# Application Note

PROXIM *wireless*

LTE vs. WORP® for Outdoor Video Security Applications

OVERVIEW

Enhancing security has become a major initiative for every type of organization worldwide –from retail stores and enterprises to public areas such as metro stations and sports stadiums. The video surveillance worldwide spending is witnessing a huge rise and is forecasted to reach $1 Billion by 2019.

Forecast of Market Revenue for Wireless Infrastructure used for Video Surveillance
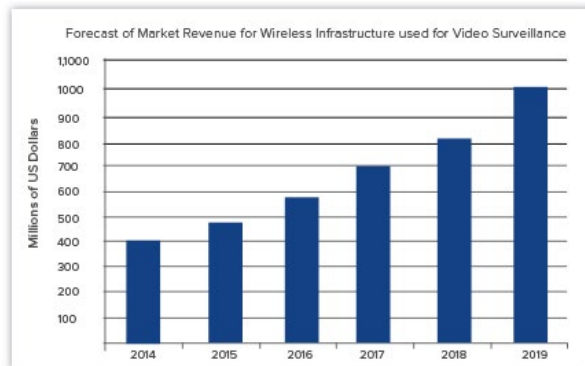
Traditionally, surveillance networks have used wire based solutions. However, with wider perimeters to secure, more 'hard to reach locations' and real-time 'on-the-move' communication demands by first responder teams, wireless is very aggressively taking its place alongside of fiber and other wired solutions in the video surveillance market. When it comes to selecting the right wireless network solution for video security, engineering teams often face a dilemma between LTE communication or WiFi technologies vs. dedicated WFT (Wireless for Things) technologies such as WORP®. WiFi, with it's inherent equal access MAC protocol, is a poor choice for video traffic given it's limited QoS capabilities. This application note addresses the LTE Vs WORP® decision for wireless video security with a pragmatic evaluation of each technology as it compares to video security requirements.

Introduction to LTE:

Short for Long Term Evolution, it is the fourth generation of mobile communication technology released by the 3GPP. LTE is predominantly a "WFP" (Wireless for People) technology that provides mobile broadband access of several Mbit/s to smart phones and mobile modems in laptop computers and tablets. LTE is essentially designed to support hundreds of users per cell in a mobility environment. While the LTE technology has the technical ability to support both fixed and mobile HD video applications, the major drawback are the recurring costs associated with an LTE based solution. LTE is typically offered as a service by MNOs (mobile network operators) in 'packages' or for a 'monthly fee'. As we will see ahead, this pricing model turns out to be cost-prohibitive when used for bandwidth intensive applications such as video surveillance.

Introduction to WORP®:

WORP® (Wireless Outdoor Routing Protocol) is a robust, field proven protocol that has been designed from the ground up to exclusively address the requirements inherent in WFT.) WORP® is a reliable, secure and efficient protocol designed to optimize the performance of multi-media outdoor wireless Point-to-Point (PtP) and Point-to-Multipoint (PtMP) links using advanced packet radio technology. Additional advanced complementary technologies such as Proxim ClearConnect, a suite of RF Robustness technologies and FastConnect, Proxim's fully mobile solution deliver high capacity connectivity in both mobile and fixed deployments. In terms of cost, organizations in this case own the entire network infrastructure, resulting in a lower TCO with a low one-time capital cost and negligible recurring costs. To learn more about WORP® click here.

HD Video Cameras: A Bandwidth Hungry Application

Typically, a single HD camera generates traffic from 60 Mbps before compression depending on environment, lighting, frame rate etc. In addition many video security applications require multiple cameras, multiplying the number of streams or Mbps needed times the output generated by each camera. To reduce this huge consumption, advanced technologies such as H.264 compression algorithms do reduce the consumption to almost 20% of the raw bandwidth, however, on doing the math, one HD camera still consumes between 4-10 Mbps of bandwidth.

Megapixel	Name	30 fps	Monthly Consumption	24 fps	Monthly Consumption
0.3	VGA	1.10 Mbits/Sec	2784 Gb	.88 Mbits/Sec	2224 Gb
0.4	NTSC	1.24 Mbits/Sec	3136 Gb	.99 Mbits/Sec	2504 Gb
0.9	HD 720p	3.31 Mbits/Sec	8376 Gb	2.65 Mbits/Sec	6704 Gb
2.1	HD 1080p	7.46 Mbits/Sec	18880 Gb	5.97 Mbits/Sec	15104 Gb

LTE vs. WORP® for Video Surveillance Applications: One size doesn't fit all

Keeping in mind the heavy bandwidth consumption, it is clear that with LTE , deploying medium to large scale surveillance networks, can quickly add up to a huge monthly fee. Whereas, WORP® via one time CapEx expense plus nominal OpEx means that after as little as one year the OpEx of an LTE based video security network exceeds the CapEx deployment cost of a WORP network. Organizations can also use the same WORP® powered network infrastructure for other applications such as data connectivity, voice over IP, Emails at no extra cost.

LTE vs. WORP® for Mobile Applications

For video cameras installed on trains, trams, buses, ferries and more, off loading the traffic can only be achieved with a wireless solution. Again in these types of applications, while LTE provides multi-megabit per second data rates, the cost involved in supporting multi-media applications such as traditional voice and messaging services make LTE a suboptimal solution.

Case Study: Madrid-Metro

Proxim's Mobility Solution Powers Video Surveillance and Wi-Fi Access in Metro Ligero Oeste Line, Madrid

Overview

With a fleet of 27 vehicles and 3 railway lines traversing a total distance of 22Kms, the Metro Ligero Oeste (MLO), S.A. has been built to provide a safe, punctual and fast transportation service in Madrid. Thousands of riders each day use this public transportation, and they want not only WiFi access while en route, but the safety from video surveillance as well.

Challenge

José Luis López Jiménez - Director of Systems at Metro Ligero Oeste and his team were tasked to provide reliable, high-speed onboard internet access in the trains. The requirement also included a reliable network infrastructure for train route management and real time communication between ticketing systems and the vehicles. Furthermore, to enhance passenger safety and security, the infrastructure was required to support real-time video transmission from onboard CCTV cameras and VoIP services for real-time Public Address system for emergency situations.

Solution

The network incorporates Proxim's field proven FastConnect technology that guarantees dedicated bandwidth and supports seamless application handover to ensure a high quality of service and service continuity. It also incorporates WORP® and ClearConnect™ for robust, multi media high capacity operations, making Proxim's solution one of the most advanced train mobility communications solutions.

The solution implemented incorporates two primary elements:

1) Proxim's Base station Units (BSU): deployed along the train route to provide continuous coverage and connectivity.

2) Proxim's Subscriber Units (SU): mounted on the roof of the train to assure continuous communications with the nearest BSU.

The solution consists of 80 Tsunami® point to multipoint base stations with 60° sector antennas along the 22 Kms of tracks including tunnels, train yards, etc. Subscriber units are installed on train roofs. For onboard internet access, two Orinoco access points are placed in every train.

Result

Proxim's solution operates in challenging environments and underground tunnels to provide upto 15Mbps internet speeds on every train. The infrastructure supports additional applications such as Ticketing, Public Announcement (PA), Communication based Train control (CBTC), and CCTV for enhanced traffic monitoring and incident management.

"The biggest reason for selecting Proxim's wireless solution was the mobility future. Proxim reliably connects the entire set of applications including many mission critical ones across the distributed sites, while at the same time provides "on the move" internet access to approximately 700 passengers daily." - José Luis López Jiménez - Director of Systems at Metro Ligero Oeste.

Highlights

- Metro Ligero Oeste (MLO) required mobility enabled high-bandwidth connectivity to support onboard video surveillance and internet access
- FastConnect Technology guarantees seamless handoffs between base stations
- Multipoint Network installed along the tracks to support mobility and access points for onboard Wi-Fi

Conclusion

As summarized in the table below, from a performance standpoint both LTE and WORP® can provide scalable, resilient networks. However, from an economic perspective, WORP® has clear advantage for mobile and large scale surveillance applications.

In the field of video security, where the traffic is mission critical, there is only one solution available today that can meet high availability and QoS demands. Proxim's Tsunami Point-to-Point and Point-to-Multipoint products provide true 4G wireless backhaul and connectivity for top-of-the-line, high-performance

Feature	LTE	WORP®
Gigabit Capacity	✓	✓
Quad Play Support	✓	✓
Quick Deployment	✓	✓
Mobility Support	✓	✓
Low TCO		✓

and ultra-secure fixed and mobile applications. The culmination of WORP® and advanced Proxim ClearConnect technologies enables carrier-grade reliability, performance and quality for robust connectivity even at high speeds. For everything from traffic surveillance and synchronization to emergency video for first responders, Proxim's wireless solutions provide the highest performance, flexible,scalable, and cost-effective solutions.

Company Profile

Proxim Wireless: Performance Matters. Proxim Delivers.

Proxim Wireless is a pioneer and global leader in advanced Wi-Fi, point to point, and point to multipoint outdoor wireless systems that are purpose built for mission critical and high availability communications. With over 30 years of wireless experience, Proxim is recognized for its unparalleled reliability, superior performance and drive for innovation.

Products and Markets

Marketed under the ORiNOCO® and Tsunami® brands, Proxim provides a comprehensive product line for a wide variety of market segments including enterprises, service providers, carriers, governments and municipalities, Wi-Fi Operators/Hot spot Operators and other organizations that need high performance, secure scalable wireless solutions.

Go to Market

Proxim serves customers through a global network of distributors, value-added resellers, system integrators and original equipment manufacturers. Our strong internal sales force also engages in direct-touch, consultative selling with major customers regardless of whether fulfillment is direct or via a channel partner. Our experienced system engineering team is available to provide professional services to both our channel partners and end customers.