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Technical Report

**Emergency Communications (EMTEL);
Emergency calls and VoIP: possible short and
long term solutions and standardization activities**

ETSI

ETSI

650 Route des Lucioles
F-06921 Sophia Antipolis Cedex - FRANCE

Tel.: +33 4 92 94 42 00   Fax: +33 4 93 65 47 16

Siret N° 348 623 562 00017 - NAF 742 C
Association à but non lucratif enregistrée à la
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Foreword

This Technical Report (TR) has been produced by ETSI Special Committee Emergency Communications(EMTEL).

The present document is one of several deliverables covering the communication needs of individuals and authorities in emergency situations, as identified below:

TR 102 180: "Basis of requirements for communication of individuals with authorities/organizations in case of distress (Emergency call handling)";

TS 102 181: "Requirements for communication between authorities/organizations during emergencies";

TS 102 182: "Requirements for communications from authorities/organizations to individuals, groups or the general public during emergencies";

TR 102 410: "Basis of requirements for communications between individuals and between individuals and authorities whilst emergencies are in progress".

1　　Scope

The present document gives an overview of standardisation activities and summarises different methods for VoIP providers to deliver emergency communication services. VoIP is growing quickly, especially in countries with a high broadband penetration. Therefore the use of this technology for the provision of emergency communication services will be considered. For this, specific features can be introduced such as location and routing facilities.

The present document is applicable to ETSI technical bodies for the defining of services and specifying technical solutions.

2　　References

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2.1　　Normative references

The following referenced documents are indispensable for the application of the present document. For dated references, only the edition cited applies. For non-specific references, the latest edition of the referenced document (including any amendments) applies.

Not applicable.

2.2   Informative references

The following referenced documents are not essential to the use of the present document but they assist the user with regard to a particular subject area**.** For non-specific references, the latest version of the referenced document (including any amendments) applies.

[i.1]   ETSI TR 102 180: "Basis of Requirements for communication of Individuals with authorities/organizations in case of distress (emergency call handling)".

[i.2]   ETSI TS 102 424 (V1.1.1): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Requirements on the NGN network to support Emergency Communication from Citizen to Authority".

[i.3]   ETSI TS 123 167: "Universal Mobile Telecommunications System (UMTS); IP Multimedia Subsystem (IMS) emergency sessions (Release 7)".

[i.4]   IETF RFC 5012: "Requirements for Emergency Context Resolution with Internet Technologies".

[i.5]   IETF RFC 5031: "A Uniform Resource Name (URN) for Emergency and Other Well-Known Services".

[i.6]   IETF RFC 5069: "Security Threats and Requirements for Emergency Call Marking and Mapping".

[i.7]   Draft-ietf-ecrit-mapping-arch-03: "Location-to-URL Mapping Architecture and Framework" by H. Schulzrinne.

NOTE: This reference can is available at http://www.ietf.org/internet-drafts/draft-ietf-ecrit-mapping-arch-03.txt.

[i.8]   Draft-ietf-ecrit-lost-10: "LoST: A Location-to-Service Translation Protocol", by T. Hardie, A. Newton, H. Schulzrinne and H. Tschofenig.

NOTE: This reference can is available at http://www.ietf.org/internet-drafts/draft-ietf-ecrit-lost-10.txt.

[i.9]   Draft-ietf-ecrit-phonebcp: "Best Current Practice for Communications Services in support of Emergency Calling", by B. Rosen and J. Polk.

NOTE: This reference can is available at http://www.ietf.org/internet-drafts/draft-ietf-ecrit-phonebcp-04.txt.

[i.10]   Draft-ietf-ecrit-framework-05: "Framework for Emergency Calling using Internet Multimedia", by B. Rosen, H. Schulzrinne, A. Newton and J. Polk.

NOTE: This reference can is available at http://www.ietf.org/internet-drafts/draft-ietf-ecrit-framework-05.txt.

[i.11]   Draft-ietf-ecrit-dhc-lost-discovery: "A Dynamic Host Configuration Protocol (DHCP) based Location-to-Service Translation Protocol (LoST) Discovery Procedure", by H. Schulzrinne, H. Tschofenig and J. Polk.

NOTE: This reference can is available at http://www.ietf.org/internet-drafts/draft-ietf-ecrit-dhc-lost-discovery-03.txt.

[i.12]   ETSI TS 182 009: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Architecture to support emergency communication from citizen to authority; [Endorsed document 3GPP TS 23.167, Release 7]".

[i.13]   ETSI TS 102 164 (V2.1.1): "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Emergency Location Protocols; [OMA-TS-MLP-V3_2-20051124-C]".

[i.14]   ETSI EG 202 339: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Definition of requirements on the functional architecture for supporting Emergency and Priority user services".

[i.15]   ITU Recommendation E.164: "List of ITU Recommendation E.164 assigned country codes".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

IP network: packet transport network deploying the IP protocol

Voice over Internet Protocol (VoIP): is the generic name, which defines the transportation of voice traffic by means of transmission in packets using Internet Protocol (IP)

NOTE: VoIP traffic can be routed on a controlled private network or the internet, which is a public network, or a combination of the two. Internet telephony and managed IP-based telephony are sub elements of VoIP.

IP-based telephony (or managed IP-based telephony): specific VoIP service, where the voice traffic is carried by data packets fully or partially on managed IP network, in which case the management of network means management of quality, reliability and security of calls

internet telephony (or Voice over Internet (VoIT)): a specific VoIP service using transmission in packets on the Internet public network which is by definition open and noncontrollable

3.2 Abbreviations

For the purposes of the present document, the following abbreviations apply:

3GPP	Third Generation Partnership Project
DNS	Domain Name System
EGEA	Expert Group on Emergency Access
ETSI	European Telecommunications Standards Institute
IETF	Internet Engineering Task Force
NTP	Network Termination Point
PATS	Publicly Available Telephony Services
PIDF-LO	Presence Information Data Format – Location Object
PSAP	Public Safety Answering Point
PSTN	Public Switched Telephone Network
RPC	Remote Procedure Call
SIM	Subscriber Identification Module for GSM
VoIP	Voice over Internet Protocol
URI	Uniform Resource Identifier
USIM	Subscriber Identification Module for UMTS

4 Purpose of the present document

4.1 The network evolution

New communications networks are IP-based. The number of broadband telephones is increasing quickly and more and more calls no longer reach a circuit switched network.

Emergency calls traditionally reach the PSAP through the PSTN. Actors offering VoIP services without a PSTN network, e.g. municipality networks, need to transfer emergency calls through a circuit switched network, typically the old PSTN. Since IP allows for transfer of more information related to the call and the caller, it could be beneficial to allow for direct IP-interconnect to PSAPs. It is also foreseeable that the days of the circuit switched networks are coming to an end. That means that the requirements for IP-interconnections of PSAPs are developed. It can also be argued why new IP-based public communications operators would not have the possibility to connect directly to PSAPs over IP.

Apart from the above mentioned reasons for EMTEL to work on IP-interconnection of PSAPs, it is likely to be an advantage to try and define a PSAP IP interface. It could lead to easier reaching common functionality meeting requirements on Emergency Services which in turn could lead to a possibility to utilize common platforms and easier exchange of experiences. This is done with the knowledge that other standardization bodies are working on different aspects of the problem.

4.1.1 Summary

- The circuit switched network era will end.

- The routing from IP networks to PSTN for reaching PSAPS is not necessary when PSAPs are connected directly to IP networks.

- A pure IP-interface for PSAPs should be defined.

- More information can be transferred through IP into the PSAPs compared to today's circuit switched signalling interfaces (trunk or access signalling).

- Common requirements are beneficial for meeting requirements on Emergency Services, cost for systems and exchange of experiences.

4.2 Broadband subscribers

The increasing penetration of broadband has opened the market for VoIP over broadband. From being a complement to the PSTN it is becoming a replacement. Driving factors are the possibility to reduce subscription and call costs and also other services, e.g. the possibility to log into the network and thus receive calls to your actual location.

When becoming a replacement subscribers would expect that the behaviour of the telephony service concerning Emergency Calls is the same as in the PSTN. Due to technical reasons this is not possible to guarantee when a call is set up from the Internet.

This problem is addressed in many international working groups in e.g. IETF, 3GPP, and ETSI. There is a need to coordinate the VoIP Emergency Call standardization activities and also to define the requirements on the PSAP IP interface.

For this reason EMTEL in this TR defines short and long term requirements for Emergency Calls from broadband connections with the aim to facilitate a harmonized European approach. The individual subscriber should not be forced to know technical details of the network he is connected to for making Emergency Calls.

4.2.1 Summary

- VoIP is going from being a complement to PSTN into becoming a replacement.

- The subscriber expects Emergency Calls to work "as usual".

- It is desirable to have a harmonized approach in Europe since the VoIP service is borderless.

- There are a lot of standardization activities going on in different groups.

5 General on Access to Emergency Services

The efficient operation of Emergency Services requires fulfilment of the following basic **functions**.

1) Routing to the appropriate PSAP (as defined by the relevant authority).

2) Identification of the caller (network identity through e.g. NTP and/or U/SIM).

3) Location of the caller.

These three basic **functional** requirements are valid independent of **what service type** the Emergency Call is set up from the Communications Network and to the PSAP and **which interface** is used. See figure 1.
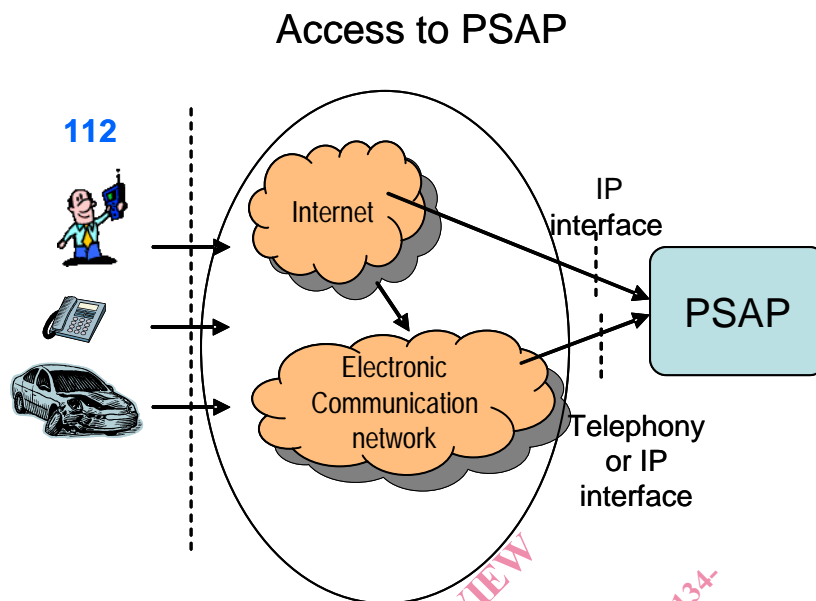
Access to PSAP

Figure 1: Network overview 2

5.1   Service types

All Emergency Communication have to originate over a Service Type. Below a list of possible Service Types is given:

Voice Services:

1) POTS (Plain Old Telephone Service);

2) Mobile telephony (circuit switched);

3) Satellite telephony;

4) Voice over IP:

- Fixed (The subscriber cannot move the service to another Network Access Point);

- Nomadic (The subscriber can move the service to another Network Access Point);

- Mobile Communication Services on Packet Access;

- Internet telephony.

Other Services:

1) Video calls (E.g. from 3G-telephone);

2) Data calls (E.g. alarm from a device);

3) E-mail;

4) SMS (Short Message Service);

5) MMS (Multimedia Messaging Service);

6) Real-time Instant-Messaging and Chat.

The present document deals with the Service Type for Voice over IP category 4.