Cooper University Hospital Utilizes Cisco IPT and Wireless Network to Track Equipment and Enhance Patient Safety

Dimension Data’s wireless site survey enables CUH to use cutting-edge smart pumps and other RFID items to save the hospital money and reduce expenses.

Executive Summary

After successful prior engagements, Cooper University Hospital (CUH) asked Dimension Data to implement an IP telephony (IPT) solution for its existing data center and new Medical Coordination Center (MCC). Dimension Data initially deployed 70 IP phones; the number has since grown to about 600. Dimension Data upgraded CUH’s CallManager for enhanced security features and benefits and performed a detailed wireless site survey for both Voice over WLAN (VoWLAN) and radio-frequency (RF) coverage requirements. The solutions improved CUH’s operational efficiency, provided significant cost savings, reduced expenses, and enhanced patient safety.

Client Overview

Cooper University Hospital is the leading provider of comprehensive health services, medical education and clinical research in southern New Jersey and the Delaware Valley. With more than 550 physicians in over 75 specialties, Cooper is uniquely equipped to provide an almost unlimited number of medical services. As the clinical campus of the University of Medicine and Dentistry of New Jersey – Robert Wood Johnson Medical School at Camden, the hospital is committed to excellence in medical education, patient care and research. CUH offers a network of comprehensive services that include prevention and wellness, primary and specialty physician services, hospital care, ambulatory diagnostic and treatment services, and home health care.

Business Challenge

Like many organizations, CUH reached a crossroad with respect to its future state of telephony. It was determined through an internal reorganization that the Telecommunications department would be better suited under the leadership of Information Technologies, instead of Biomedical Engineering. At the time of this transition, CUH’s TDM-based PBXs and key systems were legacy systems and were not well-maintained with regard to hardware and software lifecycle maintenance. A strategic plan relative to the future state of CUH’s advanced communications requirements did not exist at this time. Concurrently, CUH’s IT department was in the implementation phase of migrating its network core from Voice over ATM (VoATM) to Voice over IP (VoIP), scaling from 155Mbps to 1000Mbps, and adding redundancy in order to achieve a 99.999% uptime requirement for its network core.
At this time, the direction to embrace IPT was evident, and a migration plan was established. It began with a pilot in the IT department's data center, as well as in its new Medical Coordination Center. CUH has since adapted a strategy of deploying IPT in all new construction areas, including its soon-to-be-opened 10-story pavilion, new Digestive Health Institute, new Center for Neurological Institute, as well as its new locations offering cutting edge minimally invasive treatments using Cyberknife and Gammaknife.

In addition, CUH lacks an enterprise contact center, yet has business requirements that extend beyond that of a traditional Automatic Call Distribution (ACD) solution. As a result, CUH is preparing for an implementation of Cisco's IPCC Express, and will pilot this solution for its internal IT help desk with the intent of extending into a full contact center for centralized scheduling. In preparation, CUH engaged Dimension Data to lead an upgrade of CallManager so the hospital would be able to build a new contact center in the near future, as well as obtain the latest technological benefits.

Finally, with the construction of the new pavilion, CUH is abandoning its 900 MH infrastructure for in-house wireless telephony in favor of an 802.11a based VoWLAN solution.

Relationship History
Dimension Data and CUH first began working together in 2001 when Dimension Data was engaged to assist with migrating the remaining 30 percent non-Cisco network to that of a 100 percent Cisco homogeneous network. The relationship continued with security and Microsoft engagements, followed by the IPT solution, CallManager upgrade and wireless site survey.

Solution Provided
Dimension Data initially deployed 70 IP phones for the data center and MCC at CUH. This number later grew to 600, with about 70 of the phones in the data center and the remaining phones spread throughout the hospital and physician offices.

Dimension Data then upgraded CUH’s CallManager in order for CUH to obtain enhanced benefits and support a new contact center in the future. Dimension Data upgraded and configured Cisco CallManager 4.1.3 to CallManager 5.1.1.X.

Dimension Data later performed a detailed wireless site survey that included an onsite survey for wireless LAN coverage requirements and defined RF coverage requirements to provide an optimal WLAN solution to support both VoWLAN as well as location based services. CUH now offers a secure wireless network to its employees, patients and their families.

Radio-frequency identification (RFID) technology involves the use of small electronic devices consisting of a small chip and an antenna that transmit the identity of an object using radio waves. The wireless site survey that Dimension Data conducted enables CUH to utilize this technology to track movable equipment, furniture, medical devices, and other high-value items to provide access when needed and to reduce losses.

How We Delivered
IPT Solution for Data Center and MCC
Staging/Burn-in, Migration and Training. Dimension Data performed a complete staging and systems test prior to installation consisting of assembly, loading, system configuration and solution testing. Dimension Data trained CUH end users at both the data center and the remaining sites.
and MCC on the functionality of the IP telephones. Dimension Data also reviewed the as-built configuration, provided a configuration overview of the IPT system and offered system administrator training. The training provided the CUH Telecommunications group with knowledge on networking and, in turn, educated the networking group on telecommunications.

**Infrastructure Equipment Installation and Integration.** Dimension Data was responsible for Layer 2 and Layer 3 QOS configurations while CUH was responsible for LAN/WAN infrastructure deployment.

**IP Telephony Equipment Installation.** Dimension Data installed two CallManagers in a centrally clustered configuration. Utilizing the existing CallManagers, Dimension Data set up IP phone route plans and initially installed 70 phones. Dimension Data installed two Cisco digital 2821 gateways at the MCC and upgraded an existing Cisco 3825 gateway at the data center. Dimension Data also installed a video conferencing system for the MCC.

**CallManager Upgrade**
Dimension Data upgraded and configured Cisco CallManager 4.1.3 to CallManager 5.1.1.X. This included the migration of two CallManagers in a clustered configuration, the migration of existing gateways to a new CallManager cluster and the migration of existing phones to a new CallManager cluster.

**Wireless Site Survey**
Dimension Data provided detailed documentation covering the required design to meet CUH’s wireless needs. This included identifying the following: the optimal components to provide the required wireless coverage; the optimal placement of wireless devices; the optimal antenna selection and configuration; any conflicting RF signaling; cabling pathway design; required CAT 5e/6, fiber and cabling lengths between access points (APs), antennas and telecommunication closets; power requirements and “bleed through” of RF signals. Dimension Data conducted the WLAN site survey using Cisco 1242AG APs based on 802.11a/b/g coverage requirements. The survey defined an optimal WLAN solution that would support location services/RFID tagging and guest access wireless services.

Dimension Data then reviewed and analyzed information gathered during the survey. Documentation was developed, as well as diagrams of AP placement locations and RF coverage maps. Dimension Data also provided CUH the estimated pricing that would be required to implement the wireless LAN design determined by the survey.

**Value Derived**

*Improved Operational Efficiency.* Dimension Data implemented a Cisco IPT solution that provides improved operational efficiency and redundancy. Through the internal reorganization, the gap between telecommunications and networking engineers has been closed with cross training and recognition of the strategy of a single, converged voice, video and data network. This greatly increases the efficiency of the IT staff.

The upgraded CallManager offers the foundation for CUH to build a new contact center when it is ready and currently provides enhanced benefits and security features. In addition, the CallManager can integrate with other third-party applications for online availability of patients, doctors and other staff members.

The wireless solution also contributes to CUH’s operational efficiency. As CUH migrated its 900MHz technology to 802.11a-based VoWLAN technology, it has achieved operational efficiency and can take advantage of advanced IP-based integration solutions such as Nurse Call and biomedical alarm routing. With Nurse Call integration, patients are able to reach and communicate immediately with their caregiver versus the traditional call-bell method. Additionally, critical alarms stemming from physiological monitors and ventilators in the Intensive Care Unit are routed to the Nurse’s handheld Cisco phone as a secondary means of notification that supplements the audible and visual alerts. As a result, the need for a centralized monitoring solution, and its full time equivalents, has been eliminated.

**Enhanced Patient Safety.** By expanding its wireless coverage from 802.11a to now include 802.11b/g, CUH has been able to wirelessly network its smart IV pumps. By doing so, patient safety was greatly enhanced. Drug dosage updates that were previously distributed over 90 days to all pumps via a server on wheels and an RS232 cable have been replaced with real-time updating via the wireless network. Additionally, CUH added a Cisco Location Appliance and is able to track the location and usage of over 400 IV pumps via its 802.11-based connection. Leveraging the data, the hospital learned it was unnecessary to purchase additional IV pumps for the pavilion resulting in an estimated $1 million cost avoidance. CUH is now planning on expanding its asset tracking beyond 802.11-based assets and into those that will be tracked via RFID.

**Significant Cost Savings.** CUH will be utilizing RFID technology to track movable equipment, furniture, medical devices and other high-value items to provide access when needed and to reduce losses. For example, CUH will be applying tags to assets such as wheelchairs. As a result, the hospital staff will be able to tell how many wheelchairs they have and how they are being used at any given time. The staff will then have quicker access to wheelchairs for patient discharge. This results in beds being available sooner by reducing delays of patient transport caused by searching for wheelchairs.

CUH IT provides value to its business by aligning technology with business drivers instead of deploying technology for technology’s sake. “By networking IV
pumps, patient safety has been increased based on being able to distribute drug dosage updates in real-time versus one pump at time," said Michael Sinno, chief technology officer at CUH. "Furthermore, by leveraging Cisco's Location Appliance, real time data is collected to show how many pumps are actively being used at any given time. This data was paramount in deciding not to purchase additional pumps, which led to an approximate $1 million cost avoidance. When you can articulate the value of technology in measurable outcomes, such as $1 million cost avoidance, subsequent technology investments are received as business enablers."

As a result of the IPT solution, the hospital is saving money by expanding its on-network calling between offices and lines of business. Since voice traffic travels at no additional cost over data lines and equipment, the hospital no longer has to pay for phone calls from the hospital to physician offices and vice-versa. Administrative costs were also lowered by centralizing management.

For more information please visit www.dimensiondata.com/solutions