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TIA-1179 and Beyond: Addressing Information Technology Needs for Evolving Healthcare Facilities

The New TIA-1179 Healthcare Standard, Advanced Technologies and IP Convergence Demand More Bandwidth for Network Cabling Infrastructures in Today's Healthcare Facilities

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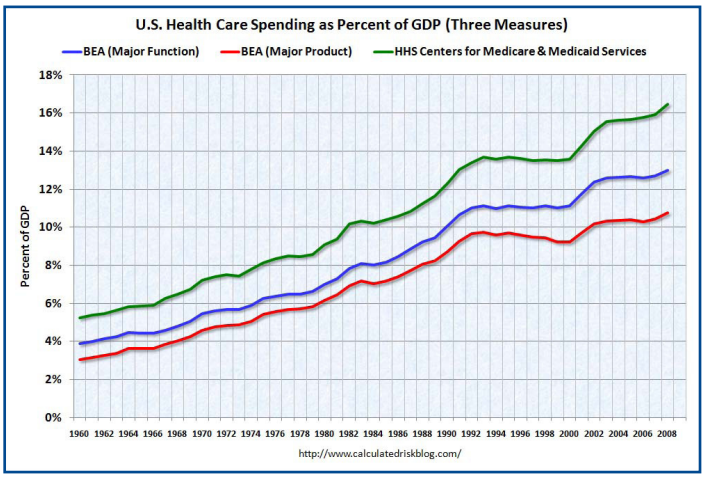
Executive Summary

In recent years, the healthcare industry has become considerably competitive, challenging facilities to improve the quality of care by replacing or upgrading outdated spaces and expanding services. As information surrounding medical procedures, policies and practices becomes widely available via the Internet and other mass media entities, consumers are becoming empowered to make their own healthcare choices. Today's patients demand:

- Faster medical response with reduced waiting times
- Information accuracy, delivery and availability
- Safe, secure hospital stays with all the comforts of home
- State-of-the-art procedures for improved results, reduced pain and faster recovery
- Digital access to the latest medical information and results

Improving the quality of care to meet consumer demands is compounded by longer life expectancy, increased chronic disease, an aging population and the administration expenses of complying with the latest healthcare codes and regulations. This has caused healthcare costs to steadily rise for several years. Healthcare costs account for more than 17% of the U.S Gross Domestic Product (GDP) and more than 10% of the Canadian GDP, and U.S. healthcare costs are expected to reach 19.3% by 2019.



This chart shows U.S. healthcare spending from two sources—the Bureau of Economic Analysis (BEA) and the Department of Health and Human Services (HHS). BEA measures cost by major type of product (healthcare services) and by major function (healthcare goods and services). In addition to goods and services, HHS measurement includes investment in medical equipment and structures and is the broadest measure of healthcare spending.

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To improve the safety and accountability of national healthcare systems and cut costs, governments are putting more pressure on healthcare facilities to increase the use of Electronic Health Records (EHRs). Enacted as part of the American Recovery and Reinvestment Act of 2009, the U.S. government passed the Health Information Technology for Economic and Clinical Health (HITECH) Act that invests billions of dollars in healthcare infrastructures and incentives to encourage the use of EHR systems, with the goal of full digital health records by 2014. In Canada, the federally-funded organization Infoway works with provinces and territories to accelerate the adoption of EHR systems using standards-based communication technologies. These initiatives are driving facilities to upgrade their technology infrastructures to support EHR systems, and approximately 60% of healthcare facilities have cited the adoption of an EHR system as one of their top three technology priorities.

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Improving Efficiency to Cut Costs

To minimize total cost of ownership while boosting the quality of care, healthcare facilities and personnel need to work and operate more efficiently. Healthcare facilities are deploying a wide range of advanced clinical and non-clinical applications and systems that optimize the delivery and access of healthcare information; enable better communication between staff, providers and patients; enhance patient safety, security and satisfaction; and lower a facility's overall cost of operation. Some of the latest clinical and non-clinical applications and systems include:

- Clinical Information Systems (CIS) are complex network-based systems designed for collecting, storing, manipulating and accessing clinical information and images, including EHRs, laboratory and radiology information, electronic Picture Archiving and Communication Systems (PACS) and Computerized Physician Order Entry (CPOE) systems. As more healthcare information and images shift to digital format as opposed to paper and traditional X-ray film, clinical information systems need to support fast transmission, and access of information and images. With the global digital x-ray systems market forecasted to reach $4.8 billion by 2016 with a Compound Annual Growth Rate (CAGR) of 4%, the need for systems like PACS to store and manage thousands of digital images will continue to grow in tandem.
- Patient Monitoring Systems are dedicated systems that monitor breathing, heart rate activity and other vital signs, and issue alarms when these vital signs fall outside certain parameters. Individual monitors at each patient bed are connected to nurses' stations and often to a central monitoring station. More sophisticated versions may also include a video system for visual observation of patients.
- Interactive Patient Systems use a patient's in-room television or computer-based bedside terminal to create two-way interactive communication that provides patients with access to entertainment and medical information and allows them to order meals, schedule a case worker or spiritual counselor, or request blankets, pillows and other items. An interactive patient system can make facility operations more efficient by reducing the number of non-clinical requests, allowing caregivers to focus on providing care.
- Nurse Call Systems are no longer limited to the function of calling nurses. A nurse call system may be used to notify doctors, nurses, orderlies, wait staff, or other staff. In addition, the system may notify staff using designated tones, lights, voice communication, text messaging, or other forms of communication. Typically, a nurse call system can interface with a facility paging system to annunciate code calls or to page specific staff. It may also be interfaced with Real-Time Locating Systems (RTLS) for tracking medical equipment, patients and staff.
- Voice Systems are a vital part of any facility. To reduce cost and increase efficiency, healthcare facilities are increasingly adopting Voice over Internet Protocol (VoIP) technology where voice signals are digitized and transmitted over the network. VoIP offers many advantages, including instant messaging, call forwarding, conversation encryption and recording, and reduced cost by eliminating long-distance fees. It is estimated that approximately 66% of healthcare facilities have deployed VoIP services to some extent.
- Communication Systems include overhead paging, operating room sound systems, public address systems, and cath lab intercom solutions for staff to have total hands-free communications. These systems are used to communicate with patients and update facility personnel on abnormal or emergency conditions, changes in facility status, or other major events.
- Security Systems, including surveillance, access control and life safety alarm systems are a critical part of healthcare facilities. Some areas require security measures to limit access to authorized users, prevent unwanted visitors, avoid possible infant abduction or track specific equipment or individuals. This has created the need for facility-wide access control systems, monitoring sensors and technologies like mother-infant matching systems, infant abduction systems or senior elopement systems using Radio frequency Identification (RFID) technology.
- Building Automation Systems (BAS) control the basic functionality of a healthcare facility, including HVAC, energy

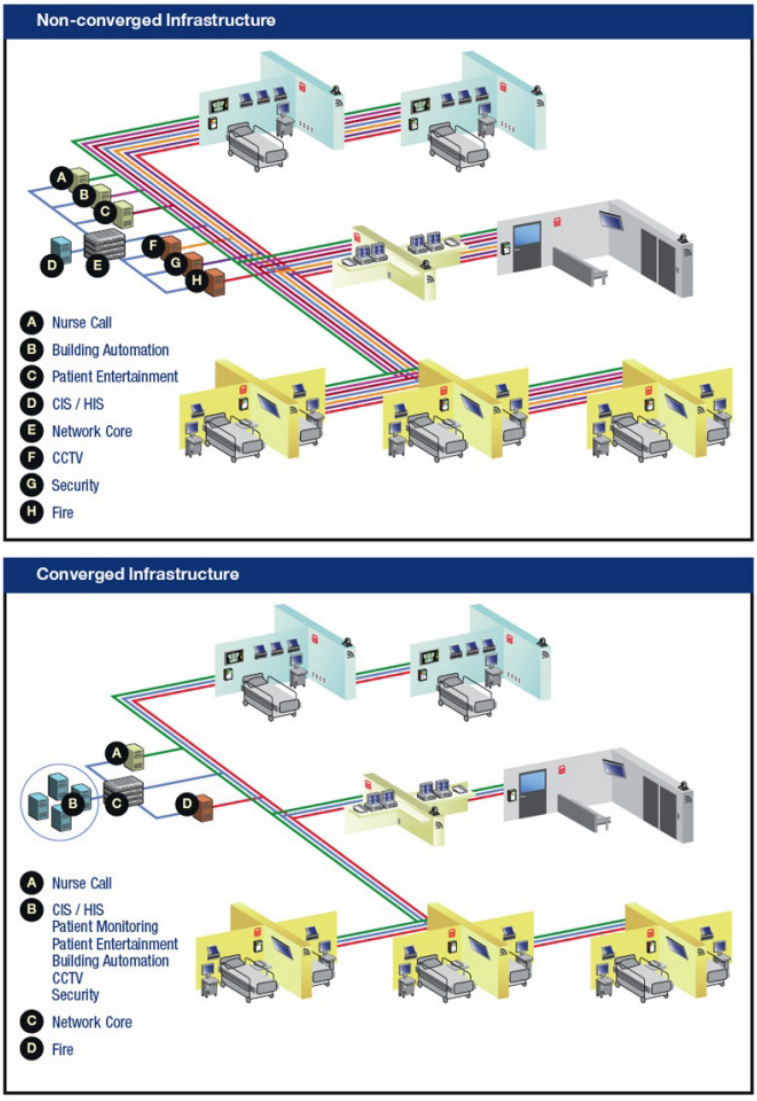
management, temperature control, lighting controls, occupancy, parking control, clocks and air handlers. Modern-day BAS are comprised of intelligent electronic devices that are able to significantly increase operational efficiency by monitoring system performance and providing notification over the network to computers and wireless devices. In North America alone, the building automation market is expected to reach more than $8 billion in 2011, with the fastest growth expected to come from the healthcare market.

- Audio-visual (AV) Systems are often deployed in larger healthcare facilities to provide full audio and video capabilities in auditoriums, conference rooms and common areas used for medical seminars, meetings, video conferencing and entertainment. AV applications in a healthcare facility could include such technologies as large flat-screen TVs that act as virtual windows in areas where patients cannot be exposed to sunlight, or large digital signs that provide information on available services or emergency room waiting times.

Migrating Towards IP Convergence

Advanced healthcare applications and systems operate over low-voltage cabling infrastructures and are increasingly communicating via Internet Protocol (IP) over converged Ethernet-based networks that optimize efficiency. As the foundation for all communications, a converged infrastructure ties all healthcare applications and systems together along one or more infrastructures, providing the bandwidth, signal performance and scalability required. IP converged networks:

- Allow flow of information and integration between applications and systems to enhance patient care
- Facilitate the deployment of new clinical and non-clinical systems and applications across facilities
- Enable mobility for healthcare providers, non-clinical staff and patients
- Allow for remote monitoring of systems, equipment and patients
- Simplify command and control of building automation systems via a non-proprietary protocol
- Reduce the complexity of managing multiple independent infrastructures
- Lower the healthcare facility's overall cost of operation



The non-converged layout depicts seven dedicated infrastructures supporting seven systems. The converged diagram shows five of the systems on an IP-based Ethernet infrastructure, while the Nurse Call and Fire systems remain on dedicated infrastructures to comply with regulations.

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Some healthcare facilities have realized up to a 20% savings in time and labor costs simply by implementing an IP converged network. For example, with clinical systems like patient monitoring systems increasingly being connected to IP converged networks, healthcare providers can view and analyze patient information from remote locations. IP-based overhead paging systems with amplifiers and intercoms connected to the network can be managed via paging software that resides on a network computer.

While some non-clinical systems like fire alarm systems are required to remain segregated on their own network, others are increasingly running over IP converged networks, such as IP-based surveillance cameras and access control panels that can interface with other applications residing on the network. Some BAS systems remain proprietary, but most centralized control units now include an IP network connection for monitoring and controlling BAS via computers or wireless devices.

To support the latest healthcare applications and migrate to IP converged networks, healthcare facility, security and information technology managers must work together to ensure that the supporting cabling infrastructure is designed and deployed to provide optimal performance levels, as well as the flexibility to support future applications and growth without having to make significant costly changes to the infrastructure. As the foundation of a converged IP network, the cabling infrastructure must ensure resiliency, reliability for maximum uptime, and easy implementation and management of new applications.

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TIA-1179 Healthcare Standard vs. TIA-568-C Commercial Building Standards

What's New?
Room Size—TIA-1179 recommends a growth factor of 100% when determining room size for Equipment Rooms (ERs) and specifies that Telecommunications Rooms (TRs) should be sized at 12 m2 (130 ft^2) or larger.
Cabling Practices—TIA-1179 specifies a minimum of two diverse pathways to be provided between ERs and entrance facilities and to each TR or Telecommunications Enclosure (TE) for critical care areas.
Work Area Location—TIA-1179 does not require outlets to be located together and location of outlets should consider the various uses. For example, while commercial building standards place outlets at 18 inches above the finished floor, outlets in healthcare facilities may best be located at bedside height to support patient monitoring, nurse call and other systems.
Work Area Outlet density—TIA-1179 recommends higher work area outlet densities based on the function at each location (see other sidebar). Commercial building standards recommend only a minimum of two work area outlets.
Recognized Transmission Media-- TIA-1179 recommends using the highest performing media whenever possible and specifies Category 6a cabling capable of supporting 10Gb/s for all new healthcare installations.
Infection Control Requirements (ICR)—TIA-1179 recommends labeling spaces subject to ICR. The standard also states that TEs may be a better option for ICR areas and should be a suitable material when installed in surgical and other sterile environments.
The Use of MUTOAs—TIA-1179 does not recommend the use of MUTOAs for new construction, but states that MUTOAs may be advantageous for renovation of existing healthcare facilities in areas where any significant collection of equipment or modalities are moved or reconfigured frequently.
Security and Segregation—TIA-1179 recommends the use of segregated networks when necessary to ensure adequate support of life and safety protocols. The standard recommends considering the use of colored cables, colored jacks or keyed connectivity to maintain segregation.
Environmental Considerations—TIA-1179 recognizes that some locations in healthcare facilities may be sensitive to atmospheric contamination, high levels of EMI, radiation, high temperature, chemicals, etc. To minimize these effects, the standard recommends that solutions, design and installation should be compatible with the surrounding environment.

What's the Same?
Topology and Length—TIA-1179 specifies the same hierarchal star topology requirements and backbone and horizontal cable lengths for healthcare facilities as specified in commercial building standards.
Transmission Performance and Test Requirements—TIA-1179 refers back to commercial cabling standards for all performance and testing specifications for copper and optical fiber cable and connectivity.
Administration—Like commercial cabling standards, TIA-1179 refers to ANSI/TIA/EIA-606-A Administration standard for labeling and documentation.
Grounding and bonding—TIA-1179 states that grounding and bonding in healthcare facilities shall meet the requirements of ANSI/TIA 568 C.0 and ANSI-J-STD-607-A.

What's Not Covered?
Harsh Environment Protection—TIA-1179 does not specify what components to use for harsh environments subject to impact, humidity, strong disinfectants, harsh cleaners or wash downs. It does specify that cabling solutions, design and installation methods compatible with the environment should be selected in order to support adequate performance in these areas during operation.
Aesthetics—TIA-1179 does not specifically address aesthetics when designing cabling infrastructures for healthcare facilities.
Environmental Design—TIA-1179 does not specifically address green building design considerations such as the use of reduced packaging, recycled materials or environmentally-friendly components.

The New TIA-1179 Standard

With healthcare network infrastructures needing to support more applications, transmit and store more digital information and migrate to IP convergence, the telecommunications industry realized that existing commercial standards for network cabling infrastructures were not adequate for healthcare facilities. In August 2010, the Telecommunications Industry Association (TIA) responded by ratifying the *ANSI/TIA-1179 Healthcare Facility Telecommunications Infrastructure Standard*, which specifies requirements above and beyond the scope of commercial cabling standards for healthcare network cabling infrastructures to support a wide range of IP-based clinical and non-clinical systems.

To support healthcare technology needs and IP convergence, the new TIA-1179 standard addresses the need for cabling infrastructures to provide performance and reliability, increased cabling density and room for growth. It also makes key recommendations regarding design and installation practices based on specific healthcare environments and applications.

While it is based on the ANSI/TIA-568-C standards for office-oriented commercial building cabling, the TIA-1179 healthcare standard specifies requirements above and beyond the scope of commercial cabling standards to support healthcare network cabling infrastructures. Accordingly, some infrastructure design and installation considerations remain the same between the two standards, while some are new and others are simply not covered.

Responding to Healthcare Challenges

While the new TIA-1179 standard is changing how healthcare network infrastructures are designed and deployed, holistically addressing information technology needs for evolving healthcare facilities involves much more—it requires identifying and understanding all the challenges healthcare facilities face in deploying cabling infrastructures to support the latest clinical and non-clinical applications. Following are the key cabling infrastructure design and installation considerations for today's healthcare facilities.

- High-Speed Performance—Due to the increasing amount of information needing to be quickly transmitted and larger file sizes associated with digital diagnostic images from Computed Axial Tomography (CAT), Magnetic Resonance Imaging (MRI) and Positron Emission Tomography (PET) systems, TIA-1179 recommends that cabling infrastructures be designed with Category 6a cabling capable of supporting speeds of 10 gigabits per second (Gb/s). CT, MRI and PET scans can generate large amounts of data, reaching as high as 300 MB per image. In addition, one patient case can contain 30 or more images, for a total of 9000 MB worth of information per patient. A 9000 MB file takes more than a minute to download over a 1Gb/s network, but the same size file takes only about seven seconds over a 10Gb/s network. In an emergency healthcare situation, that amount of time can mean the difference between life and death.

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- Maximum Reliability—Healthcare facilities are different from commercial buildings because they provide essential services necessary to ensure life and safety. Many areas, particularly critical care areas, can be severely impacted by network downtime. As a result, the TIA-1179 standard makes provisions for route diversity and redundancy by requiring a minimum of two diverse cabling pathways between the main service entrance facility, data center, telecommunications rooms and any space considered a critical care area.

  Healthcare facilities are increasingly deploying Power over Ethernet (PoE) technology that supplies power to a variety of devices over the same cabling that connects the device to the network, eliminating the need for costly power outlets and enabling scalability. The cabling infrastructure must also reliably support the latest technologies like PoE, VoIP and video over IP.
- Higher Density—One of the most significant differences in TIA-1179 compared to commercial building cabling standards is that TIA-1179 recognizes the need for higher cabling density to support more applications. In the standard, the term "work area" takes on a broader scope depending on the healthcare environment and functions. With higher densities, more cabling resides in the pathway between telecommunications rooms and healthcare spaces. Cabling for the various systems must be able to share the pathway without experiencing performance degradation. In TRs and data centers, where cabling terminates to patch panels for connecting to switches and routers, higher-density solutions are needed to manage the higher number of terminations in less space.
- Maximum Safety, Security and Administration—Because healthcare networks directly support life systems, safety, security and administration are of particular importance. In some areas of a healthcare facility, such as pediatrics and psychiatric wards, it may be appropriate to deploy tamper-proof work area outlets to avoid damage to network connections and the associated downtime and maintenance costs required to replace them. The TIA-1179 standard recommends the use of colored cables, colored jacks or keyed

TIA-1179 Recommended Work Area Densities

Environment	Function	Recommended Density
Patient Services	Patient Room, Nurses Stations	High
	Administration, Registration, Library	Med
	Family Lounge, Waiting Room, Consultation	Low
Caregiver	Nurse Station	High
	Clean Utility, Nourishment, Charting, Workroom, Galley, Read Room	Medium
	Exam Room, Soiled Utility	Low
Diagnostic & Treatment	MRI, Simulation, Linear Accelerator, CT Scan & control rooms, Procedure and Operating Rooms, Lab	High
	Fluoroscopy, Radiograph, X-Ray, Radiation Processing	Low
Surgery, Procedure, Operating Rooms	Intensive Care Rooms, Operating Room	High
	Anesthesia, Patient Prep, Holding and Recovery	Medium
	Sterile and sub-sterile Zone	Low
Emergency	Observation, Procedure Rooms	High
	Evaluation, Exam Rooms	Medium
	Ambulance Bay	Low
Critical Care	ICU, Neonatal ICU, Recovery	High
Ambulatory Care	Out-Patient Surgery Rooms	High
	Procedure Rooms, Mammography, Exam Rooms	Medium
	Biopsy, X-Ray, Patient Holding	Low
Women's Health/ Maternity	Labor / Delivery Room, Infant Bays	High
	Nursery	Medium
	Ultrasound Lactation	Low
Service/ Support	Anesthesia Area	High
	Blood Bank Area, Pharmacy Area	Medium
Facilities	Security Office Command Center	High
	Fire Command	Medium
	Janitor, Electrical, Communication, Building Utility, Elevator Machine, Mechanical, Specialty Storage	Low
Operations	Admin, Conf Room, Food Service, Central Sterile	Medium
	General, Cafeteria, Locker, Showers Laundry, Lounge, On Call Suite, Retail Areas, General Office Areas	Low

TIA-1179 Healthcare Facility Telecommunications Infrastructure Standard includes recommended telecommunication outlet/connector densities at the work areas for different healthcare environments. Within the various environments, the TIA-1179 recommended outlet density varies depending on the function performed at that location, as shown in the table below. TIA-1179 defines outlet/connector densities in ranges, which are significantly broader in scope than commercial cabling standards. Since adding outlets after initial construction can be complex and disruptive to a healthcare facility, the standard recommends that designers select a number between the midpoint and upper end of the range if no other guidance or direction is provided. The outlet density ranges are as follows:

- Low—2 to 6 outlets in each area
- Medium—6 to 14 outlets in each area
- High—greater than 14 outlets in each area

connectivity to maintain segregation for certain networks, enhance security and assist in management and administration of networks. TIA-1179 also recommends considering the use of automated infrastructure management systems to further enhance administration.

- Sustainability and Growth—Sustainable facilities are designed and deployed in such a way that they meet both present and future needs, reducing future costs associated with frequent upgrades. This is especially critical in healthcare facilities that are expected to be in place for several decades and where 24/7 operation means that facility upgrades can cause significant disruption that impacts patient care. To ensure sustainability and room for growth, the TIA-1179 standard recommends larger telecommunications spaces than what is typically seen in commercial environments, allowing for 100% growth. This recommendation supports a migration to IP convergence and future clinical applications without having to disrupt rooms, hallways and other areas within a healthcare facility. Cabling pathways, spaces and components also should accommodate growth and not compromise a facility's current and future operation.
- Infection Control—There are many sources of infection in hospital environments, and not all are related to clinical services. For example, the dust and contaminants in the plenum space can be a source of infectious diseases. All work with a hospital environment is therefore subject to Infection Control Risk (ICR) procedures, including cabling infrastructure moves, adds and changes. For example, ICR procedures for opening the plenum space can include restricting the number of ceiling tiles that can be removed, how long they are removed, and procedures for cleaning the air and personnel in the work area. According to TIA-1179, areas subject to ICR should be labeled to indicate that measures

may be necessary. Reusing cabling products (e.g. patch cords) from certain areas of a healthcare facility may also be restricted.

- Resistance to Interference—As noted in TIA-1179, some areas of a healthcare facility may expose the cabling to the detrimental effects of Electromagnetic and Radio frequency Interference (EMI/RFI). Compatibility with these environments can be achieved with enhanced cabling components, or through protection, separation or isolation. Accordingly, the standard recommends testing the cabling performance during operation of certain equipment, especially in the case of MRI and related machinery.
- Harsh Environment Protection—From food service and utility rooms, to sterile zones like emergency and operating rooms, many areas of a healthcare facility are considered a harsh environment due to exposure to high temperatures, impact, humidity, strong disinfectants, harsh cleaners or wash downs. Chemicals used in disinfectants and harsh cleaners can degrade plastics and corrode network connections and faceplates, requiring durable infrastructure components specifically designed to resist abuse and corrosion and maintain reliability in these spaces. In addition, some healthcare areas may undergo wash downs, requiring IP67-rated water-proof industrial network components.
- Wireless Mobility—Healthcare facilities increasingly need to support a variety of wireless and mobile applications. Doctors and nurses are using wireless devices for voice communication, paging and access to clinical information systems, while patients and visitors are demanding wireless access to the Internet for all the comforts of home. Tracking applications like RTLS and RFID for locating medical equipment, patients and staff all communicate via wireless networks. Moreover, the networks themselves must accommodate needs for portable medical equipment like portable X-ray, ultrasound or C-arm systems.
- Aesthetics— Evidence suggests that design elements can improve patients' health and morale. Surveys actually demonstrate that patients in well-decorated facilities rate their care more highly than patients in unappealing settings. To remain competitive, healthcare facilities are choosing aesthetically-pleasing infrastructure connectivity options that can help maintain a uniform look throughout administration areas, auditoriums, conference rooms, lobbies, patient rooms and common areas.
- Environmental Considerations—As seen in commercial construction, healthcare facilities are also receiving incentives to ensure environmentally-friendly construction (i.e. LEED) through the use of greener building components, reduced energy consumption and reduced waste. Environmentally-friendly construction reduces impact on the environment, contributes to occupant health and productivity and cuts costs.

Building it Right from the Beginning

Across North America, healthcare facilities are spending billions of dollars as they are embarking on new construction and upgrades. According to researcher Compass Intelligence, healthcare facilities including hospitals, doctors' offices, private practices, clinics and other healthcare organizations are expected to spend an estimated $85 billion a year on technology products, services and solutions by 2014. From the onset of construction, ensuring convergence of such diverse and complex healthcare applications demands an open, standards-based infrastructure designed and built with a wide range of advanced technologies. The cabling and connectivity components that make up converged IP network infrastructures provide the physical pathways required to transfer information like voice, data and images between various computers, systems and devices in real time.

Cabling and connectivity components have a direct impact on ensuring performance, reliability, density, sustainability, safety and security, durability, mobility, aesthetics and environmental considerations. When the infrastructure is not installed using high-performance components and best practices, it may not be able to support the latest clinical and non-clinical applications and IP convergence that today's healthcare facilities need to improve quality of care and increase efficiency. On the other hand, a properly designed and installed cabling plant provides a solid foundation to deliver predictable and consistent performance, as well as the flexibility to support future healthcare applications without making significant changes.

When selecting cabling and connectivity components for IP converged networks, today's healthcare facilities demand breadth of product and the latest technologies backed by solid, reputable experience, guaranteed performance and service and support that ensure peace of mind.

- Breadth of Product—Access to a wide range of copper and fiber infrastructure solutions ensures support for all low-voltage healthcare applications, facilitates a migration to IP convergence and helps facilities meet specific needs like infection control, interference, harsh environments and aesthetics. With so many non-clinical systems like building automation, security and life safety, communications and AV systems, access to a wide range of solutions enables IP convergence of these systems where possible while still enabling stand-alone traditional systems that may be required by code. Partnering with one vendor for these solutions establishes consistency across clinical and non-clinical

networks. In contrast, networks deployed with solutions from several different vendors can jeopardize the ability for healthcare facilities to rollout technology upgrades across multiple locations.

- Latest Technologies— Keeping in mind that healthcare facilities are expected to last for several decades and upgrades can be extremely disruptive and costly, implementation of the best technology possible is required to support current and future healthcare applications. Accordingly, infrastructure solutions must be proven to provide the highest bandwidth and reliability for fast, accurate transmission of healthcare information, as well as maximum safety and security and the ability to support the very latest technologies—from VoIP and PoE to audio visual and building automation. They also need the flexibility and manageability to support higher-density deployments, room for growth and maximum efficiency of operations and maintenance.
- Experience—Deploying converged networks to support facility-wide applications merges the responsibilities of information technology, security, audio-visual and facility managers. Ensuring proper converged network deployment and management, as well as collaboration across various healthcare entities, requires infrastructure solutions from a vendor with solid experience in converged healthcare networks. Healthcare facilities benefit from working with partners who understand specific healthcare technology challenges and the variety of clinical and non-clinical applications supported. Partnering with vendors that support a green building strategy can help healthcare facilities ensure environmentally-friendly construction and reduce waste when deploying converged IP networks.
- Peace of Mind—When it comes to deploying an IP converged network that needs to reliably support many current and future healthcare applications, healthcare facilities need ultimate confidence in their vendor choice. They want to know that the components that comprise the infrastructure will provide proven guaranteed performance backed by a solid warranty. At the same time, those components need to come from a reputable manufacturer with the corporate stability and dedicated service and support to guide healthcare facilities through the process. Having access to a comprehensive network of thoroughly trained professionals helps ensure that networks are being installed using best practices, avoiding inadequate deployments that can hinder maintenance, new technology rollouts and future upgrades.

From the need for high-bandwidth, reliable cabling, high-density solutions and infection control, to systems that can withstand harsh environments, enable mobility and provide aesthetics; there is much to consider when selecting cabling and connectivity components for IP converged healthcare networks—it's not a choice that should be made lightly.

For more information about converged healthcare networks, meeting the TIA-1179 standard and overcoming the challenges healthcare facilities face in deploying cabling infrastructures to support the latest clinical and non-clinical applications, call 1.800.BELDEN.1 or visit the web site at www.belden.com/enterprise.

References

1. **60% adopting EHR: A new survey conducted by Embarcadero Technologies shows EHR implementations are the top priority among healthcare IT professionals. Nearly 60% of those surveyed in March and April said they are already in the process of implementing an EHR system and 25% are planning to within the next six to 18 months. The Healthcare Data Management Survey was conducted throughout the months of March and April 2010.**
2. **9000 MB taking more than a minute over 1Gb: Simple math. 9000 Megabytes equals 75,497,472,000 Bits (8 bit = 1 byte). At 1 Gigabit per second, it takes about 75 seconds (1 minute 15 seconds). At 10 Gig, it takes about 7.5 seconds.**