



## Customer Case Study

# Wireless Network Supports Clinical Applications

**Sutter Health chose Cisco networking solutions and Integrated Services Routers to create a long-lasting infrastructure foundation.**

### EXECUTIVE SUMMARY

#### SUTTER HEALTH

- Healthcare
- Sacramento, California, United States

#### BUSINESS CHALLENGE

- Enable shared applications and any-to-any collaboration between affiliates
- Consolidate multiple WAN technologies into a common WAN environment for supporting a growing number of distributed healthcare solutions
- Support innovative clinical applications that require converged voice, data, video, and security services

#### NETWORK SOLUTION

- Cisco Medical Grade Network based on a carrier-managed IP/Multiprotocol Label Switching WAN with Cisco Integrated Services routers at each affiliated location to support existing and future converged data, voice, and video services
- Wireless network environment supporting clinical applications

#### BUSINESS RESULTS

- Enables all affiliates to directly collaborate and share information over a carrier-managed IP/MPLS network
- Improves application performance at 209 locations and enables Sutter Health to develop traffic-managed solutions, such as archiving of PACS images
- Supports innovative new Electronic Health Record and Electronic Intensive Care Unit monitoring capabilities

### BUSINESS CHALLENGE

Sutter Health is a family of not-for-profit hospitals, physician organizations, and other health-care providers, with 3500 physicians and 43,139 employees serving 100 communities in Northern California. Its commitment to advancing patient care is reflected in a long list of awards and recognition for outstanding heart disease care, cancer treatment, hip replacement surgery, liver transplants, case management, and overall best practices. Technology plays an important role in Sutter's high-quality care delivery, and recently the organization upgraded its Cisco® Medical Grade Network and replaced its network routers at all 209 locations.

Previously, Sutter's WAN was based on ATM or Frame Relay connections that linked its Sacramento data center with two major hub locations. Each hub had multiple links to hospitals and medical office buildings in its area. Because Sutter's locations spanned multiple carriers' local access and transport areas (LATAs), they had to be interconnected by an expensive, dedicated WAN. As bandwidth demands increased and new caregivers were added to the network, it became cost-prohibitive to expand using the same approach.

Sutter Health affiliates wanted to be able to share regionally based applications and collaborate directly with each other. For example, Electronic Intensive Care Unit (eICU) hubs monitor hundreds of intensive care beds across geographically distributed facilities. Provisioning every location to provide direct connections to all other locations required manually allocating bandwidth—per site, per virtual circuit, and per application. Time-consuming, costly, and a tremendous management burden, this goal was almost impossible to achieve with the existing network architecture.

The organization's clinical application environment is also evolving. Over time, acquisition of specialized applications for each medical specialty and multiple locations had resulted in hundreds of applications and specialized interfaces—each of which served

a limited number of users. Now Sutter was moving toward centralized application suites, such as an electronic health record (EHR) that would deliver new capabilities, standardize support, and simplify information sharing over the Medical Grade Network. New IP-based applications required delivery over an IP network in order to optimize Sutter's return on investment.

## NETWORK SOLUTION

“Sutter Health wanted to move to a Cisco Medical Grade Network that would facilitate the information, communication, clinical, and administrative needs of our affiliates,” says Steve Wike, engineering and architecture manager. “We chose a carrier-based IP/Multiprotocol Label Switching managed service and Cisco Integrated Services Routers to help us deliver high-performance, concurrent voice, data, and video services.”

The new network provides Sutter with the robust foundation that it needs to help ensure high resilience, application responsiveness, interactive services, and enhanced security. By choosing an IP/Multiprotocol Label Switching (IP/MPLS) WAN service, Sutter can help ensure that patient and treatment data is always available wherever it is needed.

A high-performance network backbone enables Sutter to provide caregivers with rapid access to data, support innovative wireless applications, and cost-effectively converge voice and video traffic with data over the network.

**“We measure return on investment by our ability to deploy new applications that improve patient care. The new network and high-performance Integrated Services Routers have met our expectations and will allow us to perform tasks, such as remotely archiving PACS images or delivering voice and videoconferencing, which we could never do over the old network.”**

—Steve Wike, Engineering and Architecture Manager

## BUSINESS RESULTS

With built-in support for converged data, voice, and video capabilities, Sutter can support consultations between caregivers at different facilities and expand videoconferencing services to all locations in the future. Diagnostic images from its Picture Archiving and Communication Systems (PACSs) can be transported and archived remotely, assuring secure backup storage in the event of a local archive failure.

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Sutter’s wireless environment supports the organization’s new Electronic Medication Administration Program (eMAP). With more than 17,000 trade and generic pharmaceuticals marketed in North America alone, the potential for medication errors is high. Sutter’s eMAP system uses a bar code on each patient’s wristband, the nurse’s ID badge, and on each dose of medication. Before administering a medication, the nurse scans each of the three bar codes using a handheld device at the bedside. The three codes are used to match the medication ordered by the doctor and to help ensure that the right medication, in the right form, is administered to the right patient at the right time.

Sutter Medical Foundation physicians dictate notes over mobile devices directly into a hosted application, which transcriptionists use to transcribe into patient records. The wireless environment reduces the time required to update charts and eliminates the potential for lost tapes. Sutter is piloting numerous new wireless applications that may be used in the future for patient monitoring, asset tracking, nurse call, and alerting systems.

The eICU application enables physician specialists, known as intensivists, to remotely monitor patients in ICUs around the clock. Using eICU, these highly specialized physicians can monitor patients in multiple hospitals, 24 hours a day over the network, enabling highly sophisticated care for more critically ill patients and measurably improving outcomes.

Sutter is poised to begin deployment of a new Electronic Health Record (EHR) application, which will provide a single electronic patient chart that includes important information, including test and imaging results, medication history, doctors' notes, and general health history. The EHR will replace paper charts, providing immediate access to the patient's caregivers anywhere in the Sutter Health network and helping ensure better, safer, and more efficient health care.

Although not yet deployed universally across the network, point-to-point videoconferencing and consultations are enabling caregivers and specialists to collaborate and share information in real time over the network. Wike expects video applications to become used heavily as the network infrastructure is completely deployed and the applications begin to become more widely available to affiliates.

"By making these services more easily available to our physicians and other caregivers, Sutter can set itself apart and continue its tradition of delivering market-leading healthcare," says Wike.

**NEXT STEPS**

Sutter is in the process of implementing network-based quality of service (QoS) features for its most critical applications. Once these needs are addressed, Wike's team will standardize QoS features across the network. He also expects to deploy the Cisco Security Monitoring, Analysis and Response System (MARS), an all-inclusive solution that will allow Sutter to monitor, identify, isolate, and counter security threats. With a correlation engine, vector analysis, and hotspot identification, Cisco Security MARS can identify anomalous behavior and security threats and also recommend precision removal of those elements, leading to rapid threat mitigation.

PRODUCT LIST
<ul style="list-style-type: none"><li>• Cisco 3825 and 3845 Integrated Services Routers</li><li>• Cisco 7600 Series Routers</li><li>• Cisco Catalyst 6500 Series Switches</li><li>• Cisco Aironet 1200 Series Wireless Access Points with CiscoWorks Wireless LAN Solution Engine</li><li>• Cisco Aironet 1100 Series Wireless Access Points</li><li>• Controller Based LWAP standard WISM</li><li>• Cisco Security Monitoring, Analysis and Response System (MARS)</li><li>• CiscoWorks LAN Management Solution</li></ul>

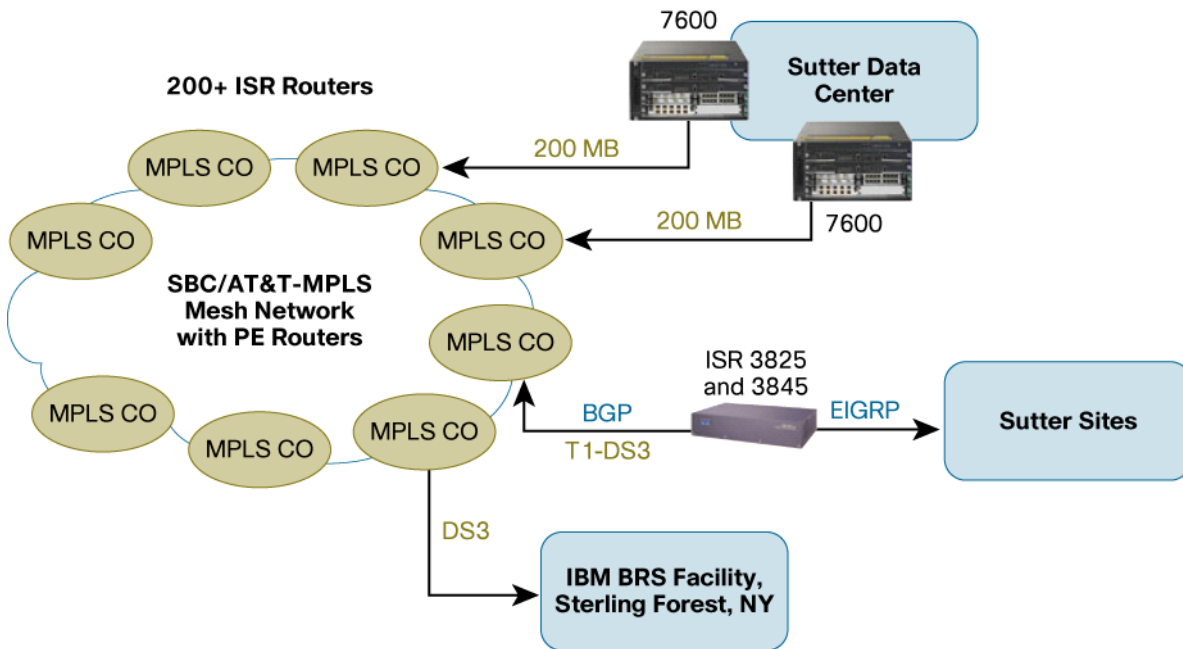
Sutter plans to develop a system-wide unified IP communications architecture that will include converged voice, video and messaging services, distributed call-center functionality, application integration, and presence-based services. By standardizing on Cisco Integrated Services Routers, Sutter will gain a great deal of flexibility and functionality in developing its converged environment.

"We are building the infrastructure now to support our needs for the future," says Wike.

"Whatever technology we will need to continue our mission of improving patient care is what we are planning for now and the network is the critical element."

## TECHNICAL IMPLEMENTATION

The new IP/MPLS WAN connects the Sutter data center with affiliate sites across Northern California. The data center employs a 10-GB Ethernet core based on Cisco Catalyst® 6500 Series Switches with Catalyst 6500 Series Supervisor Engine 720 processors for high performance and resiliency. It connects to the WAN using two Cisco 7600 Series Routers—each connected to a different Central Office for redundancy using Gigabit Ethernet links.



All of Sutter Health’s affiliate sites are connected to one of eight MPLS-equipped carrier Central offices using Cisco 3825 or 3845 Integrated Services Routers with links ranging from T-1 (1.55 Mbps) to DS-3 (45 Mbps).

The Integrated Services Routers’ support for QoS enables Wike to manage traffic through categorization and prioritization features. Applications are categorized using source and destination information or protocol-specific, and then voice and video applications will be prioritized using low-latency queuing techniques. Electronic medical record application traffic receives the next-highest priority, followed by all other clinical applications, which are queued using fair-weighted queuing. Background traffic is rate-limited and extra available bandwidth can be allocated to transporting archived images from Sutter’s PACSs to remote archives.

“We were impressed by the routers’ high performance as well as the ability to easily add new services as needed,” says Wike. “We intend to use them for remote survivability in a future IP Communications deployment and to support highly responsive clinical applications.”

Cisco IOS® Software-based firewall features are implemented in some locations, and several site-to-site virtual private networks are deployed to facilitate collaboration.

Sutter has been using Cisco wireless solutions based on Cisco Aironet® 1100 and 1200 Series Wireless Access Points for approximately two years. Each affiliate site is initially provisioned using Command Line Interface tools. CiscoWorks LAN Management Solution is then used to back up router configurations and track equipment across the network.



## FOR MORE INFORMATION

- To learn more about Cisco routing solutions, visit: [www.cisco.com/go/routing](http://www.cisco.com/go/routing)
- To learn more about Cisco switching solutions, visit: [www.cisco.com/go/switching](http://www.cisco.com/go/switching)
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- To learn more about Cisco IP Communications solutions, visit: [www.cisco.com/go/ipc](http://www.cisco.com/go/ipc)
- To learn more about Sutter Health, visit: [www.sutterhealth.org](http://www.sutterhealth.org)

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