The History and Evolution of 911

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The following article was submitted by PA NENA on behalf of the statewide 911 community, and published by the County Commissioners Association of Pennsylvania in the Spring 2023 issue of their periodical, Pennsylvania County News.

Over nine million times a year residents and visitors dial 9-1-1 in Pennsylvania. Those calls are answered at any one of the sixty-one county based public safety answering points (PSAPs) in the commonwealth. But how did we get to where we are today, so that you can dial or text 9-1-1 and the call for help is always answered?

- In the United States, work started in 1957 when the National Association of Fire Chiefs recommended the use of a single number to report fires, but it took 10 years until the President's Commission on Law Enforcement and Administration of Justice recommended that a single number be developed and used to report any emergency situation nationwide.
- In November 1967, the Federal Communications Commission (FCC) met with the American Telephone and Telegraph Company (AT&T) to find a solution for establishing a universal emergency number that could be quickly implemented. In 1968, AT&T announced that it would establish the digits 9-1-1 (nine-one-one) as the emergency number throughout the United States.
- On February 16, 1968, the very first 911 call was placed in the small town of Haleyville, Alabama.
- Currently over 6,000 public safety answering points (PSAPs) in the United States answer 911 calls.

In Pennsylvania, a number of county's began to form dispatch centers in the late 1960s. Although they provided limited services, they were the precursor of today's county 911 public safety answering points (PSAPs). In 1973, the first full fledge PSAPs went live. Basic wireline 911 service was deployed throughout the 1970s. It simply routed an emergency call to a PSAP, but provided no information about the phone number that was calling or the location of the caller. Enhanced wireline 911 occurred in the late 1970s and 1980s. It provided the telephone number and location of the telephone calling 911. This level of location information was sufficient in an era where every 911 call was placed on a wireline from a physical location (residence or business).

As communications technology continued to evolve, the aging 911 infrastructure struggled to keep up. Mobile and cellular communications were no longer "tethered" to a house, business, or other physical location. Wireless technology began to significantly penetrate the market in the mid-1990s. Using a phone anywhere there was cellular coverage meant a static address was no longer available to pass along with a 911 call. A new process of passing along a mobile number and dynamic location, through latitude and longitude coordinates needed to be developed.

At the turn of the 20th century, voice over Internet-protocol (VoIP) communication technology started to emerge as a popular replacement for aging wireline systems. VoIP communication is highly portable as compared to a traditional wireline. A VoIP user can make and receive calls from anywhere there is an Internet connection as if they were sitting at their desk or in their living room.

Location and information that controls the routing of 911 calls from the VoIP line are configurable by the account owner, which created room for human error and a high risk of misrouted 911 calls. In 2021, wireless and VoIP calls accounted for over 80-percent of all 911 calls in Pennsylvania[1]. This means the established 911 infrastructure is only handling 20-percent of all calls as it was originally designed to work.

Outside of the evolution of voice communication, mobile device connectivity has opened up a highway of communication possibilities that include text, alarms, and notifications from sensors and devices or objects within the Internet of Things (IoT). Text-to-911wireless providers are required by the FCC to deliver emergency texts to PSAPs, but PSAPs are still not required by the FCC to accept emergency texts. There is an increasing expectation that this technology is available for use in emergency situations. This message has been carried mainly by the deaf and hard-of-hearing community, and advocates for abuse victims. Today, sixty-one of sixty-seven counties in Pennsylvania provide text-to-911 capabilities within their PSAP[2].

Direct alarm delivery can be configured for situations such as school panic buttons or a wearable distress alarm for a police officer. Systems can be established to monitor gunshot detection and send an alert when detected. Mobile phones and devices have recently been designed to contact emergency services when sudden changes in velocity, height, or impact are detected as would be common in a fall or vehicle collision. Although a proactive way to hasten the response of emergency resources, this function has been associated with a variety of false alarms from roller coaster riders and skiers who take a tumble and get right back up. Sending streaming video and pictures to 911 is quickly becoming a deployed technology throughout Pennsylvania and the nation.

The “add-on” mentality to legacy 911 infrastructure is an unsustainable model. Separate functions and systems often do not interface within an individual PSAP. The quick-paced evolution of communication technology makes it necessary for Pennsylvania to make the migration to Next Generation 911 (NG911) with an Internet-protocol (IP)-based infrastructure.

The emergency services IP network or ESInet is a public safety grade network the provides the resiliency and redundancy required for emergency services. Pennsylvania’s State 911 Office started to plan for a statewide ESInet deployment that would allow all 911 calls to be delivered to every PSAP using a modern and robust IP network. After years of planning with and preparing all stakeholders, the PSAPs in Pennsylvania began to make the migration to the ESInet

[1] Pennsylvania 911 Annual Report – Calendar Year 2021: https://www.pema.pa.gov/911-Program/Documents/Annual-Reports/2021.pdf

[2] Pennsylvania Text-to-911 Status: https://www.pema.pa.gov/911-Program/Public/Text-To-911/Documents/PA-Text-To-911-Status.pdf

in mid-year 2022, with the expectation that all PSAPs will be successfully migrated to the ESInet by early 2024.

After completion, PSAPs will have the ability to receive a full view of 911 activity across the state and better share vital emergency incident data across geopolitical borders that once created artificial technology and communication borders. In a society as mobile as ours, it is critical to quickly share data as additional resources are added to assist or as jurisdictional authority changes.

In addition to the new technology, legislation had to be introduced to ensure Pennsylvania's PSAPs had the funding, rules, regulations, technology and training to accept these calls. Over many years, the County Commissioners Association of Pennsylvania, the Keystone Chapter of the National Emergency Number Association, the Pennsylvania Chapter of the Association of Public Safety Communications Officials and the Pennsylvania Emergency Management Agency have worked cooperatively to pass and implement this legislation.

911 will continue to evolve just as it has over the last fifty years and we must all remain vigilant to ensure that our public safety answering points have the funding, rules, regulations, technology and training to answer the call for help, no matter from what device it comes.

About the authors:

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