

Rural Utility Delivers Broadband Services Using Wireless WAN

Utilities are looking for opportunities to offer new services to their consumers in an effort to add value in a competitive business environment. They are discovering that a wireless Wide Area Network (WAN) can answer the questions of what service to offer and how to cost-effectively deploy it.



Illinois Rural Electric Cooperative was not new to wireless infrastructure, having already installed a SCADA network to automate the monitoring of their regional substations. The non-profit co-op is collectively owned by residential and business consumers and serves a 2,200 square mile region of rural farming communities in western Illinois. Substations are located throughout the region and are connected to the utility's central office in Winchester via wireless WAN, which has ample bandwidth to manage the transfer of meter data. It was the availability of additional bandwidth that spawned the idea to leverage the network for other purposes, including the distribution of high speed Internet service.

The low population density of rural communities in Illinois was a disincentive for incumbent carriers to deliver high speed services so a majority of the utility's consumers remained unserved. Nonetheless, demand for broadband access continued to swell, and the co-op determined that it was in an ideal position to expand its services by offering their consumers high speed Internet access.

To accomplish the goal, the utility leveraged its for-profit Internet service provider subsidiary, known as the Illinois Rural Telecommunication Company (IRTC), to own and operate the new broadband services. The IRTC explored a number of delivery vehicles for broadband, keeping in mind the unique geography of this rural Midwestern farming region where consumers are widely separated, often by miles, and townships rarely exceed 2,000 residents. Rolling terrain makes line-of-sight unattainable to all but a few of the potential subscribers. Satellite was an initial choice, but the IRTC soon realized that satellite lacked the scalability to meet demand as their systems reached capacity. They began exploring wireless technology.

Having already deployed a wireless WAN to the utility's power substations, engineering manager, Sean Middleton, began investigating the extension of these networks as a last-mile delivery system to subscriber homes. But after thorough exploration, the initial vendors involved were unable to make the deployments work due to limitations in point-to-multipoint scalability and their inability to deploy the networks profitably. The IRTC brought in Wireless Data Systems (WDS) and a technology integration specialist located in Wilmington, North Carolina with extensive experience in wireless infrastructure. Rick Greene, President of WDS, enjoys not only the performance he achieves with Trilliant's wireless mesh but also the ease of



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– Sean Middleton,
Manager of Engineering,
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Wireless WAN Opens Opportunities in Underserved Rural Markets

deployment and serviceability of a mesh network, which as Mr. Greene says, “puts Trilliant way ahead of other mesh systems out there for total cost of ownership.”

The WDS team showed the IRTC how a wireless WAN mesh solution goes beyond conventional point-to-multipoint. It was immediately clear to the IRTC’s Middleton that a wireless mesh network could scale to reach the majority of the utility’s rural consumers and do so cost effectively. With point-to-multipoint vendors, the IRTC had difficulties with interference and the ability to deliver service over longer distances while maintaining bandwidth. Trilliant’s SecureMesh™ WAN technology mitigates interference, while its advanced dynamically switched antenna array supports distances up to 10 miles between nodes with dedicated bandwidth. “With an alternative solution, we would have to put sites all over to achieve the same type of coverage as far fewer Trilliant nodes. That is cost prohibitive and creates frequency availability problems,” stated Mr. Middleton.

In deploying the wireless mesh network, the IRTC places a SecureMesh Gateway or Extender device at each substation which act as broadband base stations to inject capacity to the wireless mesh with 360 degree coverage. Extender devices are also deployed to expand the mesh network to reach utility consumers, allowing the IRTC to hop closer to rural towns to increase access to the service. Mr. Middleton finds the dynamic routing capabilities of the mesh to be exceedingly flexible in responding to changing coverage requirements as the IRTC increases the service availability area. New subscribers are provided a SecureMesh Connector CPE through which they receive the 5 GHz network signal at distances up to 7 miles from a base station node.

The IRTC has been operating the Trilliant network for several years and overwhelming customer demand has exceeded expectations. Mr. Middleton says he is also exploring the option to deploy Wi-Fi services in town centers using an integrated 2.4GHz access point, “We will prioritize Wi-Fi services once we have addressed the demand for last-mile connections.”

Co-op members receive a monthly subscription rate of \$25 while non-members can access the network for \$35. The ability to cost-effectively offer these services despite the challenges of rural geography is why the IRTC has been able to move forward. “The Trilliant WAN mesh is what makes our service model work,” says Mr. Middleton, who continues, “Point-to-multipoint systems just can’t do the job the way the wireless WAN mesh has in our situation.”

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SecureMesh™ WAN Solution

Trilliant supports hybrid mesh network deployments with an advanced Wide Area Network (WAN) architecture for greater scalability and reliability of the wireless mesh backbone. The solution includes:

- SecureMesh Gateway nodes to inject capacity in the network
- SecureMesh Extender nodes to expand the mesh to cover up to 50 miles from the SecureMesh Gateway
- SecureMesh Connector nodes to provide broadband connectivity

Benefits

Exceptional performance and dependability based on multi-radio design and advanced synchronous mesh architecture to manage traffic throughout the wireless WAN

Unparalleled scalability and spectral reuse from a dynamically-switched antenna array that increases range and capacity while mitigating the effects of self-interference and line-of-sight obstructions

Low total cost of ownership (TCO) resulting from reduced deployment and RF planning complexity, and the ability to support multiple applications over a common wireless WAN

Flexibility to support multi-use networks, including 2.4GHz Wi-Fi, 4.9GHz public safety access, VoIP, video surveillance, SCADA, and more



1100 Island Drive Redwood City, CA 94065
T 650-204-5050 F 650-508-8096
www.trilliantinc.com