Cisco Connected Real Estate for Healthcare:
Changing How Hospital Real Estate is Developed, Used, and Managed

Executive Summary

Today's healthcare executives encounter new challenges to providing quality healthcare within their budgets. One reason is that the developed world's aging population has unprecedented expectations for healthcare service and quality of life. The Internet makes it easier for prospective patients to identify superior healthcare providers. Patients increasingly choose a hospital based not just on location, but also on facilities and reputation.

At the same time, the cost of care is rising, a result of advances in the tools, treatments, and techniques used to prevent and cure disease. And yet the financial resources available for health services are limited, even in the richest nations. Hospital administrators must therefore grapple with staff shortages, higher patient loads, and reduced budgets.

The Connected Real Estate for Healthcare framework from Cisco® helps address these challenges. Its premise is that the traditional approach to designing hospital buildings—deploying multiple proprietary networks for voice, video, data, heating, ventilation, and air conditioning (HVAC), security and access, energy, lighting, fire and safety, and other functions—unnecessarily increases capital costs and operational expenses. When developers and builders incorporate the Cisco Connected Real Estate for Healthcare framework into their buildings, all building and IT systems are converged onto a single Cisco Medical-Grade Network. Not only do operational and maintenance costs drop, but the hospital IT group can deliver innovative new services that improve caregiver productivity and enhance patient care.

Unified communications converge voice, video, and data capabilities over building information networks, including IP telephony, videoconferencing, rich media, and other collaboration and productivity tools. Converging security applications over the building information network allows you to use your existing IP infrastructure for video surveillance, access control, visitor management, and fire safety. Lastly, the IP infrastructure can now support the monitoring, control, and visibility of your varied building systems, such as HVAC, lighting, transportation, and energy management.

It is the convergence of these systems over a single information network that allows healthcare organizations to:

- Introduce innovative workplace processes that improve the productivity of caregivers
- Avoid the operational costs of multiple networks
- Support the monitoring, control, and visibility of your building systems, such as HVAC, lighting, and energy management
- Deliver new patient services that make the hospital more appealing to patients and create new sources of revenue and funding

The IP Network as the Building Information Network

Network connectivity has traditionally been an afterthought in building construction, left to the healthcare organization that moves into the building. But today, growing numbers of builders and healthcare organizations see the IP network as an integral part of the building design.

When builders plan for the network infrastructure as part of the building foundation, their tenants can:

- Avoid the costs of deploying and managing multiple proprietary networks for voice, video, and data as well as separate building systems and associated devices to control HVAC, security and access, fire and safety, elevators, and lighting.
- Develop new sources of revenue and funding: Fee-based services such as Internet access and video on demand can enhance the patient experience. Hospitals can also use their IP networks to earn incremental revenue from in-hospital advertising, either on the built-in displays of patients' Cisco Unified IP phones, the home page that patients and visitors see when they access the Internet, or networked plasma screens and kiosks in common areas.
- Deliver new patient services that increase the hospital's competitive appeal: For example some healthcare facilities now feature IP telephony and environmental room controls at the patient's bedside. In countries that are introducing market forces to healthcare delivery, new patient services can help differentiate the hospital for a competitive advantage.

St. Olav's Hospital in Trondheim, Norway, is one of that country's five university hospitals. It has 5000 employees and 1000 beds, and treats approximately 45,000 patients each year. The hospital's new infrastructure is one of the world's most advanced Cisco Medical-Grade Networks. To differentiate its patient services, St. Olav's has equipped every patient room with an IP-based patient terminal that provides access to TV, radio, telephony, the Internet, a special application for ordering food, nurse call, and control of room lighting and temperature. Using a security card, hospital staff can use the same terminals to access clinical applications.

Workplace Solutions: Integrating Space, Technology, and Services

Shortages of nurses and clinicians have increased the urgency of productivity improvements. Healthcare organizations need to provide their staff with the tools and technology to deliver service to more patients—without taking shortcuts that might compromise patient safety. In buildings with Cisco Connected Real Estate for Healthcare, clinicians and nurses can receive voice, video, and data on their handheld wireless device, saving countless trips to the nurse's station each day to answer calls or retrieve information. By promoting greater collaboration and mobility, Cisco Connected Real Estate can streamline caregiver and administrative processes and improve workflow.

More Efficient Caregiver Processes and Workflow

Collaborative Care: In buildings with a Cisco Connected Real Estate foundation, voice and video can be sent over the same network used for data and building systems. This facilitates collaboration between teams, which improves caregiver productivity and the quality of patient care. In the event of a cardiac arrest, a missing patient, a fire, or other emergency, for example, nurses can use Cisco Unified MeetingPlace to quickly set up voice and videoconferences with a crisis management team. The ability to initiate ad hoc voice and video conferences can also help overcome language and cultural barriers. If a patient speaks another language and an interpreter is not on site, the hospital can arrange a videoconference with a qualified interpreter in another facility. Voice and videoconferencing capabilities also help deliver telemedicine services to patients at detention facilities and other remote locations.

The Health Care Interpreter Network (HCIN) of Northern California is a system of shared remote interpreter services operated by Northern California public hospitals. Running on a Cisco Medical-Grade Network, this integrated solution of voice, video, and data communication offers hospital staff instant access to trained

interpreters. The network currently routes approximately 3500 videoconference and phone calls per month, with an average response time of 22 seconds.

Mobile Applications: In order to deliver quality care and the best possible patient experience, it is essential to help ensure that caregivers and patients are connected to vital health information when and where they need it. Not getting the right information at the right time decreases productivity and potentially impacts treatment.

With Cisco Unified Communications healthcare providers can improve nurse call, hospital services, and clinical event processes. For example, when patients ring their nurse-call buttons to request assistance, the system delivers the requests either to the Cisco Unified IP phone at the closest nurse station or directly to a nurse's wireless Cisco Unified IP phone. The nurse can instantly confirm receipt of the message by pressing a soft key on the phone, and talk directly with the patient if needed. Productivity increases for the nurse and the patient experience is improved through faster response times.

When administrators of the Poudre Valley Health System, in northern Colorado, decided to meet the demands of the area's increasing population by building a new hospital, they wanted a network that would support the latest clinical technologies with high-level security and robustness, and would provide caregiver mobility. The Cisco Medical-Grade Network supports virtually unlimited wireless access throughout the hospital. The nurse call system will contact a caregiver wirelessly, rather than calling out to a central desk and having the unit nurse track down the caregiver responsible for an individual patient. The hospital has also implemented a system called the GetWell Network. This allows online access to patient information and a complement of entertainment services, as well as the opportunity to provide feedback to hospital staff.

Asset Management: Hospital staff, who must track a wide variety of devices that are constantly being moved. By one estimate, hospitals cannot find 15 to 20 percent of the devices they own. Of the eight hours needed to perform preventive maintenance on an intravenous (IV) pump, seven hours are typically spent locating the pump. An average 400-bed healthcare facility can save from $400,000 to $500,000 annually by reducing short-term equipment leases, loss prevention, fewer purchases, and labor savings.

At the Bronson Healthcare Group of Kalamazoo, Michigan, greeters and orderlies previously devoted part of each day to looking for wheelchairs, and twice a week they sent e-mail "wheelchair alerts" to all 4000 employees. Now that Bronson tags its wheelchairs, any clinician who needs a wheelchair simply calls a greeter's station and asks for the nearest chair. A quick glance at a screen shows within three meters where the tagged wheelchairs are. Patients wait no more than a few minutes for a wheelchair, and the hospital saves $28,000 a month by eliminating searches. RFID asset tracking also increases the productivity of the biomedical engineers who maintain sophisticated equipment. Bronson Healthcare Group estimates that simply locating assets accounts for more than half of its labor costs associated with some equipment calibrations, repairs, and upgrades.

Administrative Process Efficiencies

In buildings with Cisco Connected Real Estate, clinicians and nurses can use any network-connected PC or terminal to take live or recorded training courses—eliminating the need for caregivers to travel and giving them the flexibility to take courses during less busy times.

Using a converged network for all hospital functions can also create back-office process efficiencies. Employees can sign on and off their shifts by logging in to any Cisco Unified IP phone. The organization benefits further by tracking assets with the wireless IP network instead of manually recording inventory.

When caregivers can connect to the hospital network and use the phone from any location, healthcare facilities can reduce dedicated office space. At Norway's St. Olav's Hospital, for example, all physician offices other than examination rooms have been eliminated. Physicians now work from any convenient location in the facility, logging in to any Cisco Unified IP phone to personalize it with their phone number and preferences.

Convergence and Integration: IT and Building Systems on a Common IP Network

Healthcare organizations with a geographically dispersed portfolio of real estate gain even more benefit from Cisco Connected Real Estate by exercising oversight and control across the entire portfolio from any point on the network. Systems that can be monitored and controlled include:

- Critical medical systems
  - —Medical gas supplies
  - —Temperature control for blood banks and cryogenic storage facilities
  - —Nurse call, baby tagging, and other alarm-generation systems
- HVAC
- Elevators
- Lighting
- Security
- Universal power supply
- Kitchen refrigeration
- Blast chillers

The ability to centrally manage and monitor building services and devices provides economies of scale, and real-time reporting improves response time. At the Reutlingen Regional Clinics of Germany, for example, patient satisfaction has increased because patients can now control the lighting, heating, and blinds in their rooms. Patients use a simple, touch-screen interface on their Cisco Unified IP phones to operate the controls, sending signals over the IP network. Patients can even use their Cisco Unified IP phones as a door intercom.

Enhanced Energy Management Strategy

According to the U.K. Carbon Trust, 30 percent of the energy consumed in primary healthcare in the United Kingdom is wasted. This is a significant amount of money that could be better spent in patient care.

Heating and lighting are the largest sources of energy consumption in healthcare. The Connected Real Estate framework helps to keep this consumption under control through daylight saving, time scheduling, and occupancy detection integrated with bookings systems, access control systems, and business systems. The integration of these systems on a converged network allows data sharing and constant automatic monitoring and targeting. Hospitals using the solution have experienced significant reduction in lighting and heating costs for corridors and waiting areas.

The London Health Sciences Centre in Ontario, Canada, uses sophisticated Web-based computer systems to remotely control and monitor air conditioners, heating equipment, and lights, eliminating the need for staff to go from building to building to extinguish lights and adjust thermostats. The hospital forecasts a 5 to 10 percent decrease in the US$8.5 million annual energy cost for the more than 40 buildings on its three campuses. In corridors and waiting areas, lighting has been cut by as much as 50 percent and temperatures reduced by up to 2 degrees.

The task of energy control is made easier by 9,000 control and monitor points that keep track of room temperature, air quality, and humidity throughout the campuses. These allow engineering staff to observe the impact of changes in air temperatures and, when necessary, make adjustments remotely. In many areas of the complex—with the exception of operating rooms and patients' rooms—the temperature of heated air is being decreased to 18°C from a normal 20°C. If cold weather makes warmer conditions necessary, the system automatically boosts temperatures.

Improved Safety

The convergence of IT networks and building systems allows healthcare providers to implement more sophisticated and comprehensive physical security through video surveillance, access control, and asset management.

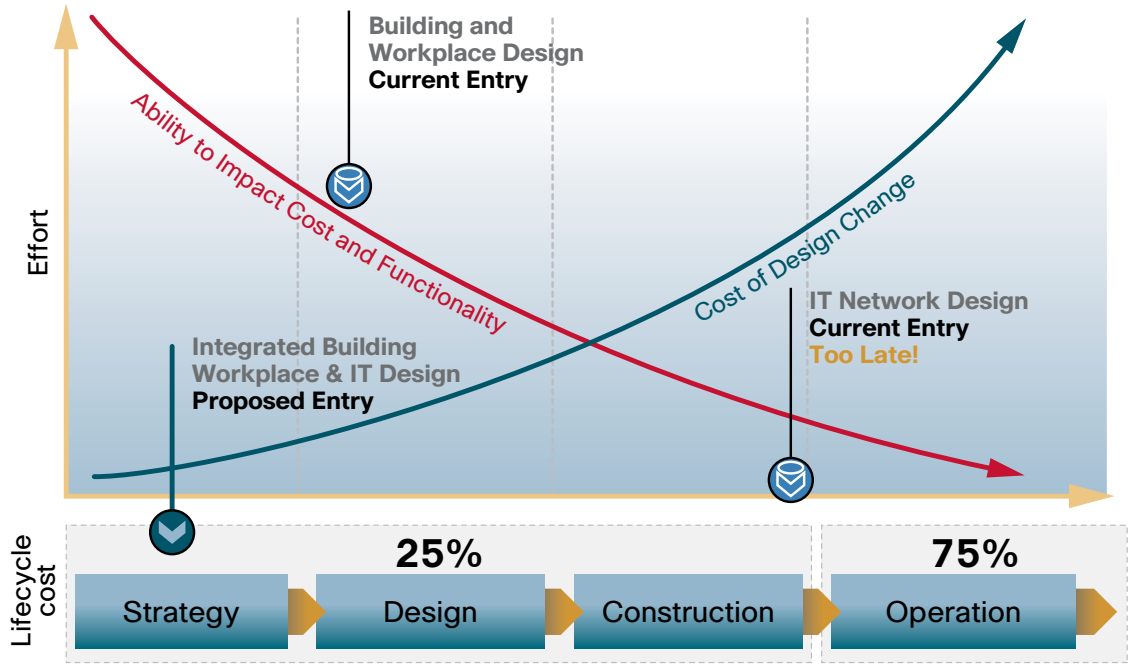
Integrating devices such as CCTV cameras with door security systems, card readers, and IP-based lock controllers and networks helps staff to respond more quickly and effectively to security events based on immediate data. If somebody forces a door, for example, staff can send a signal to the nearest CCTV camera to focus on the door, and security guards can monitor the video from a central location to decide the most appropriate action. IP-based CCTV has been shown to reduce vandalism, graffiti, and other forms of antisocial behavior in remote areas of hospital facilities. Security personnel can view clear images from any Web browser and initiate action early enough, in many cases, to prevent harm. Scanning digital archives of CCTV images is much faster than scanning videotapes. Safety improves, as well, when access control systems are integrated with other hospital systems. If the badge of an employee who is listed as on holiday or sick leave is swiped through an access control reader, the system can deny access and alert security personnel to possible identity theft.

Cisco Connected Real Estate for Healthcare also improves safety by facilitating the communication of emergency status and instructions to patients, visitors, and staff. Security personnel can send voice, video, and data alerts to multiple devices, including PCs, IP phones, digital signage, and public address systems. Third-party IP telephony applications can be used to quickly inform building occupants of security breaches that may require evacuation.

Timing Considerations: When to Add Cisco Connected Real Estate for the Greatest Financial Benefit

The illustration below shows the four phases of a building lifecycle and the costs associated with each phase. Because the largest portion of a building's total lifecycle cost—75 percent—accrues during the maintenance and operations phases of the building, decisions made during these phases can have far-reaching financial and operational impact and strategic, informed decisions can reduce ongoing costs over the lifecycle of the building.

Technology is an Important Part of Your Real Estate Strategy



By including the Cisco Connected Real Estate framework in the building design process and installing it early in the construction phase, builders and their healthcare tenants gain the following advantages:

- Reduced initial capital costs as well as lower ongoing costs from maintaining a single, standards-based IP network instead of multiple proprietary networks. The Cisco Connected Real Estate framework uses embedded technologies to deliver high levels of security and resilience, further reducing maintenance and repair costs. All network components—hardware, software, and services—are based on open standards and are designed using roadmaps that anticipate and support constantly changing business requirements.
- Reduced disruption for a retrofit.
- Reduced operating expenses over the building's lifecycle through centralized monitoring, maintenance, and control of the building environment.
- Increased return on investment because the healthcare organization can begin experiencing cost savings, increased productivity, and enhanced patient services from the first day of occupation.

Conclusion

Today's healthcare providers face a daunting challenge: sustaining or improving patient care levels despite shortages of clinicians and nurses, increasing competition, and financial pressure. Builders and developers can help healthcare organizations meet the challenge in an innovative way by designing buildings with a standards-based IP network to deliver and manage the hospital's services more efficiently and at a lower cost. When builders and developers design their buildings with a Cisco Connected Real Estate for Healthcare framework, healthcare providers benefit by differentiating their service, increasing staff productivity, and reducing costs with IP-based applications and centralized control of systems. Cisco Connected Real Estate for Healthcare brings together all the necessary elements in a building to work for the patient and the caregiver.

Americas Headquarters
Cisco Systems, Inc.
170 West Tasman Drive
San Jose, CA 95134-1706
USA
www.cisco.com
Tel: 408 526-4000
800 553-NETS (6387)
Fax: 408 527-0883

Asia Pacific Headquarters
Cisco Systems, Inc.
168 Robinson Road
#28-01 Capital Tower
Singapore 068912
www.cisco.com
Tel: +65 6317 7777
Fax: +65 6317 7799

Europe Headquarters
Cisco Systems International BV
Haarlerbergpark
Haarlerbergweg 13-19
1101 CH Amsterdam
The Netherlands
www-europe.cisco.com
Tel: +31 0 800 020 0791
Fax: +31 0 20 357 1100

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09/07