Making connections that bring real-time healthcare to life

White paper: Transforming Healthcare IT

Video: Healthcare needs the cloud for its digital transformation

Webinar: What it takes to become a digital master

Transforming Healthcare IT

More than 96 percent of hospitals have electronic medical records in place;[1] the use of connected devices is on the rise, as the global Internet of Things (IoT) healthcare market is expected to reach $410 billion by 2022;[2] and the healthcare data universe is expected to consist of 2,314 exabytes of data by 2020, up from just 153 exabytes in 2013.[3]

With the industry moving toward a digital environment comes a challenge: Making good use of data by providing it to the right person at the right time in the right format. To accomplish this, healthcare organizations need an IT infrastructure that supports widespread digital transformation and a real-time healthcare system (RTHS) model.

What is the real-time healthcare system?
The real-time healthcare system is a new technical and operational model that requires healthcare organizations to connect and communicate more effectively. It relies on aware and adaptive technologies that:
• Use real-time information to transform care delivery
• Sense the need for change and adjust processes
• Accelerate innovation, streamline workflows and deliver knowledge that improves care

"It's important for us to contemplate the next evolution of this digital transformation to not just do digital but *be digital*. Being digital means truly capitalizing and leveraging the data that we have to get to end points that can actually transform healthcare," said Rasu Shrestha, MD, MBA, chief innovation officer at UPMC and executive vice president at UPMC Enterprises. "Healthcare as we know it today has been about moving disease processes along to circumvent the clinical pathway of diseases so that at a certain point we can save that person's life. And there's nothing wrong with that. Indeed, we need to be doing this with more gusto. But with digital transformation, it shouldn't just be about surviving, it should really be about thriving. And, that's a different mindset."

The problem: Many healthcare providers are not keeping pace with the dash to digitization. Their siloed IT environments and inflexible legacy systems cannot provide the connectivity, scalability or speed to support the tsunami of applications, devices and data that has converged upon the industry.

What's needed is a next-generation healthcare IT infrastructure that offers the medical-grade connectivity that will enable access to information, cloud deployment and support open communications and collaboration, while also leveraging data from a variety of disparate sources.

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[2] Grand View Research. Internet of Things in Healthcare Market Is Anticipated to Witness an Upsurge in Demand for Technologically Advanced Medical Devices Till 2022. https://globenewswire.com/news-release/2016/06/13/847997/0/en/Internet-of-Things-in-Healthcare-Market-Is-Anticipated-To-Witness-An-Upsurge-In-Demand-For-Technologically-Advanced-Medical-Devices-Till-2022-Grand-View-Research-Inc.html
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IDC Technology Spotlight: Providing the Network Foundation for Enterprise Clouds

White paper: Moving from a legacy to a cloud environment with TCO analyst validated by IDC

White paper: Stairway to cloud: 9-step blueprint to a best practices private-hybrid cloud for your enterprise

Busting a private cloud myth

The private cloud has taken a public lashing — of late. Many of its critics claim that the private cloud does not provide the real cost savings associated with its public counterpart. The notion is unfounded, according to research conducted by Nokia, which found that the private cloud can save enterprise IT 25 percent over a five-year adoption cycle. Indeed, the study found that the "common assumption that private cloud is too difficult or costly to adopt is flawed, and that large enterprises should, in fact, make the move directly to private or hybrid cloud because it utilizes off-the-shelf components and is less expensive."

These findings, of course, are music to the ears of healthcare organizations that have been looking to tap into the advantages of cloud technology without the security concerns associated with public cloud.

Public clouds can be cost efficient and used for applications that don't need to follow strict security or regulatory requirements. "When security and compliance are critical, as they are in healthcare, providers should choose a private cloud approach," said Cindy Bergevin, head of enterprise healthcare marketing at Nokia. Because public clouds provide infrastructure tenancy to a variety of clients, data may be on shared systems calling for greater security. A private cloud is self-administrated and accessed within the healthcare provider's infrastructure running on private networks managed for an optimal experience.

While it is possible to cost efficiently move to a private cloud, healthcare organizations should consider the advantages associated with a hybrid model as well. "In the future, some applications may be deemed suitable for a public cloud, for certain noncritical workloads or applications, or your organization might want to connect to other organizations in the healthcare community," said Gary Holland, director, verticals marketing, IP/Optical Networks at Nokia. "Preparing for a hybrid model can futureproof an organization's infrastructure to ensure interoperability and make environments more scalable."

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>
> ***Gary Holland***
> *Director, Verticals Marketing,*
> *IP/Optical Networks*
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White paper: Why networks are essential for real-time healthcare

White paper: Building a private network for real-time healthcare.

RTHS networks: beyond common connectivity

When people can't connect to the Internet to check their social media posts, frustration ensues. When a healthcare provider can't connect to the network to access vital care applications, patient care can be compromised.

As a result, healthcare organizations can't be satisfied with typical networks – but instead need network infrastructure for the real-time healthcare system (RTHS). "Safety is a big concern. If you have a network that is not available or reliable, you can put patients at risk," said Fai Lam, product marketing director, IP/Optical networks at Nokia. "In addition, when providers are not able to access patient information, that degrades the quality of care they are providing. And, it impedes the deployment of innovative care models such as telehealth."

A traditional IT architecture can mean that information is scattered across multiple data repositories, in multiple data centers, with networks that make it difficult to gather, analyze and provide valuable insights for patient care. An RTHS network goes above and beyond the typical network by providing optimal security, reliability, resiliency, scalability and other attributes.

- **Scalability –** Virtual care solutions enabled by cloud-based patient portals, Internet of Medical Things (IoMT) devices and big data create new demands for network scalability and capacity.
- **Reliability –** The network must minimize downtime and support backup and disaster recovery capabilities to provide the level of continuity required by a real-time care environment.
- **Quality of service –** Medical applications, services and data must be prioritized. At any given moment, the network must differentiate between what is important and what is not and match quality of service to each traffic type or application.
- **Security –** Growing concerns about security put pressure on network infrastructure and those who manage it. Key areas of concern include meeting strict regulatory requirements for patient data privacy and confidentiality, new devices connecting to the healthcare network, patients and visitors accessing the wireless network, and IoMT devices that monitor patients and other medical equipment.

Software-defined networking (SDN) – which leverages open interfaces to provide an automated, centralized way of provisioning network resources – minimizes the time and cost burden associated with enabling connectivity. SDN can help healthcare organizations forge a more agile environment, so that network changes do not stand in the way of developing new applications. In addition, SDN makes it easier to keep pace with changing regulatory and mounting security requirements by automating many of the functions involved in managing network equipment and security policies.

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White Paper: An Internet of Things blueprint for a smarter world

White Paper: Telemedicine in Taiwan: Assuring universal access to healthcare at a reasonable cost

The Internet of Medical Things: Better together

The Internet of Medical Things (IoMT) is providing patients and care providers with a plethora of ways to deploy and monitor health management processes inside and outside of the healthcare system. With connected blood sugar monitors, cardio scales, web-based hygiene systems, smart fluid monitoring, ingestible pills for diagnostic imaging, heartbeat sensors, blood pressure cuffs, smartwatches and more, care providers and patients are collecting all kinds of data points in the name of improved health and wellness.

And, the proliferation of these devices is not expected to slow down anytime soon. "Sensors are becoming very cheap. As a result, more IoMT devices are being developed. So, healthcare providers have a lot more data coming at them that they need to manage," said Lee L'Esperance, business modeling principal at Nokia.

The challenge, however, rests in managing this unprecedented influx of information. "All this data is collected, but it's stored in separate silos. Each of the devices does its job – it collects the data and stores it. What's needed, though, is a way to put all of the data together so that it is easy to analyze and easy for care providers and patients to take the actions that will improve health," L'Esperance said.

As such, healthcare organizations need to make sure that devices are connected to a network with an IoMT management platform that makes it possible for both clinicians and patients to access data that empowers them to make the informed choices that will lead to improved health. "It's important to apply intelligence that will determine what information is important," added L'Esperance.

Nokia's IMPACT (Intelligent Management Platform for All Connected Things) platform handles every aspect of machine-to-machine (M2M) connections – data collection, event processing, device manage-ment, data contextualization, data analytics, end-to-end security and applications enablement – for any device, any protocol and across any application in the real-time healthcare system.

> **"** **It's important to apply intelligence that will determine what information is important."**
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> **Lee L'Esperance**
> *Business Modeling Principal Nokia*

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White paper: Connected health: Spreading digital innovation in healthcare
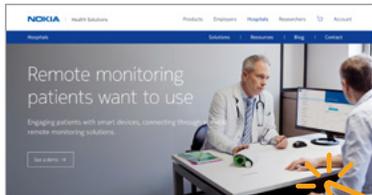
Web page: Remote monitoring patients want to use

Mobile health and remote patient care

Telecommunications, the Internet and mobile smart devices have revolutionized how we communicate. The healthcare sector is readily exploring and adapting these devices in the care of patients and their daily practices. To date, more than 100,000 smartphone health apps have been released.

Connected devices are the latest innovation in the ongoing mobile healthcare revolution. The increasing miniaturization of sensors and the spread of smartphones have spurred the growth of new tools that make it easier for people to monitor their health from home and share it with medical professionals if they choose. From smart watches to wireless blood pressure monitors to cardio scales, patients are now using connected devices to track their health and wellness in real time.

Mobile healthcare (mHealth) offers new possibilities to perfect remote monitoring methods and self-management programs. Using smart devices, mHealth changes the treatment of chronic disease from intervention to prevention. With the use of remote monitoring devices, patients learn how to assess their own situation so they can better decide an appropriate and timely response.

The use of connected devices for chronic conditions such as diabetes, hypertension, obesity, sleep disorders, asthma and COPD can lower the cost of monitoring for healthcare providers and improve the comfort and quality

of life for patients. Connected devices can reduce travel time, shorten the length of hospital stays, lower the number of doctor appointments and raise the patient's level of therapeutic education.

Connected devices are already having a positive effect on patient health. Ochsner Health Systems, since 2016, has provided their hypertensive patients with a Nokia wireless blood pressure cuff when they leave the hospital. The remote blood pressure cuff sends data to the care team and has resulted in better control of hypertension in patients. Hypertension control rates of those using the remote wireless blood pressure cuff have increased to 86 percent compared to the U.S. average of 52 percent.[1]

The patient data gathered from smart devices can provide better care and effective management of a patient's health, and also proves valuable in population health efforts. Analysis of patient-generated data, which is more representative of the real world than data collected within a lab, can help healthcare professionals better understand correlations, trends and predictive factors — making it possible to identify best practices with specific patient populations.

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[1] Ochsner Health Systems: https://www.ochsner.org/io/the-o-bar

Move to real time faster

The healthcare industry is sitting upon the precipice of major change. With an array of technologies in place, it is possible to move toward a RTHS that is aware, adaptive and accessible anytime and anywhere. Backed by the right technology infrastructure, a healthcare system that is real time accelerates innovation, improves workflows and delivers knowledge that improves patient care.

Nokia provides the network and digital health technology that supports real-time healthcare delivery. Nokia's networking and cloud solutions provide the scalability and agility needed to address new demands and capitalize on mission-critical digital health data and workflows. They can

speed a healthcare system's transition to a real-time model that increases access to quality care, improves operational efficiency and reduces total cost of ownership.

"The key point here is that cloud and connectivity are mission critical to a healthcare organization," Lam noted. "And, when organizations can get the right IT infrastructure in place, they can truly take advantage of all of the digital capabilities associated with real-time healthcare."

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> *Fai Lam*
> *Product Marketing Director,*
> *IP/Optical Networks*
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