

CALLING FOR HELP: Transforming Emergency Communications with NG911

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There are multiple approaches to implementing NG911. The right approach lays the groundwork for scalability and flexibility, as technology continues to evolve. As PSAPs consider modernization options, what are the roadblocks? What have we learned? And, what is the opportunity to advance emergency communication and keep all citizens safer?

Introduction:

Our communication habits look very different than they did in the 1970s: Text messaging, social media, video streaming. And with the rapid growth of the Internet of Things (IoT), every electronic device has the potential to be not only a “connected device,” but another communication portal as well.

In sharp contrast to communication advances, most Public Safety Answering Points (PSAPs) – emergency 911 call services – in the United States rely on technology from the 1970s.

Call routing was originally designed to handle landline calls only. But today, more than 70 percent of emergency calls are placed from wireless devices. Each PSAP has a certain number of CAMA circuits: E-911 trunks that use analog technology and allow for the caller’s telephone number to be delivered as tones prior to the actual delivery of the call. Since each PSAP has a fixed number of CAMA circuits, extensive backlog occurs if all CAMA circuits are in use – resulting in a busy signal for the caller. Using this dated technology restricts the PSAP from receiving potentially life-saving alternative communication inputs, such as text messages, in the event the caller is unable to speak; or multimedia – photos/video – that can provide first responders with enhanced situation awareness.

Next Generation 911 (NG911) will modernize 911 communications, replacing the current infrastructure with an interconnected IP-based network that supports modern communications, routes calls to the most qualified call taker available, and delivers a complete set of information to call takers.

There are multiple approaches to implementing NG911. The *right approach* lays the groundwork for scalability and flexibility as technology continues to evolve. As PSAPs consider modernization options, what are the roadblocks – and what is the opportunity to advance emergency communication to keep all citizens safe?

Why the Status Quo Isn’t Working

Emergency services face a host of challenges as they prepare to update 911 technologies; installed solutions are hardware-based (inflexible), not scalable, and unable to take advantage of advanced communication methods.

- Fixed and segregated CAMA circuits: Each PSAP has a fixed number of CAMA circuits – all of which are commonly segregated by landline and wireless calls. As a result, 911 calls made from wireless devices may receive busy signals even if a landline CAMA circuit is available. If all CAMA circuits for a particular PSAP are in use, the caller receives a busy signal – instead of being queued or routed to the next available PSAP
- Delayed location information: Since 911 technology is still based on landline technology, location information for each caller is retrieved after the call is received. For wireless callers that may be in transit, the PSAP must wait 60 seconds to refresh location information of the caller. In the event of an emergency, 60 seconds can make all the difference

Next Generation 911 Goals



Support multimedia contacts and services



Deliver accurate caller location in real time



Achieve regional, state, and national interoperability

- Inability to handle new forms of media/lack of VoIP capability: Because 911 calls are still delivered via analog circuits, most 911 call centers are unable to accept and handle text, video, image, and other forms of messaging. With today's advanced communication technology, landlines are quickly being replaced with smartphones that support multiple communication types.
- No data exchange or interoperability: Unless a mutual agreement exists in the form of a technical interface and a Memorandum of Understanding (MOU) between PSAPs, there is no exchange of data between neighboring PSAPs. Interoperability between local, regional, and state PSAPs is practically nonexistent

Moving Forward: The Opportunity for Next Generation 911

Next Generation 911 (NG911) is an Internet Protocol (IP)-based system that streamlines 911 operations by allowing digital information to flow from the public and through the 911 network to the emergency responders¹. Introduced by the National Emergency Numbers Association (NENA), NG911 seeks to bring emergency services into the 21st century by enabling multimedia calls, increasing nationwide interoperability and real-time location services, and seamlessly routing calls depending on the availability and capability of resources.

Today, there are two major areas requiring NG911 modernization. First, the Emergency Services IP Network (ESInet), or the telephony infrastructure on the carrier side that delivers each emergency call to the PSAP best able to handle the call. Updating the telephony infrastructure to an ESInet enables the routing and delivery of multimedia messages – including voice, text, video, and “data” calls – to a 911 center and the real-time determination of the caller's location, increasing the interoperability and information-sharing ability among PSAPs. The second area requiring NG911 modernization is the actual PSAP – or updating the technology at each 911 call center to support advanced NG911 features.

While both areas must be updated to achieve full Next Generation 911 status, there are many reasons for PSAPs to proactively take the first modernization steps rather than wait for an ESInet to be established first.

Starting the PSAP NG911 transition today will allow more time for call-taker training on the new forms of communication and promote a step-by-step transition. From a financial perspective, the PSAP can make the investment required to upgrade over a period of time, versus all at once. And, once funds are not tied up maintaining legacy infrastructure, PSAPs can invest in other areas, including expanded call-taker training and support, to reduce agent turnover.

Finally, and perhaps most importantly, as new capabilities come online – for example, the ability to support text messages, via a Text Control Center (TCC) – the PSAP is ready to provide these capabilities to citizens. Taking a proactive approach establishes the PSAP as a prepared regional leader, supporting improved emergency communication throughout their region.

PREPARING FOR NG911: FIVE STEPS FOR PSAPs

- 1** Upgrade your center to VoIP to support SIP
- 2** Upgrade your mapping system to automatically plot incoming emergency calls
- 3** Upgrade your Computer Aided Dispatch (CAD) systems to be NG911-compatible
- 4** Slowly introduce NextGen functions such as short messaging service (SMS)
- 5** Interface with the ESInet to ensure that all new communications methods are supported

¹ <http://www.911.gov/911-issues/standards.html>

The Modern Emergency Call Center: Prepared for Current and Future 911 Needs

There are different approaches to NG911 modernization. MicroAutomation and UNICOM Government work together to deliver the Omni911 solution, a software-based NextGen PSAP solution that continuously adapts to meet industry and NG911 standards. Omni911 transforms the PSAP into a modern contact center, supporting both existing legacy E-911 environments and NG911 features when available.

Implementing Omni911 prepares PSAPs for ESInet modernization by eliminating the need for costly, proprietary hardware infrastructure – replacing your PSAP solution with an expandable software-based solution. While most 911 vendors claim to support the NG911 features, simply adding software on top of existing legacy systems will not deliver the scalability and interoperability needed to meet current and future emergency communications needs defined by the NENA i3 standards.

Omni911 can be implemented in a variety of ways:

- Deployed to support a single PSAP in a stand-alone or redundant configuration
- Deployed in a hosted environment with access from multiple PSAP locations – mainly for larger or multi-tenant configurations
- Deployed as a cloud-based solution with the server components in data centers coupled with CAD and GIS software in a similar configuration

Fault Tolerance with Zero Dropped Calls

Running over SIP provides PSAPs with virtually infinite bandwidth and intelligent routing capabilities. NG911 components of ESInet are aware of the capacity and availability of NextGen PSAPs, so the routing of emergency calls is based on availability rather than pre-determined assignment.

Accurate Caller Location in Real Time

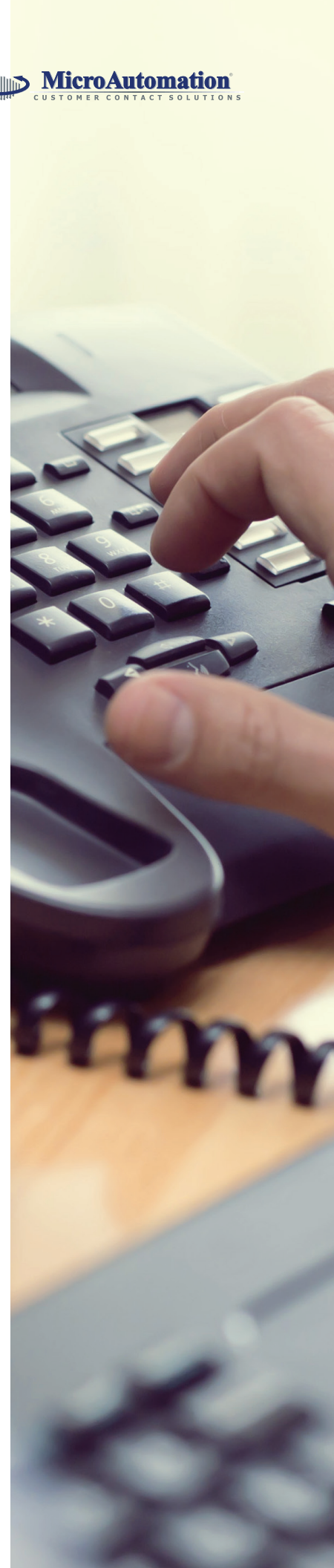
GPS capabilities in today's mobile devices and triangulation algorithms can now provide accurate location information in real time. With NG911, when a call goes into the ESInet, the location information of the caller is used to route the emergency call to the closest and best PSAP for the call, eliminating the reliance on expensive Automatic Location Identification (ALI) databases that are maintained by telephone companies.

Enhanced Extensibility and Flexibility

As a software solution, Omni911 requires no proprietary hardware. It operates in Virtual Machine or Standard PC environments, enabling Omni911 to be easily enhanced to support the latest NG911 requirements when they are adopted. This allows your PSAP to adapt to the changing needs of NG911 over time and grow along with your communications requirements.

Multimedia-Ready

Omni911 natively enables your PSAP to receive and accept multimedia – including voice, text, video, image, and telematics calls. The versatility of Omni911 allows you to introduce each communication method when your PSAP is ready.





Reduced Maintenance and Operating Costs

Rather than spending 911 funds on telecommunication carrier costs and legacy, hardware-centric technology that requires five-year refresh cycles, PSAPs can now use 911 funds to enable new and advanced technologies – or to increase staff support within call centers.

Achieving Continuous Availability: NG911 In Action

As counties upgrade their local PSAPs to NG911 solutions, they need to have redundant solutions in place.² The first step? Properly planning upgrades and establishing multiple redundancies in place for 911 centers

ensures an outage never results in 911 services being unavailable to the public. For one county in the United States National Capital Region, having a resilient backup environment was the critical piece in avoiding a potentially fatal 911 outage. When Baltimore County's primary 911 center needed to be evacuated due to a gas leak, it was able to re-route and receive incoming calls at its fully operational alternate 911 center location through its NG911 solution.

Baltimore County primarily utilizes VoIP telecommunications, currently used by modern contact centers, and has two backup solutions in place. The software-based solution is implemented in a distributed, geo-diverse, redundant configuration that supports primary and alternate PSAP centers – enabling each center to operate independently (in the case of a disaster) or as a single, virtual PSAP during normal operational mode. The PSAP operates in an “active-active” mode that allows an enhanced level of flexibility, scalability, and operational readiness not available in traditional PSAPs.

Then, to provide further redundancy, Baltimore County also maintains a traditional digital telephone switching system if the redundant VoIP system fails. And, finally, in the unlikely event that all of the technology fails, the county has the ability to flip a switch to route all 911 calls to traditional analog phones. Through the use of a robust NG911 system and its resilient backup environment, Baltimore County did not drop any calls during its primary center evacuations for gas and water main leaks over a two-week period.³

About MicroAutomation

For 25 years, MicroAutomation has focused on delivering impactful contact center and 911 solutions that provide our customers with a competitive advantage in the marketplace. MicroAutomation's legacy Enhanced 911 and new Next Generation 911 PSAP solutions are proven, powerful, and reliable. Developed to be effortless and intuitive when every second counts, Emergency response solutions from MicroAutomation expertly accommodate expanding communities, changing technologies, and evolving 911 standards. MicroAutomation's purpose-built Next Generation solutions adapt seamlessly to all PSAP requirements and call-taker needs while adhering to NENA i3 specifications to meet the 911 technologies of today – and tomorrow.

MicroAutomation also offers Emergency Operations Center products and professional services including Omni911 Next Generation 911, complete PSAP and ESINet architecture and design, configurable, custom application development, turnkey implementation, comprehensive 24-hour/7-day customer support, NENA i3 standards compliance, and DoD Joint Interoperability Test Command (JITC) Certifications.

About UNICOM Government

UNICOM Government, a division of UNICOM Global, is a leading provider of technology solutions and professional services to federal, state, and local governments. Founded in 1983, the company has helped meet the unique IT needs of more than 1,700 governmental agencies worldwide. www.unicomgov.com.

² <http://www.microautomation.com/new-blog/montgomery-county-911-outage-highlights-importance-of-ng9-1-1-upgrade-planning>

³ <http://www.microautomation.com/new-blog/911-outage-narrowly-averted-due-to-a-next-generation-911-solution>

About U.S. Communities

UNICOM Government and MicroAutomation work together under the U.S. Communities contract. U.S. Communities is a government purchasing cooperative that provides world-class procurement resources and solutions to state and local government agencies, school districts (K-12), higher education, and nonprofits.

U.S. Communities delivers critical oversight requiring vendors to offer their best supplier government pricing, and performs third-party audits on all contracts to ensure ongoing value. An Advisory Board of key public procurement professionals oversees U.S. Communities and adheres to a stringent competitive selection process for all contracts offered through the program.

ABOUT THE AUTHORS

Suresh Gursahaney is the Practice Lead and Lead Architect for MicroAutomation's Emergency Operations Solution (EOS) practice. In his role, Suresh helps PSAPs in localities, the Department of Defense, Campuses, and Airports to design and implement Next Generation 911 solutions. MicroAutomation leverages its 25 years of experience in call center automation to address the needs of Next Generation 911. Suresh has been working with Public Safety solutions for over 16 years and currently participates in three NENA working groups to help define the NG911 standards for North America.

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Clem Munno represents UNICOM Government as an expert in Contact Center design, strategy, configuration, deployment, support and procurement. Clem has a special focus, as does UNICOM Government, to provide the most state-of-the-art, proven technologies and best practices to meet the needs of the Public Safety Community. With extensive Next Generation 911 design and account management experience, together with the experience and knowledge base of critical technologies such as Physical, and Cyber Security, as well as a wide range of Law Enforcement Solutions, Clem and his UNICOM Government Team are able to serve their customers as true "Trusted Advisors" in the area of Next Generation Technology Solutions.

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