

Synergies That Save

The right network can help public safety agencies meet the latest communications objectives while saving money and improving efficiency across governments.





Introduction

Communication Collaboration

Public safety and civilian agencies gain numerous benefits from network convergence.

Public safety agencies are under constant pressure to improve the interoperability and coverage of their communications networks. In addition, they must deal with spectrum limitations, keep up with evolving technology standards, and most importantly, avoid network failures. And government agencies everywhere — both public safety and civilian — are being asked to cut costs without reducing service levels.

As public safety agencies move to upgrade their radio networks, some innovative jurisdictions have tackled these issues by working with Alcatel-Lucent to integrate public safety radio and civilian data networks. By integrating fiber networks with IP-based wireless networks, public safety and civilian agencies get the best of both networks, therefore improving efficiency and cutting costs while meeting their respective challenges.

Using standards-based equipment that interoperates with both old and new systems and complies with the latest public safety standards, Alcatel-Lucent has helped numerous public safety agencies build microwave networks that meet current demands while providing the flexibility to address the emerging needs of tomorrow. The company

has also worked with many governments to create highly efficient data networks with its world-class network equipment and multi-protocol label switching (MPLS) technology. By integrating radio and data networks, both public safety and civilian agencies can extend their networks without laying more fiber or deploying additional towers.

Increased Efficiency

While a strong network infrastructure is essential to supporting the varied data types that traverse a converged network, MPLS technology helps ensure that the converged network meets users' needs and lets the various data types and traffic patterns coexist on the network without sacrificing quality, reliability or security.

MPLS allows administrators to prioritize traffic based on type — such as voice, video or static files — or by user groups. For instance, emergency responder voice traffic, which must be delivered in a continuous stream, could take top priority, while e-mails, which can take a second to traverse the network without any repercussions for the end-user, take a relatively low priority. It also allows administrators to segregate traffic for security purposes and limit access to certain areas of the network to specific user groups.

MPLS also offers dynamic bandwidth allocation, which makes the network more efficient for everyone. Traditional networks might limit lower priority applications to a fixed bandwidth connection. For instance, an employee watching a training video might be subject to slow load times and video stream interruptions, while high-priority applications, such as IP phone systems, keep a large amount of bandwidth in reserve to account for the maximum possible load. With MPLS, unused bandwidth can be "borrowed" when required.

With so many data-rich applications on the horizon for first responders, it's essential that public safety agencies prepare for those infrastructure demands even as they work to meet today's challenges. Alcatel-Lucent's radio, fiber and convergence solutions and expertise can help agencies do so cost-effectively.

Case Study

Across the Sea

Maui County MIS and Police Department converge networks for increased bandwidth, better redundancy and improved network management.

The Management Information Services (MIS) Department of Maui County, Hawaii, runs a highly efficient fiber-based network on each of the county's three populated islands, but that efficiency is contained to each island.

"The infrastructure is kind of chopped up," said Jacob Verkerke, information services manager for Maui County.

The county uses fiber from the local cable company, but it doesn't reach across the water so the county has been leasing T1 links to reach the other islands, which reduces bandwidth considerably.

"In the beginning, it wasn't too much of a problem," Verkerke said, "but now everyone expects to do video conferencing, and doing that over a T1 along with the normal data traffic is really not something we can sustain."

MIS found a solution in working with the Maui County Police Department. Both organizations had recently worked with Alcatel-Lucent to upgrade their networks. The Police Department moved from an older analog radio network to a digital microwave network, and the county upgraded its data network from a routed to a switched architecture. As a result, the two organizations saw an opportunity to work with the vendor on a convergence project that will benefit both the county data network and public safety communications in numerous ways.

Better Public Safety Network

When manufacturer's support ran out on its old analog network, the Police Department saw the need to deploy a network that could be enhanced as its needs grew.

"We were at the point where we had to have the capability and transport capacity to pass voice, data and video at higher speed, on adequate bandwidth and on a system that is reliable and stable," said Capt. Jeffrey Amaral, who oversees the Police Department's radio network.

The new IP-based microwave network with MPLS allows the police to accommodate older technology on the network while being ready for future technologies. The department will soon replace its push-to-talk radio system, and the new network will accommodate the P25 solutions it is considering.

"I can't say it's limitless, but we certainly have more diversity than we've ever had," Amaral said.

With the ability to dynamically allocate resources and manage network traffic, the Police Department can allow county data to traverse its wireless network without impacting crucial public safety communications. Now bandwidth-intensive county data is beginning to reach other islands and save the county money on leased T1 circuits.

"I have to haul traffic out to these areas anyway because my sites are out in those areas. So in that partnership all of my surplus



bandwidth is available to the county," said Walt Pacheco, communications coordinator for the Maui County Police Department.

"We are still a ways away from having the full deployment and the full convergence in place," said Verkerke. "But we have already achieved bandwidth improvements for the data side to remote locations by being able to travel across the microwave network."

The convergence benefits don't only go to the county data network; the Police Department also can now extend its coverage by allowing communications to cross the fiber network en route to their destinations. The Police Department also has its own leased lines to ensure secure communications with federal databases. With the new arrangement, the department can use MPLS and firewalls to route the data across the county's fiber infrastructure instead.

In addition to cost savings, the converged network will provide redundancy.

"The beautiful thing about it is if we lose any segment of the network once we've created a mesh with alternate routes, the MPLS infrastructure will quickly reroute itself around any seam or breaks in the network," Pacheco said. And when all is well on the network, the MPLS will move traffic along the fastest route available.

Resilient, Reliable Operations

Once the convergence is complete, data network administrators will be able to reroute network traffic with a few keystrokes if an office or building is no longer accessible, thanks to MPLS.

"It offers us the ability to move our PSAP if our primary public safety answering point here at the station is compromised," Pacheco said. While 911 calls would be redirected to a new location by the local telecommunications provider, connectivity to computer-aided dispatch systems could be routed quickly and easily to the new location using the MPLS capabilities. "We can relocate and still keep the data connectivity going."

In addition, the prioritization enabled by MPLS will ensure that public safety gets first priority on the network if there's a surge in network traffic, as often happens during a disaster.

Pacheco said the Police Department keeps spare parts on the islands and a warranty agreement with Alcatel-Lucent to ensure that the network is always up and running, but so far, he hasn't had to use either of them. "I'm happy to say that in the time we've been on the air, we really have not had an issue."

Coming Together

Statewide IP-based radio network links Maine public safety agencies and opens a world of opportunities for the state.

Around the turn of the 21st century, Maine found itself in an unenviable situation: The state's 17 public safety and public service agencies were operating on disparate, outdated wide-band analog radio networks. Outages were common, and while bridges had been created to connect the systems via seven dispatch centers, responder agencies such as the State Police, HAZMAT and Emergency Management, lacked seamless communications with one another.

"Every agency did their best to ensure their staff had reliable radio communications, but over time, each agency built on their system, going in their own direction," said Maine's Director of Radio Services Shawn Romanoski. "They each had their own policies; each had their own staff for maintenance."

At the same time, the FCC issued a mandate requiring public safety agencies to move to narrowband to conserve spectrum.

Maine turned its challenges into an opportunity. After consolidating network and radio services within the Office of Information Technology, Maine is now pursuing a new statewide radio network that will provide the carrier-class reliability its public safety agencies need. And as the state moves toward converging data, voice and radio services on the same network, it anticipates big cost savings and efficiencies.

"The Maine State Communications Network (MSCommNet) project is an example of converging technologies, standardization, and multiple state agencies working together to build a state-of-the-art communications infrastructure," said Greg McNeal, Chief Technology Officer for the State of Maine. "The Office of Information Technology (OIT) is taking the lead on this project. This is a tremendous learning experience for us and our business partners. Together we will develop a system that will greatly enhance our public safety communications interoperability."

More Control

With a single statewide network, Maine's public safety and public service agencies will be able to communicate seamlessly. The new system, which will be built on an IP-based microwave

network from Alcatel-Lucent, will interoperate with both digital and analog systems used by local agencies and comply with public safety standards, such as the P25 standard for land mobile radios that many agencies are moving to.

MPLS technology will help ensure that bandwidth is allocated to the various agencies efficiently and traffic is managed appropriately. Going with an IP-based network will also afford radio services more control over the network. Because devices, like computers and radios, accessing an IP network are identifiable, officials can track network use. In addition, the integration will allow radio services to use a standards-based network management system to remotely troubleshoot problems.

Currently if the system fails, he said, the only way radio services knows is if a user reports it. "We then put technicians into a truck. We may load up ATVs or a snowmobile depending on the time and location. They then drive for sometimes six or seven hours to a site to reset a switch," Romanoski said. "Under the new system, we will be able to do that remotely."

Further Integration

Initially the state will focus on the public safety communications network. Only data traffic from the state's seven dispatch centers will be carried over the network.

"Once we determine the total capacity requirements for those seven dispatch centers, we will then start to migrate other data onto the network," he said.

Using the microwave network backhaul to move data across the state could save Maine significant money by reducing its reliance on the leased lines it currently uses to transport data. But immediate savings will come from the state's ability to consolidate its network and radio operations and improve operational efficiency.

"This allows us to operate and achieve efficiencies between network and radio," said Romanoski, "not just from a bandwidth perspective, from a leased line perspective. It's also from a staffing perspective, it's from office space, it's from billing — so many of these things will now be consolidated."

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