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IP Telephony Requirements for Emergency Telecommunication Service

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Status of this Memo

Abstract

This document presents a list of requirements in support of Emergency Telecommunications Service (ETS) within the context of IP telephony. It is an extension to the general requirements presented in [2]. Solutions to these requirements are not presented in this document.

1. Introduction

Effective telecommunications capabilities can be imperative to facilitate immediate recovery operations for serious disaster events, such as, hurricanes, floods, earthquakes, and terrorist attacks. Disasters can happen any time, any place, unexpectedly. Quick response for recovery operations requires immediate access to any public telecommunications capabilities at hand. These capabilities include: conventional telephone, cellular phones, and Internet access via online terminals, IP telephones, and wireless PDAs. The

commercial telecommunications infrastructure is rapidly evolving to Internet-based technology. Therefore, the Internet community needs to consider how it can best support emergency management and recovery operations.

1.1 Problem

Standards have been developed by other standards bodies concerning emergency communications. As discussed in [2], some of these standards, such as T1.631 [4], define specific indicators or labels for emergency communications in SS7 networks. Certain requirements must be defined in order to achieve peering across hybrid networks (networks that communicate between IP and other types of networks such as that realized by the Public Switched Telephone Network) in order to achieve an interworking of services.

2. Scope

[2] has defined a set of general system requirements to support Emergency Telecommunications Service (ETS). This document defines an additional set of system requirements to achieve support for ETS within the specific context of IP telephony (note that this document views IP telephony within the context of an end-to-end application layer service). Solutions to requirements are not defined. The document does not specify protocol enhancements or specifications.

Note that [3], Requirements for Resource Priority Mechanisms for SIP, is an RFC that shares some overlap with this document. However, [3] only applies to SIP and is not meant to be applied to a more general perspective of IP telephony as it relates to ETS.

2.1 Out of Scope

An item that is not in scope of this document is mandating acceptance and support of the requirements presented in this document. The IETF does not mandate requirements or capabilities to independent networks that comprise the Internet. As an example, Internet Service Providers (ISP) may choose not to operate any telephony-related gateways or services. The IETF cannot and does not mandate that an ISP deploy either telephony-related gateways or telephony-related services. There is an expectation that business contracts, for example Service Level Agreements (SLA), will be used to satisfy those following requirements that apply to service providers. Absence of an SLA implies best effort service is provided.

It is assumed that some ISPs will choose to offer ETS services and that other carriers will choose not to offer ETS services. These requirements do not apply to ISPs that have chosen not to offer ETS

services.

3. IP Telephony Requirements

The requirements in this section relate only to Telephony Signalling as used in Internet-based telephony services. They are an extension to the general requirements specified in [2]. The following requirements explicitly do not relate to IP-layer mechanisms, such as Differentiated Services or Integrated Services.

1) Telephony signalling applications used with Internet-based telephony MUST be able to carry labels.

2) The ability to carry labels MUST be extensible to support various types and numbers of labels. A single binary value will not be sufficient given the various labeling standards in existance today.

3) Telephony signalling labels SHOULD have a mapping with the various emergency related labels/markings used in other telephony based networks, such as the PSTN. This ensures that a telephone call placed over a hybrid infrastructure (traditional PSTN over some portion(s) of the path, Internet telephony over some other portion(s) of the path) can carry the labels end-to-end with appropriate translation at PSTN/Internet boundaries. Absence of a mapping means that the signaling reverts to a default service (presumably one attributed to the general public).

4) Application layer IP telephony capabilities MUST NOT preclude the ability to do application-layer accounting.

5) With respect to application layer signaling, Application-layer mechanisms specifically targeted to recognize ETS type labels MUST be ABLE to support a service other than best effort (we assume this to be better than best effort service). This support SHOULD focus on probability of forwarding packets used for call completion. Probability MAY reach 100% depending on the local policy associated with the label. Local policy MUST also be used to determine IF better than best effort is to be applied to a specific label (or related set of labels).

The above paragraph MUST be taken in its entirety. The ability to support better than best effort does not mean that the application layer mechanism is expected to be activated. Further, we do not define the means by which better than best effort is or should be realized. Application-layer mechanims that do not recognize ETS type labels are not subject to this requirement.

4. Issues

This section presents issues that arise in considering solutions for the telephony requirements that have been defined for ETS. This section does not specify solutions nor is it to be confused with requirements. Subsequent documents that articulate a more specific set of requirements for a particular service may make a statement about the following issues.

1) Alternate paths

Experience with GETS over the PSTN has shown the utility of alternate paths to a destination to help facilitate emergency-related communications. From the perspective of the Internet, this utility may be difficult to achieve and have a more limited benefit. Unlike the PSTN, which creates a fixed path during call setup phase, the Internet uses dynamic routing for IP packets. This dynamic routing capability automatically causes IP packets to travel the best current path. The Internet network infrastructure does not have the concept of a "call" or the concept of "call setup", though IP telephony applications might have application-layer awareness of calls or the call setup concept.

5. Security

Only authorised users or operators SHOULD be able to create non-ordinary Labels (i.e., labels that may alter the default best effort service. Labels SHOULD be associated with mechanisms to provide strong end-to-end integrity during their transmission through the telephony systems. Finally, in cases where labels are expected to be acted upon by operators, these operators SHOULD have the capability of authenticating the label on a received message or transmission in order to prevent theft of service and reduce risk of denial of service (e.g. by unauthorised users consuming any limited resources).

Security is also discussed in the general requirements of [2], which applies to section 3 above.

6. References

1 Bradner, S., "The Internet Standards Process -- Revision 3", BCP 9, RFC 2026, October 1996.

2 Carlberg, K., Atkinson, R., "General System Requirements for Emergency Telecommunications Service", Internet Draft, Work In Progress, September, 2002

3 Schulzrinne, H., "Requirements for Resorce Priority Mechanisms for the Session Initiation Protocol (SIP)", RFC 3487, February, 2003.

4 ANSI, "Signaling System No. 7(SS7): High Probability of Completion (HPC) Network Capability, ANSI T1.631, 1993.

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