


Case Study:

Rural Utility Delivers Broadband Services Using Scalable Wireless Mesh



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 mesh network 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 data acquisition 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 backhaul, 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 has been a disincentive for incumbent carriers to deliver high speed services. As a result, a majority of the utility's consumers have remained un-served. Demand for broadband access has none-the-less continued to swell, and by the end of 2005 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 telephone 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 2000 residents. Rolling terrain makes line-of-site 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 backhaul network 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), a SkyPilot partner and 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 SkyPilot's wireless mesh but also the ease of deployment and serviceability, which

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Manager of Engineering,
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SkyPilot Mesh Opens Opportunities in Underserved Rural Markets



as Mr. Greene says, “puts SkyPilot way ahead of other mesh systems out there for total cost of ownership.”

The WDS team showed the IRTC how a SkyPilot 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. SkyPilot SyncMesh™ technology mitigates interference, while its advanced SectorSwitch antenna array supports distances up to 10 miles between nodes with dedicated bandwidth. “With the Canopy solution, we would have to put sites all over to achieve the same type of coverage as far fewer SkyPilot nodes. That is cost prohibitive and creates frequency availability problems,” stated Mr. Middleton.

In deploying the wireless mesh network, the IRTC places a SkyGateway device at each substation, providing a convenient way to connect the mesh to the existing wireless backhaul. The SkyGateways act as broadband base stations by injecting capacity to the wireless mesh with 360 degree coverage. SkyExtender devices are then located 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 SkyPilot mesh to be exceedingly flexible in responding to changing coverage requirements as the IRTC increases the service availability area. New subscribers are provided a SkyConnector CPE through which they receive the 5 GHz network signal at distances up to 7 miles from a SkyPilot node.

The IRTC has been operating the SkyPilot network for over seven months 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 the SkyExtender DualBand that includes 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 \$20.00 while non-members can access the network for \$35.00. 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 SkyPilot 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 SkyPilot wireless mesh has in our situation.”

SkyPilot Solution

SkyPilot supports more hybrid mesh network deployments by combining standards-based Wi-Fi access with advanced SyncMesh™ architecture for greater scalability and reliability of the wireless mesh backhaul. The solution includes:

- SkyGateway™ nodes to inject capacity in the network
- SkyExtender™ nodes to expand the mesh and offer optional for Wi-Fi and 4.9GHz access
- SkyAccess™ DualBand nodes for cost effective infill of Wi-Fi HotZones
- SkyControl™ provides centralized EMS management

Benefits

Exceptional performance and dependability based on multi-radio design and advanced SyncMesh architecture to manage traffic throughout the mesh network

Unparalleled scalability and spectral reuse from advanced SectorSwitch antenna array that increases range and capacity, while mitigating the effects of self-interference and line-of-site obstructions

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

Virtually unlimited flexibility to support multi-use networks, including 2.4GHz Wi-Fi and 4.9GHz public safety access, VoIP and video Surveillance, AMR/SCADA, and more



Leading the Mesh Revolution

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