Network upgrades support heath care growth in rural Iowa

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A redundant 10G closed network infrastructure allows state health care workers to transport data to and from hospitals, clinics and outside partners.

To improve networking speed and capacity at state hospitals and clinics, the Iowa Communications Network engineered and implemented site upgrades to the Iowa Rural Health Telecommunications Program (IRHTP), a consortium that connects about 85 health facilities to a dedicated broadband fiber network.

As part of the project, ICN, a state agency, installed new switches and migrated broadband services from a legacy platform to the new Multiprotocol Label Switching network. It installed core equipment at 21 locations and aggregation at 23 sites, feeding 91 hospitals.

"The whole infrastructure is based on 10 gig infrastructure," ICN CTO Scott Pappan said. "All that infrastructure is actually a redundant design so one fails over the other," he said. "I can lose a core device, I can lose an aggregation device, but now because of the design infrastructure, I fail [over] to another device. Our whole goal is that the network never goes down."

If a ring of the network goes down, a network-monitoring tool catches it, notifies the network operations center and reroutes traffic in less than 50 milliseconds, Pappan said.

"What this has done has really given us more of a reliable network," said Corey Martin, vice president of education services for the Iowa Hospital Association, which manages IRHTP.

IRHTP provides a closed network that allows health care workers to transport data to and from hospitals, clinics and outside partners. The program started in 2007 and laid the first fiber in 2008. Planning for the refresh started in 2017, and work on it began in mid-2020 and ended this year.

"They did a lot of the work in parallel sections, so one section could be moving while the other one was cut off and stopped," Martin said of ICN. "That really helped our hospitals not see any kind of breaks in service."

One important use of IRHTP is for telehealth – a pre-pandemic capability that ballooned when COVID-19 hit.

"All of our facilities took stock in what their bandwidths were and how much they were allocating to telehealth visits,'" Martin said. "Almost every single one of them had some sort of bandwidth increase."

For instance, rural hospitals and clinics don't have a much specialty care, so if someone tears a ligament in their knee and the hospital has no orthopedist, they can do a virtual visit with a specialist in Des Moines or Iowa City and share X-rays. One telehealth area that grew significantly was behavioral and mental health, he said.

"Having this network and having these connections, you're not relying on this kind of stuff flowing over an open internet connection," Martin said, adding that many connections involve both ethernet for moving data site to site and the internet, which can be used for public access. "This network really is something unique and pretty special."

Other services ICN can provide include cloud connections to Amazon Web Services, Google Cloud and Microsoft Azure as well as firewalls and distributed denial-of-service (DDOS) mitigation. ICN bills IRHTP facilities individually based on the bandwidth they hold, but the consolidated bill goes to Martin, executive director of the consortium, who then bills the members and pays ICN.

"What's fantastic about this is many of our sites are eligible for federal reimbursement … so a lot of them are getting what I almost consider a discounted cost to their fees because it's a 65/35 split," Martin said. "They pay this all upfront and then I submit reimbursement requests and … they can get up to 65% of their fees given back to them."

In fiscal 2021, the Universal Service Administrative Co. provided funds for discounts to 158 hospital and health-care providers, saving them almost $2 million on data services through the Healthcare Connect Fund Program. USAC is an independent not-for-profit designated by the Federal Communications Commission, and HCF is a USAC program that provides a 65% discount on eligible broadband connectivity expenses for eligible rural health care providers.

For Martin, the network construction is never done.

"Health care is always changing and always evolving, so how can we evolve with it?" he said. "As new clinics and new locations open, it's time to lay new fiber to them and get those last-mile connections to those newer locations. As facilities grow and change and their business models change – if a hospital decides they want to add comprehensive cancer care, that's going to add a lot more bandwidth, different needs with their medical records – how are we going to adjust? We're constantly looking at it from a health care perspective and that model."

ICN has several efforts under way, Pappan said. Because the network averages almost 11,000 DDOS attacks per year, it's updating its platforms and moving and updating its firewall infrastructure. It will provide security to agencies based on their individual needs, not as one group.

He also expects to finish a 100-gigabit core in the next couple months, moving aggregation to a 10-gigabit format statewide and making it scalable to 100.

But ICN's true success is a result of its partners, Pappan said. "I think the whole public/private partnership is the reality of the future," he said. "This is a great example of how the public/private partnership comes together and works for everybody."

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