Protecting the City and the Budget

Overview

VIDEO SURVEILLANCE IS EFFECTIVE but it doesn't need to be expensive. While first generation backhaul solutions proved the concept and value, the latest generation of wireless solutions are providing HD images at a fraction of the cost of wired or fiber alternatives. As the demand for video surveillance continues to increase, municipalities wrestle with the cost of citywide deployment. Budapest Hungary is deploying the latest technology on a private network with a payback of 2 – 3 years.

> "ePMP helped us put the cameras in locations that minimized rental costs and eliminated leased line costs. The HD image quality is better and we are expanding the network to add hundreds of additional cameras."
>
> -AKOS VARGA -
> TECHNICAL DIRECTOR,
> VIDEODATA LTD

Challenge

CAMERAS MONITOR THE CITY CENTER, TRAIN STATIONS, AND MAIN STREETS FOR PUBLIC SAFETY. In addition to sending police to the right place the first time, video surveillance is also used by the city public works department to prioritize building and maintenance projects to keep disruptions to a minimum.

City officials were seeking to improve the analog video surveillance system installed a decade ago. When the project was put up for bid, VideoData proposed a wireless solution that operated as a private network.

This would provide a higher definition security system while saving the city the monthly costs of leased line infrastructure. VideoData was awarded the contract, with the requirement that the solution would have to be designed, installed and handed over to the city in 90 days.

Location of Cameras in Elizabeth District

ePMP Access Point in Budapest City Center

"No problem," said Akos Varga, the technical director of VideoData. Akos is a professional wireless network engineer with more than ten years of experience who lives in the suburbs of Budapest. Having developed and maintained wireless networks for Closed Circuit TV (CCTV) in nine other districts including the city center, he was able to leverage his experience in wireless and detailed knowledge of the city to personally tailor a solution that would exceed expectations and eliminate the recurring cost of leased lines as communications infrastructure.

Video Surveillance Operations Center

Solution

WHILE THE ANALOG NETWORK HAD PERFORMED WELL, new technology was available to enhance performance. Image quality would be improved by installing High Definition (HD) IP based cameras across the network. New network encoders would be used to process the images, and an all-wireless network owned and operated by the city would replace costly leased lines that were connecting each of the 90 cameras.

ePMP Modules Connect Cameras and Provide Bandwidth for the Next Camera in the Architecture

"I live in the city and I had a chance to improve the system," says Varga. "They were paying high leased line rates for each location, and in some places were renting the space to install the camera. Where we were replacing analog cameras, we reused the power access. The wireless solution helped us put the cameras in locations that minimized rental costs and eliminated leased line costs."

To support the video network, VideoData selected the following equipment:

- Cambium Networks' PTP 650 wireless backhaul for high speed point-to-point links in the network backbone. With a maximum throughput of 450 Mbps and Non Line of Sight (NLOS) capability, this provided a high performance core.

- Cambium's ePMP™ wireless access network to distribute bandwidth to the HD IP video cameras. Given the spectrum environment with 50 Mbps upload speeds in a 20 MHz channel, each ePMP Access Point (AP) could accommodate 4 – 6 cameras.

"The PTP 650 and ePMP wireless infrastructure is very flexible in design," says Varga. "In many cases, we were replacing the analog cameras with new HD cameras at the same location. If we could not get permission to place a camera in a certain location, it was easy to link to another location with wireless connectivity."

Profile - VideoData

www.videodata.hu

Challenge

Design, install and turn over a 90 camera district wide video surveillance system that reduces operational expense (OPEX) in 90 days.

Solution

- Wireless point-to-point PTP 650 backhaul to connect infrastructure

- Wireless point-to-multipoint ePMP access to connect cameras

Advice from VideoData on Creating Wireless Video Surveillance Networks:

1. **Identify LOS links** – Line of Sight links are the easiest to install. Identify them first and focus on the small number of more challenging links.

2. **Use 5 GHz** – in urban areas, it has less RF noise and interference than other unlicensed frequecies.

3. **Get down to street level** – higher equipment encounters more noise. Use the buildings to isolate the signal from ambient noise.

4. **Narrow the sectors** – use point-to-point (PTP) links or very narrow sectors for multipoint (PMP) connectivity to improve noise isolation.

The distance between modules is approximately 1,500 feet (500 meters). RF noise isolation is critical to network performance. In dense urban areas many emitters use the 2.4 GHz frequency, while 5 GHz is relatively clear. VideoData placed the cameras 15 feet (4 – 6 meters) above the ground. This enabled the buildings and streets to provide isolation from other 5 GHz emitters and the geography created a "virtual waveguide" for connectivity. Most wireless links were in areas with clear Line of Sight (LOS). Some locations had near Line of Sight (nLOS) or complete non Line of Sight (NLOS). In a few cases, the system is able to reflect signal off of buildings and go around corners.

Installation was simple. "Everything was ready to use, right out of the box," says Varga. "Other solutions needed mounting equipment, routers or cables. ePMP is the best solution that I have found.

"ePMP is simple to install. Wireless is so flexible, I can design the network that I need." - Akos Varga

Results

FIELD PERFORMANCE IS OUTSTANDING. Cameras are able to consistently provide 6 Mbps streaming upload capability across the network. "With our MikroTik solutions, we were only seeing 30 Mbps of throughput, ePMP is providing betweeen 50 and 100 Mbps on a 20 MHz channel."

Modules perform well with no equipment failures. Round trip latency is consistently between 10 – 15 milliseconds, and HD video quality is consistently clear.

The system has proven itself to be effective in supporting public safety, traffic monitoring and public works project management and has been featured in local news reports.

Next Steps

VIDEODATA HAS DONE MUCH MORE THAN INSTALL VIDEO surveillance cameras. Varga has served the city in which he lives by improving public safety and reducing operational costs. Based on the success of this deployment, VideoData has been selected to deploy similar systems in other districts in Budapest. These projects will extend the deployment with hundreds more cameras.

"Of course, I will use ePMP for this extension," says Varga. "It is a proven solution that will create a homogenous network. And I know it will work."

Why VideoData Chose Cambium Networks:

- **Stable Low Latency** – provides consistently clear HD images

- **High Throughput** – enables 4 – 6 cameras to be connected to each access point

- **Simple Installation** – enables the network to be deployed in a matter of hours at each camera location

- **High Reliability** – maximizes system uptime and minimizes maintenance and repair costs