History in the Making—Next Generation 9-1-1

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Those that attended the NG9-1-1 Proof of Concept Demonstrations at the NENA 9-1-1 Conference in the Fort Worth Convention Center witnessed history in the making: the first emergency (simulated) telephone call was successfully placed using the NG9-1-1 architecture in a multi-vendor environment. The efforts of many people through decades of work were rewarded in that instant.

To understand the significance of that call, it is important to understand the history of how we arrived at this point. In 2003, NENA, working with representatives from standards' bodies and the 9-1-1 community, began the process to define an open architecture that will result in a complete transformation of the existing 9-1-1 systems.

In 2004, the United States Department of Commerce (USDOC) awarded a grant to Texas A&M University where researchers began to build and test core components of the proposed architecture. Working in conjunction with Columbia University, NENA, three Public Safety Answering Points (PSAPs), two state 9-1-1 offices and equipment manufacturers, Nortel and Cisco, this initial project focused on the areas of call location identification, basic call routing and call taking in an IP-enabled PSAP. While the project testing was limited to Voice-over-Internet Protocol (VoIP) calls, it showed the power of IP networks in dealing with multi-media environments.

A second R&D project was funded by the United States Department of Transportation (USDOT) in 2006, in cooperation with the USDOC. A team, led by staff at Booz Allen Hamilton, and including personnel from NENA and Kimball and Associates, and researchers from Texas A&M University and Columbia University, furthered the movement toward Next Generation 9-1-1. This project documented the system's core requirements and architecture. With this information in hand, the team proceeded to build a proof-of-concept system that carried the emergency IP-based call from the calling party to the NG9-1-1 PSAP using NG9-1-1 architecture, which included location-based routing elements ("LoST" or Location-to-Service-Translation), policy-based routing elements ("ESRP" or Emergency Services Routing Proxy) and the PSAP workstation. In August, 2008, these NG9-1-1 systems were successfully tested and demonstrated using five PSAPs across the United States.

While the initial 2004 demonstration allowed the team to focus strictly on calls initiated from a VoIP device, the subsequent projects added in the challenges of NG9-1-1 testing calls with other call types. These were wireline calls from a central office, wireless calls from a wireless network, SMS text messages through a gateway and telemetry information derived from OnStar crash data. The results of this project demonstrated that not only could voice, video and data be received, but also calls could be transferred with all of the data intact, as well as logged and recorded. Using mapping systems from Pictometry, the ability of NG9-1-1 systems to import graphics was also tested successfully.

An intent of NG9-1-1, however, was not to show that one team or company could build an end-to-end system. A primary goal was to show that components of the architecture, made by different vendors, could interoperate. This was the challenge identified approximately five years ago, but that primary goal could not be achieved until actual interoperability work was completed. This was the significance of the demonstration at the 2009 NENA conference.

One month prior to the conference, a group of people began discussions about the feasibility of an interoperability demonstration at the conference. After conference calls with six vendors, the preconference testing plan was initiated. On the Sunday before the conference officially opened, we completed some additional onsite testing and were ready to go. Monday morning, following a discussion of the NG9-1-1 architecture, the research team made a call using the USDOT proof-of-concept system. A change was made in the LoST server, whereby, instead of sending the call to the USDOT ESRP and PSAP, we successfully sent the call to a microDATA ESRP and PSAP. All of this happened with little to no onsite manipulation required. This is a testament to what can be done with adherence to standards. A virtual ESInet was built to support this effort. The network consisted of the PSAPs in Fort Worth and our partners' lab at Columbia University, the USDOT LoST and ESRP servers at Texas A&M University in College Station, the microDATA ESRP in Pennsylvania, and another microDATA PSAP also located in Fort Worth. The Texas A&M University lab staff configured this network in about four hours on the Sunday before the conference began. This demonstration was then followed by other vendor interactions and successful calls using interoperable system configurations, presented to subsequent demo audiences. Other vendors involved were Solacom, ng-911inc and InterAct.

Photo courtesy of NENA.

While it would be presumptuous to compare the historic importance of this to either the flight at Kitty Hawk or Bell's first telephone call, we should not understate the importance of what happened in Fort Worth. Thomas Hardy, of the USDOC, was on hand to witness the event. Hardy was assigned as the grant administrator of the first grant, and, as such, had witnessed the beginnings of this effort. He and Laurie Flaherty of the USDOT have been strong supporters of the NG9-1-1 prototyping efforts, and the industry has greatly benefited from their efforts.

Just as the work did not end at Kitty Hawk, the national NG9-1-1 efforts are just now getting solidly underway. We will begin interoperability efforts in earnest this fall, as NENA's NG9-1-1 Standards work is being completed, with a series of NENA Industry Collaboration Events (ICE) testing activities. The sum of these efforts should result in standards-based, interoperable NG9-1-1 coming to fruition sooner, rather than later. **NENA**

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