BY JAMES CARELESS

DENVER PICKS NetworkFirst

The 1999 Columbine high school shootings was a horrific event for the people of Colorado, and an astounding challenge for the first responders who attempted to deal with it. The combination of multiple agencies and incompatible radio systems at the scene severely hampered their responses.

Mindful of this problem, and faced by communications issues at subsequent multiple responder situations since Columbine, the Denver Police Department (DPD) has been seeking an interoperability solution. After a field trial held in Denver in December 2004, the DPD has selected M/A-COM's NetworkFirst to solve its interoperability problem once and for all.

"We've kept the NetworkFirst demo running since we set it up last December," says Dana Hansen, the DPD's superintendent of communications. "It's worked just fine the entire time, helping local police, fire, and EMS communicate freely with each other plus the FBI, DEA, and the US Marshal."

How NetworkFirst Works

In essence, M/A-COM's NetworkFirst works as a Voice Over IP switch (VoIP), one that interconnects incompatible radio systems in the same way Ma Bell interconnects telephone subscribers. The difference is that NetworkFirst is connected into

each agency's radio system, rather than their telephones, and interoperability in instantaneous.

Specifically, each participating radio system outputs its audio into a NetworkFirst voice gateway that converts the audio into IP data packets. The packets are then routed over a private IP network into a NetworkFirst Switching Center.

Connected to all the participating agencies, the Network Switching Center plays telephone operator; automatically routing traffic to and from each agency's voice gateway (which converts the transmissions from IP to voice and vice versa) as required. The result is instant interoperability; one that can easily accommodate network players simply by deploying more voice gateways and connections to the Network Switching Center.

"From the user's standpoint, achieving interoperability with NetworkFirst is quick and easy," Craig Moore, M/A-COM's NetworkFirst product manager, said. "M/A-COM has developed the software switch application to make it happen—and NetworkFirst uses off-the-shelf hardware that is affordable and widely available."

Denver's Deployment

Even before NetworkFirst was deployed in Denver, the DPD had some experience with interoperability solutions. "In fact, we have been using JPS ACU-1000 12-channel audio bridge for a few years," Hansen said. "It's worked well in certain situations. However, the drawback is that the ACU-1000 is not always on 24-7: a request has to be made to both participating agencies to create a patch. This can take 10 to 45 minutes. Then there are training issues related to using the ACU-1000. All told, we wanted something that was always on, and didn't require much training."

It was with these concerns in mind that the DPD agreed to let M/A-COM deploy the NetworkFirst field trial. Thirteen incompatible radios systems run by local, state, and federal agencies were patched into a NetworkFirst Switching Center established for the trial. As well, the city's police, fire, and EMS agencies remapped their radio channels to make room for three NetworkFirst talk groups.

These were designed to be provisioned by the NetworkFirst Switching Center; ensuring that each and every portable radio in the area now had true interoperable communications. The benefits were immediate; allowing state troopers using Motorola radios to talk to DPD officers on M/A-COM portables.

Still, this was only a fraction of the power provided by NetworkFirst, since a Network Switching Center can create and manage over 65,000 talk groups. Granted, the portable radios in the field don't have room for this many channels, but the capability could still be valuable to emergency planners; allowing them to pre-create specific talk groups to deal with specific situations on an occurrence (police chase, fire, HAZMAT) and geographic basis.

"We are able to add more talk groups to NetworkFirst on the fly," Hansen noted. In a situation like Columbine, linking together incompatible radio systems at the scene could be accomplished in a matter of minutes.

In 9/11-type situations, local NetworkFirst Switching Centers can be interconnected to form statewide and even national interoperable networks. Just imagine the power of such a system during extraordinary situations, when agencies from across the country find themselves working together for the first time! In turn, think of the command and control offered by such a super-network; one where everyone from the President on down to the officers at the scene could talk to each other in real-time.

Performance

Denver's experience with NetworkFirst moved the DPD to award a $2 million contract to M/A-COM, in order to expand the trial deployment's reach and make it permanent. With NetworkFirst, the kind of radios and radio spectrum used by each agency no longer matters. As well, each agency can upgrade their

radios as they see fit, without a need to tightly coordinate purchases with other departments.

Still, it is worth noting that although NetworkFirst can make interoperability a reality for first responders, the interconnections will only be as good as the weakest radio in the transmission chain. "NetworkFirst can't make bad radios better," Hansen said. "If you've got coverage problems now, you will still have them."

Where NetworkFirst Fits In

Dana Hansen's point is worth careful consideration: although NetworkFirst can provide a real solution to incompatible radio systems, it cannot solve all of a first responder's communications problems.

What this means is that radio coverage problems, equipment issues, and other challenges need to be resolved in tandem with implementing a NetworkFirst system, to provide the kind of results all departments dream of. For instance, if a department's radio coverage is spotty, extra transmitters need to be installed to fill in the gaps. If the radios being used are old and tired, then they need to be replaced; and such replacement should be based on a thorough evaluation of different radio frequencies and technologies.

Finally, if local departments can't get along jurisdictionally, implementing NetworkFirst won't smooth relations: if anything, improved communications between the rivals might actually make matters worse.

As a result, although NetworkFirst is a technological approach that works—as attested to by the Denver Police Department's experiences—it is only part of a successful interoperability solution. That Denver's trials went so well speaks about the good interagency relations that existed before that trial, and which now make the permanent installation of NetworkFirst a real asset to the community.

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NetworkFirst in Maryland

NetworkFirst has also been deployed across nine counties in Maryland's Eastern Shore. Under a contract worth $5.6 million, M/A-COM installed a NetworkFirst Switching Center and voice gateways to tie together the Maryland Eastern Shore Inter-Operability Network (MESIN).

Included in the MESIN system are state, county, and municipal law enforcement agencies, fire and EMS, plus the US Coast Guard. More than 3,000,000 visitors visit the Ocean City region annually between Memorial Day and Labor Day. As well, this region's proximity to Washington DC means that local first responders need the very best in interoperable communications; given the capitol's unfortunate attractiveness to terrorists.

"To face widely-varied emergency situations on the Eastern Shore, public safety personnel from multiple agencies, on various disparate systems, must be able to communicate effectively," Teresa Owens, director of Worcester County's Department of Emergency Services, Worcester County, said.

"With M/A-COM's NetworkFirst, we're getting a very powerful tool that will lead to better communications and improved effectiveness for Maryland Eastern Shore public safety organization."