Cambium Networks™

Integrated City-Wide Communications

Situation

Every city wants the best for its employees and its citizens, but shrinking budgets and economic turmoil have made that hard to deliver. The city of Wauwatosa, Wisconsin, didn't let that stop it. It realized that if it wanted to create a foundation for services and applications, for everything from the water department to City Hall, it needed a robust, reliable and secure network infrastructure.

Like many cities, Wauwatosa relied on leased T1 lines to transfer data and provide bandwidth for its city services and applications. But the problems with these lines are numerous, something Thomas Otzelberger, Manager of Information Technology for the city, makes clear, "The two biggest problems with T1 lines are speed and cost. T1 lines do not have anywhere near the bandwidth to do some of the things we were looking to do, and the recurring costs that come with them, let alone the costs necessary to increase bandwidth, are prohibitive." The city needed a solution that could provide the bandwidth, security and reliability to provide the foundation for critical city services.

Solution

Utilizing a solution comprised of point-to-point (PTP) and point-to-multipoint (PMP) products from Cambium Networks, the city of Wauwatosa created a reliable, secure and redundant wireless network infrastructure that connects key utilities, buildings and worksites across the city. This cost-efficient network enables critical functions from video surveillance at remote sites to replication and backup of vital city data.

Cambium Networks partner Baycom worked closely with the city to understand its initial objective—to enable video surveillance at critical water department sites throughout the city—and demonstrated how PTP and PMP solutions from Cambium could provide the wireless connectivity necessary.

Further analysis revealed a greater opportunity for Wauwatosa, as Baycom understood that a more robust wireless network could do so much more by enabling the city of Wauwatosa to create a unified, redundant and far- reaching wireless network. Michelle Dahlen, Public Safety Systems Administrator, speaks to the benefits of this close relationship, "Originally, we just wanted to provide video surveillance at city sites that didn't have IP connectivity via our wired network, but Baycom had the vision to see that we could create a wireless network that could both meet our current needs and lay the foundation for future applications."

Result

The city of Wauwatosa now has bandwidth for simultaneous data, voice and video, and the solution has provided advanced surveillance with over 40 cameras to date and centralized video monitoring and capture, cost savings and speed upgrades over the old leased T1 line infrastructure and clearer audio thanks to IP telephony services.

"When you put it all in perspective," Thomas Otzelberger says, "and think that this wireless system has mushroomed from an initial idea of wanting to capture video to what it is today—centralized video monitoring for the entire city, voice, data backup and everything else—it's really just incredible."

Keeping Up with a Growing City

Surrounded by the river basin of the Menominee River in the western Milwaukee metropolitan region, Wauwatosa is an innovative city with 47,000 citizens. In the mid-1950s, Wauwatosa's population grew quickly, and while it still maintains its "small town" feel the city continues to build for the future with its many parks, schools and emerging businesses. However, as city budgets shrink, data demands still continue to skyrocket due to advancing technology and a need for reliable mobile connectivity. When the city of Wauwatosa started to feel this crunch, its dependency on T1 lines was the first thing it needed to address, as the benefits of improving upon this system, along with concrete ROI, could be realized the fastest.

Otzelberger points this out, "To move ahead and do any of the kind of things we wanted to do with connectivity," he says, "we either had to go wireless or invest in burying fiber optic lines, which comes with staggering costs and long cycle times to deploy. Once we saw what kind of wireless reliability, security and bandwidth Baycom and Cambium Networks could provide, we knew that was the answer for us."

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CUSTOMER PROFILE:

Create robust city wide system replacing T1 lines.

APPLICATIONS

- Video surveillance connecting 40 cameras deployed across the city

- Leased line replacement

- Data transfer between city hall and police department

SOLUTION

- Point-to-Point (PTP) 600 wireless backhaul

- Point-to-Multipoint (PMP) 120 wireless access network in a hub and spoke architecture

VALUE TO THE COMMUNITY

- More efficient connectivity between municipal buildings saving time and recurring leased line costs

- Leveraging one network for public safety and public works reducing costs

- 40 video surveillance cameras provide increased safety with out increasing personnel costs

- Deployed faster and at a fraction of the cost of fiber technology

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Working Together for a City Wide Solution

A few years ago, the water department received a Homeland Security grant to install a video surveillance system. The fire and police departments were also interested in video capture, and realizing this common need, the city had the foresight to form a committee to ensure each department wasn't investing in overlapping solutions.

When Baycom, a Cambium Networks-authorized channel partner, got involved, the city quickly realized that if it wanted to achieve its goals it needed to invest in a wireless solution that could provide the kind of reliability, security and bandwidth it needed. "Early on, everyone wanted to go off in their own direction," Otzelberger says, "but we instantly recognized the potential that could be realized from an integrated Cambium Networks wireless network."

> "As this project evolved, it became a great example of departments with varying interests working together toward the best interest of the city and its citizens as a whole. Because of this, each party has achieved its goals. The system has already returned the full capital investment through savings, and we've created tremendous opportunities for expansion into other service sectors."

Laying the Foundation for a Cutting-Edge Video Surceillance System

The first objective for the city of Wauwatosa was to improve the security of its water resources. "In this day and age, when you have various threats out there, even for towns of our size, the water utility is one area that could potentially be vulnerable," Otzelberger says. "And there was a real need to ensure the security for our systems was top of the line." The city had two options if it wanted to extend connectivity to its critical water department sites, either lay new fiber optic lines, or invest in a wireless network.

The choice for the city was easy, and IT invested in a Cambium Networks wireless broadband system that leveraged the capabilities of the PMP 120, which extends 14 Mbps wireless connectivity to remote sites to stream voice, video and data. This system provides a nearly instantaneous connection between a centralized hub and the surveillance systems at several water department sites, allowing video to not only be monitored in real time, but also captured, stored and backed up. Plus, cameras were able to be placed in precisely the right location, as they were not constrained by the trenching requirements and limitations of wired technology. This surveillance, made possible by the reliable wireless connection, provided the city with the type of security it demanded to ensure water department sites, and the city's citizens, were protected.

Backup Done Right

After the successful implementation of the water department surveillance system, the city began to see the potential of wireless connectivity and quickly looked to find new ways to leverage Cambium's products. "Even

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before our video surveillance system was installed," Otzelberger says, "we were collecting a wealth of vital data that needed to be recorded, backed up and stored. In order to securely and safely store it, we had couriers manually carrying tapes back and forth between City Hall and the police department, a process that took a great deal of time and came with a high price tag."

With the help of Baycom and Cambium Networks, Wauwatosa installed a high-speed wireless connection between City Hall and the police department, utilizing Point-to-Point PTP 600 series wireless Ethernet bridges to provide high-performance connectivity. Now, with this reliable and secure connection in place, the city houses two data centers, one in City Hall and one in the police department, that syncs every 15 minutes and provide them with a redundant storage system for their vital city data. They were also able to eliminate the costs associated with their courier service, adding even more savings for the city.

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Police Dispatch, Mobile Video and More

Thanks to its network connectivity, the police department now leverages broadband for everything from dispatch to records management software. In addition to the cameras utilized by the water department, the police department also has an additional 25 cameras in place, each transmitting and capturing data. Plus, with the speed of Cambium's network, it is able to control these cameras in real time and deliver mobile video to officers in the field. Public Safety Systems Analyst Michelle Dahlen describes these benefits. "With the speed and reliability of the network," she says, "we're able to wirelessly deliver video out to the squad and control cameras with pan, tilt and zoom functions from anywhere on the network." In addition to the central monitoring center, these video feeds can also be transmitted over the network to first responders in the field; giving them the crucial information they need right at their fingertips. On some networks, this could cause bottlenecks, but Wauwatosa has nothing but positive reviews of the Cambium system. "With all we've got going on over the network," Dahlen says, "you'd think we might not be able to control the cameras in real time, but you'd be surprised at how instantaneous it is."

The Reliability and Security to Bolster Disaster Recovery Plans

When you've got a reliable, secure and redundant network, you can focus on department operations and issues instead of using valuable time dealing with network-related problems. "The thing I'm really excited about," Thomas Otzelberger says, "is disaster recovery. I haven't talked to a single other city that has a better disaster recovery system than we have. We could sustain the loss of one of our two data centers and recover in very short order. Our entire operating environment and all the applications would fail over to the alternate data center."

Cambium Networks' unique technology in both PTP and PMP products is the key to this reliability, enabling carrier-class performance even in obstructed and high-interference environments. These wireless broadband systems seamlessly provide IP connectivity to existing systems, and the city of Wauwatosa's network has proved its resilience time and time again, something Otzelberger has experienced firsthand. "We had a huge blizzard last February, and I couldn't even open my garage door the snow was so deep. I came to work with my fingers crossed, and we did not have one communication problem whatsoever. It's just an incredibly reliable solution for our tough, tough weather here in Wisconsin."

Leveraging Connectivity for Government Business Applications

In addition to critical services like surveillance and police dispatch, Cambium Networks' wireless network also provides day-to-day connectivity for employees on premises across the city. These premises also transmit data for backup to the centralized hub in City Hall, so the network not only enables key wireless capabilities like email, timekeeping systems and web browsing, it also ensures data from key applications like payroll and financial functions are replicated across the network throughout the day.

Eliminating Costly T1 Lines

Now that the city of Wauwatosa was running nearly every key application across Cambium's wireless network, they realized it was time to get rid of their costly leased T1 line contracts altogether. "After everything had gone so well with our other applications, we thought 'Let's get rid of these T1 lines,'" Otzelberger says. "We realized with a couple additional bridges, we could get the entire wireless network running with 100% redundancy."

In order to achieve this redundancy, Wauwatosa invested in several PTP 200 series bridges, capable of transmitting up to 21 Mbps of data through near and line-of-sight conditions. Once the system was up and running, the wireless reliability and connectivity allowed them to let their T1 line contracts expire. "All these technologies have to play nice together," Otzelberger says, "which is tricky, but in just a short while everything was in place and it was all tested and running smoothly. The whole system has been pretty much bullet-proof since then."

A Trusted Partner

Baycom played a crucial role in implementation of the city of Wauwatosa's wireless network, and its dedication and knowledge made a strong impact on the city. "They're just an awesome vendor to deal with," says Otzelberger. "That technology is not the easiest thing to talk about and they made it really easy to understand what it is and what it could do for us. They've really done Cambium proud with the things they've done."

Additionally, all the applications and services located at City Hall, from business licenses to tax documentation, are now accessible at any of the remote sites, enabling seamless information sharing and peace-of-mind redundancy. Nearly every day-to-day function of the city relies on Cambium's network, right down to the hundreds of phone calls made daily over the network enabled IP telephony communications.

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Leveraging Bandwith for Future Applications

With Cambium Networks' wireless broadband network already lowering costs, improving efficiencies and keeping the city connected, Wauwatosa is now looking forward to what's next. "It's just opened the door for us to do so many advanced things," Otzelberger says, "things that we never could have done with the T1 lines because of the costs and the lack of bandwidth."

Now the city is looking into implementing advanced traffic light controls to ease rush hour congestion, using wireless controls for sewer and water gates to prevent flooding in underground systems and leveraging other Cambium Networks products to help it extend connectivity to hard-to-reach areas.

Solutions that can make a Difference

With what the city has been able to do with its Cambium wireless network, Otzelberger is rightly enthusiastic about the solution. "When I talk to IT managers and CIO s from other cities," he says, "they're quite impressed with the things we're able to do. We're years ahead in terms of technology and disaster recovery, and it's going to take them a long time to get to this point thanks to Baycom's foresight and Cambium's products." Even in challenging economic times, the city of Wauwatosa has demonstrated that, when you can stay connected reliably and securely through wireless broadband, the possibilities are nearly limitless. And the effect it's had on the city and its citizens as far as safety, efficiency and cost savings are concerned have given it a leg up and made it a role model for other communities.