The Anadolu Health Centre needed a communications infrastructure that would provide staff with rapid access to medical data and offer valuable services to patients and their guests. As an affiliate of the Johns Hopkins Hospital in the USA, Anadolu Health Centre also planned to use technology to promote real-time collaboration between the two institutions. A highly secure Cisco wireline and wireless infrastructure is helping the hospital to achieve these goals.

**Business Challenge**

Anadolu Sağlık Merkezi (Anadolu Health Centre) is a privately owned, state-of-the-art hospital offering comprehensive diagnostic and treatment services at all stages of a patient’s life. Opened in 2005, it has 209 beds and nine operating rooms and will eventually become part of a wider campus that includes a hotel, a terminal care home and a nursing academy. The hospital’s catchment area extends throughout the Middle East and southern Europe.

Intended as the pioneer of a new healthcare model, Anadolu Health Centre was designed to offer high standards of clinical care in a secure, flexible and comfortable environment. A strategic agreement with the Johns Hopkins Hospital in Baltimore, one of the most respected healthcare institutions in the United States, created opportunities for learning and collaboration. However, sophisticated technology such as high-speed live video links would be essential to make such long-distance interactions a reality.

Anadolu Health Centre also planned to adopt best practices and treatment protocols developed by the Johns Hopkins Hospital. Based on a multi-disciplinary approach, these would require integrated computerised systems with multimedia support. In addition, technology would act as a key enabler for new standards of patient services in Turkey, including wireless Internet access.

“While setting up our systems, we analysed different companies’ solutions to look at their core capacity, performance and scalability. We also looked at security and compatibility. Our research combined with our earlier experiences with Cisco helped us decide that Cisco’s solution was the best fit for us.”

Murat Dayanikli  
Chief Executive Officer  
Anadolu Health Centre
Solution
Anadolu Health Centre issued a Request for Proposal (RFP) that contained a number of specific criteria relating to a local area network (LAN) infrastructure, wide area network (WAN) routing, a wireless infrastructure and security. In the LAN, the hospital required rapid access to different types of data and multimedia content; correct and efficient analysis and transfer of data; and secure storage of confidential patient records to comply with both Turkish and US regulations.

The infrastructure needed to support access to information from any point within the hospital and to connect different clinical systems, medical equipment, the Hospital Information System (HIS), doctors, administrative staff, patients and visitors. The hospital also needed to maintain continuous communications with clinics in different locations, such as the Suadiye Clinic in Istanbul.

Through its chosen network, Anadolu Health Centre was seeking to increase productivity while decreasing operational costs, thereby improving customer satisfaction and gaining a competitive advantage.

The winning proposal, among seven turnkey solutions, came from Cisco Systems. It consisted of a high-performance and resilient LAN, WAN and wireless infrastructure based on Cisco Catalyst 6513 Switches in the backbone, Cisco 2950 Series Intelligent Ethernet Switches at the network edge, and Cisco Aironet 1120 wireless access points throughout the campus. This provided fast, ‘always on’ and secure connections between the HIS, the hospital’s SAP and Pyxis solutions, its Picture Archiving and Communication System (PACS) and a range of medical equipment, as well as Internet access.

“We set up our network based on the Cisco solution because of its high performance, reliability and scalability,” says Murat Dayanikli, Chief Executive Officer. “We also looked at the Cisco solution’s ability to support voice and video services, such as VoIP and video conferencing.”

The same platform would also support Voice over IP (VoIP) – removing the need for a separate telephone network – and video-based applications such as videoconferencing. Anadolu Health Centre implemented VoIP in order to communicate seamlessly and cost effectively with its Suadiye Clinic located 60 kilometres away from the campus. IP videoconferencing offers a low-cost and efficient platform for telemedicine – online consultations with colleagues in distant locations such as the John Hopkins Hospital.

Security was a priority, not only because of the confidential data stored on the hospital’s network but also because the same infrastructure would be used by staff, patients and visitors. A Cisco Catalyst 6513 Firewall Security System ensured data security, while a Cisco Intrusion Detection System (IDS) Module prevented attacks and a Cisco Network Analysis Module monitored the network’s performance between the Anadolu Health Centre and the Suadiye Clinic.

The Cisco Self-Defending Network helps network users in many sectors to develop an integrated and comprehensive security strategy that will identify, prevent and adapt to threats in an intelligent way. Anadolu Health Centre has focused particularly heavily on three aspects of the Self-Defending Network: network availability, ubiquitous access and admission control.

“Firewall and IDS applications are used to ensure data security and to prevent attacks. We have also introduced some analysis modules for monitoring data transfer and performance,” says Burak Uzkan, Chief Information Officer, Anadolu Health Centre.
Business Results
The Cisco-based infrastructure has been highly successful in more ways than one. First, it has enabled the hospital to raise the quality of healthcare provision by giving clinical staff rapid, secure access to online patient records and medical images from anywhere in the building. This, in turn, has provided staff with more accurate and up-to-date information so that they can treat patients more quickly and in the most appropriate manner.

The network has also had a positive effect on the hospital’s management and administrative processes by reducing the amount of time it takes to perform certain tasks and, consequently, cutting costs. The ability to run data, voice and video services on the same infrastructure has significantly reduced the ongoing costs of operating the network, while also eliminating capital expenditure on separate cabling and management systems.

Thanks to the wireless infrastructure, everyone on the campus – patients, visitors and hospital staff – can now access the Internet via fast and secure connections. This service is free of charge to patients and visitors, which has helped increase patients’ satisfaction levels. Efficient and safe LAN, WAN and Internet links have also provided staff with a more comfortable and flexible work environment.

Anadolu Health Centre plans to extend the penetration of wireless networking by providing staff with PDAs and tablet PCs. This will be particularly helpful for employees such as nurses and doctors who move around frequently and may require access to information on the network anywhere in the building, at any time. The hospital also aims to increase its use of IP videoconferencing as well as implementing storage and disaster recovery solutions.

“We have designed a wireless network that doesn’t interfere with hospital equipment, ensuring that there is no risk to patients’ health,” says Murat Dayanikli. “The system has wide coverage, it is easy to manage, and it supports a wide range of devices and applications for staff, patients and visitors.”

While developing the use of its new infrastructure, the hospital has remained aware of the principles behind the Cisco Medical-Grade Network (MGN) which is designed to:

- Be more responsive – maximising the effectiveness of application and device performance to distribute information intelligently to improve quality of care
- Optimise responsiveness at the point of care to reduce the number of medical errors and improve clinical productivity
- Use intelligence within the network to make the most vital information available when, where and for whom it is needed most
- Enhance integration of applications and services to improve diagnostic capabilities, reduce time to treatment for patients, shorten billing cycles and create new revenue sources
- Provide seamless communication regardless of device or location
- Be interactive, being able to connect various communication technologies to provide greater collaboration and knowledge sharing.

Anadolu Health Centre expects a rapid return on its investment due to the number of different services that can be run over the converged infrastructure. The total cost of ownership will also be relatively low because the scalable Cisco platform will allow the hospital to continue adding to the network as its needs grow and change. This scalability will encompass not only new applications and services, but also the requirements of new buildings such as a hotel, nursing academy and terminal care home on the site.
Technology Blueprint

Anadolu Health Centre's fully redundant and fault tolerant network backbone consists of two 720Gbps Cisco Catalyst 6513 Switches. Over 30 Cisco 2950 Series Ethernet Switches form the network edge, each with two redundant 2Gbps fibre connections to the high-speed backbone. A Cisco 3745 Multiservice Access Router and a Cisco 1760 Modular Access Router provide VoIP capabilities.

The Cisco 3745 Multiservice Access Router also supports Multi Protocol Label Switching (MPLS) VPNs, allowing the hospital to create IPsec secure tunnels to protect both wireless and wireline communications between remote clients and headquarters on the hospital's internal network.

One of the main reasons why the hospital selected Cisco Systems was the superiority of its Quality of Service (QoS) and bandwidth optimisation, two critical capabilities for VoIP and WAN services. QoS allows the network manager to allocate different levels of priority to different types of traffic, ensuring that time-sensitive services such as voice and video are always given the highest priority. Bandwidth optimisation delivers the best performance out of the hospital's WAN connections and lowers its costs.

To meet stringent data protection requirements, the hospital has deployed a Cisco Catalyst 6513 Firewall Security System, a 13-slot model of the switch which incorporates a Cisco Catalyst 6500 Series Supervisor Engine 720 and a Cisco Catalyst 6500 Firewall Services Module providing 5Gbps of firewall services. A Cisco Intrusion Detection System Module, installed in one of the remaining 11 slots, prevents attacks from a wide range of potential threats.

A Cisco Secure Access Control Server (ACS) provides the hospital with centralised identity networking and simplified user management across all Cisco devices on the network – including wireless – and all security management applications. It is a practical and efficient tool for ensuring access security by combining authentication, user and administrator access, and policy control in the same framework. Anadolu Health Centre was particularly concerned about network monitoring and management, from the perspective of security as well as cost control, and it has also implemented the CiscoWorks LAN Management Solution and the Cisco Network Analysis Module (the latter as a blade in the Catalyst 6513 Switch).

The wireless infrastructure at Anadolu Health Centre currently runs on 80 Cisco Aironet 1120 Access Points, and this centrepiece of the hospital's technology integration will be expanded over time.