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Expand Community Access with Text-to-911

Overcome operational issues by carefully considering integration options

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1 Background

Instances of domestic abuse are on the rise and because victims are unable to pick up the phone and call 9-1-1, incidents frequently go unreported. But because text-to-911 is silent, simple, and provides the appearance of anonymity, victims feel empowered to send a text-to-911 to request assistance. One victim who later learned about text-to-911 believes the channel would have helped her to discreetly contact public safety.[1] A recent review of archived text calls confirms this need.

Text not only helps during emergencies when silence is preferred, it is absolutely necessary in order to provide direct access to emergency services for our neighbors who are hard of hearing and speech impaired. The Department of Justice (DOJ) ruled that communities must provide text access to 9-1-1 in order to comply with the Americans with Disability Act (ADA).[2]

The NENA i3 Next-Generation 9-1-1 standards were designed for text and multimedia call handling; however, they did not address carrier network technologies such as short message service (SMS) and multimedia sent to 9-1-1. As such, this white paper addresses the technology and policies behind the major wireless carriers' December 2012 voluntary initiative to deliver SMS text calls to public safety answering points (PSAP's). Furthermore, it describes solutions to close gaps in the industry standards.

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[1] https://cbs12.com/news/local/domestic-violence-survivor-urges-women-to-learn-about-countys-text-to-911-service

[2] https://www.apcointl.org/resources/ng911/text-to-9-1-1/#:~:text=The%20Department%20of%20Justice%20(DOJ,hearing%20or%20speech%20disability%20that

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2 SMS/MMS to 9-1-1 architecture

In alignment with the wireless carriers' voluntary initiative, the FCC issued a further Notice of Proposed Rule Making (FNPRM), 12-149,[3] that by May 15, 2014 the major wireless carriers would deliver SMS text calls to "9-1-1" to any jurisdiction requesting the service.

Short message service (SMS) text messages are nominally constrained to 160 characters (although most devices support longer messages) and are terminated to the Internet by a carrier SMSC gateway. As part of the voluntary initiative, and in accordance with the ATIS standards J110, the wireless carriers provisioned and delivered handset location to a new functional element (FE) called the text control center (TCC).

According to the ATIS standards, the TCC would offer the following interfaces into PSAP's:

- Text Telephone TTY/TTD
- Web portal/browser
- Next-Generation integrated using SIP/MSRP[4]

The carriers selected TCC vendors who would interface to each other so that both could offer redundant, aggregate services. A PSAP could select its TCC vendor and an interface that meets its technical and financial requirements. TTY has not been widely deployed. The Next-Generation interface is accessible via secure networks, including the ESINET. The Next-Generation interface is available to PSAP's with NG-ready CPE or to the Emergency Service Routing Proxies (ESRP) that offer specialized features.

3 Workflow

Upon receipt of the first SMS text message within a text call, the TCC requests the routing location from the wireless carrier. The location and its accuracy are provided to the call taker as shown in Figure 2. The initial accuracy ranges from a few to several thousand meters and may be rebid for a more accurate dispatchable location. The location coordinates are submitted to another FE, the Location to Service Translation server (LoST) which returns a PSAP identifier. The

[3] https://www.fcc.gov/document/text-911-further-notice-proposed-rulemaking

[4] https://cdn.ymaws.com/www.nena.org/resource/collection/2851C951-69FF-40F0-A6B8-36A714CB085D/08-003_Detailed_Functional_and_Interface_Specification_for_the_NENA_i3_Solution.pdf , page 56.

LoST server is able to return instructions in order to re-route text calls to another agency in the event a PSAP unavailable.

Once the text call is routed, the PSAP is notified of the incoming text call. If the PSAP is Next-Generation ready, the integrated text call is distributed via CPE equipment which will alert the next available call taker.

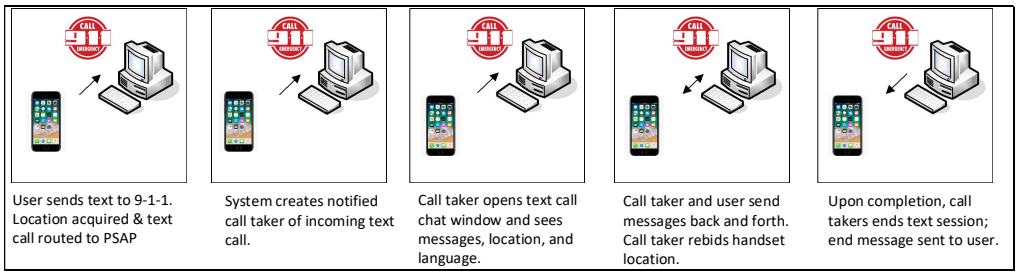

Figure 1: Text call routing

On-the-other hand, the browser solutions provide audible tones, color changes, and even OS (Windows) notifications. AGENT511 TEXTBLUE offers a parallel voice call flow that dials the PSAP phone system and plays audio that prompts the next available call taker to open the browser as shown in Figure 1. This ensures the call taker never misses a text call.

One of the promises of Next-Generation is the ability to automatically re-route calls for service based upon location or keywords within the text message. This may be controlled directly by a supervisor so that all text calls may be routed to a single position or group responsible for managing the incident. An example may be a policy that routes calls about a vehicle accident to a call taker based upon a geo-fence centered at the incident.[5]

4 CPE integration

Text may be integrated with call handling, computer aided dispatch (CAD), and recording systems. One of the key considerations for any solution is the distribution and notification for new incoming text calls. In additional to the i3 Next-Generation interface, ESRP's offer simpler, feature-rich modern web API's.

In order to archive text calls, PSAP's leverage text call recording via

[5] https://www.youtube.com/watch?v=mERICv_w93k

SIPREC or web services API's.[6]

5 Call taker experience

When a new text call arrives, the call taker is alerted to open the chat window or accept the call as shown in Figure 2. The interface continuously refreshes and all texts (until the call is ended) are consolidated into a single view. The call taker sees the incoming text messages, location, and wireless carrier. If a configurable autoreply message is sent, the call taker sees that as well.

If the call taker is also a dispatcher in a small agency, they will manage the call from cradle-to-grave; otherwise, the call taker must initiate a conference transfer to a dispatcher. The dispatcher may be with the Police or Fire Department depending upon the incident. The entire call and history should be viewed by the dispatcher in order to expedite the process. Police may remain on the text call in order to coordinate dispatch of units to support the incident.

The text call may also be transferred externally to other PSAP's. if the PSAP's are on the same ESRP, transfer policies may be leveraged in order to enhance access to call history and other features. Otherwise, the PSAP's may initiate a PSAP to PSAP transfer for which the TCC anchors the text call and all inbound messages are routed to both PSAP's and all outbound messages are shared until either PSAP releases the text call. The TCC will send a transcription of the history to the receiving party.

As the call ends, the call taker releases the call and the system sends an "end call" message.

[6] https://tools.ietf.org/html/rfc7866

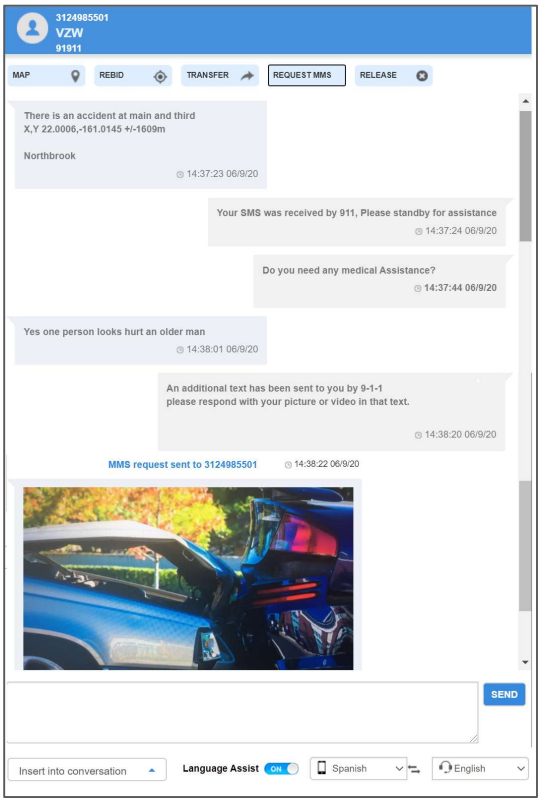

Figure 2: text chat window

6 Foreign language

Foreign language character support across handsets, carriers, and TCC's may differ and as such, only English and Spanish are generally supported. There are initiatives to validate Unicode character support which covers languages such as Simplified Chinese, Korean, and Arabic, non-exclusively. The challenge is that most PSAP's do not have multilingual call takers nor policies for multilingual call handling so translation is a challenge.

There have been several industry efforts to provide live translation, however, due to the volume of text calls, current business models do not sustain the service, especially across popular languages[7]. Text

[7] https://www.policeone.com/police-products/police-technology/software/cad/articles/techfest-event-looks-to-the-future-of-translation-for-text-to-911-k3Td3fT7SCzjOLgR/

uniquely offers the ability to parse and translate phrases using automated machine translation services. As such, some vendors are incorporating best effort automated translation into the browser (see Figure 2, bottom right), CPE platform, and even via ESRP API. Typically, in doing so, the English and foreign language phrase are displayed side-by-side.

7 Text back and multimedia

The voluntary text-to-9-1-1 deployment did not require the TCC's to provide MMS (Multimedia Messaging Service) nor SMS text back. Only Sprint provides 9-1-1 pictures, audio, and video by sending them to either Intrado CPE or embedding them into an email to the PSAP. An ESRP, such as AGENT511's, mitigates the gap in the citizen's journey by soliciting text and multimedia messages from texters via commercial SMS/MMS services as shown in Figure 3. This is done either on a web console by initiating a text back or sending commands in the API.

Pictures and videos are forwarded to the 9-1-1 center as a link to the multimedia file which may then be displayed in the browser or CPE. Pictures are received as .JPEG and video typically, 3GP or mp4, depending on the handset and carrier. Videos are typically restricted to 1 MB and less than 60 seconds. File archives must be scaled in accordance with retention requirements and the anticipated citizen engagement.

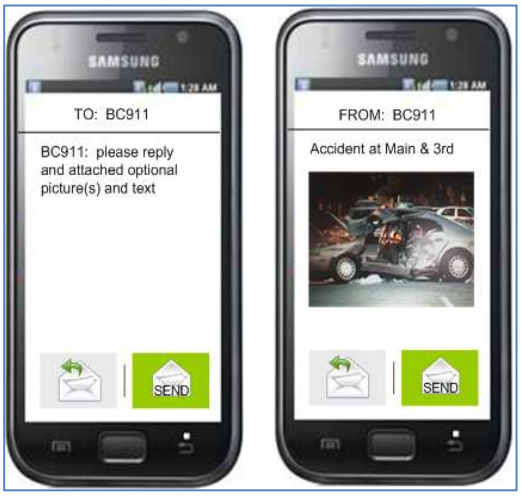

Figure 3: Solicited multimedia messaging process

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8 Welcome to the “cloud”

The cloud is no longer scary as numerous mission critical platforms are now delivered via reliable, load balanced geographically diverse secure environments such as AWS, Microsoft Azure, and the public/private cloud. Not only does this deliver economies of scale, but it offers agencies the ability to leverage the latest tools and technologies without the burden of maintaining complex infrastructure.

Cloud technologies ensure logical separation between client environments. Intrusion detection systems (IDS) combined with the application of development best practices, minimize the impact of attacks. Data in transit is readily encrypted and may be combined with tunnels and private circuits to avoid decryption.

Further, the cloud creates new business models and solutions by avoiding the burden of deploying and supporting on premise equipment.

9 Getting started

The first step in accepting text-to-911 is for any agency to share its requirements with its vendor partners to determine the right solution. Once a TCC or ESRP is selected, the PSAP will submit a formal request for service (RFS) to the wireless carriers. The PSAP oversees the requisite integration, or in the case of the browser solution, works with network engineering to open ports on the firewall. PSAP’s should train and test on the system via test numbers and simulation tools. At the time of launch, the PSAP, all parties will test and certify the PSAP is ready to answer live text calls.

10 Education is the key

Text and multimedia create new communication channels for communities desperately seeking alternatives to voice. They hold the promise of offering richer evidentiary data that maximizes situational awareness in the field. The key to success is establishing the appropriate expectations both for call takers and wireless users. Call takers require simplicity and integration with existing platforms as well as comprehensive workflows delivered by the terminating text control center that manage the flow of text and multimedia and offer features consistent with voice calls such as rebid and text call back. Wireless users need to feel comfortable with the channel as a reliable medium; as such, timely confirmation messages are critical. SMS text messaging offers a universal first step in delivering on the promise of

Next Generation multimedia and policy-based networking.

About AGENT511 TEXTBLUE

AGENT511 TEXTBLUE ESRP platform delivers seamless text and multimedia workflows for the largest (and smallest) public safety agencies. It is integrated with the leading text control centers (TCC) as well as commercial and private carrier SMS/MMS multimedia gateways for US and International markets. TEXTBLUE incorporates Next-Generation 9-1-1 and modern web interfaces to deliver communications to call handling, CAD, and recorders.

In addition, the platform is coupled with a number of differentiating features such as patented[8] parallel voice dialing to ensure call takers never miss a call as well as text back, language translation, natural language triage, and streaming video

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[8] US Patent 9386407B2