

Nokia and UPMC collaborate for Health IT

Center for Connected Medicine

NOKIA



How do you ready a health system's IT network for a future that hasn't been invented yet?

Collaboration.

At the crossroads

In 2006, UPMC knew it had to evolve its information technology system. Electronic health records and high-resolution digital imaging were replacing paper records and physical storage, and telemedicine was beginning to supplement traditional doctors' appointments. More and more carrier- and WiFi-connected devices were entering patient rooms. The significance of network reliability in healthcare was headed for new heights.

UPMC also was changing. At the center of an ambitious growth strategy: the ability to elevate newly acquired health systems and hospitals to UPMC-grade clinical workflows. Extending network infrastructure, applications and digital tools was imperative to successful expansion. Scalability of the UPMC data center was crucial.

Patient care and enterprise growth hinged on UPMC's IT infrastructure. Predictive analytics and the Internet of Things were on the horizon. Voice and data were converging. UPMC didn't need an IT update—it needed a seamless, consistent

experience for users regardless of access, location or application. It needed an IT transformation.

UPMC sought a partner to help conceptualize and build an end-to-end vision of healthcare IT. UPMC found its health IT collaborator in Nokia Networks. In UPMC, Nokia would find an innovative healthcare leader whose forward-thinking requirements and feedback would help Nokia refine its software-defined networking technology.

Constructing resiliency

UPMC had a clear list of criteria any partner would have to meet. First was a comprehensive portfolio: everything from optical networking, IP routing and data center technologies to wireless access, telephony and video. Those solutions needed to satisfy the real-time performance and reliability requirements of a 24/7, year-round, trauma-grade healthcare network. UPMC knew availability of carrier-grade products and resiliency were paramount—that's where Nokia stood out.

Nokia had built its reputation designing and deploying networks for the world's biggest telecommunications companies, delivering carrier-grade performance with subsecond failovers for every contingency.

As UPMC hospitals became more and more reliant on technology, even short disruptions had the potential to impact patient care. Consider bedside monitoring: if the network fails, caregivers may lose tech-enabled visibility of patient status, such as the ability to monitor a patient's heart rate activity or IV pump functionality from the nursing station.

With Nokia's networking solution, it was possible to maintain network functionality at all times, for example even if a router became compromised due to a component failure. Before Nokia, a network outage affecting patient care at UPMC typically lasted between 30 and 60 seconds. On the new UPMC network, that time was reduced to less than one second and became unnoticeable to end users.

“We knew early on, that to be successful in healthcare we needed a redundant, highly available network. To expand our capabilities in patient care and operations, we needed routers that were reliable and resilient. We talked to other healthcare providers and learned that those who shared our perspective had also selected Nokia routers because of this important factor.”

Dan Snyder, Principle Architect,
UPMC

Big bandwidth for big data

There's not much data bigger than genomic sequences—a single genomics file easily reaches 2 TB. UPMC's network includes high-performance clusters for analytics and fast data-transfer capabilities to get results into practitioners' hands quicker. Ultra-high-resolution digital images have exploded in size as well, and are often 10 times the size of conventional image files.

With Nokia network hardware, UPMC can conduct maintenance without affecting end users. This is significant as UPMC conducts systematic IT updates at all of its 800 sites on an annual basis, a process that can take several months to complete. Additionally, UPMC executes frequent security-driven upgrades to prevent vulnerabilities, upon notification from vendors and partners.

Building bandwidth

When UPMC partnered with Nokia to map and build the health system's IT transformation, UPMC had several optical networks in place. None had the bandwidth to support increasingly intensive functionality such as digital image sharing, electronic health records, and remote medicine. The health system worked with Nokia to boost the optical core from 1 GB/s to 10 GB/s for hospital connectivity, and connectivity between data centers from 10 GB/s to 400 GB/s.

The new infrastructure connected UPMC's 20 hospitals, 400 remote sites, and more than 48,000 employees in 2007—and

was able to accommodate the influx of data and healthcare technologies, as well as the growth that UPMC saw coming. Over a decade later, UPMC has 40 hospitals, 600 remote sites, and 95,000 employee users.

Nokia hardware provided tremendous bandwidth to UPMC for the full duration of the hardware's 10-year lifespan. When the time came to replace the hardware in 2017, satisfaction with its performance led UPMC to replace the products with new Nokia hardware, which is now set to support the health system's growth and IT needs for another 10 years.

Building for the future

UPMC needed a true collaborator to help define and meet the health system's connected healthcare goals. Bandwidth, resiliency and carrier-grade products were table stakes; UPMC needed to build an IT infrastructure that would support current operations and seamlessly usher in technologies on the horizon, and prepare for ones that haven't yet been invented.

Dedicating senior executives to the project, Nokia set up offices at UPMC. For 18 months, over a dozen Nokia architects, engineers, global service managers and program managers worked with UPMC's IT team to evaluate existing systems and build a plan that would support UPMC through their healthcare and enterprise transformation.

UPMC recognized the need to connect its data centers and create a private cloud. This was in step with the vision Nokia had for the future: its R&D was focused on software-defined networking (SDN) and the cloud. But UPMC wanted these capabilities combined with carrier-level reliability. Following discussion, feedback and on-the-ground collaboration, Nokia introduced a new SDN-enabled product that used carrier-grade software. UPMC became an early adopter.

Adopting a private cloud infrastructure leveraging SDN and virtualized network services has made UPMC efficient and effective in delivering IT as a service from its data center to hospitals within the network, whether they are in New York, Maryland, Pennsylvania or overseas. This technology allows UPMC to store and share more than 3 million digital images each year and connect and operate almost 10,000 virtual servers.

Automation now enables rapid provisioning and application deployment, while the network's MPLS control plane segregates and manages voice, video, and data services. This allows for prioritization and independent handling of sensitive data like payment card and patient information traffic. It also keeps guest internet access separate from internal network traffic, important as UPMC has 60,000 unique guest users on its guest network daily, including patients at Children's Hospital of Pittsburgh of UPMC who use it to connect gaming systems and entertainment devices.

Teamwork delivered UPMC with a future-ready network. It also brought Nokia and UPMC together in an effort to fortify and expand digital healthcare: Nokia joined the Center for Connected Medicine in 2010. Nokia also benefited from close on-the-ground collaboration with UPMC: the direct, immediate customer feedback about the needs of healthcare systems helped Nokia drive refinements to its network gear, management tools and equipment functionality and gain the trust and admiration of one of the nation's leading health systems.

Opening up new frontiers of care

The UPMC team anticipates new demands on its network, especially as big data analytics from genomic sequencing become a routine component of clinical practices. The network can now handle massive data analytics and next-generation imaging, allowing UPMC to explore the emerging possibilities of digital pathology and personalized medicine. A UPM facility devoted to

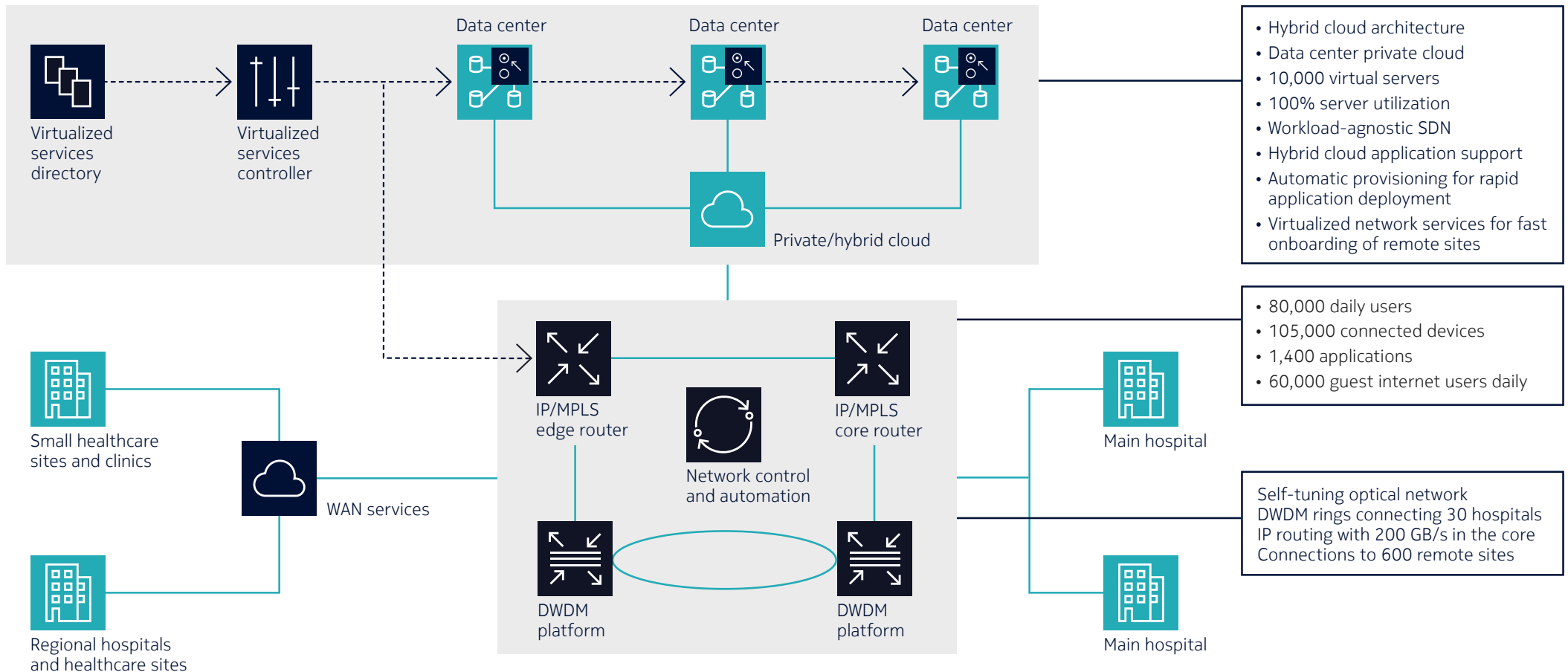
genomics processes over 100,000 genomes per year. By the end of 2017, UPMC provided 10 GB service to every hospital connecting to the core, enabling ultra-fast data transfer and 600 GB service for data centers.

UPMC's network has also allowed the health system to delve into the Internet of Things, bringing a wider array of connected devices into its network. These include wearables that monitor patients after outpatient procedures. UPMC has also been able to deploy video services for telemedicine, reducing patient and physician travel between sites. With its network from Nokia, UPMC has supported organic growth, while acquiring hospitals and physician practices and nearly doubling its revenue to \$16 billion.

“Our network is the most critical, most important layer of our technology. It's how we share, communicate, and collaborate. We needed high availability, resilience, and reliability—collaborating with Nokia enabled UPMC to deliver on these goals, furthering patient care.”

Chris Carmody, Senior Vice President of Infrastructure, UPMC

Anatomy of a connected health system



Nokia OYJ
Karakaari 7
02610 Espoo
Finland

Tel. +358 (0) 10 44 88 000

CID:202059

nokia.com

NOKIA

About Nokia

At Nokia, we create technology that helps the world act together.

As a B2B technology innovation leader, we are pioneering networks that sense, think and act by leveraging our work across mobile, fixed and cloud networks. In addition, we create value with intellectual property and long-term research, led by the award-winning Nokia Bell Labs.

Service providers, enterprises and partners worldwide trust Nokia to deliver secure, reliable and sustainable networks today – and work with us to create the digital services and applications of the future.

Nokia is a registered trademark of Nokia Corporation. Other product and company names mentioned herein may be trademarks or trade names of their respective owners.

© 2023 Nokia