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NETWORK INTEROPERABILITY

"When it comes to real-world disasters, the lack of interoperability typically translates into response agencies not being able to communicate across radio systems." As Director of Enhanced 9-1-1 in Lexington, Ky. and nearly 30 years of experience with the Lexington Division of Police and 15 months at the helm of Lexington Enhanced 9-1-1, I've seen the realities of next-generation public safety communications—what it can be and what it should be. You can't go 60 seconds in a conversation about public safety communications without someone using the word "interoperability." Plus, the number of interpretations—and misinterpretations—of what "interoperability" actually means is directly related to the number of participants in the conversation. That's because "interoperability" means something different to the many facets in the industry. One commonality, however, is that regardless of how the term is used, interoperability is vital to realizing the true potential of next-generation public safety communications and how we can better protect lives. But in order to realize that potential, everyone who has even a cursory stake in public safety

operations should be aware of the breadth and impact of interoperability—in each of its expressions. While there are numerous levels and sublevels to interoperability, network and component interoperability are the two core considerations mentioned in this article.

Disasters, man-made or natural, can happen anywhere and to any city, county or municipality, regardless of size. In public safety, we throw around the term "interoperability" as if it is a panacea to solve all issues during a disaster or large event. However, at the disaster exercises I've assessed, the interoperability topic often appears prominently in after-action reports, where technicians are observed spending the vast majority of the exercise huddled around an integration device trying to get it to work. When it comes to real-world disasters, the lack of interoperability typically translates into response agencies not being able to communicate across radio systems. This is why network interoperability is so vital. When jurisdictions can seamlessly connect to neighboring radio systems, first responders can step in and collaborate quickly and efficiently, which can make the difference when lives are on the line. For instance, if a natural disaster rips through a small town or city, it's easy to imagine that police, fire and EMS could be overwhelmed with the sheer volume of emergency calls and requests. And with the influx of manpower support from nearby jurisdictions, the lack of communication and coordination due to conflicting network infrastructures can complicate an already dire situation. Fortunately, agencies across the nation are taking note and have invested a significant amount of money on temporary integration systems, multi-band radios, command posts, emergency operations centers and other solutions to achieve network interoperability. If used properly, these resources are a good investment. However, an even better investment would be the deployment of an Inter-RF Subsystem Interface (ISSI) gateway, which integrates cities in close proximity of each other. A high degree of interoperability can be achieved if P25 (Project 25) radio systems from different manufacturers are linked through an ISSI. What you get is a system of shared systems that allows users to roam freely in the coverage area. Imagine police, fire and other first responders roaming freely throughout a coverage area without the fear or doubt of their ability to connect and communicate. This is possible when several cities or counties with different P25 800 MHz radio systems connect through an ISSI gateway. That's the future we should strive for. That should be the end goal when purchasing radio systems.

SO HOW DO YOU AVOID THIS SITUATION?

Begin with a bid process that requires vendors to disclose all proprietary features. Understand how these features directly or indirectly impact your ability to purchase replacement components, handheld and mobile radios, as well as how the features will interface with legacy radio systems and other agencies' systems in the region. An important point is to find out if the vendor's price is contingent upon acceptance of one or more of the proprietary features. These simple actions on your part increase your ability to evaluate proposals on an "apples to apples" comparison. Fortunately, there are industrywide changes taking place that can help.

COMPONENT INTEROPERANILITY

It's astonishing how many agencies buy a new radio system only to get an unpleasant and costly surprise soon after implementation. The surprise comes in several forms but it usually involves functions and features that are proprietary to the system. A common example is when a land mobile radio (LMR) vendor's bid is presented as the best value because it includes a "free" capability, such as encryption or interface capabilities. Here is where the surprise comes in. Since the "free" feature is proprietary to the vendor's system, agencies are only able to benefit when using this same vendor's handheld and mobile radios. The proprietary feature locks you into using a single vendor, which limits choice and control. I recently met two E9-1-1 directors who were stung by this approach and it opened my eyes to the importance of component interoperability, or the lack thereof, in radio systems. One lamented that his city paid thousands of dollars more for each radio because of proprietary "freebies" included with the radio system that were absolutely necessary for certain routine operations, such as encryption, talk-around and group paging. Both directors bemoaned the fact that the initial cost savings of the radio system evaporated when they learned that their handheld and mobile radios could only be purchased from the same vendor—at nearly double the cost of similar radios. The price hike for radio units typically sneaks in during the year after the initial system purchase.

INDUSTRY STANDARDS ARE CHANGING THE COMPONENT INTEROPERABILITY LANDSCAPE

Industry standards offer the hope of reshaping the LMR marketplace for the better, but only if cities, counties and states insist upon it. The infrastructure behind digital radio systems involves computers that perform multiple functions, switches, combiners and antenna. Industry veterans may remember the days when spare parts for many systems could be purchased from electronics vendors without the need to go through the original system installer. Today, that's not necessarily the case. A vendor can install a complete system that includes core components that can only be purchased from that same vendor. So when a computer performing a key function fails, it's not as simple as reinstalling software onto another computer—even if it's completely capable of running the application. Without industry standards for interoperability, customers must buy a replacement computer from the original system vendor. Clearly, the vendor controls the life of its products but what happens when the vendor decides that a core component is at its "end of life" and will no longer offer it? For some agencies, the shock comes in a letter from the vendor notifying the agency that their six to eight-year old, multi-million dollar radio system will be phased out and support will cease on a specified date. Imagine delivering that news to your elected leaders just a few years after installing a state-of-the-art system. That's when public safety agencies begin shopping for used parts on the Internet to keep their legacy systems in operation as long as possible.

SO WHAT SHOULD AGENCIES DO?

A good first step is to ask your vendor which components must be purchased from them and which can be purchased on the open market. When purchasing open-market items, it may be necessary to ship a replacement part to a vendor for configuration, and it may help to have the vendor integrate the replacement component into the larger system. But bottom line, you will have the part. Those who manage radio systems should demand the option of pricing components on the market to get the best value for the agency, and more importantly, the taxpayers. Tests are changing the component interoperability landscape When it comes to regulating industries, it seems counterintuitive to suggest that having the federal government weigh in on radio systems, integration and interoperability would yield a positive outcome for all public safety agencies. However, that is exactly what it may take for us to install a new radio system and continue to be able to use the handheld and mobile radios purchased earlier for the previous system. But there is a better way—interoperability testing. Inter-operability testing is a rigorous examination process where vendors have their products tested and certified to work on the radio infrastructures of competing vendors before going to market. Once on the market, agencies can test radio communications between their existing handheld and mobile radio units from their old system to the new radios on the new network and determine feasibility and functionality. Agencies can also ask a manufacturer to test sample radios on a new system in a lab environment to confirm point-to-point communication and determine which functions will and will not operate properly. While this is demanding and intensive, this testing is nevertheless the most cost-effective approach. It ensures that every piece of equipment is used to its fullest potential and that there are no issues that hamper emergency response. Although interoperability testing ensures functionality between systems, many vendors are reluctant to participate. Clearly, they would rather you buy everything from them, from the handheld to the dispatch console. However, this places agencies that have a large quantity of handheld and mobile radios into a corner if they select a radio system from another vendor. The Association of Public Safety Communications Officials' (APCO) P25 standard was meant to alleviate this issue and promote interoperability within the industry. When a large contract is at stake, manufacturers will express interest in testing their radio units and commit to interoperability, but they rarely follow through. These same manufacturers will be quick to caution that they're not responsible if their brand of radio fails to perform properly if used on another manufacturer's infrastructure. Of course, this framework is designed to keep customers locked into a single source for their radios and to pay the price for single-source. To be fair, manufacturers have the right to proprietary features and they have the right to only make them available on certain systems, but the core capability and functions essential to public safety should work universally. Basic connectivity and communication should be seamless. This is where the government could step in to help.

INTEROPERABILITY FOR THE NEXT GENERATION

Interoperability is forever evolving. With the next generation of public safety in the works, smartphones, tablets and other commercial devices are delivering a vast amount of information, intelligence and evidence to public safety— more than we ever thought possible. Text to 9-1-1 has rolled out in some jurisdictions, but that is only the beginning. Within the next decade, live video will be streamed to responders in the field, often in real time, and law enforcement will get a live view of inside a facility using IP-based video surveillance systems. Soon, interoperability will call for public safety agencies' ability to capture and store the images, video and text in an archival manner required for instant replay and evidentiary purposes. Interoperability has come a long way from exchanging handheld radios between agencies at an emergency scene. The meaning of the term "interoperability" continues to expand. It means requiring radio systems that work together through a gateway, either permanently or on an as-needed basis. It means ensuring that the radio system core is comprised of components that can be obtained from multiple sources and doesn't become obsolete the moment a vendor decides a master site controller will no longer be manufactured or supported. Interoperability also includes the ability of multiple brands of radio to work on a manufacturer's infrastructure, which provides agencies choice in selecting radios, while also demonstrating good stewardship of taxpayer dollars. The ability to integrate entirely separate radio systems is critical to achieving large-area or statewide interoperability. It also ensures jurisdictions have access to public safety communication systems should they lose their master site. Regardless of how it is defined, we should demand that our federal government and public safety industry work together for the common goal of interoperability. We can't afford not to.

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