TROPOS networks

Metro-Scale Mesh Networking Defined™

Public Safety and Public Access: Granbury, Texas & Frontier Broadband

A Tropos Networks Case Study
November, 2005

A Broadband Partnership: Granbury & Frontier

Scenario

- Before Tropos: A Granbury, Texas, patrol officer pulls over a Ford Explorer at 2 a.m. on U.S. Highway 377, a popular through route to Mexico. The officer suspects that the vehicle may be stolen and its four occupants driving the car across the border to sell it. The officer has no way to verify his suspicions from the road. He collects names and the license plate number and allows the four to leave. Back at the station, the officer checks law enforcement databases. The Explorer was indeed stolen earlier that night and the occupants are known members of a Dallas-based auto theft ring.

- After Tropos: Another late-night vehicle stop. A Granbury patrolman suspects that one of the auto's occupants may be someone he booked the previous week. He also thinks the driver's auto license may be a fake. The patrolman uses a digital camera to snap high-resolution pictures of the driver, his license, the familiar-looking man, and some fingerprints on the auto that the officer raised with an evidence collection kit. He loads the pictures into the patrol car's laptop and sends them via Granbury's city-wide wireless network to an investigator at headquarters. The investigator confirms that the patrolman is correct on all counts. The two men are arrested on the spot.

History

Granbury is a picturesque city located on the Brazos River 30 miles southwest of Fort Worth. Its Victorian-era courthouse square is on the National Register of Historic Places and its cemetery contains the graves of Jesse James and Davy Crockett's grandson.

Behind its 19th century façade, Granbury is a growing, dynamic 21st century community. When information systems manager Tony Tull joined the town government about three years ago, his first act was to assess the town's information needs.

The assessment showed that town government operations were "disjointed," Tull reports. Departments were located in different buildings; none of the town's operations were networked; and municipal organizations could not share data. Linking police vehicles in the field to the police headquarters database was the top priority.

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"I wanted real computer power in the cars -- data, photos, video and Internet access," Tull explains. That meant equipping Granbury's 10 marked police units with wireless laptop computers rather than mobile data terminals that work over a cellular digital packet network. With terminals, officers could only check for warrants, write field reports and print out traffic citations.

Tull consulted Frontier Broadband, a Granbury-based wireless internet service provider. "Networking Granbury government operations seemed like a great plan to us, and we were interested in offering residents monthly Internet subscriptions – a service that no one provided at the time," recalls Frontier Broadband's Michael Timmins.

While researching Wi-Fi offerings, Timmins stumbled across a case study from Tropos Networks detailing the city-wide MetroMesh Wi-Fi network in Corpus Christi, Texas. The network carries public safety, municipal, and residential Internet traffic.

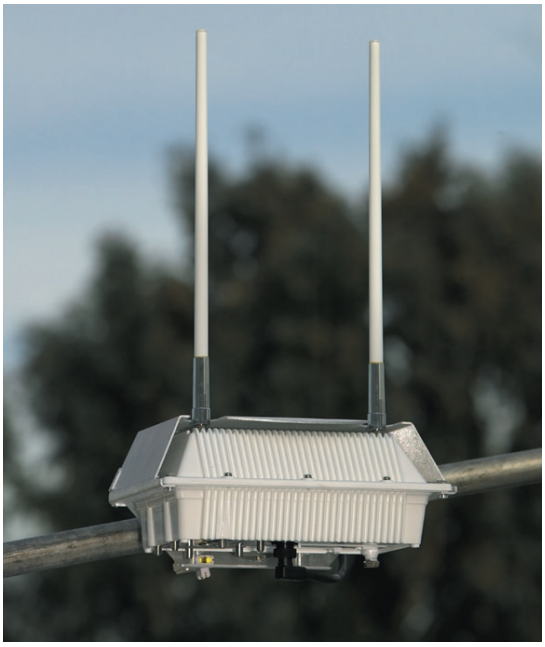
"We researched mesh networks and concluded that they would meet our requirements and the city's," Timmins says.

Deployment

Granbury earmarked $70,000 of a Homeland Security grant to buy wireless laptops for the 10 police cars, as well as for the vehicles driven by the police chief, captain, three sergeants, three investigators, and the fire marshal and health inspector.

Meanwhile, Frontier bought two Tropos 5110 MetroMesh routers for concept testing and mounted them on the outside of its office building. Tropos routers combine the Wi-Fi networking industry's most sophisticated mesh routing intelligence, designed to optimize throughput in a dynamic metro-scale Wi-Fi mesh environment, with a carrier-grade hardware platform that offers peerless Wi-Fi link budgets.

In October 2004, Tull and Timmins attended the Public Technology Institute's National Summit for Local Governments in Corpus Christi. The institute partnered with Corpus Christi to design and deploy that city's multi-use Wi-Fi network.



The Tropos 5210 Outdoor MetroMesh Router

After the conference, Frontier ordered 40 Tropos 5210 routers for a more extensive of test on a network covering half the city's nine square miles.

- The Tropos virtual network infrastructure allows many different user communities using a metro-scale Wi-Fi mesh network to have its own private network, address space, class of service and security settings on a single infrastructure. Police, fire and public works each can have their own network which can be administered separately, with different access and security policies. The same network also can be open for public access without compromising security.

- The rugged 5210 router is NRTL certified for outdoor installation. A trade-level city worker using a single tool can mount the router on an external structure such as a building or lamppost in under 15 minutes.

In September 2005, Frontier installed 100 Tropos 5210 routers on city streetlights to create a Wi-Fi mesh that spans all of Granbury, except for a few industrial areas. The Wi-Fi network links to Frontier's private broadband network via 5.7 GHz Motorola Canopy radios.

Financials

Some cities opt to build and manage their own metro Wi-Fi networks. Others, like Granbury, outsource. Frontier deployed, owns and maintains the Wi-Fi network in Granbury. The city has a five-year, $305,000, five-year contract for total network access and network services. Frontier also receives all the revenues it generates from offering residential Internet services to Granbury's 5,700 residents at $19.95 a month, about half the price of DSL or cable service

Marketing

Well before Frontier announced residential Internet service, an item in the local newspaper generated instant demand just by hinting that such a service might be in the offing. Tull says that the city and Frontier plan to market Internet services jointly in utility bill inserts, newspaper ads and spot ads on local radio.

Results

"I estimated that equipping police vehicles with laptops would save Granbury $70, 000," Tull says. After eight months of access to in-vehicle data lookup, report writing and other information tools, the police department turned back to the city $78,000 in monies y allocated for salary and overtime. As a direct result of the dramatic drop in overtime, the department has reduced its budget for the current fiscal year by $100,000.

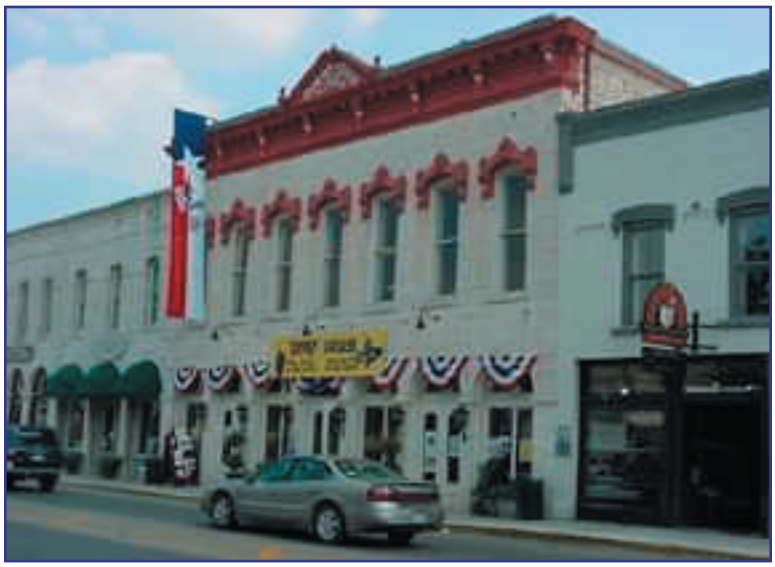
What's Ahead

Next up for Granbury is wireless automated meter reading and laptop-equipped fire apparatus.

- By combining intelligent digital meters with the MetroMesh network, the city can read meters automatically several times a day, instead of sending personnel into the field once a month. Besides lower costs, benefits include higher accuracy and added efficiency.

  "When we combine automated meter reading with a SCADA (supervisory control and data acquisition) system," Tull says, "we can look at water consumption totals by day, check which pumps are losing water, repair them quickly, and ultimately, lower rates."

- In the public safety arena, Granbury will use laptops to improve emergency communications. The headquarters command team can use a visual intelligence system such as Pictometry to plan the response, site the field command and measure hose distance and send en route vehicles data on any chemicals that a business or warehouse stores. First responders can check the type of chemicals a business or warehouse stores, inspect building and roof layouts, and locate ingress and egress points.



Summary

A city-wide Tropos Metro-Mesh network links municipal departments in Granbury, Texas to each other and to information that allows them to operate more efficiently in the field. The same network supplies Granbury residents with Internet access at half the cost of DSL or cable-modem service.

"The wireless network will enable Granbury to do a number of things," Tull says. "For example, the city's health, electric and building inspectors can use wireless laptops to issue permits on site, saving time for developers and residents and speeding up permit fee collection."

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