TechNote

Homeland Security
Science and Technology

Next Generation 9-1-1

Next Generation 9-1-1 (NG9-1-1) is a collaborative research and development effort designed to expand the capabilities of the current 9-1-1 system. Current 9-1-1 systems are not equipped to handle the mobility and technical requirements of today's digital communications technologies. The NG9-1-1 effort was created to establish a foundation for public emergency services to enhance communications across a broad spectrum of technologies. The NG9-1-1 initiative aims to create a 9-1-1 system that will transmit voice, text, images, and video media across nationally interconnected networks. NG9-1-1 is not a single application, technology or product, but rather an entirely new communications architecture for 9-1-1 systems that will enhance the collaboration and applications of the emergency responder networks and public communication systems.

Background

9-1-1 systems were initially created to support only wireline telephones using analog technology. However, advances in digital communications have made wireless phones, video-relay, Voice over Internet Protocol (VoIP), telematics, medical alert devices, wireless computers, automatic crash notification systems, and camera-enabled mobile phones mainstream communications technologies. The widespread adoption of these digital communications technologies, however, presents a problem for Public Safety Answering Points (PSAP), many of which are unable to receive, exchange, or share information with these new technologies. Because 9-1-1 system capabilities have critical implications for public safety, the 9-1-1 system must be enhanced to accommodate new technologies.

In coordination with public safety organizations, the U.S. Department of Transportation (USDOT) created the NG9-1-1 initiative. USDOT interest was driven by the need for improved 9-1-1 technology that will enhance public safety and mobility by enabling motorists to send quicker, more accurate, and more useful forms of information about incidents to PSAPs. According to the USDOT, NG9-1-1 systems will enable:

- Quicker and more accurate information delivery to responders and the public.
- Improved situational awareness as a result of information presented in new formats (real-time text, images, video, and other data).
- More flexible, secure, and robust PSAP operations.
- Increased sharing of data, resources, procedures, and standards to promote greater coordination of emergency response.
- Maximized public capital and operating costs for emergency communication services.

Challenges

As people adopt new communications technologies, consideration must be made for how PSAPs will receive and respond to calls for help from these new digital devices.

Government agencies, PSAPs, emergency responders, and organizations, such as the National Emergency Number Association (NENA), have determined that callers using any type of communication medium must be able to directly access PSAPs in an emergency. Additionally, PSAP operators must be able to send location and incident specific guidance to emergency responders. A major challenge is the development of universal interfaces that extract the necessary data from these new technologies, and then deliver that information to and from PSAPs.

One of the greatest challenges presented to PSAPs and the emergency responder community is that no national 9-1-1 network or 9-1-1 program exists. PSAPs are funded and operated independently of each other often by local communities, counties, or states. As a result, funding the establishment of standards and coordinating related state and federal initiatives are all necessary for NG9-1-1 to be realized.

Because there are a great deal of technological, organizational, deployment, and management complexities surrounding the interconnection of the nation's emergency responder communities, NG9-1-1 efforts are being accomplished through consensus and open communication among public and private stakeholders.

Successful implementation of NG9-1-1 networks involves all organizations that are engaged in the creation, delivery, receipt, and management of 9-1-1 calls, including:

- 9-1-1 and public safety agencies and related industries.
- Information standards organizations.
- Consumer, research, academic, and consortia communities.
- Technology and consulting industries.
- Telematics, third-party, Internet, and wire line/wireless service providers.
- Transportation, government, regulatory, and professional organizations.

Consensus and open communication among stakeholders will ensure the establishment of a set of engineering standards to support the future operational and technical architecture, including design, development, and refinement.

Interoperability and Automation

A key component to accomplishing NG9-1-1 goals is interoperability. Interoperable systems facilitate automatic data sharing among PSAPs and throughout the emergency response community to allow collaboration between the public safety personnel involved with a 9-1-1 event.

Suppose a PSAP operator must transfer a misrouted wireless call to another PSAP. Currently, the location, phone number, and details of the call can not be automatically transferred from one PSAP to the next. Essentially, the rerouted call comes into the second PSAP as a new 9-1-1 call, but without any location information. As a result, the second operator must ask the caller to repeat the information regarding the location and details of the emergency. This adds time to the emergency response process. If, however, both PSAPs operate from an NG9-1-1 network that seamlessly shares data, the pertinent information obtained by the first operator would be automatically delivered to the second operator located at the correct PSAP.

In another example, an NG9-1-1 system could be configured to automatically notify the highway department if a caller was in a traffic accident due to weather or a chemical spill. This notification would allow the highway department to proactively address any expected cleanup issues or prevent additional accidents. In addition, the operator could request the caller to send images of the scene to the PSAP since NG9-1-1 supports the transmission of multiple information types, such as video, text, and images. This would allow the operator to see the conditions and advise emergency responders accordingly. If the conditions warranted a public information notice, the system could also transmit the information automatically to broadcast media outlets, mass notification systems, and other forms of public emergency notification. In this example, information could be provided automatically in a timely and context-sensitive manner.

Current NG9-1-1 Status

The NG9-1-1 initiative was originally expected to run from December 2004 through December 2007; however, that duration continues to be extended due to ongoing funding, policy, regulatory, and technical issues. NENA currently estimates that 2009 is the earliest a fully-featured and standards-compliant NG9-1-1 system could be realized nationwide.

Detailed system requirements, operational policies, and standards are currently under development. Life-cycle costs, potential architectures, deployment plans, and planning for how existing systems will be transitioned to the nationwide NG9-1-1 architecture are being evaluated. While NG9-1-1 hopes to solve many of the data sharing and integration problems currently experienced by the nation's PSAPs, it will require extensive coordination and cooperation of all interested parties to become a reality.

Agencies considering updating their 9-1-1 system should remember that NG9-1-1 standards have not been set. Lacking standards to refer to, it is not possible to determine if equipment on the market today will be NG9-1-1 compliant in the future.

Resources

United States Department of Transportation, Intelligent Transportation Systems
http://www.its.dot.gov/ng911/

National Emergency Number Association
http://www.nena.org/