

Sault Area Hospital Taps IoE to Cut Costs and Provide Simpler Management of Building, People, Information



EXECUTIVE SUMMARY

Objective

- Simplify operations and reduce staff workload, while improving the overall experience for patients, doctors, and management

Strategy

- Built the solution from the ground up, enabling the team to consider how integrating systems could benefit hospital management, staff, and patients

Solution

- Technology infrastructure designed to support patient and business processes, coordinated through – and layered upon – a single network
- Network integrates daily management of utilities, surveillance security, telephony, and patient monitoring

Impact

- Enables simpler management of the building, people, and information
- Saves money and energy via lighting and climate-control functions of network
- Economizes IT processes through new, centralized infrastructure
- Enhances ability to offer state-of-the-art healthcare with an integrated patient experience
- Streamlines communications between patient and provider, enabling easy access to remote specialists

Background

In January 2014, Cisco released the results of an in-depth analysis of the economic benefits of the Internet of Everything (IoE) for the public sector. Cisco's model revealed that some \$4.6 trillion in "Value at Stake" would result from the adoption of IoE capabilities across 40 key public sector use cases over the next 10 years, including smart water, smart buildings, smart energy, smart parking, and more (<http://bit.ly/1aSGIzn>).

As a next phase of its analysis, Cisco engaged Cicero Group, a leading data-driven strategy consulting and research firm, to undertake a global study of IoE capabilities across these 40 use cases – how the best public sector organizations are "connecting the unconnected," as Cisco terms it. To that end, Cicero Group conducted interviews with dozens of leading public sector jurisdictions – federal, state, and local governments; healthcare organizations; educational institutions; and non-governmental organizations (NGOs) – to explore how these global leaders are leveraging IoE today.

The research examined real-world projects that are operational today, are being delivered at scale (or through pilots with obvious potential to scale), and that represent the cutting edge of public sector IoE readiness and maturity. The aim of the research was to understand what has changed in terms of the jurisdictions' people, processes, data, and things, and how other public sector organizations can learn from (and replicate) the trail blazed by these global IoE leaders. In many cases, these jurisdictions are Cisco customers; in others, they are not. The focus of these jurisdictional profiles, therefore, is not to tout Cisco's role in these organizations' success, but rather to document IoE excellence, how public sector entities are putting IoE into practice today, and to inform a roadmap for change that will enable the public sector to address pressing challenges on multiple fronts by drawing on best practices from around the globe.

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About Sault Area Hospital

Opened in March 2011, Sault Area Hospital (SAH) is a 600,000-square-foot, 291-bed facility that includes a 24-hour emergency department; acute, rehabilitation, and complex continuing care inpatient beds; surgical services; maternity and pediatrics; mental health and addictions; outpatient clinical services; diagnostic imaging; full laboratory/pathology services; and is also home to the Algoma Regional Renal Program and the Algoma District Cancer Program, complete with a radiation treatment complex.

SAH is a publicly owned and operated nonprofit institution, governed by a Board of Directors comprised of members of the local and regional community. Assets, income, expenses, and other budgeting information are publicly disclosed. The construction of the Sault Area Hospital building was funded by the provincial government of Ontario, Canada.

Chad Carter is the enterprise architect for Sault Area Hospital. He is an experienced network specialist who assisted in the design of Sault Area Hospital's technology infrastructure. He previously worked for the same facility as ICT manager, and as an IT manager for Grand River Hospital.

Objectives

The new Sault Area Hospital utilizes technology infrastructure designed to support patient and business processes coordinated through – and layered upon – a single network. By integrating daily management of utilities, surveillance security, telephony, and patient monitoring into this IP network, SAH simplifies operations and reduces workload for staff. Patient histories, provider-to-provider communications, and administration and building management functions are centralized in a secure, remotely accessible data center. The new infrastructure features a common platform for patient care, including simple methods of sharing patient histories with physicians outside the hospital. SAH also actively collaborates with the Ontario Telemedicine Network as a provider and in training events.

Strategy

Mr. Carter described the process of planning for the new facility: "Since the facility was a completely new build, that gave us an opportunity to build from the ground up, which is kind of rare in the technology arena – especially in healthcare, where you're usually marrying technology into older buildings and trying to make things work. We were able to plan from the ground up and say, 'What technology will best support the business operations? Let's build a building that can house those properly.'" This sort of thought process allowed Mr. Carter and his team to consider how integrating systems could benefit hospital management, staff, and patients.

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Chad Carter,
Enterprise Architect,
Sault Area Hospital

Solution

Patient Care Communication

The central network streamlines patient care by storing data machine-to-machine. “Where the data itself is able come across electronically, that information can be automatically captured into our EMR (electronic medical record) instead of having the nurse enter it manually,” Mr. Carter explained. It minimizes mistakes and errors, and [reduces] cycles on the clinician who’s taking care of the patient.” Sault Area’s electronic medical records are then available via the network for doctors, so they can monitor patients even when they are not onsite.

In addition to saving steps for staff, the central storage of patient data supports data security. Mr. Carter added that “data privacy and security definitely are forefront items.” Patient data is kept in a secure central database, rather than stored on mobile devices or desktops, and is easily accessible to authorized personnel wherever they are. Mr. Carter noted that these data trails are periodically checked for anomalies: “We have audits that check both access and what they’re accessing, and should they be accessing that particular record within the circle of care.” Sault Area Hospital mitigates risk by keeping sensitive data secured within the facility.

The network also provides Wi-Fi for public and internal use. It integrates a wired as well as wireless telephone system in place of a traditional paging system. Mr. Carter describes this as “a huge change for the organization,” saying, “In the past, a patient sitting in a bed might press the nurse call bell and it would ring up the nursing station. Now, the call bell actually sends that alert directly via wireless phone to the nurse who is responsible for the patient. It removes geographical limitation, letting nurses move around and still receive alerts right away. This allowed us to remove our old PBX system and really leverage the new wireless technology.”

Provider-to-Provider Communication

The hospital collaborates extensively with the Ontario Telemedicine Network, the province’s main avenue for provider-to-provider communications. “We have the Telemedicine Network configured to use our hospital network,” Mr. Carter explained. “We’re able to deploy that where we need. Whether it would be in the ICU or auditorium or a classroom or ER, we’re able to easily activate ports on our network that support the Telemedicine Network. It’s definitely a service that we use very often.” This network provides a teleconference bridge for specialist consultations and referrals, and Sault Area Hospital acts as a main forum for provider education – offering both live-feed education and access to a large archive of recorded material.

Building Management

New IT infrastructure supports central management of building functions. For example, the facility is wired throughout with both light and motion sensors. “We layered in an IP lighting environment,” Mr. Carter explained. “We have lots of natural light coming into the building. Usually your lights are on or off, but in a hospital with 24/7 operation, you can imagine those lights never turn off. So, the lighting environment has sensors that monitor ambient light – reducing lighting load in the day and bringing it back up during the evening. All that translates into savings on overall power. It’s a nice green item.” True to the vision of using a single, integrated

“Everything is connected, right down to the incoming power feeds in the system. So our maintenance folks are able to manage that environment without having to walk to the panels, for example, to make a change or monitor our system. All the cooling, heating, and power controls are network-connected, and the team is able to manage that.”

Chad Carter,
Enterprise Architect,
Sault Area Hospital

system, Sault Area Hospital also manages its heating and cooling systems over this IP network.

Remote connectivity plays a large role in terms of simplifying building control. “They’re able to set schedules on when we’ll be in the building so lights will go off automatically and then come on based on motion,” Mr. Carter said. In the evenings, SAH uses on-call staff who are able to monitor the environment and change settings remotely. “As long as you’re on the network, you have access to those services,” Mr. Carter explained.

In addition to making facilities management remotely accessible for maintenance staff, employees can unlock and adjust building functions based on room use. Access is granted by card interaction with RFID readers and a proxy-based HID access control reader. Mr. Carter indicated that hospital security systems, including video monitoring, are centralized as well. The cards provide a level of security by recording access details, such as employee name, date, and time.

“It’s all controlled by one card, our ID badge,” Mr. Carter explained. “An ID badge not only gives staff access to doors, but it also gives them access to their parking. We’re able to determine who has access to what, and to what area of the hospital. We can track the date and time access happened.”

Controls for room environments can be optimized simply through the network. “Everything is connected, right down to the incoming power feeds in the system. So our maintenance folks are able to manage that environment without having to walk to the panels, for example, to make a change or monitor a system. All the cooling, heating, and power controls are network-connected, and the team is able to manage that,” Mr. Carter explained. Having the controls in one location simplifies the work of maintenance and increases overall efficiency.

Lighting is connected to the network throughout the building. Lights in unoccupied offices are automatically turned off and on based on movement.

Telephony System

Mr. Carter indicated that the opportunity to build “from the ground up” facilitated the inclusive nature of the network infrastructure. “We started off with a mandate of ‘everything on the network.’ We went from a PBX environment to a fully IP-based, voice-over-IP environment. Now, we can deploy telephony anywhere – wired or wireless – throughout any part of the building,” he said.

“We have corporate wireless for our laptops and handhelds, and also voice on the same network, and then we also have our guest wireless,” Mr. Carter continued. Clinical staff and members of the nursing staff carry wireless phones, which allow free movement around the building. These phones serve as the main communication tool, and integrate the nurse call system.

Patient Care

According to Mr. Carter, traditional patient-monitoring systems are generally isolated on their own physical network. At SAH, monitoring is combined with other network functions. Mr. Carter stated, “We moved forward when we implemented our patient-

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Not only does having patient monitoring on the network facilitate better patient care, but it also allows the hospital to manage facilities differently in the context of patient care. Mr. Carter explained, “We’re able to leverage the network capabilities with patient monitoring. For instance, if I need a patient monitor in a new room on the other side of the building, all that is required is a simple network port configuration.” Without the network, they’d be up against extending a private network and cabling across the building, which wouldn’t be nearly as feasible. “Now, we’re able to have that flexibility and install monitoring where we need it. Whether the ER needs another room activated or the ICU, we’re able to do that with very little effort, and on the same network,” Mr. Carter reported.

Sault Area Hospital utilizes virtual storage for clinical data, which Mr. Carter described as “85 percent virtualized on the back end.” He said, “We’re a big virtualization shop. Within the last four years, we really ramped up that piece.”

Remote Access

The network’s firewall allows controlled access for employee groups, including remote access to the central database and building management functions. “A lot of them are able to connect in and monitor our systems or remotely change settings, whatever they need, just as if they were here,” Mr. Carter explained. “As long as you’re on the network, you have access to those services.” This integrated network makes data easily available, and simultaneously controls who can access what information.

This network functionality has been expanded to be compatible with offsite Sault Area Hospital campuses as well. “We actually manage some of our remote campuses that way – you might have the management application on the main site, but the systems are being managed remotely. Remote connectivity is a huge piece of our environment,” Mr. Carter explained.

Administration

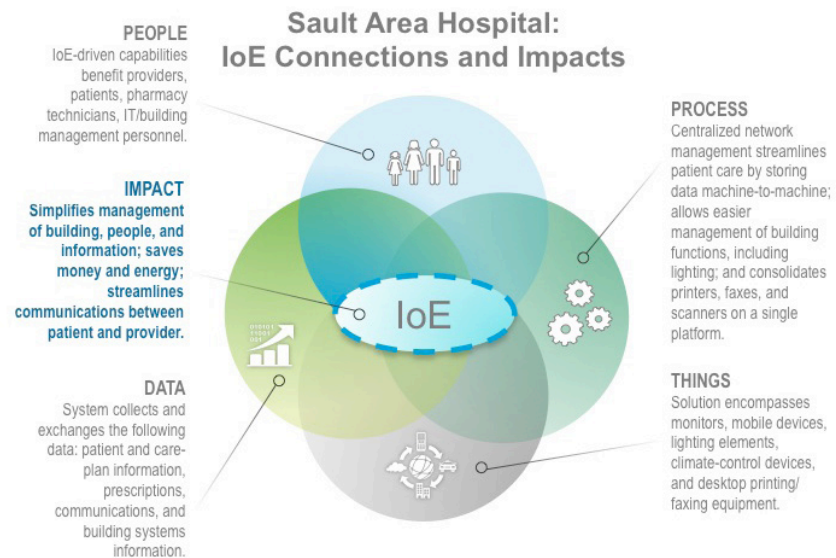
Sault Area Hospital consolidated printers, faxes, and scanners into a single platform. Mr. Carter explained: “We deployed a large fleet of multifunction devices throughout our facility, including fax, scanners, and photocopiers, so we’ve consolidated that down quite a bit. For the equipment that we deployed, the footprint is definitely a lot smaller than before.”

Because the hospital still relies heavily on faxing technology, the new equipment incorporated a system of print-on-demand electronic faxes. Mr. Carter described the process of rethinking faxing as the preferred method for transferring information from hospital to pharmacy: “On top of that multifunction strategy, we changed the way that we deliver our drug orders, or how a drug order for a patient gets to the pharmacy. Before we had this new building, all that happened via fax.”

With the technology available over the IP network, faxing has become outdated. The hospital's new method was far more efficient and environmentally friendly. "We wanted to keep the same feel, so the nurse still walks up to the device, puts the order in, and selects the pharmacy from the contact list," Mr. Carter explained. "Now we simply route this message to an electronic inbox so the pharmacy gets their 'faxes' via email. For example, in our IT department, all of our faxing is electronic – everything comes in as a PDF and it's distributed that way." This new method allowed the hospital to centralize management of faxing in terms of the number of phone lines needed to support the environment.

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Figure 1. Sault Area Hospital: New and Better Connections.



Source: Cisco Consulting Services, 2014

Impact

The new Sault Area Hospital has been well-received by patients and the community. It received a 5-star Energy award in 2012 for wise conservation of resources, acknowledging its commitment to green practices.

The benefits of Sault Area Hospital's consolidated network show up in the relative simplicity of managing the building, people, and information. The lighting and climate-control functions of the network save money and energy, simplifying building management. The new, centralized infrastructure also economizes IT processes. Mr. Carter's team of 20 individuals can handle all aspects of IT in the large complex: service desk, PC tech, desktop support, network server, data-center applications, and business support telephony. "We have fewer [IT] providers at the table right now," said Mr. Carter. "We do a lot of our management internally, which allows us to be very flexible. That, in turn, benefits our business." With an integrated network that replaces stand-alone systems, Sault Area Hospital can focus its IT resources more effectively.

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The IP network enables SAH to support patient and doctor needs more efficiently. In addition to offering state-of-the-art healthcare, Sault Area Hospital offers an integrated patient experience. It streamlines communications between patient and provider, enabling easy access to remote specialists through the Ontario Medical Network. The hospital also works closely with the network as a training forum for physicians.

In terms of managing information, the network creates a secure platform for ongoing transactions among medical providers, administrative staff, and pharmacy personnel. It enables secure, remote access to patient monitoring and history, and simplifies administrative processes.

“When you take all of those components, it does make for a fairly integrated and involved environment,” stated Mr. Carter. “It’s been a lot of work, and you definitely need to have the proper resources available, but we see the benefits.” From his perspective, the investment in the building and new technology pays off every day.

Lessons Learned / Next Steps

While the new infrastructure has largely improved processes, it required some initial staff adjustment. “Within the first year of moving in, we definitely had to take some time getting used to new processes throughout the facility,” he said, although he clarified that they haven’t had any problems with the technology itself.

If he were providing advice to other hospitals or organizations who are interested in implementing similar technology, Mr. Carter would emphasize the importance of finding strong partnerships and internal champions for a project of this scale. “If you don’t have that one person or team driving, it’s not going to be successful. I don’t care how good the technology is – if you don’t have the people from both the hospital side and the vendor side to deploy, it’s very easy for stuff to get dropped, and then it’s not successful. It could be the most awesome technology in the world, but you have to match that with the people and processes to support it.”

In terms of future plans, Mr. Carter explained that there are many ongoing initiatives, but some of the bigger ones lean toward virtualization. He continues to work with desktop management, and with moving data from the edge to the center. Sault Area Hospital is upgrading workstations and organizing data so that it’s easily presentable to staff and clinicians. Regarding the Internet, he noted, “I see huge uptake in wireless – our wireless network is probably one of the biggest areas. From a wired perspective, there is growth, but the spike we see from wireless is pretty immense.” Incorporating more wireless technology into its network will undoubtedly increase Sault Area Hospital’s ability to provide quality care.



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