

Communicate. Locate. Interoperate.

MESH Enabled Architecture Solutions for Police and Law Enforcement Agencies

INTRODUCTION

Today's Public Safety vehicles have become mobile offices. Built-in mobile data terminals (MDT's) are used to access, download and transmit information to assist officers and command staff in their daily tasks. However, today's low speed data networks are limited to text-only and other low bandwidth applications. Every day, police officials are disadvantaged by not having access to applications like streaming video, multimedia e-mail and content-rich databases. These innovative tools of the trade would allow them to more effectively carry out their duties. The fact is that these applications are available today, but the bandwidth available from cellular and data services needed to support them is not.

THE CHALLENGE

On Aug. 8, 2002, the US Federal Communications Commission announced the end of CDPD (Cellular Digital Packet Data) services - a specification for supporting wireless access to the Internet and other public packet-switched networks. Public cellular operators are attempting to persuade Law Enforcement agencies to switch from the CDPD network to data overlay networks such as GPRS and 1xRTT. These data services are built on top of cellular voice networks; hence they still only offer low bandwidth (typically 30 to 60 KBPS). In addition, they do not offer the same coverage as CDPD, yet come with a much higher monthly service and equipment fee.

Some Law Enforcement agencies are looking to Wi-Fi for a solution. However, this solution ties police officers to tiny, pre-defined "hot spot" areas. Wi-Fi solutions do not offer the high bandwidth connectivity where police officers need it most - en route, or at the scene of the incident. These agencies have been tasked to provide officers with tactical data communications tools that enable them to better protect their communities serve the public interest and ensure their own safety.

Police organisations are also challenged to keep their operations continuously up and running during emergency situations. Protecting the public depends on continuity of communications - being able to access information and immediately respond with high situational awareness in the event of a disaster. In a field

survey conducted by McKinsey & Company in 2002 of 453 police officers who responded to the New York World Trade Centre (WTC) September 11th attacks, 50% reported that their radios failed after WTC Tower 1 collapsed. The public safety communications infrastructure was severely overloaded and then damaged, as the event ran its course. When choosing a data communications solutions, police agencies have learned that large-scale responses require effective coordination and communication among different agencies and levels of government.

"...nothing is more important in times of cataclysmic events than the ability of public entities to speak to one another."

FCC Commissioner, Kathleen Abernathy, December, 2001 Conference on Homeland Security

Clearly there is an urgent need to resolve interoperability issues between personnel of different public safety agencies. Recent high profile incidents have tested the ability of government and public safety organisations to implement a well coordinated response. In many cases, it was the shortcomings in the existing communications networks that hindered effective response and coordination between these various institutions.



The Solution

Responding to the need of Police and Law Enforcement agencies, MESH Enabled Architecture (MEA) technology offers an integrated wireless communications solution that provides a high performance, survivable broadband network. By leveraging technology originally developed for battlefield communications, MEA supports high speed data, video, voice messaging and geo-location services for fixed and mobile users. Motorola's MEA solution is designed to improve the efficiency and responsiveness of Police assets, while increasing their safety. All elements in a MEA network come together to create a wireless mesh of coverage that offers a range of benefits.

High-speed data, video and voice services

Motorola's mobile broadband products wirelessly deliver high-speed data connectivity, with burst rates up to 6 Mbps. All MEA products support end-to-end

Internet Protocol (IP), so any IP device or application works seamlessly in the network. This makes it possible for personnel with Mobile Data Terminals (MDT's) Personal Digital Assistants (PDAs), laptops and other mobile devices to connect to local, state and federal databases and networks. It also supports mobile high-speed links to the internet at data rates previously available only over wired broadband connections such as DSL and cable modems.

Robust and survivable networking

Motorola's products use a patented peer-to-peer technology that helps to eliminate single-points of failure. Every device in the MEA network acts as a router or repeater for all other devices in the network. This means that each device and user can "hop" through neighbouring devices to communicate with each other - and to reach network access points that can connect them to other data and voice networks. This distributed topology helps eliminate the single points of failure and bottlenecks found in public cellular data networks by creating an interconnected private web between devices. This capability

creates a robust, distributed network that automatically routes around congestion. In essence, every MESH enabled user helps make the network more scalable and more robust.

Supports agency and application interoperability

Self-forming, scalable, IP-based networks allow public safety agencies to share information and mission critical applications. When two agencies with MESH enabled devices converge on an incident, a single network can be formed between every device - increasing coverage, communications, and situational awareness instantly.

Mobile connectivity

Motorola offers a true wide area mobile wireless solution to Law Enforcement agencies. Data connectivity and location and positioning services are available throughout the network to both stationary and mobile users, even at speeds in excess of 150 mph!

Cost effective and efficient

MESH enabled systems are less expensive to implement and more robust than conventional cellular or other wireless alternatives. With Motorola's MEA technology every device in the network can connect directly, or "hop" through the network to reach any other device. This is also known as peer-to-peer networking. Peer-to-peer networks help eliminate the need for vulnerable and expensive radio towers. Since there are no centralised bottlenecks in a MESH enabled wireless solution, user data rates and capacities are very high.

MESH ENABLED APPLICATIONS

A Motorola communications and location network provides Law Enforcement agencies with wireless networking solutions that can make initial dispatch, incident response and field reporting activities more productive and efficient. In fact it makes a whole host of new applications and capabilities available that will increase effectiveness of the entire organisation.



Wide area data connectivity

MEA networks are the perfect solution for agencies being forced to find a CDPD replacement. They offer high-speed broadband capabilities that can support today's and tomorrow's data intensive dispatch and incident reporting applications.

Asset tracking and location

Motorola's MEA technology is the only solution that provides reliable, mobile, wireless communications and location and positioning services in an integrated solution. Dispatch can track each MESH enabled vehicle and individual to increase his or her safety. Location information can also assist in the deployment of resources, giving a visual map of asset positions at an incident or across an entire city. Location information is generated quickly and accurately: typically 10 metres or better in under one second.

Supports desktop applications in the field

E-mails with attachments, database look-ups, instant messaging, routine reporting and file transfers can be sent or received by mobile units. High-speed data rates and end-to-end IP protocol support create a desktop-like experience in the vehicle or on the street.

Real-time video monitoring and surveillance

MEA networks provide bandwidth needed to enable field officers to wirelessly receive video feeds from helicopters, public safety vehicles, building security systems and traffic cameras. Likewise, video from dashboard video systems can be sent back to dispatch and monitored in real-time, improving the safety of the officer.

Voice back up

Voice messaging can provide an emergency back up to the primary voice communications network. Instant messaging and email support also can be used until the primary voice service has been restored.

Instant tactical networking

MEA technology enables instant incident communications networks to be deployed virtually anywhere, anytime. Routes and links are automatically formed between users, no pre-installed network infrastructure is needed. SWAT, incident response and other specialised units can deploy a broadband tactical data communications network, simply by turning on their MESH enabled devices. Video from supporting aircraft can be sent wirelessly to the ground units to improve situational awareness.

PARTNERING FOR COMPLETE SOLUTIONS

Motorola has working relationships with many partners who provide custom and total solutions to meet Police needs. Network engineering, applications, devices and other services are available from this team to meet the requirements of the smallest or largest organisations.

SUMMARY AND CONCLUSIONS

Law Enforcement agencies are faced with convergence of several issues that are putting more demands on their resources. Increased responsibilities for local national defence, tight budgets and the demise of the CDPD network are all challenging the ability of these agencies to meet their primary mission: to protect the lives and property of the public. New communications technologies can play a vital part in addressing all of these needs. However, these new systems must also address the shortcomings of existing wireless networks. Survivability, support for desktop data speeds and integrated location services are obviously required, but these must come at a price that make deployment affordable.

Motorola's MEA solutions offer a complete mobile, IP-based network for high speed data, video, voice messaging and location services. Its Multi-Hopping peer-to-peer architecture makes it ideal for both wide area and tactical incident communications. Originally developed for the military, MEA provides survivable and cost-effective networking by leveraging a distributed meshed infrastructure. Motorola is offering these solutions today.



To learn more about Motorola's MEA products and other MESH enabled solutions, please visit our MESH website at www.motorola.com/emea/mesh



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