Title: Next Generation 9-1-1: State of Ohio and Morgan County

Category: Emerging and Innovative Technology

Contact: Rob Jackson, Ohio 9-1-1 Administrator
Ohio Department of Administrative Services
Office of Information Technology
614.728.2114
Rob.Jackson@das.ohio.gov

State: Ohio

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Executive Summary

9-1-1 service across the United States is in the process of a sweeping technological transition to the next generation of systems involving advanced capabilities. This new approach is called Next Generation 9-1-1 (NG 9-1-1). These refined capabilities include improved call routing, text-to-9-1-1, photo and video sharing and location technology.

The State of Ohio and Morgan County have partnered to make NG 9-1-1 a reality. Not only does the local community benefit from the next step in the technological evolution of their 9-1-1 system, but the partnership has helped develop a statewide plan to offer an Emergency Services Internet-Protocol Network (ESINet) to other local communities.

On July 9, 2014, Morgan County replaced its legacy Enhanced 911 (E911) call-handling system with a new IP-based NG 9-1-1 system with the ability to accept emergency service requests from public networks using a variety of communication methods and devices, including text, VoIP, and video. Morgan County's NG 9-1-1 system is one of the first in the nation to fully implement spatial routing in compliance with the new National Emergency Number Association's (NENA) i3 architecture standards, ensuring public safety needs can be met using these new and emerging modes of communication and enabling interoperability with other local, state and national i3 compliant systems. The system resides within a secure cloud architecture utilizing the Ohio Academic Resources Network (OARnet) for network services and data transfer, which provides superior reliability, redundancy and sustainability and housed in the State of Ohio Computer Center.

Through collaboration and partnership with state, local and vendor representatives and by leveraging the current OARnet, a real world NG 9-1-1 system is now in place and operational, providing a base platform that will assist in expanding this offering statewide.

This project was not only beneficial from a technology standpoint, but it is also a proven example of how the State of Ohio and local communities can use the shared services concept to implement real solutions for real problems. 9-1-1 is one of the most critical government services that exist today. When citizens find themselves in danger due to fire, medical emergency or by criminal element, 9-1-1 is their tool to contact emergency first responders. Transforming 9-1-1 technology in Ohio will help to save lives and property.

Next Generation 9-1-1 in Morgan County

Introduction

9-1-1 service across the United States is in the process of a sweeping technological transition to the next generation of systems involving advanced capabilities. This new approach is called Next Generation 9-1-1 (NG 9-1-1). These refined capabilities include improved call routing, text-to-9-1-1, photo and video sharing and location technology.

Although there are many pieces involved in NG 9-1-1, the two main pieces involving government services are core Public Safety Answering Point (PSAP) equipment and the Emergency Services Internet-Protocol Network (ESINet). When these pieces are implemented and linked together, along with vendor telephone services, true NG 9-1-1 service can be achieved.

Business Problem and Solution

Emergency calling needs to evolve beyond the traditional 9-1-1 call. Text and instant messaging are becoming a more common method of communicating than traditional two-way voice communication. Pictures and videos are increasingly shared through the use of IP-enabled devices such as PCs, Tablets, Smart Phones, VoIP, etc. Video and text based communications are now the communications norm for the deaf and hearing impaired. These technologies are a reality and our citizens expect to be able to place a 9-1-1 call and receive help with the technologies that they currently use.

Yet, with all of these advancements in consumer communications technology, Ohio's current 9-1-1 system cannot deliver any of this information to Ohio's 9-1-1 centers, also known as Public Safety Answering Point (PSAPs). The architecture of the current 9-1-1 system is based on circuit switched telephony designed to enable voice calls to 9-1-1, not data. In order to support the current and future needs of Ohio citizens, we must expand the planning effort for an Internet Protocol (IP)-based communications system referred to as Next Generation 9-1-1 (NG 9-1-1)[1] to enable PSAPs to receive this valuable data.

Transitioning to NG 9-1-1 is a challenge for Ohio, which follows the home rule government model. In addition to the governance complexities, are the challenges

[1] *NG9-1-1 is an IP-based system comprised of managed IP-based networks, functional elements (applications), and databases that replicate traditional E9-1-1 features and functions and provide additional capabilities. NG9-1-1 is designed to provide access to emergency services from all connected communications sources, and provide multimedia data capabilities for PSAPs and other emergency service organizations.*

associated with converting all of Ohio's PSAPs to NG 9-1-1 and developing an affordable ESINet that links local PSAPs with comprehensive, redundant and efficient call routing, as well as allowing for transfers and communication between each other.

To achieve the level of statewide collaboration that is necessary to realize such impactful change, Ohio established an ESINet Steering Committee, as well as two sub-committees; Technical Standards and PSAP Operations. These groups are mandated by law to complete certain tasks related to NG 9-1-1 and include state, local and vendor resources. In addition, the Ohio Department of Administrative Services (DAS) Office of Information Technology (OIT) established the Ohio 9-1-1 Program Office to help support the ESINet Steering Committee in its statewide NG 9-1-1 implementation.

As part of its efforts, the ESINet Steering Committee partnered with a local county to implement the State's ESINet offering and a basic NG 9-1-1 system. On July 9, 2014, Morgan County (Ohio) replaced its legacy Enhanced 911 (E911) call-handling system with a new IP-based NG 9-1-1 system that allows emergency service requests from the public networks using a variety of communication methods and devices, including text, VoIP, and video. Morgan County's new National Emergency Number Association's (NENA) i3 compliant NG 9-1-1 system ensures public safety needs can be met using these new and emerging modes of communication.

Working with the Ohio DAS OIT, the Morgan County NG 9-1-1 system is using the following State infrastructure assets:

- The Ohio Academic Research Network (OARnet)
- The State of Ohio Computer Center (SOCC)
- The Location Based Response System (LBRS)

Morgan County's system leverages the spatial routing features of NG services to accurately route calls based on the location of the caller and utilizes enhanced Geographical Information System (GIS) data to accurately map the caller's location information against LBRS data developed by the County in partnership with the State. Using this accurate spatial information, the Morgan County NG 9-1-1 system has the ability to transfer calls and corresponding information to the most appropriate emergency response units, including neighboring counties.

The NG 9-1-1 solution enables Morgan County to easily accept emergency information from a variety of sources and provides first responders with faster, more accurate details to aid in response. Morgan County's NG 9-1-1 system is one of the first in the nation to fully implement spatial routing in compliance with the NENA i3 architecture

standards, ensuring interoperability with other local, state and national i3 compliant systems. The system was built on a secure cloud architecture utilizing OARnet for network services and data transfer, which provides superior reliability, redundancy and sustainability.

By utilizing the State network the Morgan County 9-1-1 system can scale to accommodate emergency communications for neighboring counties as well. According to Dave Bailey, Morgan County 9-1-1 Coordinator, they have fully moved to NG 9-1-1 and removed all legacy equipment from the PSAPs. They are also very happy with the system's performance and reliability, geospatial mapping and routing capabilities and ease of operation

Below are some of the i3 functional requirements used in the Morgan County System:

- Border Control Functions (BCF)
- Emergency Call Routing (ECRF)
- Emergency Service Routing (ESRP)
- Location Validation (LVF)
- Location Database (LDB)
- Policy Routing Function (PRF)
- GIS Data Creation
- GIS Data Maintenance (SIF)
- Interconnected NG9-1-1 and E9-1-1
- System Engineers 24/7 monitoring with Remote Access to the Full System
- Legacy Network Gateway (LNG)
- Integrated CAMA Trunks ANI/ALI
- Integrated Multiple County/PSAP Capacity
- Network Security
- Fully Recorded Voice and Data with extended Capacity/Retention
- System Monitoring/Logging
- Robust VoIP (LAN) Network Telephones
- Redundant Diverse Fiber Path Using a Secure IP Network with more than adequate bandwidth
- Work Stations support all NG911 applications
- Video and Text solutions supported (not implemented)
- End User Friendly, robust, fast with NG voice/data transfer

<u>Significance and Improvement of the Operation of Government</u>

NG 9-1-1 is an extremely significant issue and is one of the most crucial government services existing today. When citizens find themselves in danger due to fire, medical emergency or by criminal element, 9-1-1 is their tool to contact emergency first responders. This action saves lives and property and is at the core of local, regional and state government services. Not only is it extremely important, the liability risk associated with 9-1-1 and first responder activity makes this issue that much more important.

The significance of NG 9-1-1 cannot be overstated and is the technological portion of government's emergency response system that starts the process. With this in mind, how does the Morgan County project improve government operations? It confirmed that the ESINet offering and core equipment work together seamlessly to ensure 9-1-1 calls are handled and routed appropriately. The Morgan County project validated that the current approach is on target and it also provided many opportunities for participants to further plan and conduct business.

Morgan County was able to determine the proper setup of NG core services equipment for call handling at the PSAP level, while partnering with the State for ESINet services to deliver these calls from Morgan County equipment housed within the SOCC to Morgan County's PSAPs across OARnet. This allowed the county to route calls appropriately with all available information. Due to this successful project, ESINet projects will soon begin in four to five more counties.

Another realization from this initial project was the importance of vendor interaction to help ensure that not only their equipment worked, but to also design a platform where multiple vendor connections could be coordinated within the system. This allows the state to avoid being reliant on one provider, while also allowing for competition and choice at the local level.

Finally, the cooperation and coordination among local and state agencies is an example of how consolidation of resources and the application of shared services can be successful and ultimately lead to a best practice model for other implementations. In this case, due to the partnership between Morgan County and the State, Morgan County was able to stand-up one of the first NG 9-1-1 PSAPs in existence today. This system has been and will again be featured at national organizations' conferences (APCO / NENA) and in articles to the overall 9-1-1 and emergency communication industry.

<u>Benefits of the Project</u>

There are quite a few benefits to the project. First and foremost, the citizens of Morgan County, Ohio benefit from an enhanced NG 9-1-1 system and the ability to more effectively communicate to first responders. This benefit alone made the project worth the effort.

Second, the partnership between the State and Morgan County has allowed for others to see an illustrative, real-world example of what a successful partnership of this magnitude can accomplish. With a real working system and real results, the implementation of a statewide ESINet is that much more attractive to everyone involved. By mid-summer 2015, four to five counties will have completed their own ESINet implementation projects.

Third, there is an economic benefit from this project, though not specific enough to list dollar values. However, in abstract form, the benefit of utilizing existing state assets and avoiding the duplication of systems saves taxpayer dollars and resources across the board.

Overall, the project resulted in technology, economic and strategic planning benefits that will eventually lead to a statewide ESINet and NG 9-1-1 implementation at the state and local level.