

Inova Intensive Care Goes Remote With Verizon Business

Inova Health System

Falls Church, Virginia

Business Challenges

- Grow business
- Improve patient care
- Support demanding reliability and security requirements of new critical care rapid response center

Network Solution

- Data and voice communications platform designed around an OC-48 Dedicated SONET Ring
- Ethernet-LAN Service to interconnect local area networks
- Private Line Service for locations to be connected to the SONET ring in the future

Business Value

- **Growth.** Use of advanced networking technology-supported plans for growth and use of leading-edge medical technology
- **Compliance.** Full compliance with HIPAA mandates for network reliability and data security
- **Application utilization.** New Critical Care eICU® Center brought smoothly online by joint Inova/Verizon Business team in an aggressive 90-day project
- **Improved care.** Inova's use of eICU drives significant improvement in critical care metrics

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Phil Stiff

**Director of IT Infrastructure
Inova Health System**

Furthering their reputation as a national healthcare innovator, Inova Health System is using advanced communications technology to set the standard for high-quality patient care.

Company Background and Industry

With 13,000 employees, five major hospitals, nursing homes, urgent care, home care and assisted living centers, Inova Health System is Northern Virginia's largest healthcare provider. Inova has a straightforward mission to deliver the highest quality patient care to the communities it serves. Fulfilling that commitment is not without its difficulties—especially when it comes to treating the critically ill. Consider the following fact: there are only 6,000 accredited critical care physicians in the U.S. to treat the 5 million patients requiring intensive care each year. At Inova, this is no abstract statistic—with over 200,000 emergency interventions annually, ensuring that each patient has access to the right medical experts is a significant undertaking.

Key Business Challenges

Named as one of the *Nation's 100 Most Wired Businesses* several years in a row, Inova has established a reputation for using advanced technology to improve the delivery of patient care.

True to form, when Inova asked a joint medical and IT team to develop a strategy for overcoming the shortage of critical care specialists, their recommendation featured prominent use of innovative technology.

The team determined that Inova could significantly improve critical care effectiveness by creating a specialized center called an eIntensive Care Unit (eICU). Their proposal envisioned an eICU that was staffed around-the-clock by critical care experts who would provide remote support to the bedside practitioners in the ICUs of all of Inova's hospitals.

As a critical care specialist and core member of the team, Dr. Elizabeth Cowboy had a clear view of what the eICU had to deliver. “The technology at the heart of the eICU needed to allow us to perform continuous monitoring of the ICU patients at all of the Inova hospitals. We needed to see real-time vital signs for every patient, and we also had to be able to establish an immediate video and audio presence to any ICU bed. Collectively, these capabilities would allow the eICU to act as extended “eyes and ears” for the bedside doctors and nurses, and ensure that each patient received immediate expert attention in the event of a life-threatening emergency.”

Although the eICU proposal won immediate support from Inova's leadership, the effort ran into a technology challenge. Phil Stiff, Inova's director of IT infrastructure, explains. “Communications technology plays a key enabling role in most advanced medical applications, and the eICU is a perfect example. All of the patient vital signs as well as the audio and the video feeds need to pass over the network, and the performance and bandwidth requirements are intense. We had never before attempted to move so much critical, real-time data over our network.”

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“In addition to requiring instantaneously available capacity, patient data is very time sensitive, so we couldn’t tolerate any network delay or packet loss. We also needed to ensure that network performance would be sufficient for us to meet our HIPAA (Health Insurance Portability and Accountability Act) mandates for operational reliability and security of patient information.”

Given all of these requirements, Inova decided to conduct a rigorous assessment to determine whether the network was capable of supporting the eICU application. “The results were sobering,” adds Stiff, “and revealed that Inova’s existing network would not be able to deliver the required performance. Since the eICU was a critical initiative for the enterprise, we chose to make some major changes to the network in quick order.”

The Solution

As the Inova planning team set about researching options for improving network performance, the list of “must-haves” began to expand. In addition to the eICU’s rigorous requirements for performance, reliability, and security, it was clear that Inova’s growth-oriented business plan would require the network to be highly flexible and easily scalable. On the non-technical front, Inova’s IT leadership also wanted to take the network service provider relationship to a new level.

“Having a provider that delivered superior network performance was not enough; we also wanted to be aligned with a company that would interact with us like a genuine business partner,” recounts Stiff. “We wanted a provider that not only understood our business and was committed to Inova’s success, but was someone we could strategize with about the best technology solutions for the future. We looked at the total capabilities of our incumbent carrier, as well as those of several other providers—including Verizon Business. When we added it all up, only Verizon Business could deliver everything Inova was looking for.”

Following a detailed fact-finding and needs assessment, the Verizon Business engineering team developed a comprehensive networking technology “blueprint” for Inova. At the heart of the design was a SONET (Synchronous Optical Network) fiber optic ring. For bandwidth, Inova chose to initially use the OC-48 SONET speed, which transmits data at nearly 2.5 gigabits per second (Gbps).

When business applications like an eICU demand “no-compromise” levels of performance, Verizon’s Dedicated SONET Ring Service (DSR) is often an optimum architecture for a core enterprise network. With built-in self-healing capabilities, DSR maximizes reliability and resiliency.

Since most of Inova’s 50 locations had their own Local Area Network (LAN), a new way to interconnect all of these data networks was needed. The Verizon Business team utilized Ethernet LAN Service (E-LAN) as the preferred approach to creating Inova’s Wide Area Network (WAN). With E-LAN, all local networks can interoperate at their normal “native” speeds, whether at 10 or 100 Megabits per second (Mbps), or at full Gigabit rates. E-LAN also afforded cost-savings to Inova; unlike other methods for interconnecting local networks, this service doesn’t require the purchase and installation of any additional premises equipment.

Verizon Private Line Service rounded out the major networking components of the solution. By using dedicated private lines, Inova had the flexibility to immediately extend high-speed connectivity to those network locations that were scheduled to be connected to the SONET Ring at a later time.

In keeping with Inova’s need for the highest levels of network survivability and business continuity, the solution also included a secure Verizon Business location to house the eICU. Located near Inova’s main Fairfax Hospital, the Verizon Business site provides the eICU with emergency power, redundant network connections, and ample physical security. “This is a perfect location,” adds Dr. Cowboy, “and a great example of Verizon Business’s commitment to Inova’s success.”

Why Verizon Business?

When the Inova planning team was researching the different network service providers, the ability to provide comprehensive solutions was a significant area where Verizon Business

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stood out. Phil Stiff sees Inova's IT organization as reaping the benefits. "Unlike many other suppliers, Verizon Business can design and implement full end-to-end solutions. This brings benefits to Inova in a number of ways. In addition to being generally less expensive than piecing together a solution from multiple sources, Verizon Business provides us with a single point of accountability. When Verizon Business designs a comprehensive solution, it's engineered for interoperability. This means better network performance and easier manageability. The bottom line is Verizon Business delivers greater value."

Results and Next Steps

Strong Support

By the fall of 2004, the new Verizon Business network was fully in place, and the eICU was ready to go live. Dr. Cowboy—now the medical director of the eICU—had been intimately involved in every step of the center's implementation. "Inova and Verizon Business engineers worked hand-in-hand to implement the eICU in only 90 days, which is extremely aggressive. When we 'threw the switch,' the network performed perfectly. The Verizon Business team was very capable and technically astute. They were highly responsive and professional, and did an outstanding job on the project. Verizon Business really played a key role in making the eICU a reality."

Improved Patient Care

Now that the center has been operational for a number of months, Dr. Cowboy has had an opportunity to reflect on the impacts of bringing leading-edge medical and communications technology together.

"We're still collecting data, but the trends are extremely positive. Patient recovery rates are improving, and the average length of stay is decreasing. This is great news on all fronts. Not only are more patients returning to wellness, but they are getting home to their families faster."

"When we first set out to build an eICU, we wanted to extend the reach of our medical experts, and that's exactly what has happened. A critical care physician in private practice might be able to attend to the medical needs of 18 patients in a day. By using the Verizon Business network, an eICU physician can help the bedside team support 100 patients a day. That's quite a multiple."

Network Security and HIPAA Compliance

As Dr. Cowboy sees it, the impact of the Verizon Business relationship extends well beyond the eICU. "Reliable and secure communications is fundamental to the delivery of quality healthcare at Inova. We have thousands of doctors and nurses that rely on the Verizon Business network every day as they care for their patients. Part of that care involves meeting our HIPAA responsibilities to protect patient privacy and confidentiality. The Verizon Business SONET ring is a highly secure private network that gives our medical practitioners the assurance they need that their patient information remains private."

Network Performance and Scalability

For Phil Stiff, the Verizon Business solution has definitely delivered. "We continuously monitor our key networks, and it's clear that the Verizon Business SONET solution delivers superior day-in and day-out end-user network availability."

"In addition to delivering the performance we need, the SONET ring is an ideal architecture to meet our future growth. We've already added several nodes and are nowhere near exhausting the capacity of the ring. If we ever do need more bandwidth, we can easily take the speed up to an OC-192 rate."

Looking to the Future

Even though the eICU is up and working, Dr. Cowboy sees a future filled with non-stop innovation and expansion. "We've already brought the eICU into four of our intensive care

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About Verizon Business

- Leading provider of advanced communications solutions for business and government
 - Owns and operates one of the most expansive IP backbone networks in the world
 - Offers services on 6 continents, in 150 countries, and more than 2,800 cities around the globe
 - Offers innovative applications to help simplify, secure, and transform businesses
 - Delivers converged and integrated services that bring communications solutions together
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units, and we'll have all ten Inova ICUs connected within a few months. The eICU technology is really a means to deliver consistent, high-quality patient care to the broadest possible community."

"We've also got another big medical initiative underway that relies on the Verizon Business network. This project involves digital imaging, and will enable the medical staff to view an x-ray from any PC in the system within 15 seconds of the image being taken. Now that we have the SONET ring, we're no longer prevented from implementing bandwidth-intense applications like this."

Like Dr. Cowboy, Phil Stiff and his IT team have no lack of network projects underway. "In addition to re-homing one of our data centers to a more secure location, we're right in the middle of a large-scale server consolidation. In the past, we had to distribute application and file servers out at the individual sites, due to bandwidth and latency issues with our old network. As a result, we built up a huge number of servers that became a real management headache."

"Since the Verizon Business solution provides us with all the bandwidth and performance we need, we're eliminating many of these local devices and replacing them with centralized servers. With SONET, it's no problem to use the network to move these applications out to the edges. In addition to improving business continuity, this new centralized approach will be far more cost-efficient. None of this would have been possible before we partnered with Verizon Business."

Doctor Cowboy summed up the going-forward perspective nicely, "Medical innovation and advanced communications are perfect together. We fully intend for Inova to remain a national trendsetter when it comes to using leading-edge technology. As we continue to move forward with our vision, we want Verizon Business to be right there with us."

For More Information

Visit www.verizonbusiness.com to learn more about Verizon's Dedicated SONET Ring (DSR), E-LAN Service, and Private Line Service.

All statements in this Verizon Business Case Study were made by Dr. Elizabeth Cowboy, Medical Director, and Phil Stiff, Director of IT Infrastructure, Inova Health System.

