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Emergency Communications (EMTEL); Lightweight Messaging Protocol for Emergency Service Accessibility (LMPE)

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ETSI650 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 Specification (TS) has been produced by ETSI Special Committee Emergency Communications (EMTEL).

Modal verbs terminology

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Executive summary

Lightweight Messaging Protocol for Emergency Service accessibility (LMPE) extends a SIP SIMPLE based messaging service with session mode and facilities to redirect or transfer a chat. The mechanisms introduced in the present document differ from existing solutions like MSRP in a sense that no media plane is required. This reduces the functionality to chat, but requires less deployment effort and complexity (e.g. no intermediate services or relays in case of NAT), especially in a roaming use case. In addition, to further reduce complexity, the identification of a user is carried out via a device identifier only, such as a mobile phone number as with comparable chat services. In summary, it simplifies the implementation and thus can be used in simple mobile applications or even smart IoT devices and chatbots, which for example send or respond to messages automatically.

The referred baseline specification (ETSI TS 103 479 [1]) already defines page mode messaging suitable for a single message exchange or a series of short messages similar to paging or SMS on a mobile device. Routing and mapping mechanisms (defined in ETSI TS 103 479 [1]) to determine the proper control room, are based on location information. Therefore a single message exchange is not practicable as caller location may change and lead to messages being routed to a different control room. The present document defines specific message types to group messages into sessions with routing and mapping only required at setup time. In addition the same principles are used to support supplementary services like chat redirect and transfer. Each mechanism is transparent to ETSI TS 103 479 [1] core services and requires only minor modifications to the PSAP interface.

Introduction

Emergency communications services are primarily voice only, along with a marginal share of data and multimedia used by Public Safety Answering Points (PSAPs). Improving access to emergency services for citizens, especially for the deaf and hard of hearing, requires PSAPs and people in need to handle new modes of communications such as text. Messenger services are widespread and well known to the public and currently, the present document defines extension to support a comparable messenger service to access emergency control rooms by leveraging the new architecture introduced in ETSI TS 103 479 [1]. The main purpose of the extensions is to enable a simplified chat session mode combined with means to redirect or transfer a chat session. Furthermore the specification allows a lightweight implementation of a messenger application for emergency chat or bot services. The fact that besides a signalling plane, no further media sessions are required, supports a straight integration with firewalls or, in general, network security technologies.

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1 Scope

The purpose of the present document is to describe a lightweight session based emergency chat protocol that extends the base messaging functionality as defined in ETSI TS 103 479 [1]. The messaging service is based only on methods of the SIP signalling plane and interworks with Border Control Function, Emergency Service Routing Proxy, Emergency Call Routing Function, Public Safety Answering Point, the Location Information Server. It is important to emphasize that the introduced feature is an alternative to MSRP, real-time text or, in general, total conversation and not a replacement.

2 References

2.1 Normative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

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Referenced documents which are not found to be publicly available in the expected location might be found at <https://docbox.etsi.org/Reference>.

The following referenced documents are necessary for the application of the present document.

- [1] ETSI TS 103 479: "Emergency Communications (EMTEL); Core elements for network independent access to emergency services".
- [2] IETF RFC 2046: "Multipurpose Internet Mail Extensions (MIME) Part Two: MediaTypes", Freed N. and Borenstein, N., November 1996.
- [3] IETF RFC 3261: "SIP: Session Initiation Protocol", Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston, A., Peterson, J., Sparks, R., Handley, M. and Schooler, E. June 2002.
- [4] IETF RFC 3325: "Private Extensions to the Session Initiation Protocol (SIP) for Asserted Identity Within Trusted Networks", Jennings, C., Peterson, J. and Watson, M., November 2002.
- [5] IETF RFC 3326: "The Reason Header Field for the Session Initiation Protocol (SIP)", Oran, D. and Camarillo, G., December 2002.
- [6] IETF RFC 3428: "Session Initiation Protocol (SIP) Extension for Instant Messaging", Campbell, B., Rosenberg, J., Schulzrinne, H., Huitema, C. and Gurle, D., December 2002.
- [7] IETF RFC 3841: "Caller Preferences for the Session Initiation Protocol (SIP)", Rosenberg, J., Schulzrinne, H. and Kyzivat, P., August 2004.
- [8] IETF RFC 4119: "A Presence-Based GEOPRIV Location Object Format", Peterson, J., December 2005.
- [9] IETF RFC 4244: "An Extension to the Session Initiation Protocol (SIP) for Request History Information", Barnes, M., November 2005.
- [10] IETF RFC 4412: "Communications Resource Priority for the Session Initiation Protocol (SIP)", Schulzrinne, H. and Polk, J., February 2006.
- [11] IETF RFC 4566: "SDP: Session Description Protocol", Handley, M., Jacobson, V. and Perkins, C., July 2006.
- [12] IETF RFC 5031: "A Uniform Resource Name (URN) for Emergency and Other Well-Known Services", Schulzrinne, H., January 2008.

- [13] IETF RFC 5621: "Message Body Handling in the Session Initiation Protocol (SIP)", Camarillo, G., September 2009.
- [14] IETF RFC 6442: "Location Conveyance for the Session Initiation Protocol", Polk, J., Rosen, B. and Peterson, J., December 2011.
- [15] IETF RFC 6881: "Best Current Practice for Communications Services in Support of Emergency Calling", Rosen, B. and Polk, J. March 2013.
- [16] IETF RFC 7135: "Registering a SIP Resource Priority Header Field Namespace for Local Emergency Communications", Polk, J. May 2014.
- [17] IETF RFC 8446: "The Transport Layer Security (TLS) Protocol Version 1.3", V Rescorla, E., August 2018.
- [18] W3C: "Decentralized Identifiers (DIDs) v1.0 Core Data Model and representations", Working Draft 08 November 2020.

NOTE: Available at <https://www.w3.org/TR/did-core/>.

2.2 Informative references

References are either specific (identified by date of publication and/or edition number or version number) or non-specific. For specific references, only the cited version applies. For non-specific references, the latest version of the referenced document (including any amendments) applies.

NOTE: While any hyperlinks included in this clause were valid at the time of publication, ETSI cannot guarantee their long-term validity.

The following referenced documents are not necessary for the application of the present document, but they assist the user with regard to a particular subject area.

- [i.1] EENA, Version 1.1, March 2013: "Next Generation 112 Long Term Definition".

NOTE: Available at <https://eena.org/knowledge-hub/documents/ng112-long-term-definition-standard-for-emergency-services/>.

- [i.2] EENA Version 1.05, March 2016: "Public Safety Digital Transformation The Internet of Things (IoT) and Emergency Services".

NOTE: Available at <https://eena.org/document/the-internet-of-things-and-emergency-services/>.

- [i.3] W3C Recommendation, November 2019: "Verifiable Credentials Data Model 1.0".

NOTE: Available at <https://www.w3.org/TR/vc-data-model/#ecosystem-overview>.

3 Definition of terms, symbols and abbreviations

3.1 Terms

Void.

3.2 Symbols

Void.

3.3 Abbreviations

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

AP	Application Provider
BCF	Border Control Function
BGP	Border Gateway Protocol
CA	Certification Authority
CAP	Common Alerting Protocol
CERT	Computer Emergency Response Team
CR	Carriage Return
DID	Decentralised Identifier
DLT	Distributed Ledger Technology
ECRF	Emergency Call Routing Function
ESInet	Emergency Services IP network
ESRF	Emergency Service Routing Function
ESRP	Emergency Service Routing Proxy
ETSI	European Telecommunications Standards Institute
FG	Forest Guide
GIS	Geographic Information System
HELD	HTTP Enabled Location Delivery
HTTP	Hypertext Transfer Protocol
HTTPS	Hypertext Transfer Protocol Secure
IETF	Internet Engineering Task Force
IF	Interface
IM	Instant Messaging
IoT	Internet of Things
IP	Internet Protocol
IT	Information Technology
JSON	JavaScript® Object Notation
LF	Line Feed
LIS	Location Information Server
LMPE	Lightweight Messaging Protocol for Emergency Service accessibility
LO	Location Object
LOST	Location to Service Translation
LTD	Long-term Definition
MSD	Minimum Set of Data
MSRP	Message Session Relay Protocol
NAT	Network Address Translation
P-A-I	P-Asserted-Identity
PIDF	Presence Information Data Format
PIDF-LO	Presence Information Data Format - Location Object
PNNS	Protocol Naming and Numbering Service
PSAP	Public Safety Answering Point
RCS	Rich Communication Services
RFC	Request For Comment
SDP	Session Description Protocol
SIP	Session Initiation Protocol
SMS	Short Message Service
TCP	Transmission Control Protocol
TLS	Transport Layer Security
TR	(ETSI) Technical Report
TS	(ETSI) Technical Specification
UDP	User Datagram Protocol
URI	Uniform Resource Identifier
URN	Uniform Resource Name
UTF	Unicode Transformation Format
WGS84	World Geodetic System 1984

4 General

4.1 Overview

Per ETSI TS 103 479 [1] emergency calls are routed by the ESRF to the ESRP via a BCF. Depending on national PSAP models the ESRP may then forward directly to the appropriate PSAP as explained in NG112 LTD [i.1]. The same mechanism applies to instant messaging in a non-session mode. The present document defines certain extensions to interfaces and introduces a mobile application (APP) interface to support a session based chat application. Figure 1 illustrates a high level functional architecture, where specific Application Provider (AP) services are used to manage the application (AP BE) or to interconnect with an ESInet (SIP PROXY). Chat messages addressed to public emergency service SIP URI or service URN are forwarded to a BCF and routed within the ESInet utilizing a geodetic location determined by the mobile application (typically via sensor fusion).

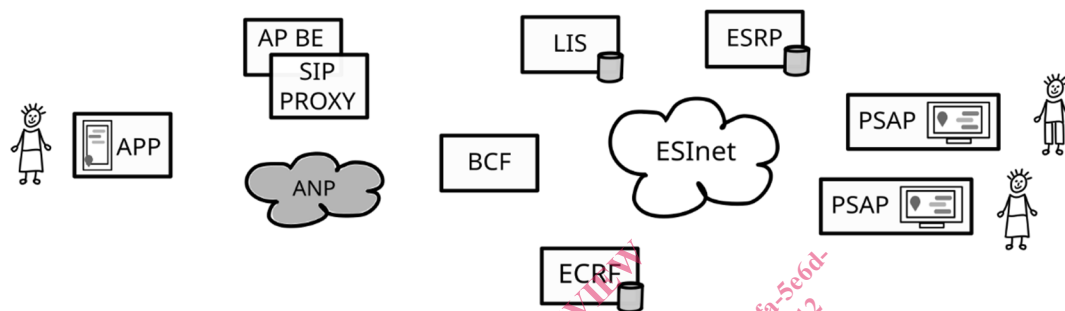


Figure 1: High level functional architecture

The present document specifies only the signalling interface between APP, PSAP and other core services required to setup a session based chat. The following architecture introduces functional elements that comprise an IP only environment. Such elements provide security measures (BCF), emergency call routing (ESRP), mapping PSAP boundaries to SIP URIs (ECRF), a mobile application (APP) and chat processing equipment (PSAP).

4.2 Architecture

The definition of core elements and interfaces supporting a Lightweight Messaging Protocol for Emergency Service accessibility (LMPE) is based on the core concept introduced in ETSI TS 103 479 [1]. LMPE utilizes IP technology and requires public and private managed, and routed IP networks. The present document introduces new interfaces between the functional elements APP and PSAP (dashed-line boxes in Figure 2), and refers to functional elements with their internal and external interfaces as defined in ETSI TS 103 479 [1]; listed below:

- Border Control Function (BCF);
- Emergency Call Routing Function (ECRF);
- Chat Application (APP);
- Public Safety Answering Point (PSAP);
- Emergency Services Routing Proxy (ESRP); and
- Location Information Service (LIS).

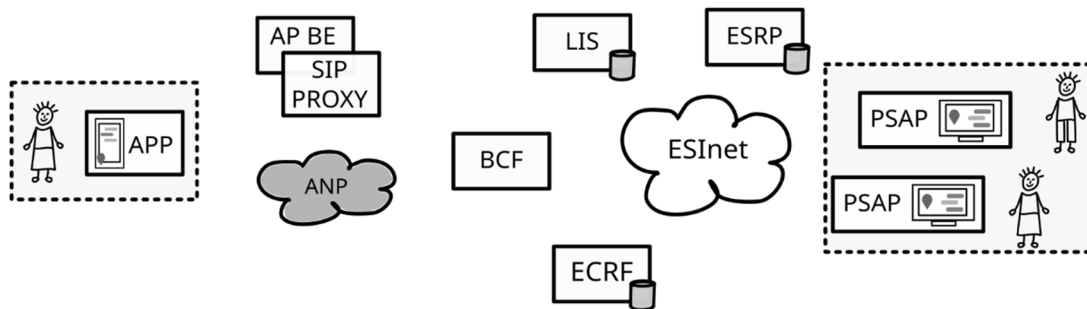


Figure 2: Core elements

4.3 Mandatory Interfaces

Mandatory interfaces are either referenced (ETSI TS 103 479 [1]), or introduced by the present document to define simple chat capabilities of an APP and ESInet core elements. Figure 3 shows interfaces as listed in the following:

- **SIP-1, SIP-2:** Interface between APP, BCF, ESRP and PSAP elements that defines SIP transport and signalling capabilities.
- **LOST-1, LOST-2:** Interface between ESRP and ECRF elements that defines LoST signalling capabilities.
- **HELD-1, HELD-2:** Interface between ESRP or PSAP and LIS elements that defines location dereference and HELD signalling capabilities.
- **IM-2:** APP and PSAP chat handling capabilities to support instant messaging.

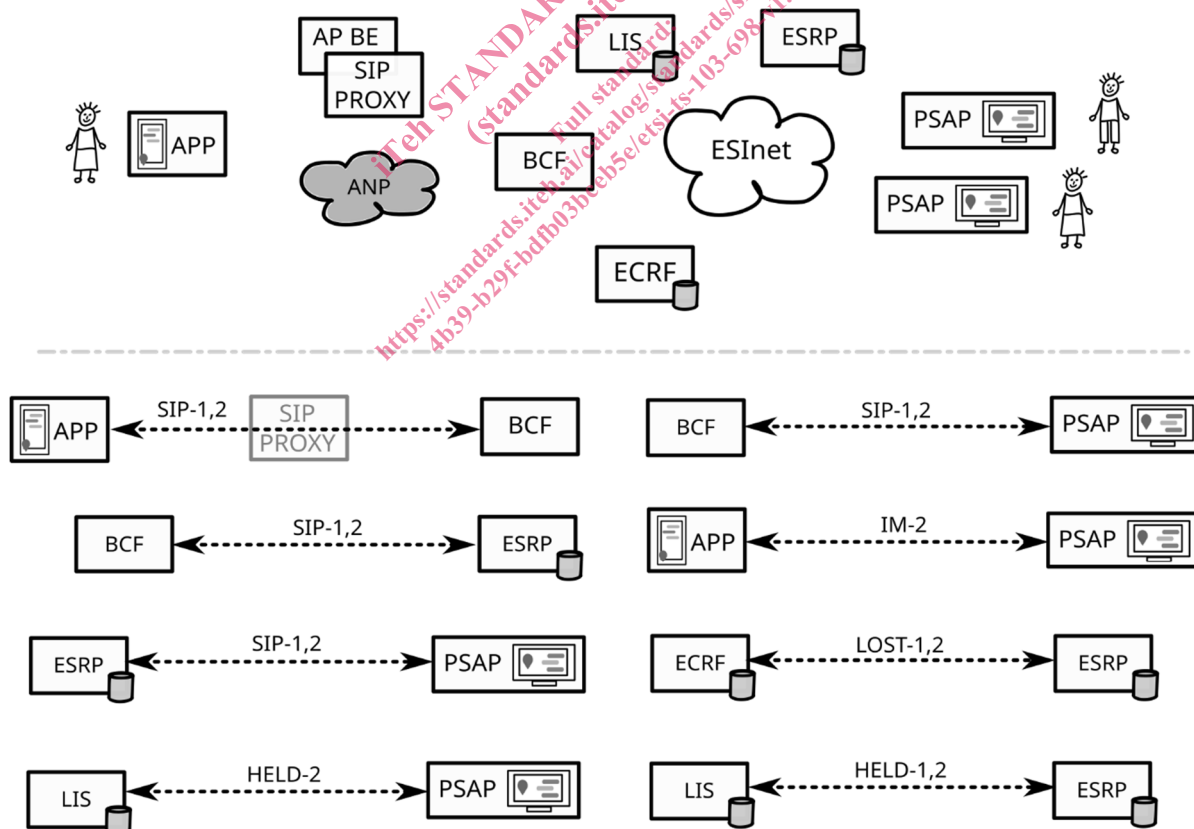


Figure 3: Considered mandatory interfaces

4.4 Optional Interfaces

In addition, optional interfaces as defined in to ETSI TS 103 479 [1], are referenced by the current document to extend mandatory capabilities. Figure 4 shows interfaces as listed in the following:

- **HTTP-2:** Interface between BCF and PSAP elements that defines domain specific web service capabilities.
- **HTTP-3:** Interface between PSAP elements that defines domain specific web service capabilities.
- **LOST-1:** Interface between APP and ECRF elements that defines LoST signalling capabilities.
- **HELD-1:** Interface between APP and LIS elements that defines HELD signalling capabilities.

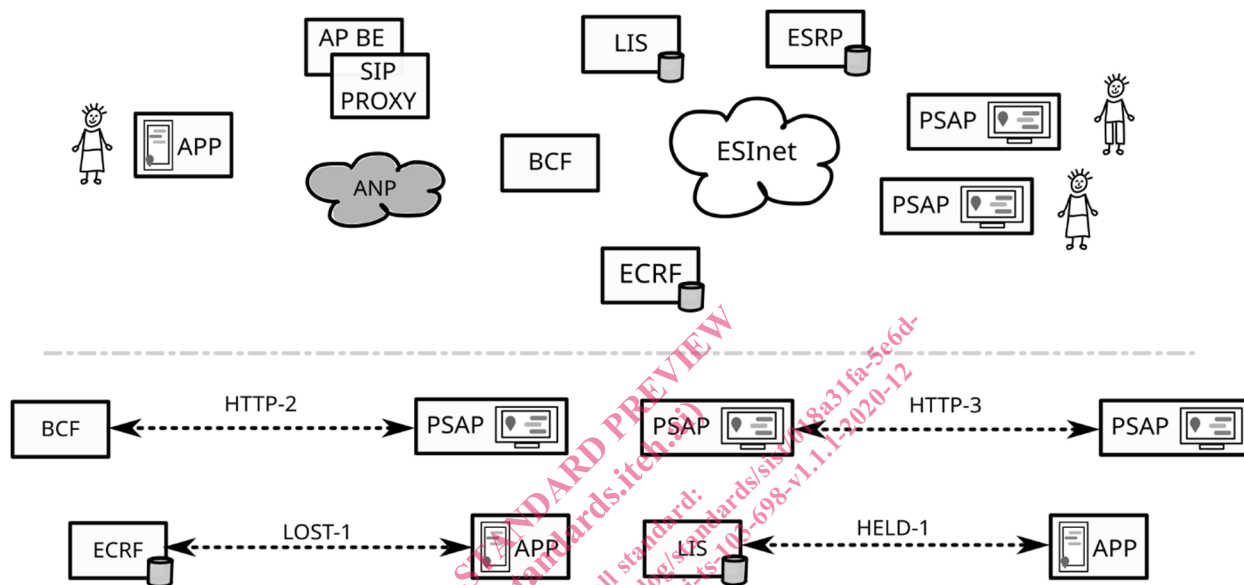


Figure 4: Considered optional interfaces

5 Entities

5.1 Border Control Function (BCF)

5.1.1 Overview

A BCF is the entry point (point-of-interconnect) to the ESInet infrastructure where all traffic from external networks transits. General procedures and interfaces are specified in ETSI TS 103 479 [1].

5.1.2 Mandatory Interfaces

To be compliant with the procedures in the present document, a BCF shall support:

- 1) the SIP-1 interface as specified in ETSI TS 103 479 [1], clause 6.1.1;
- 2) the SIP-2 interface as specified in ETSI TS 103 479 [1], clause 6.1.2.

Figure 5 shows mandatory interfaces and neighbouring entities.