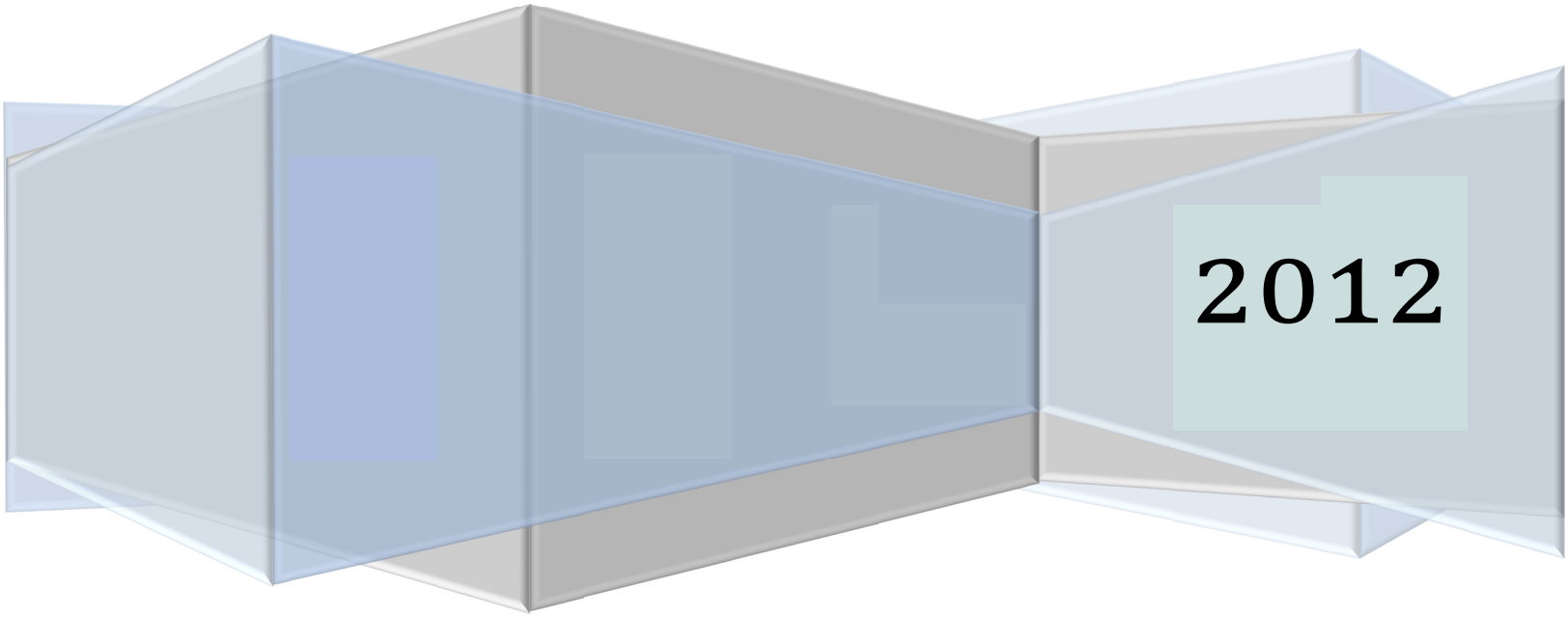
NENA: The 9-1-1 Association &
The Association of Public-Safety Communications Officials

Public Safety Considerations for Smartphone App Developers



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Introduction

There are an increasing number of smartphone applications (apps) entering the market that impact public safety and emergency communications. Many of these new apps are developed with a high degree of creativity and innovation, but may not fully consider the impacts on 9-1-1 and public safety during the development process.

The National Emergency Number Association (NENA: The 9-1-1 Association) and the Association of Public-Safety Communications Officials (APCO) have worked together to provide developers with information on the Enhanced 9-1-1 (E9-1-1) technical architecture, as well as operational limitations that may influence the development of smartphone apps.

This document provides an overview of the E9-1-1 system and outlines key issues for consideration by smartphone application developers.

Smartphone Apps & Their Relationship to Enhanced 9-1-1 Service

Enhanced 9-1-1 (E9-1-1) is the system used by the public in the vast majority of the USA & Canada to access 9-1-1 centers, also referred to as Public Safety Answering Points (PSAPs), during an emergency. A 9-1-1 center is an entity that receives 9-1-1 calls from a defined geographic area and processes those calls according to operational policies. The E9-1-1 emergency communications and data system was designed in the 1970's and has unique limitations as compared to the current application and Internet environment. Key limitations that app developers should be aware of are:

- Only voice and a single 8- or 10-digit reference code can be carried with an E9-1-1 call. This 8- or 10-digit code is designed to carry the caller's telephone number, or a reference number that assists in determining how to route a 9-1-1 call to the appropriate 9-1-1 center. It is important for developers to note that the 9-1-1 center that a call is routed to may **not** be the 9-1-1 center physically closest to the caller. There are jurisdictional responsibilities, local laws, and geographic relationships that impact the decision as to where a 9-1-1 call is routed.

- The public expects that their location will be automatically delivered to the 9-1-1 center any time they call or contact 9-1-1. Data that is resident within smartphone-type applications, such as the caller's name, location, or callback number, cannot currently be delivered with a 9-1-1 call. There are limitations in the E9-1-1 call delivery networks that prevent this. A limited amount of critical data, such as location information and telephone callback number, can be automatically acquired after the voice call is answered at a 9-1-1 center. This data is obtained from external, standardized databases that contain pre-processed and pre-validated information. One of the databases involved that may be familiar to developers is an ALI (Automatic Location Identification) database[1]. There are still 9-1-1 centers in the U.S. that do not receive any of this data, due to technology limitations. Not all public safety agencies are capable of receiving 9-1-1 calls.

- Most 9-1-1 centers currently **cannot** accept text, pictures, or videos, nor can they receive additional data such as personal information, medical history, or building floor plans. E9-1-1 uses different interface techniques for calls from wireline, wireless, and Voice over Internet Protocol (VoIP), due to forced adaptation of the original E9-1-1 architecture to support the newer caller service types. There are significant variations in how calls and data are handled among different service types, which results in a need for application developers to understand how these services interact with the E9-1-1 system.

- An app that notifies the caller's family or friends of an emergency situation should not be viewed as a solution for contacting 9-1-1. Callers that need emergency services need to contact 9-1-1 directly or there is risk that emergency services may be significantly delayed.

[1] ALI: The automatic display at the 9-1-1 center of the caller's telephone number, the address/location of the telephone, and supplementary emergency services information of the location from which a call originates

- The app must not interfere with the handset's ability to place a voice 9-1-1 call to the local authority. If the user makes a 9-1-1 call, some phones will not allow the user to access any other applications within the phone, such as texting or video.

Next Generation 9-1-1 & Future Developments

An improved 9-1-1 communications system has been designed based on Internet Protocol (IP), and it is beginning to be implemented in some areas across the United States. It is expected that Canada will follow this transitional pattern soon. This new system, known as Next Generation 9-1-1 (NG9-1-1), has the capabilities to support voice, text, video, and additional data. There are many factors (e.g. funding, regulatory) that impact how and when the new 9-1-1 system will be available on a large scale. In addition, standards developed in the wireless carrier environment may affect the timing of certain types of text support. As a result, NG9-1-1 will likely take 8-10 years to evolve across most of the USA & Canada. During this transitional period, while the original legacy E9-1-1 system is still in use, it is imperative that new communications services or technologies that allow users to speak, text, or otherwise communicate with others are able to interoperate with the legacy E9-1-1 and the new NG9-1-1 systems in a reliable, seamless manner.

Additional Considerations for Developers

Telecommunicators[2] are tasked with handling each call competently and expeditiously to ensure effective and efficient emergency response. It is important that applications do not adversely affect 9-1-1 center operations. Developers should become familiar with common 9-1-1 center workflows and refrain from having their app rely on telecommunicators performing additional or atypical tasks, such as publishing information to Facebook or accessing third party websites.

Direct Communications with 9-1-1

The following must be considered in the development of any application proposed to contact or interface with the 9-1-1 system:

- App developers should be aware of limitations and follow established methods when routing calls to 9-1-1.

- Not all 9-1-1 centers are equipped to receive location information from wireless phones and there are some areas in the United States that do not have ubiquitous Enhanced 9-1-1 service. These centers rely solely on caller-provided location information.

- Application users should be encouraged to call 9-1-1 directly whenever possible during an emergency, allowing a trained telecommunicator to gather necessary details and dispatch emergency services.

- Application users should be advised to call 9-1-1 only during an emergency, not for general information or non-emergencies.

[2] Telecommunicator: An agent of the PSAP responsible for answering incoming requests for service from the public

- 9-1-1 centers must take the time to evaluate every call that is presented to a telecommunicator. In many cases, depending on local agency policy, a telecommunicator is required to stay on the phone in an open line situation to determine if the caller has an emergency or not. If the call is disconnected, the telecommunicator must call the user back to determine if there is an emergency. This creates additional workload and pulls the telecommunicator away from callers with actual emergencies.

- Most 9-1-1 centers do not have the ability to receive any type of multimedia or text messaging. Application users should clearly understand that although the app may provide a method to send multimedia or submit a GPS location by email or text, the majority of 9-1-1 centers will not be able to receive this information.

- 9-1-1 centers are not always able to immediately answer every 9-1-1 call that is delivered to the center. There is a possibility that a 9-1-1 caller will be put "on hold" or hear a recording. During times of unusually high call volume, incoming calls may outnumber the 9-1-1 staff. In these cases, calls may go into a queue that typically provides a recorded message advising the callers that they have reached 9-1-1 and should remain on the line. These calls are answered in the order in which they are received.

Notifying Friends & Family

App developers should be aware of several important considerations for applications designed to notify friends and family of a possible emergency:

- Direct contact with 9-1-1 is the most expedient way to guarantee that help will be sent. App developers should not encourage users to rely on a friend or family notification feature to obtain help during an emergency.

- Friends and family may not be in the same geographic area as the user needing assistance. If the friend or family member calls 9-1-1 for assistance, there is a possibility that the call will go to a 9-1-1 center in another state or jurisdiction. If the user needing assistance is relying on a friend or family member to call 9-1-1, help will be delayed.

- When friends and/or family receive a notification, they will likely call 9-1-1 to obtain information about their loved one. This will unnecessarily prevent telecommunicators from handling other requests for service.

- In the event friends and/or family call 9-1-1 in an attempt to obtain information about their loved one, it is likely the telecommunicator will not be able to provide the information to them. Local privacy laws and internal agency policies may prevent information being shared.

- App developers offering to conference friends and/or family into the user's 9-1-1 call may impede the telecommunicator's ability to hear and gather critical information. The more people engaged in a single conversation, the more difficult it is to get pertinent details. **This practice is discouraged**.

GPS & 9-1- 1 Location

Many people conserve battery power on their phones by turning off location services. Developers should clearly indicate that if a user does not have location services enabled on his or her phone, the app will not provide GPS coordinates. Non-tech-savvy users will not understand that their phone's location services must be enabled for 9-1-1 location functionality to work.

Third Party Services

App developers should clearly advertise whether the app will dial 9-1-1 directly or whether it will use another method. Calls that dial directly to the digits "9-1-1" typically take priority over any other phone line. Calls directed to a ten-digit line may not be answered as promptly. Further, app developers should clearly state in their marketing description of the product whether a call is going to be routed to a third party call center to process the emergency request prior to connecting to a public safety entity. The app developer should also clearly identify how and/or if the caller will be conferenced to 9-1-1, if necessary. The third party call center's abilities should also be identified (e.g. EMS trained, 9-1-1 center conferencing services provided).

General Considerations

Other factors app developers should take into consideration during the development process:

- Many 9-1-1 centers do not provide their telecommunicators access to the Internet for multiple reasons, primarily related to network and system security. App developers must be aware that it is not always possible to expect 9-1-1 center personnel to access information over the internet.

- It is important to comply with state and federal laws that cover 9-1-1 centers. Laws may prohibit functions such as automated calls delivered via 9-1-1 trunks to the PSAP without a voice caller. Monetary contribution requirements may also violate state or local laws and should be reviewed. App developers or users may be required to pay surcharge fees in some jurisdictions.

- Creating an app that allows a user to shake the phone to dial 9-1-1 may increase the propensity for inadvertent dialing of 9-1-1. **This type of functionality is discouraged**.

Conclusion

NENA and APCO are ready to assist app developers and distributors in the development of products that meet the needs of citizens and will work with current and future 9-1-1 systems. For the most up-to-date information regarding 9-1-1 and for answers to any questions you may have, please visit www.nena.org and www.apcointl.org.