's chose Cisco Aironet® 350 Series wireless technology to replace an existing wireless local area network (WLAN) that had proven inadequate to meet the hospital's growing technological needs.

For years, St. Luke's has been listed among the top health-care systems using information technology to improve patient care and control costs in the United States. Patients benefit from St. Luke's research and education partnership with the Texas Heart Institute, one of the top 10 cardiovascular centers in the country, and site of the nation's first successful human heart transplant in 1968.

In September 2001, St. Luke's was named one of the nation's 100 Most Wired Hospitals and Healthcare Systems by *Hospitals & Health Networks*, the journal of the American Hospital Association, which surveys the nation's healthcare systems on their use of Internet technologies to connect patients with physicians and nurses, health plans, and employees.

At St. Luke's, wireless technology—used by caregivers during bedside visits with patients—is an important part of the hospital's extensive technological system. Doctors, nurses, and other care-givers carry laptop computers or hand-held slates to a patient's bedside, to record notes, write prescriptions, or retrieve patient history data from the hospital files. As a result, patient care is both more personal and more efficient.

Broader Bandwidth with Cisco Aironet Series

Although wireless technology was already in place at St. Luke's, the administration felt an upgrade was necessary to realize the level of care the hospital should provide.

Lack of adequate bandwidth in the original WLAN was one of the primary reasons that St. Luke's decided to upgrade. "Our original system is limited to a 1.2-Mbps transfer rate. At first, it was adequate, but as we added more people, the bandwidth grew more and more insufficient, and caused ongoing performance issues," says Don McGovern, St. Luke's project manager.

For the Cisco Aironet network conversion project, nearly 100 Cisco Aironet 350 Series Access Points are being installed on 24 of the main building's 26 floors. Another 24 to 36 Access Points will be set up in the new nine-floor Denton A. Cooley Building, which will house three cardiovascular patient floors. Three hundred Cisco Aironet



350 Series Client Adapters also have been ordered, to be installed in laptops and handheld slates used by caregivers in both buildings.

Based on Wi-Fi (IEEE 802.11b) direct-sequence-spread spectrum technology and operating in the 2.4 GHz band, the Cisco Aironet 350 Series provides an Ethernet-like data rate of up to 11 Mbps.

The older system, based on a type of radio frequency technology called frequency-hopping—limited to a data rate of 2 Mbps, was another area of concern.

“St. Luke’s didn’t want to remain locked within frequency-hopping technology because they felt that direct sequence spread spectrum (DSSS) had more growth potential,” explains Jim Jenkins, Cisco account manager.

“They were also interested in transitioning to an 802.11b -compliant system, which will support the newer, evolving hardware and software becoming available in the health-care industry,” he says.

Security Standards—LEAP Solution

Improving wireless security was another important consideration at St. Luke’s. “Improved security was, in fact, one of our primary goals,” says McGovern. “New government standards under the Health Insurance Portability and Accountability Act (HIPAA) are coming into force, and hospitals must begin conforming to them. These standards deal mostly with patient confidentiality, which applies to the transfer of data. Cisco Aironet offered us the level of protection that we need to meet HIPAA standards.”

The Cisco Aironet 350 Series supports wired equivalent privacy (WEP) keys for encrypting data before it is transmitted. In addition, it supports a centralized security architecture based on the IEEE 802.1x standard for wireless local area networks (WLANs). This new standard includes centralized, mutual authentication and ensures that every client uses a unique, dynamic WEP key. Cisco supports an 802.1x authentication type called EAP-Cisco Wireless, or LEAP, on all its client adapters.

“All the other 802.11b wireless products in the market require us to rely on WEP keys that are shared among many clients and stay the same for months,” Jenkins explains. “Those static WEP keys can be compromised, but dynamic keys with LEAP are more secure. A perfect analogy would be that if every time you left your home, your lock automatically changed and so did your key. That’s how LEAP works.”

Selecting the Cisco Aironet Series, Saving Money

In an effort to ensure the hospital selected the best possible system at the best price, St. Luke’s carefully reviewed numerous vendor products before choosing a system.

“No question about it: For a conversion of this magnitude we looked at several alternatives,” McGovern says. “Security was probably the most important factor, but cost-efficiency was certainly very important.”

After reviewing several, says McGovern, the choice became clear. “We kept coming back to Cisco Aironet.”

The network infrastructure at St. Luke’s is almost entirely based on Cisco technology, including eight Cisco Catalyst® 6509 core/distribution switches. Catalyst 4003 and 2948 switches are used as edge switches on the remaining access floors.

The Cisco Aironet 350 Series Access Points have also proved particularly cost-efficient.

“The new six-floor DAC Building was going to require 48 Access Points under the previous system, but we can provide service using only two Access Points per floor, plus two extras, for backup,” Jenkins explains. “This gives them the redundancy they previously lacked, with fewer units.”

As a result, upgrading to the Cisco Aironet Series gave the hospital “higher performance, better coverage, and complete redundancy for roughly half the cost of their previous system,” Jenkins says.

In the medical field, this redundancy is critical. “St. Luke’s has many areas that are sterile, and technicians can’t be running in and out to add more Access Points if a unit happens to go down,” Jenkins says.

Another way in which cost-savings materialized is through the use of in-line power. Using a Cisco technology-powered switch, a powered patch panel, and a small, in-line device called a power injector, Cisco Aironet 350 Series Access Points can be powered remotely across the same cable that is used for Ethernet. As a result, only one Category 5 copper cable needs to be run to the Access Points.

Because Cisco is installing in-line-capable switches in the Cooley Building during construction as part of the basic infrastructure of the building, the addition of Cisco Aironet 350 Series Access Points will save the hospital almost \$500 per Access Point.

"As for the main building, we have Cisco 6509s on three of the floors, so we can use inline power there," McGovern said.

Proven Performance: Wireless Bridge Connects Mobile Van with Hospital

Conversion of its WLAN to Aironet 350 Series wireless technology was not the hospital's first experience with Cisco Aironet. Several times a week, St. Luke's sends a mobile van out to patients who are unable to travel to the

hospital for tests. Medical procedures are conducted at off-site locations, data is collected in a laptop, and the van returns to the hospital to transfer patient data.

"The van pulls up to a temporary building located across a six-lane street from our facilities. There is no convenient or efficient way for us to wire the van to the hospital network, so we use a wireless Cisco Aironet Wireless Bridge for downloading data on those patients," McGovern says. "We've been doing this for about eight months and it works very well."

"This was exactly the solution we needed, and it is almost exactly the same technique I set up at a landfill when I was in waste management. That was a Cisco Aironet Wireless Bridge, too," McGovern said.

To facilitate download data into the hospital network, St. Luke's uses two Cisco Aironet 350 Series Wireless Bridges, which provide high-speed, long-range outdoor network links between sites. Only the Aironet 350 Series has the metal case. These wireless bridges provide uninterrupted connection, even near bodies of water, railroads, or other objects that would cause interference on copper or fiber-optic cable.



Corporate Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 526-4100

European Headquarters
Cisco Systems Europe
11, Rue Camille Desmoulins
92782 Issy-les-Moulineaux
Cedex 9
France
www-europe.cisco.com
Tel: 33 1 58 04 60 00
Fax: 33 1 58 04 61 00

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-7660
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
Capital Tower
168 Robinson Road
#22-01 to #29-01
Singapore 068912
Tel: +65 317 7777
Fax: +65 317 7799

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