

Ensuring Help Arrives When You Need It Most!

Emergency Call Location for IP Telephony

VoIPS Mission Statement

To create and commercialize an effective solution for the 9-1-1 problems associated with Voice over Internet Protocol (VoIP or IP Phones) by leveraging existing standard operating procedures, operator training, bricks-and-mortar facilities and networks. Our approach will ensure continued public confidence and reliance of 9-1-1 systems as telecommunication technologies migrate from traditional landline PSTN¹ to IP based networks.

The Problem

As telephone users shift from traditional wire-line based telephone services to IP Phones they unwittingly, and often unknowingly, abandon the sophisticated and highly effective emergency locating capabilities provided by the E911 systems. Current methods employed in IP Telephony have no reliable way to identify the civic address of the caller nor to locate the correct Public Safety Answering Point (PSAP) to which to direct the call. As more and more people give up their landline phones in favor of the better features and lower costs associated with IP Phones, the established 9-1-1 system is diminished, the ability to help the public dissipates and the whole system is in jeopardy of becoming fiscally unviable and increasingly marginalized.

Besides the technical challenges, State and Local Governments are facing other 9-1-1 related issues. For example, many jurisdictions support their 9-1-1 infrastructure through direct or indirect taxes associated with telephone landlines. As the number of landlines decreases, these jurisdictions are facing shortfalls in their funding. They need to protect their investments in existing 9-1-1 infrastructure and they need to stop the declining revenues. VoIP Solutions ***ELI*** (Emergency Location Informer) technology works with existing infrastructure, supports the Next Generation (NG 9-1-1) framework and introduces a business model that creates a new long term sustainable revenue stream for 9-1-1.

Purpose

VoIP Solutions has developed its ***ELI*** technology around the concept of localization. The best place to establish location is at the edge of the network. We have created a method that positions an intelligent agent at the edge of the Internet which constantly senses for the presence of the Emergency Services Notification (ESN) “dial string”. An emergency call is redirected to an ***ELI*** Server where it is converted into a traditional PSTN 9-1-1 call. The ***ELI*** Server and its associated technology allows the IP emergency call to be delivered to the correct PSAP in the same format as is currently used to handle ESN calls. 9-1-1 Operators receive the call in exactly the same format as current landline calls. There is no need to change operating procedures or to add new equipment at the PSAP.

1 PSTN = Public Switch Telephone Network also known as the Plain Old Telephone System (POTS)

Ensuring Help Arrives When You Need It Most!

Emergency Call Location for IP Telephony

Technical Overview

As described above, the VoIP Solutions ***ELI*** agent sits at the edge of the Internet. While it can be provisioned in a number of different ways, the most effective manner is as a software routine within the ISP's edge device (ie. a modem or a residential gateway). The ***ELI*** software does not interfere with normal telephone operation. Using a packet inspection methodology it is able to identify when a 9-1-1 call is placed. Upon detecting an emergency call, the ***ELI*** agent redirects the call to an ***ELI*** server.

The ***ELI*** server is responsible for delivery of the emergency call to the proper Public Safety Answering Point (PSAP) in the format expected by the PSAP. The ***ELI*** server is location aware of the ***ELI*** agent and can implement delivery in one of two ways:

1. *In a legacy E9-1-1 Environment:* the agent redirects the call to the ***ELI*** server where it is converted into a standard PSTN 9-1-1 call. This can take the form of ISDN or POTS trunks. An Automatic Number Identification (ANI) corresponding to the civic address (ALI) of the caller's origin is presented to the telephone network. This process makes use of the same selective router technology and ANI/ALI as current E911 services. It depends on the information present in the existing E9-1-1 system's Master Street Address Guide (MSAG) and Emergency Service Zones (ESZ) databases.
2. *In an NG9-1-1 Environment:* the ***ELI*** agent recognizes all forms of an emergency call regardless of the format it takes. For instance, text messages could be directed to "9-1-1", a video or conference call could involve "9-1-1". In any case, when an emergency call is detected, the agent redirects it to the ***ELI*** server. The server is aware of the agent's location and the call type. The server directs the call to the NG9-1-1 system along with the required information, in the required format. The server interfaces with the NG9-1-1 system Location Information Server (LIS) to ensure that the call is directed to the proper PSAP.

Technology Formats

The ***ELI*** agent is a piece of software that is downloaded by the ISP to each of its edge devices. The exact form of the software depends on the type and model of edge device. The ***ELI*** server resides typically on a LINUX based server. The agent is able to inspect all standard packet formats. The agent-server communications uses standard IETF communications formats with appropriate security measures applied.

Technology testing

1. Bell Canada 9-1-1 Work Bench: Successfully completed a battery of tests on Bell Aliant's test facility in June 2009
2. ***ELI*** Field testing: Successfully completed over 800,000 test calls on DSL, Cable and Motorola Canopy infrastructures with 100% success rate

Ensuring Help Arrives When You Need It Most!

Emergency Call Location for IP Telephony

3. **ELI** 9-1-1 lab and demonstration facility is currently established in West Deptford, New Jersey and is integrated within New Jersey's 9-1-1 system. Testing and demonstration calls delivered to the test lab have been ongoing for over a year.

Business Model

As with traditional PSTN 9-1-1, the technology and fee structure of **ELI** is directed at each and every access point to the network. In the IP world that network access point is the high speed internet connection. The fee structure remains the same, a monthly 9-1-1 fee per internet connection in the same fashion as is currently collected for telephone lines.

Fees are shared as follows:

1. License fee, maintenance and network management
2. Internet Service Provider
3. State and Local Government (to fund 9-1-1 infrastructure)

This business model ensures that all 9-1-1 stakeholders benefit from VoIPS technology:

1. Consumers - Public safety network is maintained and consumers are empowered to choose the telecommunication products that best suit their budget and feature requirements while still being protected by 9-1-1.
2. FCC
 - a) Technical model that is legacy and NG 9-1-1 ready
 - b) VoIP & WiFi solution as well as cellular offload/indoor
 - c) Enables a manageable 9-1-1 model that can easily be integrated into existing regulatory frameworks
 - d) ISP and VoIP agnostic
3. ISP's
 - a) Good business practice to protect customers
 - b) Mitigate any possible liability associated with failure to deliver 9-1-1 successfully
 - c) Profit: revenue per internet connection and helps them enable their business plan to operate under a more profitable IP platform
 - d) Marketing tool to differentiate and complete bundled services
 - e) Good corporate citizenship

Ensuring Help Arrives When You Need It Most!
Emergency Call Location for IP Telephony

- f) Long term funding model for 9-1-1
- g) Enhance relationship with FCC and State and Local governments
- 4. State and Local Governments:
 - a) Long term 9-1-1 funding: new monthly recurring revenue stream
 - b) Ensure continuity and efficacy of 9-1-1 public safety system with technical solution
 - c) Protects investment in current 9-1-1 infrastructure
 - d) Retain levels of Public Safety
 - e) Legacy and NG 9-1-1 compatible.
- 5. NENA
 - a) Provides missing civic addressing component for Next Generation (NG) 9-1-1
 - b) Maintains leadership and momentum for NG 9-1-1
 - c) Solves public safety issue

Summary

1. VoIP Solutions' ***ELI*** technology benefits all stakeholder groups: consumers, ISP/ASP's, regulators and 911 provisioning bodies.
2. VoIP Solutions desires a mutually beneficial relationship with the FCC in order to promote and implement this public safety technology. ***ELI*** will provide the Civic addressing component for NG 9-1-1 VoIP and will further advance FCC's goals and objectives.