State-of-the-Art New Hospital Builds Borderless Connectivity

With Cisco Borderless Networks, RMH Healthcare can connect clinicians to the information and services they need, securely, reliably, and seamlessly.

Executive Summary

- **Customer Name:** RMH Healthcare
- **Industry:** Healthcare
- **Location:** Harrisonburg, Virginia, United States
- **Number of Users:** 2500

Business Challenge:
- Improve patient care and safety
- Make clinical information universally accessible
- Help ensure strong security and reliability of clinical applications

Network Solution:
- Deployed Cisco Borderless Networks, an architecture comprising end-to-end Cisco routing, switching, security, wireless infrastructure, along with unified communications solutions

Business Results:
- Improved emergency response times by 50-60 percent
- Enhanced clinician responsiveness to patients and other clinicians
- Achieved 100 percent compliance with regulatory standards

Business Challenge

When RMH Healthcare (RMH) began planning a move to a new facility, the hospital's leadership saw an opportunity to design the hospital of the future from the ground up. They wanted to use state-of-the-art clinical and information technology to provide safer, more effective patient care. That meant a universally accessible electronic medical record (EMR) system, a picture archiving and communications system (PACS) capable of distributing massive imaging files throughout the facility, networked clinical devices, end-to-end voice-over-IP communications systems, and more. To support this vision, they needed a next-generation hospital network.

"The network is the backbone of everything we do," says Michael Rozmus, chief information officer for RMH. "We are heavily dependent upon moving data, images, and clinical information throughout this organization. As we planned to have our IP telephony riding on that same network, we would become even more dependent."

To help clinicians be more effective, RMH leaders wanted to create a "borderless" network that could provide information and services securely, reliably, and seamlessly to any workplace environment.

"Providing ubiquitous access to information was one of our most important goals for the new facility," says Rozmus. "Wherever a caregiver is in our organization, they should have access to the data they need to treat and monitor patients."

A major foundation of this borderless capability would be high-speed wireless coverage across every inch of the new hospital. But with a need to support both voice and data communications, the wireless network had to be just as robust as the wired infrastructure.

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> "By integrating our nurse call system into the Cisco wireless and unified communications environment, we've cut our response times for code blues by approximately 50 to 60 percent, even though we're now in a larger facility."
>
> **Michael Rozmus,**
> Chief Information Officer,
> RMH Healthcare

"Previously, we had a legacy wireless phone system that supported about 100 phones," says Rozmus. "In the new hospital, we planned to support well over 450 wireless phones and more than 250 wireless devices assisting caregivers in their daily duties. The wireless performance needed to be solid and the coverage needed to be everywhere."

The most important requirement for the new hospital network, however, was that it provide a flexible foundation for future applications.

"Biomedical technology changes all the time, and our network has to be able to adapt to new requirements," says Rozmus. "We don't know what the next technology on our network is going to be, we just know that the backbone network needs to be extremely reliable, high capacity, and pervasive."

Network Solution

As RMH leaders explored network technology options for the new hospital, Cisco emerged as the clear leader in providing the robust, flexible, end-to-end solution that the hospital required.

"We chose Cisco for the reliability, the research and development, and Cisco's leadership in the healthcare market," says Roger Dickson, director of Technical Services, RMH. "Cisco is always working to bring more healthcare features and functionality to their portfolio. We know that if we need a specific feature set, Cisco either has it already or can work hand-in-hand with a strategic partner to provide it."

RMH leaders also believed that they would benefit from a single-vendor approach.

"When you have all Cisco, you know that everything has been tested to work well together," says Curt Updike, network administrator.

### Robust Network Foundation

To provide the long-term network foundation for the new hospital, RMH deployed a 10-Gigabit fully redundant core network built with Cisco Nexus™ 7000 Series and Cisco Catalyst® 6500 Series switches, and Cisco® Catalyst 4500 Series switches in wiring closets. This exceptional throughput allows RMH to extend even the most demanding clinical information systems everywhere in the hospital.

"We now have computer workstations in every inpatient room," says Rozmus. "We also have PACS reading stations throughout the hospital, and designated devices in the hospital can access PACS through the network."

RMH now brings advanced video and imaging applications directly to the operating room (OR). "Smart" ORs allow surgeons to view three-dimensional diagnostic imaging of patients' anatomies as they perform procedures. Nurses can access real-time views of all operating rooms to monitor activity. RMH also uses the same video and monitoring tools to track patient flow through the hospital. For example, the system allows family members to track when a loved one is moved from pre-op to surgery to recovery.

Borderless Communications

More than 370 Cisco Aironet® wireless access points now cover the entire 630,000 square-foot hospital, with no dead spots anywhere. As a result, RMH can bring a broad range of clinical services onto the network that change the way clinicians care for their patients.
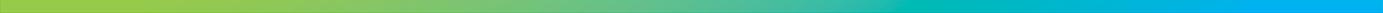
"Bringing the nurse call and the network together has been a key part of our infrastructure design," says Rozmus. "For example, we have tied bed alarms into the system, so if a patient who is a fall risk gets out of bed, that patient's nurse gets an alert on his or her Cisco wireless 7925 phone."

To centrally control and manage the wireless infrastructure, RMH uses the Cisco Wireless Control System (WCS) and CiscoWorks LAN Management System (LMS). The solution automatically monitors unauthorized access, corrects for interference, and provides a centralized platform to configure the entire environment.

Securing the Environment

To safeguard the network, RMH uses Cisco ASA 5500 Series Adaptive Security Appliances, Cisco IronPort™ Email and Web Security appliances, and Cisco network and security monitoring tools to quickly isolate suspicious activity. RMH uses multiple levels of authentication to separate different types of traffic and wall off clinical systems from the public Internet. Together, these tools allow RMH to extend the right resources to the right people anywhere, anytime, while protecting sensitive data.

RMH also uses Cisco Group Encrypted Transport virtual private network (GET VPN) technology to protect patient information and comply with the Health Insurance Portability and Accountability Act (HIPAA). Embedded within Cisco branch Integrated Services Routers, GET VPN allows RMH to maintain HIPAA-compliant encrypted links to remote sites without having to configure point-to-point tunnels.

"In the past, any time we needed to connect a remote site, we had to manually configure everything end-to-end," says Angel McNamer, lead network administrator. "With GET VPN, we're up and running in half the time."

Business Results

RMH completed its move to the new facility in the summer of 2010, and the "hospital of the future" has now been fully operational for several months. With borderless access to information and services, RMH is fulfilling its vision of enabling better-connected clinicians and more patient-centered care. Even a function as simple as a patient calling a nurse has been enhanced by the new RMH technology platform.

"Typical nurse call systems rely on a ward clerk to receive the call and then find the nurse responsible for that patient," says Rozmus. "With our system, the moment patients push the call button, they are connected immediately to their caregiver, who can respond right then."

That improved responsiveness can translate directly into lives saved. For example, instead of relying on switchboard operators and public address systems to manage "code blues" (alarms that are activated when a patient needs resuscitation), RMH clinicians now see alerts the moment they are issued, saving precious seconds in life-and-death situations.

"By integrating our nurse call system into the Cisco wireless and unified communications environment, we've cut our response times for code blues by probably 50 to 60 percent, even though we're now in a larger facility," says Rozmus.

Communication among clinicians has also improved. Instead of sending a page and waiting for a reply, nurses can reach offsite physicians (and vice versa) immediately whenever they have a question. Radiologists can access massive computed

tomography (CT) and other imaging scans from remote offices, home, or other locations to diagnose patients. RMH is even able to bring in external radiology support to cover off-hours, allowing radiologists in New Zealand to review imaging at the hospital in real time.

The ever-present network connectivity also means that clinicians always have the most up-to-date patient information, reducing risk of errors.

"In the past, clinicians could do echocardiograms and ultrasounds at the bedside, but they would have to dock the device to send the test results or images," says McNamer. "If the clinician was seeing other patients, that could mean a delay of half an hour or more. Now, they send that data wirelessly, immediately. Everyone involved in a patient's care has the results in their hands within minutes of a test being done."

In the IT department, the Cisco network infrastructure and tools have also made a significant impact. With the Cisco network and security management tools, IT personnel have much more visibility into what's happening on the network.

"We had instances in the past where we would get reports of network issues, but had no way to know where they were coming from," says McNamer. "We could spend days looking for a problem. Now, we can immediately pinpoint any abnormal behavior."

That kind of visibility and control translates directly into improved efficiency.

"Just watching the work my team can take on now compared to what we could do in the past, there is a night-and-day difference," says Dickson.

The Cisco network and tools have also helped RMH ensure HIPAA compliance. In a recent HIPAA audit, the hospital's network and security rated 100 percent effective.

Future Plans

As vital as the Cisco network is to RMH, the hospital is just beginning to take advantage of what it can enable.

"There are a lot of capabilities here that we have not yet tapped," says Rozmus. "We are looking at adding texting to our IP communications systems, and integrating more alerts and biomedical devices. We're also going to expand tracking, potentially using the wireless network to triangulate the location of equipment."

No matter what RMH clinicians need or what new medical technologies arise, RMH leaders know their Cisco network and communications backbone is up to the challenge.

"Looking at our overall system, we are state-of-the-art and ready for anything they can throw at us," says Updike.

For More Information

To find out more about Cisco Borderless Networks, visit: www.cisco.com/go/borderless. For more details on Cisco solutions for healthcare, visit www.cisco.com/go/healthcare.