ShoreTel
K12 Emergency Notification & 911
By Travis Dillard

By far the hottest topic in the K12 education space is 911 functionality and emergency notification within ShoreTel. Unfortunately, for obvious reasons most of the questions we receive from our educational customers are about Emergency Notification and 911. For this reason, we decided to compose this comprehensive white paper, outlining challenges, out-of-the box 911 functionality with ShoreTel, best practices, as well as additional functionality you should consider for your district.

/ 911 101: The Basics

To break 911 notification down into its most simple form:

1. When a 911 call is placed, the system must send out a unique caller ID that corresponds with the physical location in which the 911 call was placed.

2. When the emergency responders receive the 911 call, the Caller ID must be associated with the physical location in which the call was placed. This is often accomplished with the phone company using a Private Switch Automatic Location Information (PS-ALI) database. This database correlates the Caller ID the emergency responders receive with a physical address. The PS-ALI database must be maintained by District personnel and uploaded to the telecommunications carrier.

/ Challenges

This seems simple at first glance, but in a multi-location Voice over IP phone system deployment, there can be challenges.

Here are a few:
Relocating IP Phones or User Profiles

Often, in a VoIP deployment, the Caller ID sent corresponds with the user profile associated with the phone. Unlike days of old with digital systems, where a phone was hard wired to a station port, this presents a big challenge to 911 Caller ID accuracy. IP phones can easily be moved between classrooms, buildings, or even schools by anybody without reprogramming the system. User profiles can also easily be moved between physical phones and locations. If a user's phone is normally associated with one address, and gets moved to another, and places a 911 call, emergency responders could show up at the wrong address.

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Consolidated Dial Tone

There are many advantages to ShoreTel's unique "single system" distributed architecture. One of which is reducing dial tone resources at the school and consolidating dial tone trunks to one or a few "aggregation" points. This can present a significant cost savings because fewer trunks are needed to service the requirements of the district. That said, it can also present problems with accurate 911 Caller ID. If a 911 call is placed from one location, is sent out dial tone trunks at another, and the system isn't set up correctly, the emergency responders could show up at the wrong location. Again, the results could be disastrous.

Location Identification in a Campus Environment

In a campus environment, a single physical address can represent multiple buildings, wings, classrooms, and thousands of phone users. Even if the caller ID displayed to emergency responders correlates with the proper physical address, how do they know where to go when they get there? When seconds count in an emergency, this is a huge problem.

PS-ALI Challenges

The PS-ALI database is usually a spreadsheet form or similar and is maintained by District personnel and uploaded to the telecommunications carrier. Because of this, it's often not accurate or out of date. District personnel are busy, have other duties, and might not always be on top of this task. To make matters worse, even when the spreadsheet is uploaded to the carrier, the delay in updating the database can take days, weeks, or even months (yes, we've seen this) to be updated. It's clunky, error-prone, and slow.

/ New School Solutions to Old School Systems

Out-of-the-Box 911 Functionality with ShoreTel

Fortunately, ShoreTel natively addresses many of the system challenges associated with sending the proper ID when a 911 call is placed.

Analog Line

This is the most basic, and often the most effective, way of designing proper outbound Caller ID when a 911 call is placed. When a user dials 911, the system forces the call out a local analog line that is only used for 911 calling. Like landlines in our homes, this analog line is essentially "hard coded" with its caller ID. There is no programming that can be done in the system to alter it. Another advantage of using analog lines for 911 is that the line is powered via the local Central Office (CO). So if there is an interruption in power, the line will still be serviceable. ShoreTel voice switches also have a built-in relay that will automatically connect an along station port with an analog line port when power goes out. Many of our customers will install an "emergency" analog phone that can still be used for 911 calling should the power go out.

Best practices would dictate that an analog line be used for single small offices or branch locations. The ShoreTel Caller Emergency Services Identification feature (CESID) should be used for larger implementation.
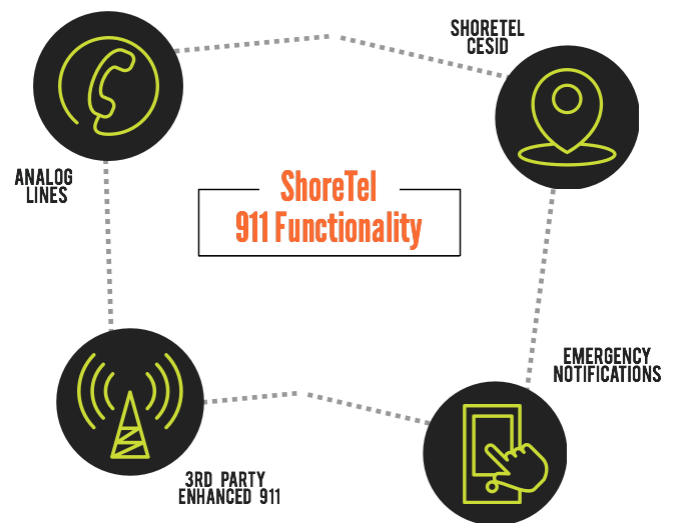
ShoreTel Caller Emergency Services Identification (CESID)

This method requires the implementation of PRI or SIP trunks with a signaling channel. With the CESID, the ShoreTel system can be programmed to out-pulse a predetermined caller ID based on the following variables:

- **CESID Based on IP Address Range:** With this method, you would organize and configure your network in which IP address ranges and IP phones within those IP address ranges were associated with a physical location. Examples could include a floor, wing, building, or location. If an IP phone gets physically moved and plugged into a different network switch at a different location, via DHCP, it would receive an IP address in the new range associated with that location. When a 911 call is placed from that phone, the new CESID correlating to that IP range will be sent out. The emergency responders would associate that caller ID with the proper physical address. This method also solves for the situation when a 911 call is placed from a phone that is at a different location from the telco trunks.

- **CESID Based on Site:** ShoreTel is organized into logical sites. These sites are often associated with a physical address. Like the IP address range, you can configure the ShoreTel system to out-pulse a CESID that correlates to a logical site. Like associating the CESID with an IP address range, this method solves for moving physical phones, profiles, or sending 911 calls out telco trunks at different locations.

- **CESID Based on Switch:** Last, the CESID that is out-pulsed can be associated with the actual ShoreTel voice switch in which the IP phones is assigned. Like the logical site and IP address range, this solves for IP phones moving and distributed dial tone. Since switches are often physical devices that can be deployed anywhere on the network within a campus, it can also provide more location granularity in those environments.

PS-ALI

Remember, sending out the proper caller ID is only half of the equation. You must also make sure the emergency responders associate that caller ID with the proper physical address. As mentioned before, this is most often done with the PS-ALI database. If you're using the PS-ALI database, it is imperative that it is current and accurate. But even if your version is current and accurate, it doesn't mean the telco's version is. As most of us all know, carriers are often large, bureaucratic, complacent, and have a hard time supporting even basic services, let alone a complex database. Don't trust them. Incorporating ongoing 911 testing, validation, and documentation into your emergency preparedness planning is crucial with PS-ALI.

Fortunately, there are more accurate and easier ways to design your District's 911 solution. Additionally, if implemented correctly, beyond a physical address, you can provide much more detailed information about the physical origin of the call (wing, classroom, etc.). Read on.

ShoreTel
911 Functionality

ANALOG LINES

SHORETEL CESID

3RD PARTY ENHANCED 911

EMERGENCY NOTIFICATIONS

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/ Extra Credit:
Additional Emergency Notification Functionality to Consider

ShoreTel Emergency Notification Application

Everything covered up to this point has been describing ways to accurately display the proper Caller ID externally to the organization and to the emergency responders. You should also have a solution that quickly propagates 911 call information internally to the organization. Ideally, when emergency responders arrive at your school, they should be greeted with people who are knowledgeable about the situation and can quickly guide the emergency responders to where they need to go. Luckily, ShoreTel's Emergency notification applications does just this:

- **Screen Pop Alerts:** When somebody dials 911, the system can be configured to "pop" alerts on predetermined computers throughout the District. The alert will show all pertinent information related to the call, the extension number, user, and additional information about the physical location (building, classroom number, etc.). Designated recipients can be preconfigured and based on the location of the 911 call. This allows staff to meet emergency responders and direct them to the appropriate location. The alerts can be configured to be "acknowledged" by staff. Where seconds are critical, this really is an absolute must for schools.

- **Email:** In addition to screen pops, emails can be sent out to designated recipients with all pertinent information. Note, out of the box, the ShoreTel system can be configured to send emails based on specific event codes. A 911 call is considered an event in ShoreTel. This is the "poor man's" version of ShoreTel emergency notification.

- **Pre-Recorded Announcements:** Last, the system can be programmed to call specific extensions or external numbers and play a prerecorded or text-to-speech announcement. The announcement contains all pertinent information regarding the location of the 911 call. Like the screen pops, recipients can be configured based on where the call was made. For example, if a 911 call was placed from Riley Elementary, screen pops and calls could be programmed to alert the front desk, the principal, and the District Safety officer at another location. These calls can also be required to be acknowledged.

- **Other capabilities:** In addition to 911 capabilities, the ShoreTel Emergency Notification application can be used for other uses like non-urgent notifications and customized lockdown procedures. We'll be releasing another white paper that dives into these topics in more detail.

3rd Party Enhanced 911

This technology is extremely effective in solving for a) the challenges mentioned above with PS-ALI, and b) providing much more granular information (as opposed to only an address) to the emergency responders.

With this technology, redundant Enhanced 911 appliances are deployed on the network. These devices dynamically track and associate the MAC addresses of IP phones to network switch ports. The network switch ports are associated with the physical location of the far-end network jack in which it is cross-connected to. If IP phones get moved, the tracking appliances re-associate the IP phone with the new switch port, and in turn, the new physical location. With this technology, the detailed physical location information of the switch port is entered and maintained by District staff. The location information can be very granular, much like the ShoreTel emergency notification application.

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When a 911 call is placed, the enhanced 911 devices intercept the call and places a SIP call, often over the public Internet, to a global 911 dispatch center. Note this dispatch center is not local. It is owned and operated by the 3rd party Enhanced 911 technology provider. The granular information (beyond the simple address) is sent to the Global dispatch center. In turn, the dispatch center relays the granular information about the origin of the 911 call to the local responders. The advantages to this are obvious. The local emergency responders are armed with the exact origins of the call.

In this scenario, the cumbersome PS-ALI database would not be used. The district would use the much easier and real-time web interface of the Enhanced 911 provider. Location information is entered, error checked, and geographically verified in real time. This reduces lag time and increases accuracy.

with our Education customers, we find that this is an area of significant weaknesses. Often, we can dramatically improve our customers' 911 capabilities with little to no cost simply because they were uneducated on best practices and inherent capabilities of ShoreTel. Your emergency telecommunication solution should account for more than 911 calling. You need to be thinking about lockdown procedures, access control, parent notification, testing protocols, and much more. With tens of thousands of K12 ShoreTel endpoints deployed and under support, Inflow Communications is an expert in the K12 telecommunications space. Contact us to discuss your telecommunication requirements – we're happy to educate and help.

/ Conclusion

Effective, accurate, and timely emergency notification is critical. As you can see, there are many ways to deploy a 911 solution for your district. There is no one right answer. The technology and methodologies used should vary depending on many factors. Among many, these factors can include campus size, number of locations, number of students, staffing, and of course budget. That said, this isn't a part of your telecommunications solution that should be low in priority. Unfortunately, when we start working

About Inflow

Inflow is a national leader in unified communications and contact centers. With over 100,000 endpoints under Inflow's innovative support plans around the world, Inflow's dedication to knowledge and innovation, and unrivaled customer support, has landed them in ShoreTel's top 2% in global customer satisfaction and as a winner of ShoreTel's coveted Circle of Excellence Partners award. Inflow was also recently named a ShoreTel Platinum Partner and is their fastest growing partner globally. In addition, Inflow is the only cloud contact center provider that provides implementation, ongoing support and compressive consulting and training programs. Founded in 1997, Inflow has offices in Portland, Seattle, Dallas, Houston, Tampa, L.A. and the Bay Area.

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