

AUTOMATIC LOCATION SERVICES

INTRODUCTION:

Technology advances in Voice over Internet Protocol (VoIP) and Internet telephony have generally strained the capabilities of the nation's E9-1-1/public safety infrastructure. While the industry has addressed the immediate challenge of dynamic location/routing of a VoIP caller who has "self-provisioned" their current location with their VoIP Service Provider (VSP), (as directed in the current Federal Communications Commission mandate for VoIP E9-1-1¹), the solution is not foolproof. VoIP callers may not know their current address, may not have a postal valid address, or may enter a false address in order to bypass the registration process. It is anticipated that the Commission will further extend the VoIP mandate to incorporate some level of "autonomous registration" and remove the VoIP caller from the equation of location determination (i.e. use an objective technology-based approach to automatically identify the location of the caller). While Intrado is fully supportive of this approach, we encourage the Commission to take into account the recommendations laid out in this paper to ensure that our nation's citizens continue to receive the level of emergency services that they have come to expect, as well as to preserve the efficacy of the 9-1-1 infrastructure.

The challenge of automatic location will be exacerbated in coming years, as VoIP moves from a predominantly static environment to a mix of static, nomadic and mobile use environments (e.g. VoWiFi, MESH WiFi voice networks, WiMAX) and end user devices integrate location determination technologies and are capable of accessing multiple disparate networks. With the advent of these new and converged technologies, and absent the adoption of sound public policy for the short and long term, comes the possibility for a real degradation in E9-1-1 services. The foundation of such public policy is the fact that the traditional E9-1-1 system returns the exact address of the caller, enabling first responders to "kick open the door" if they believe there is an emergency situation inside a structure. In order to preserve, at a minimum, this same level of service with VoIP, wireless, converged technologies as well as technologies yet to be developed, public policy must continue to ensure that these fundamental public safety requirements form the basis for future Automatic Location Services rules, i.e. the level of accuracy needed to locate a caller in distress must make it possible for a first responder to swiftly find the caller and render emergency assistance.

Intrado encourages the Commission to employ this rationale for the basis and end goal of all future Automatic Location Services policies. Also, Intrado asks the Commission to remain technology and device neutral, in order to allow the industry to develop the appropriate solutions and to ensure that such policy is applicable and pertinent law, regardless of the communications device used.

¹ *IP-Enabled Services; E911 Requirements for IP Enable Service Providers*, WC Docket No. 04-36; WC Docket No. 05-196, First Report and Order and Notice of Proposed Rulemaking, 20 FCC Rcd 10245 (2005).

BACKGROUND:

For more than two decades, telecommunications providers, public safety organizations and government agencies have turned to Intrado for their communications needs. Intrado Inc., a subsidiary of West Corporation, provides the core of the nation's 9-1-1 network and delivers innovative solutions to communications service providers (Wireline, Wireless and VoIP) and public safety organizations, including complex data management, network transactions, wireless data services and notification services. The company's unparalleled industry knowledge and experience reduce the effort, cost and time associated with providing reliable information for 9-1-1, safety and mobility applications. In addition, Intrado is continuing its leadership position to solve the challenge of automated location determination for VoIP via its recent trials in King County, Washington and New York City. It is this experience that provides Intrado the expertise to offer guidance to the Commission on future policy for Automatic Location Services.

PURPOSE:

The purpose of this paper is to provide future policy recommendations for Automatic Location Service requirements and conditions applicable to telecommunications (traditional and non-traditional) service providers for communication devices where an end-user has an expectation of emergency communications. For purposes of this paper, a communication device is a device that: (1) enables real-time, two way voice and/or data communications; and (2) permits users to initiate and receive communications from another device.

PROPOSED POLICY GUIDELINES:

Framework: Recognizing the evolution of existing telecommunications technologies and the dramatic impacts that new technologies have on the 9-1-1 system, there is a clear need to provide public safety with the ability to respond to the specific location of an end-user trying to reach emergency services regardless of device, technology or access method being used. Sound public policy, both short and long term, must: (a) continue to ensure that the level of accuracy needed to locate a caller in distress is that which makes it possible for a first responder to swiftly find the caller and render emergency aid; and (b) provide clear guidance about the intended end result of the policy such that the businesses who are expected to abide by the policy, and those who invest in them, have a predictable means for meting out and measuring their efforts and investments. Policy makers can debate the time-frames for such location-accuracy requirements, but the underlying principles for the policy are constant.

Intrado acknowledges there are numerous challenges and dependencies to implementing its proposed guidelines. To that end, these guidelines represent a desired goal for the 9-1-

1 system while recognizing there is clearly a migratory approach required when addressing precise location delivery from disparate networks and end devices. The recommendations also take into account factors that are critical to ensuring a successful migration, thus providing the public safety community with the most precise location available in order to serve the public's emergency services needs.

The following guidelines are segmented into two primary use case environments: indoor and outdoor. As the use of end devices and associated technologies becomes more transparent between fixed and mobile environments, there is a need to determine an approach that provides first responders with the most appropriate information to locate the end-user trying to reach emergency assistance. To that end, Intrado believes that whenever possible a "dispatchable" street address is the most suitable location information to enable rapid and efficient emergency response. Address information is still preferred over the alternatives until such time as the supporting infrastructure (e.g. GIS) is able to provide an equivalent level of the accuracy.

INDOOR - LOCATION GUIDELINES

Definitions:

- **"Acceptable Location for Indoor Usage"** – an address that has level of accuracy acceptable to the first responder(s) which must include as part of the address the location within the address (such as apartment, suite, floor or room number)²;
- **"Access Point"** - a wired or wireless network access or termination point that provides voice or data connectivity to an end-user device.

Indoor Location Recommendation: For those locations that are a public or private structures that can uniquely be identified by a dispatchable address; including, but not limited to houses, apartments, offices, and businesses, service providers must be able to provide the (i) call back number or the equivalent based on the applicable technology, (ii) other defined attributes including end-user's name, type of communication device and service provider, and (iii) an Acceptable Location for Indoor Usage (as defined above).

Critical Success Factors:

1) Automatic Location of all End-User Devices

It is recognized that the Commission will be providing guidance relative to the elimination of a VoIP end-user's manual intervention for providing the end-user's location for emergency services. The impediments to providing such a transparent and ubiquitous service are addressed with more specificity below.

² Not to be confused with an Acceptable Location For Indoor Usage but rather for use as back-up location information if an acceptable address is not available, it may be appropriate to use x, y, z coordinates and an uncertainty value of the location coordinates which provide an equivalent level of precision to the acceptable address. From a policy perspective, anything less than an Acceptable Location For Indoor Use should be considered insufficient.

a. Location Determination Technology (LDT)

Intrado considers LDT as specific technologies that can be utilized to determine the location of a communication device of an end-user and potentially the location of Access Points that connect the communication device to the service provider network. There are a variety of technology approaches to location determination that are either currently developed or in development. Each approach has its own strengths and weaknesses and generally aligns to different use case environments. While the achievement of the desired goal for precise location will in part depend upon the full maturation of these various location technologies, it is believed that each can play a role in supporting a migration path to that goal. Specific considerations around LDT that must be contemplated in establishing this migration path include:

- The LDT ability to integrate with the end-user or other network access devices. Depending on the specific LDT approach, this may require software and/or hardware based integration efforts.
- The LDT ability to provide ubiquitous network coverage for end-user or other network access devices. Depending on the LDT, unique infrastructure deployments maybe required to support acceptable location determination coverage.
- The ability for a Z coordinates (altitude) to be determined in accordance with the proposed guidelines. Altitude should be provided as above ground level of the location from the Z coordinate to be usable to first responders. While technologies exist today to attain a Z coordinate, they still must integrate into LDT and supporting infrastructure (e.g. GIS) solutions.
- The public safety community's ability to accept and translate a Z coordinate to achieve an Acceptable Location for Indoor Use.
- The ability for a network to automatically discover the addition or movement of an Access Point serving a communication device within the service provider's network. For some LDT approaches, an understanding of the location of the Access Point is a critical component to enable precise location determination.
- The service provider's ability to leverage LDT information and translate to an Acceptable Location for Indoor Usage.

2) Ecosystem Adoption and/or Integration

As LDT evolves and functionality becomes more readily available, service providers and equipment manufacturers will play an active and important role in driving adoption and integration of communication devices, customer premise equipment, or physical Access Point(s) within the service provider's network. This complex integration requires coordinated planning, with consideration to manufacturing lead time required for technology integration.

3) Location of a Cellular (CMRS) Caller

Cellular adoption continues to exceed expectations; with this rapid growth, its use cases have evolved to include pervasive indoor use as a wireline service supplement or replacement. Given this evolution, the existing FCC requirements for cellular location

accuracy are not adequate to address the proposed guidelines. Cellular location capability must evolve to support stated goals above with respect to delivery of Acceptable Location for Indoor Use. Intrado acknowledges the significant investment already made to meet the existing FCC requirements for cellular location and that this infrastructure can continue to support the migratory path to the desired goal of these proposed guidelines.

4) Public Safety

Intrado acknowledges that the public safety community operates in disparate environments with different needs and capabilities. The proposed guidelines are intended to enhance public safety's ability to respond in a dynamic and evolving technology environment. It is critical that the public safety community is actively engaged in the refinement and adoption of these guidelines.

5) Privacy Considerations

Most state laws permit the use of private subscriber data (e.g., telephone number, service address, etc.) in connection with rendering emergency services, and such laws provide that a subscriber's 9-1-1 call for help is deemed consent to utilize such data for that purpose. Analogies may be drawn with respect to new technologies. If location determination solutions attendant to new technologies require, for example, registration prior to an emergency call, the Commission is well-equipped to address these potential issues involving privacy. While these and other factors are critical to achieving the desired goal of these proposed guidelines, Intrado believes that certain technologies can be deployed and leveraged to support initial phases of their implementation. For example, in a converged network deployment with multi-mode communication devices and associated Access Points, correlations to an Acceptable Location for Indoor Use can be made. Intrado encourages the Commission to engage industry providers, in order to obtain additional input regarding this issue.

OUTDOORS - LOCATION GUIDELINES

Definitions:

- **“Acceptable Location for Outdoor Usage”** – an address that has a level of accuracy acceptable to the first responder(s) that includes the address of an Access Point and the x, y, z coordinates of the communication device and an uncertainty value of the location coordinates.
- **“Access Point”** - a wired or wireless network access or termination point that provides voice or data connectivity to an end-user device.

Outdoor Location Recommendation:

For those locations that are not in a defined structure and cannot be uniquely identified by an address; including but not limited to PO boxes, rural routes, parks, roads, fields, and cars, service providers must be able to provide (i) call back number or the equivalent based on the applicable technology, (ii) defined attributes including end-user's name, type of communication device and service provider, and (iii) the Acceptable Location for

Outdoor Usage for the communication device and an indication of the coverage area of that Access Point (i.e. radius of a cell site or outdoor 802.x access point).

Critical Success Factors:

Intrado believes that all the previously stated indoor success factors also apply to the location guidelines for outdoor use with an additional requirement which takes into account the mobile characteristics of an outdoor use case:

1) Direction Tracking

This is defined as the ability to track in real-time such factors as direction, velocity, trajectory etc., which may be indicative of mobile situations that require the public safety community or first responder to track the movement of an end-user. Clearly, inclusion of such real-time mobile data will require enhancements to critical infrastructure elements and support processes.

Implementation for Indoor and Outdoor Location Guidelines

It is Intrado's belief that the acceptable address guidelines as defined above will only be achieved as technology evolves and market dependencies are addressed in a unified and coordinated effort. Additionally, Intrado believes it is realistic to address short term solutions while encouraging stakeholders to move rapidly towards the desired goal of a more robust Automatic Location Service. To avoid the degradation of the existing 9-1-1 system, the implementation of such short term solutions must not hinder the development and deployment of solutions to support the proposed guidelines.

CONCLUSION:

Intrado appreciates the opportunity to share with the Commission our perspective on this complex and important issue of Automatic Location Services. In order to support technology advances, a new paradigm must be adopted regarding location as well as its application within a broad range of technologies and end-user behaviors. Intrado's perspective is founded in the belief that it is paramount to ensure the safety and well-being of the public by enabling rapid and accurate response of public safety. As a nation, we must continue to preserve the efficacy and integrity of the 9-1-1 system by employing policy guidelines that provide first responders with the most appropriate information to locate an end-user trying to reach emergency assistance. A rapid and accurate response depends on a thoughtful and measured approach by all stakeholders who must be prepared for the advances in technology occurring in today's environment. Intrado believes that it is vital for the Commission to quickly and clearly define compliance requirements of the desired end-state to support investment and development of appropriate technologies and solutions. All interested parties must know with clarity what is expected of them by way of technical location performance as well as the date(s) by which those requirements will be mandated. Anything short of that kind of clarity risks having a shortage of willing infrastructure participants and a high likelihood of ill-placed and/or ill-timed investment in infrastructure. Intrado urges the Commission to promptly "put a stake in the ground" about the ultimate system location requirement, even if a phased approach is adopted.