
Franklin County Wireless Broadband Partnership Case Study

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One Approach to Rural Broadband Deployment

Franklin County formed a partnership with a local wireless Internet service provider (WISP) to expand the County's local government wide-area network and provide broadband options for the citizens. The project leveraged County structures such as towers and water tanks for WISP transmitters and receivers. We were in the process of upgrading the public safety radio system at the same time, so the two efforts worked together to identify possible new tower locations that would improve radio coverage and meet broadband demand.

The partnership provided the WISP with a fast-path to business growth through additional funding and access to existing infrastructure. The County provided space on towers, tanks and poles in exchange for Internet service at County offices. This arrangement lowered deployment costs for the WISP, expediting business growth.

The partnership expanded the WISP customer base in Franklin County from 98 customers in early 2005 to approximately 1000 in early 2008. In addition, 15 fire and rescue stations were added to the County's wide-area-network (WAN) in addition to five other County offices. There are many advantages to moving remote offices onto the WAN, including reduced costs and improved communications and data sharing across County Administration. The wireless mesh network supports data and voice and the WISP is currently segmenting the County's voice traffic on their network to ensure quality of service (QoS).

The Challenge

Franklin County is a 721 square mile rural locality in the foothills of the Blue Ridge. The County lies just south of the Roanoke Valley and north of Martinsville, Virginia. Franklin County boasts the lowest tax rate in the area and is the fastest growing locality in the region. Citizens demand broadband for education, communications and business. The County's rural setting attracts many but presents challenges in broadband deployment. Citizens and businesses were calling on County Administration to bring broadband options to the County. The County's economic development team was being challenged that the County's broadband offerings were too limited and too expensive.

County Administration had several departments housed remotely. These departments included Parks & Recreation, Workforce Development, Public Safety, Animal Control and more. These remote facilities were not on the County's network and had no broadband options.

Education, business, communication and entertainment were all driving the need for bandwidth. The number of applications -- voice, video and data -- for Internet protocol (IP) based networks continue to proliferate.

The Options

The County holds a cable franchise that changed hands several times over the years and really did not address data communications. The cable build-out was limited to just the most densely populated areas as the franchise stipulated a minimum of 15 homes per mile before the company was required to build. To further complicate this build-out, densely populated areas existed but were too far from the cable end point to be connected. As such, the build out only covered about 1/3 of the County.

The local telco provides DSL and T1 connectivity but were limited to mostly in town limits and was too expensive for most residents. Even in areas where the telco was expanding these services out of town, they were limited to a 3-mile radius of a switching center or central office.

Satellite providers were available but the latency in those services would not support business demands. Telecommuters typically require access to the corporate network which demands broadband to support that type of connectivity (virtual private networks).

Fiber build outs by the cable provider or the telco were limited due to the expanse of the County and the challenges of the terrain and the amount of rural area between communities.

Investigating potential solutions led us to wireless – relatively low cost and provides service across 15-40 mile distances depending on location and *line-of-sight* to a transmitter. The wireless solution provides interference resistant, scalable and state-of-the art services. The wireless mesh solutions can be designed to be redundant by providing multiple paths in network routes.

We wanted to leverage local assets such as County owned towers, water tanks and poles. We wanted to limit our financial liability by not being a business investor or publicly owned provider. Therefore, we wanted to locate an existing wireless Internet service provider (*WISP*) to partner with to deploy a wireless mesh network in the County. This network would service remote County offices and provide broadband Internet service to the citizens.

The Solution

The County wanted to assist in expanding the broadband options for citizens and connect the remote offices. However, the County had neither the resources nor the desire to become an Internet service provider. We did have infrastructure (towers and tanks) that could be leveraged and public safety grant opportunities to support connecting fire and rescue stations.

We conducted the broadband assessment study in the winter of 2004/2005. The study identified all providers, their services and delivery methods, pricing structure and accessibility and reliability by geographic area within the County. We also created a layer in the County's geographic information system (GIS), mapping where broadband services existed. This mapping allowed us to easily identify most underserved areas.

In June 2005 the County issued an RFP to find a private-sector WISP to partner with to design, deploy and operate a wireless mesh network in the County. This work would include connecting all fire/rescue stations and government facilities, while also providing service to the citizens. The project would leverage County structures such as towers, water tanks, poles, etc. in exchange for wireless broadband service to County facilities. The County received only one response from B2X Online, Inc. of Salem, Virginia. That one response certainly indicated that B2X was eager for the opportunity and well-versed on solid wireless technology (Motorola Canopy).

The County had approval for a Homeland Security grant and used \$50,000 from that grant towards this project as we would be connecting fire and rescue stations. Connecting these stations allowed the entire County fire and rescue staff to utilize a central system for reporting all the data associated with public safety. In addition, the County funded about \$38,000 the first fiscal year and approximately \$44,000 the second year. These general funds went towards the County's payment for Internet services (paid in advance), receiving equipment and development of some tower and tower sites.

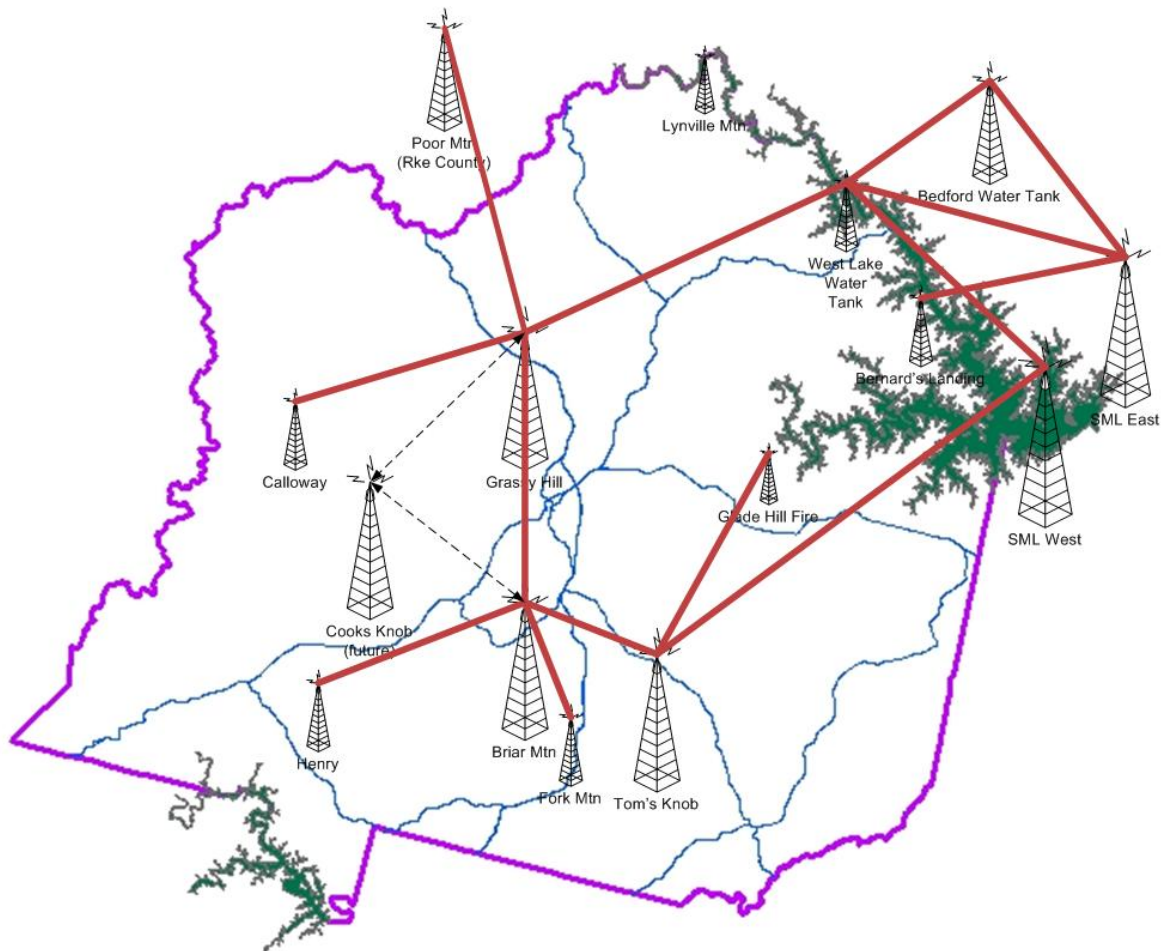
The impact of this partnership is seen in the growth of the County's wide-area network connecting all remote offices, including all fire and rescue stations -- supporting data sharing and communications. This connectivity is bringing both cost reductions and efficiencies to the local government functions. The County has 24 facilities connected via the wireless mesh, including the County's data center. Response times for County facilities and communication over this network are excellent as there is no need for traversing beyond this local network.

B2X Online's business in Franklin County grew from presence on one tower serving 18 businesses to operating a wireless mesh network consisting of 10 towers and serving 143 businesses. This growth has occurred in just a little over two years and has been managed growth as B2X wanted to ensure reliable service and support to their customers.

The wireless network included space on one commercial tower. Since that tower would provide connectivity to several County facilities, the County paid B2X for services to those facilities in advance for the next five years. That money then funded the equipment required to provide service from that tower.

In some areas of the County, citizens wanted service and did not have line of sight to any tower without erecting a pole. A few poles were erected and the land owner would come to agreement with B2X for reduced service costs in exchange for providing power to the pole and allowing B2X to then retransmit the service to other residents.

The partnership designed a network that includes WISP presence on 11 towers/tanks in the County including redundant network paths. The following diagram does not include all the smaller poles or structures setup to serve a limited area.



Business Benefits

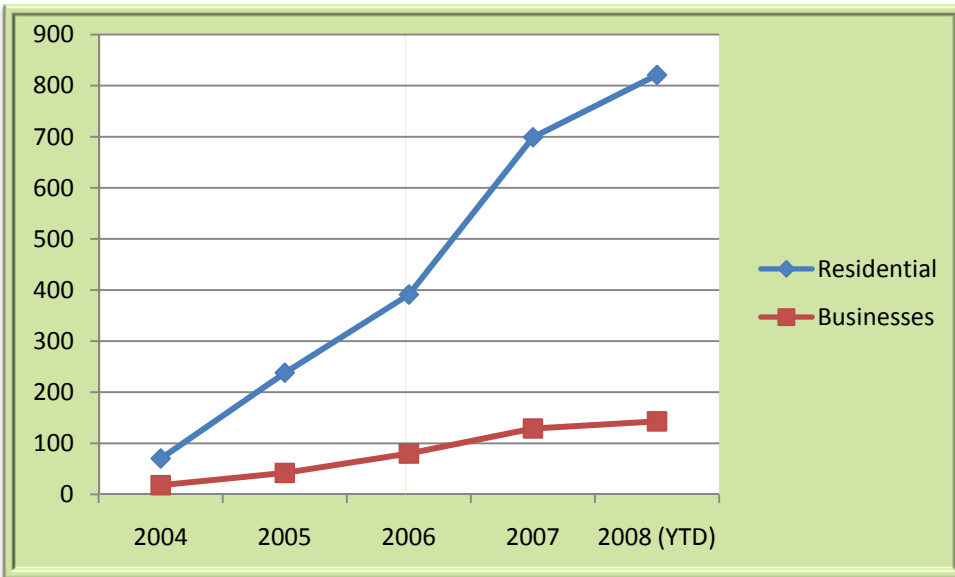
Broadband is critical for communities to attract new development and businesses and for supporting the growth of existing business. It is quickly becoming considered a utility, the same as electricity and phone service -- citizens expect broadband to be available.

The process that Franklin County followed included an assessment to identify current services - pricing and coverage, available structures and identify the demand or under served areas. The County then found a partner -- a WISP that knows the technology and can operate the service. Then we worked together to expand the service area, meet citizen demand and connect the local government offices.

The partnership continues and B2X just recently added two additional back hauls providing redundant service feed into the County's data center. B2X is also provided routing and segmentation to ensure quality-of-service (QoS) to support the County's voice-over-IP (VoIP) system over the wide-area network. The service is solid and very reliable supporting data and voice communications. A tower in the southern section of the County was just recently (April 2008) put into service for both the County's public safety radio system and

wireless broadband services. The local power company (AEP) is beginning construction on another tower in the western part of the County and agreements are already in place to provide B2X space on that tower as well.

The partnership has certainly been an enabler for improved local government efficiencies and for businesses and citizens to leverage the connectivity. In addition, B2X Online's business has grown considerably in the County.



Conclusion

It is true that broadband services are growing in our nation but in rural areas that growth is slow and limited. Technology is moving along to provide less costly and wider range coverage but wi-max is not yet main stream. Citizens, businesses and local governments need the connectivity today. If local governments partner with private providers, solid broadband services can become a reality for a fraction of the cost and in a much timelier manner. We have estimated the cost of this entire network build would have been approximately \$500,000. However, by leveraging local assets, a public safety grant and the partnership agreements, this network was built and deployed for just 24% of that estimated cost.

Working together we were able to grow a wireless mesh network over Franklin County from one tower to 10 towers and another under construction in just over two years time. The County is currently moving all County facilities to one voice-over-IP system and is positioned to provide more efficient services because of this wide-area network. The WISP's business has continued to grow and expand well beyond the County into many neighboring localities. The WISP growth brings continued improvements to the network and more opportunities for the local government, the citizens and the businesses of the County to leverage this technology and improve their own communication and processes.