

Improving Patient Care with a High-Performance Campus Fabric

University of Rochester Medical Center's new network extends privacy and patient care applications over a large campus

| EXECUTIVE SUMMARY |
|--|
| <p>University of Rochester Medical Center</p> <ul style="list-style-type: none"> • Healthcare • Rochester, NY • Number of Employees: 15,000 <p>Business Challenge</p> <ul style="list-style-type: none"> • Improve response time for patient care • Increase network reliability to support critical healthcare applications • Enhance network security to comply with privacy regulations |
| <p>Network Solution</p> <ul style="list-style-type: none"> • Hierarchical architecture based on highly configurable switches simplifies support and maintenance • Network of access points delivers wireless connectivity over a campus of 5.5 million square feet • Dedicated appliances and built-in switch capabilities enforce flexible security for different user groups |
| <p>Business Results</p> <ul style="list-style-type: none"> • Unified network services provide anytime, everywhere access to data and applications. • Integrated security supports regulatory compliance and safeguards the network and the data traversing it, and virtualization helps separate traffic and secure data. • Non-stop communications support efficient patient care. |

Business Challenge

The University of Rochester Medical Center (URMC), a large medical treatment and research campus in upstate New York, is the university's primary medical facility for education, research, and patient care. Like most healthcare providers, URMC relies on its network to deliver patient services, reduce costs, and make its operations as efficient as possible.

"Our enterprise network carries our most critical healthcare applications, including patient health information, medical images, and financial information," says Rick Haverty, Director of Information Technology at URMC. "It supports 100 percent of the administration of the medical research facilities; medical, dental, and nursing schools; and two hospitals."

When it comes to network performance, the stakes for a healthcare organization are especially high. If the URMC network goes down, even briefly, the result is slower patient care and longer waiting times for patients. Even worse, downtime can increase the

amount of time required for key patient information to get to a doctor.

Privacy is critical for the URMC network as well, because regulations such as the Health Insurance Portability and Accountability Act (HIPAA) and New York State laws make the Center responsible for safeguarding patient information. The Center also needs the ability to provide different access privileges to different network users such as guests, patients, employees, or visiting physicians.

"Regulations state that any release of personal health information or private information such as social security is a reportable event, and the last thing we want is a negative patient experience," says Haverty.

URMC needed an upgraded network solution that would deliver the high reliability that healthcare applications demand. The solution also would have to deliver the stringent security required by state and federal regulations, and be flexible to support changing needs.

Network Solution

For their network, URMC chose a comprehensive solution based on the Cisco® Campus Communications Fabric, an architecture that supports rich media applications and provides consistent services and policies, plus everywhere, anytime access. Throughout the network, the demands of the Center's clinical and administrative applications are met with a platform based on the Cisco Catalyst® 6500 Series Switch.

"We were looking for a chassis-based product so that we could have consistent equipment on hand throughout the medical center," says Haverty. "Our staff of 11 handles most of our repair and replacement, and a single platform makes it easier to provide spares and create consistent configurations through the network. The Catalyst 6500 improves the efficiency of our technicians who are familiar with the platform's operating system and automatic management applications, such as GOLD and EEM."

Haverty also cites the modular platform's flexibility and ability to grow as needs change. "We believe the investment will last for years to come."

The campus solution supports all of the Center's important desktop and mobile wireless applications. Care providers can access emergency department registration applications, diagnostic systems, imaging applications, and billing systems from the desktop or from mobile PCs or handheld devices. Secure wireless access to the network ensures that a patient's information is available from admission to checkout.

To separate public and private areas of the network, URMC segmented the network at the access layer using virtual LANs (VLANs) on the switches. At the distribution layer, VLANs are mapped to Virtual Routing and Forwarding (VRF) instances. This combination lets URMC segment the network into highly secure virtual networks that protect confidential data. Using the switches' comprehensive identity-based services, including Network Admission Control (NAC) and flexible authentication sequences, UMRC can provide differentiated access privileges for hospital guests, patients, visiting staff, and employees.

"We wanted to have a single network for easier management, control, and economies of scale. At the same time, we needed the ability to set up logical walls so we don't have security issues. The Cisco solution lets us do both."

—Rick Haverty, Director of Information Technology at URMC

Business Results

Connecting its caregivers more effectively has enabled URMC to create a human network where patient care, not technology, is always the primary focus. The most immediate benefit to patients has been the wireless network, which gives doctors and nurses immediate access to all the information they need anywhere in the facility. The speed and reliability with which they can reach that data translates into better patient care.

"We now have the reliability and speed we need, and there is nothing in the network that is slowing down patient care," says Haverty.

Opening up the wireless network for guests has also helped URMC provide a better experience for visitors. “If you bring a relative into the emergency room at 2:00 A.M. and have to work the next day, you can get on a PC while you are waiting and alert your employer or family,” says Haverty. “It’s a convenience that helps visitors make the best out of a bad situation.”

Deployment of the new network went smoothly, and network downtime has been kept to a minimum. “We have been solid as a rock, and have been constantly adding applications and data to the new network,” says Haverty. “Earlier this year we migrated a major registration and billing application on top of the network without a hitch. It creates four times the traffic as the previous system, and would have brought the old network to its knees.”

The Center is deploying Radio Frequency Identification (RFID) applications to some portions of its wireless network, and is considering expanding the technology to further improve patient services and asset tracking. Using an RFID tag, a patient requiring frequent treatment could quickly walk into the hospital, register using a wireless tag or bracelet, and be attended to when caregivers were available. RFID technology is also a promising technology for asset tracking.

“We need to be aware of everything from infusion pumps to wheelchairs,” says Haverty. “Some small expensive medical tools can actually wind up in the trash, and we could potentially save a great deal of money by tracking them more effectively.”



Technical Implementation

The URMC network architecture is based on a hierarchical design with access, distribution, and core layers. The access layer consists of a chassis solution of 86 Cisco Catalyst 6500 Series Switches. The chassis-based solution offers hot-swap capabilities in case a component should fail. URMC outfitted its switches with dual supervisors, allowing them to use Non-stop Forwarding (NSF) with Stateful Switchover (SSO). In the event of a supervisor failure, NSF with SSO provides extremely fast switchover between supervisors while minimizing or eliminating disruption in network service.

Switches at the access layer are connected to the distribution layer by Gigabit uplinks to maintain redundancy. Using statistics provided by Cisco Generic Online Diagnostics (GOLD) in Cisco IOS[®] Software, network administrators can continually monitor the health of network components and verify that the solution is running smoothly and reliably.

At the core layer are two Cisco Catalyst 6500 Series Switches with Catalyst Supervisor Engine 720 modules, and 10 distribution switches. The core layer is responsible for high-bandwidth backbone connectivity. To maintain fast, reliable connectivity, these two switches connect over redundant Gigabit Ethernet links to the distribution layer switches in the communications equipment rooms. The data center switches connect to the core switches over a 10 Gigabit Ethernet backbone.

URMC selected Cisco Catalyst 6500 Series Switches with Supervisor Engine 32 in the wiring closet for their redundancy using Dual Supervisors, dual power supplies, and support for Power over Ethernet (PoE). The management team was convinced that standardizing on a single platform would reduce operation costs, simplify support issues, and allow for future expandability. Another important benefit was the flexible Cisco IOS feature set and the ability to add service modules in the future.

URMC dedicated two switches to support its wireless network. The Cisco Catalyst 6500 Series Wireless Services Module integrates smoothly with the switches for a comprehensive wireless solution. To deliver ubiquitous connectivity throughout a campus of 5.5 million square feet, URMC is installing 1500 Cisco Aironet 1200 Series Access Points. Cisco Aironet 1250 Series Access Points are planned for deployment in the future with support for the long-range IEEE 802.11n wireless standard; these can be powered over Ethernet using the 10/100/1000 copper line cards available with the Catalyst 6500 Series.

PRODUCT LIST

Routing and Switching

- Cisco Catalyst 6506-E Series Switches

Security and VPN

- Cisco NAC Appliance

Wireless

- Cisco Aironet 1210 and 1240 Series Access Points

To further enhance security, URMC is deploying the Cisco NAC Appliance with its switches, to identify whether networked devices such as laptops comply with security policies before permitting access to the network. “We lock down the network using port locking and MAC address locking,” says Haverly. The Cisco NAC Appliance gives us a higher degree of control over how we control network access.”

For More Information

To learn more about Cisco solutions for healthcare, visit <http://www.cisco.com/go/healthcare> or contact your authorized Cisco salesperson.



Americas Headquarters
Cisco Systems, Inc.
San Jose, CA

Asia Pacific Headquarters
Cisco Systems (USA) Pte. Ltd.
Singapore

Europe Headquarters
Cisco Systems International BV
Amsterdam, The Netherlands

Cisco has more than 200 offices worldwide. Addresses, phone numbers, and fax numbers are listed on the Cisco Website at www.cisco.com/go/offices.

CCDE, CCVP, Cisco Eos, Cisco StadiumVision, the Cisco logo, DCE, and Welcome to the Human Network are trademarks; Changing the Way We Work, Live, Play, and Learn is a service mark; and Access Registrar, Aironet, AsyncOS, Bringing the Meeting To You, Catalyst, CCDA, CCDP, CCIE, CCIP, CCNA, CCNP, CCSP, Cisco, the Cisco Certified Internetwork Expert logo, Cisco IOS, Cisco Press, Cisco Systems, Cisco Systems Capital, the Cisco Systems logo, Cisco Unity, Collaboration Without Limitation, Enterprise/Solver, EtherChannel, EtherFast, EtherSwitch, Event Center, Fast Step, Follow Me Browsing, FormShare, GigaDrive, HomeLink, Internet Quotient, IOS, iPhone, IP/TV, iQ Expertise, the iQ logo, iQ Net Readiness Scorecard, iQuick Study, IronPort, the IronPort logo, LightStream, Linksys, MediaTone, MeetingPlace, MGX, Networkers, Networking Academy, Network Registrar, PCNow, PIX, PowerPanels, ProConnect, ScriptShare, SenderBase, SMARTnet, Spectrum Expert, StackWise, The Fastest Way to Increase Your Internet Quotient, TransPath, WebEx, and the WebEx logo are registered trademarks of Cisco Systems, Inc. and/or its affiliates in the United States and certain other countries.

All other trademarks mentioned in this document or Website are the property of their respective owners. The use of the word partner does not imply a partnership relationship between Cisco and any other company. (0801R)