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City of Chicago
Firetide Wireless Mesh Key to City-Wide Video Security Deployment

Firetide mesh keeps an eye on key intersections in downtown Chicago

ORGANIZATION
City of Chicago – Office of Emergency Management and Communications (OEMC)

TECHNOLOGY
Video Monitoring

CHALLENGE
Extending video surveillance network to areas not served by fiber

SOLUTION
Firetide wireless mesh network

INTEGRATOR
IBM

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Hard-Working Security for "The City That Works"

Accommodating a population of nearly 2.9 million, Chicago is the third largest city in the United States, and the cultural and business capital of the Midwest. Located at the south-western tip of Lake Michigan, the city is a bustling international hub of transportation, busi-ness, and finance. Ensuring the safety and protection of its residents and visitors has long been one of the city's highest priorities.

Accordingly, Mayor Richard M. Daley created a department called the Office of Emergency Management & Communications (OEMC) whose integration of the latest in surveillance and telecommunications technology pioneers the fields of local emergency management, disaster preparedness, and homeland security.

To execute on its mission, OEMC is implementing one of the most advanced city-wide intel-ligent security systems in the United States. "Operation Virtual Shield" is a comprehensive plan to develop, implement, and maintain an extensive city-wide network and expandable video surveillance system. The network's fiber-optic backbone creates a "virtual shield" to provide total homeland security, public safety, and traffic management in Chicago. The video surveillance system is one of the world's largest—designed to keep businesses and citizens safer, prevent problems before they occur, and aid in disaster preparedness. To accomplish this monumental feat, Chicago's OEMC engaged IBM to create and execute a master plan for the project.

Collaborating for Success

IBM selected Anixter Inc., the world's leading distributor of communication products, as the project's supplier because of the company's technical expertise and ability to serve as a single source for all the required infrastructure products. When IBM discovered that only 30% of the city's cable pathways were accessible by fiber, Anixter quickly developed a wireless solution. Having already worked with Firetide on several projects, Anixter recommended Firetide mesh infrastructure for its excellent reliability and ease of deployment.

Within one week of coming on board, Firetide had its first mesh network in place and trans-mitting video optimized to the exact specifications of OEMC and IBM. Based on this success, IBM decided to use Firetide for the remainder of the wireless project.

Operating in the dedicated 4.9 GHz public safety band, Firetide mesh delivers exceptional reliability and performance in a very dense urban environment. Downtown Chicago has numerous high-rises and narrow streets, making for a challenging RF environment. The network performs well in the uncompromising climate of the Midwest, withstanding the snow and freezing temperatures of winter, and heat and high humidity of summer.

Custom enclosure, circled in red, with Firetide node inside

Chicago Surveillance System Gets Smarter

In the first phase of Operation Virtual Shield, IBM helped Chicago design and implement a surveillance infrastructure for real-time and forensic-related safety applications. The city already had thousands of security cameras in use by businesses and police, but the new system lets cameras analyze images in real-time, 24 hours a day.

The second phase of the surveillance infrastructure adds analytics that will provide license plate recognition, trending projects, and intelligent search capabilities to the existing infrastructure. “The city has long recognized how technology can be a force multiplier in the area of public safety, and this will be another step forward when it’s put into operation,” said Kevin Smith, a spokesman for OEMC.

Operation Virtual Shield will capture, monitor, and fully index video from surveillance cameras. The software used to run the system will be able to recognize not only specific license plates, but also vehicle descriptions, and even patterns of behavior. If someone drops a briefcase on a subway platform or a park bench, and it stays unattended for more than a minute, the system will be able to detect this and alert the OEMC, which then can dispatch police officers to the scene.

Chicago city officials say that the new system has some significant advantages over the current human-monitored cameras. “You’re talking about creating something that knows no fatigue, no boredom and is absolutely focused,” said Smith.

Wireless Mesh Fills the “Fiber” Gap

The city-wide video surveillance system uses a combination of uni-fied fiber and wireless mesh networking to make data available in real time. Without Firetide wireless mesh, it would have been too difficult and cost-prohibitive to install surveillance cameras every-where they are needed.

The combination of Firetide technology and network design pro-vides real-time, continuously streaming video from the cameras to the OEMC command center. Careful network design played a key role in Firetide’s ability to deliver fluid video, indistinguishable from the video provided by wired cameras. Firetide mesh nodes are deployed in two dozen meshes spread out around Chicago’s downtown area. The multi-mesh configuration provides sufficient bandwidth for each camera on the mesh. Each mesh then connects via a “head node” to the city fiber, with fiber backhauling the traffic to the OEMC com-mand center.

The Firetide mesh network forms itself, making installation even easier. It creates many alternate wireless links so the network is extremely reliable. Even if a wireless link is blocked or a node loses power, the video continues transmitting without any interruption in service. The ease with which cameras and nodes can be deployed was an important consideration, given the strict requirements of the city as to locations, mounting, aesthetics, and timing. Most instal-lation work had to be done outside of the main travel hours on the city roads.

Big Dividends for the “Windy City”

Firetide wireless technology allowed the city to deploy hundreds of additional cameras in the exact locations required, an option which would have been too costly to implement solely on fiber. Because the Firetide network allows real-time video to be transmitted wire-lessly, the city of Chicago has saved millions of dollars in wired infra-structure costs. IBM is also testing mobile technology that utilizes Firetide mesh infrastructure to allow first responders in police and fire vehicles mobile access to the video system.

Although operational for less than a year, the security system is already paying big dividends. Recently, the city held a disaster readiness drill that demonstrated the system’s ability to provide more “eyes on the street” than if relying on the police force alone. Prior to the system’s implementation, it would not have been pos-sible to keep an eye on as many potential “hot spots” that now have this added layer of protection.

According to Roger Rehayem, IBM client solutions executive for the city of Chicago OEMC, “The cameras are the eyes of law enforce-ment in areas where the city can’t have officers patrolling every sec-ond of the day. Chicago has the most advanced surveillance solution in the country thanks to its vision and commitment to public safety.”

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