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Protocol specifications for Emergency Service Caller Location determination and transport

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Protocol specifications for Emergency Service Caller Location determination and transport

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Foreword

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1 Scope

The present document describes the protocol specifications for emergency service caller location determination and transport architecture as specified in ETSI ES 203 178 [1].

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

[1] ETSI ES 203 178: "Functional architecture to support European requirements on emergency caller location determination and transport".

[2] OMA-TS-MLP-V3_5: "Mobile Location Protocol Version 3.5".

NOTE: Available at http://www.openmobilealliance.org/release/MLS/V1_4-20150224-C/OMA-TS-MLP-V3_5-20150224-C.pdf.

[3] IETF RFC 3261: "SIP: Session Initiation Protocol".

[4] IETF RFC 4320: "Actions Addressing Identified Issues with the Session Initiation Protocol's (SIP) Non-INVITE Transaction".

[5] IETF RFC 5393: "Addressing an Amplification Vulnerability in Session Initiation Protocol (SIP) Forking Proxies".

[6] IETF RFC 5954: "Essential Correction for IPv6 ABNF and URI Comparison in RFC 3261".

[7] IETF RFC 6442: "Location Conveyance for the Session Initiation Protocol".

[8] IETF RFC 4566: "SDP: Session Description Protocol".

[9] IETF RFC 3264: "An Offer/Answer Model with the Session Description Protocol (SDP)".

[10] ETSI TS 124 229: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3 (3GPP TS 24.229)".

[11] ETSI TS 129 165: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Inter-IMS Network to Network Interface (NNI) (3GPP TS 29.165)".

[12] ETSI TS 123 167: "Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia Subsystem (IMS) emergency sessions (3GPP TS 23.167)".

[13] ETSI ES 283 035: "Network Technologies (NTECH); Network Attachment; e2 interface based on the DIAMETER protocol".

[14] ETSI TS 129 163: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks (3GPP TS 29.163)".

[15] IETF RFC 4119: "A Presence-based GEOPRIV Location Object Format".

[16] IETF RFC 5139: "Revised Civic Location Format for Presence Information Data Format Location Object (PIDF-LO)".

[17] IETF RFC 5491: "GEOPRIV Presence Information Data Format Location Object (PIDF-LO) Usage Clarification, Considerations, and Recommendations".

[18] IETF RFC 6848: "Specifying Civic Address Extensions in the Presence Information Data Format Location Object (PIDF-LO)".

[19] IETF RFC 7216: "Location Information Server (LIS) Discovery Using IP Addresses and Reverse DNS".

[20] IETF RFC 5985: "HTTP-Enabled Location Delivery (HELD)".

[21] IETF RFC 5986: "Discovering the Local Location Information Server (LIS)".

[22] IETF RFC 6155: "Use of Device Identity in HTTP-Enabled Location Delivery (HELD)".

[23] IETF RFC 6915: "Flow Identity Extension for HTTP-Enabled Location Delivery (HELD)".

[24] IETF RFC 7840: "A Routing Request Extension for the HTTP-Enabled Location Delivery (HELD) Protocol".

[25] IETF RFC 6753: "A Location Dereference Protocol Using HTTP-Enabled Location Delivery (HELD)".

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

[27] IETF RFC 6881: "Best Current Practice for Communications Services in Support of Emergency Calling".

[28] IETF RFC 3325: "Private Extensions to the Session Initiation Protocol (SIP) for Asserted Identity within Trusted Networks".

[29] IETF RFC 7852: "Additional Data Related to an Emergency Call".

[30] IETF RFC 3323: "A Privacy Mechanism for the Session Initiation Protocol (SIP)".

[31] IETF RFC 5079: "Rejecting Anonymous Requests in the Session Initiation Protocol (SIP)".

[32] Recommendation ITU-T Q.850 (1998) Amd. 1 (07/2001): "Usage of cause and location in the Digital Subscriber Signalling System No. 1 (DSS1) and the Signalling System No. 7 ISDN user part (ISUP), Amendment 1".

[33] ETSI TS 124 525: "Universal Mobile Telecommunications System (UMTS); LTE; Business trunking; Architecture and functional description (3GPP TS 24.525)".

[34] ETSI EN 300 899-1 (V1.1.2) (09-1998): "Integrated Services Digital Network (ISDN); Signalling System No.7; Interworking between ISDN User Part (ISUP) version 2 and Digital Subscriber Signalling System No. one (DSS1); Part 1: Protocol specification [ITU-T Recommendation Q.699, modified]".

[35] IETF RFC 7163: "URN for Country-Specific Emergency Services".

[36] draft-winterbottom-sipcore-locparam-01 (May 2017): "Location Source Parameter for the SIP Geolocation Header Field".

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] ETSI ES 282 001: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); NGN Functional Architecture".

[i.2] IETF RFC 3825: "Dynamic Host Configuration Protocol Option for Coordinate-based Location Configuration Information".

[i.3] IETF RFC 6225: "Dynamic Host Configuration Protocol Options for Coordinate-Based Location Configuration Information".

[i.4] ETSI TS 123 228: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); LTE; IP Multimedia Subsystem (IMS); Stage 2 (3GPP TS 23.228)".

[i.5] ETSI TS 123 032: "Digital cellular telecommunications system (Phase 2+) (GSM); Universal Mobile Telecommunications System (UMTS); Universal Geographical Area Description (GAD) (3GPP TS 23.032)".

3 Definitions and abbreviations

3.1 Definitions

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

access network: portion of the telecommunications network that provides access to the switching function and terminates the user access signalling

Access Network Provider (ANP): service provider that provides physical and IP connectivity to a user equipment (UE) via a fixed or mobile access

NOTE: The access network may be provided by a single organization or it may be provided by a number of different organizations, BUT the interfaces between these organizations are not relevant to the scope of the present document as it is matter of contractual relations between the parties.

default PSAP: PSAP that is routed to when insufficient information exists to route to a specific PSAP, based on either location or emergency category

emergency: urgent need for assistance or relief

emergency call: call from a user to an emergency call centre, PSAP or similar agency charged with routeing calls to the relevant emergency response organization

emergency call facilities: mechanisms provided by public or private communications networks, emergency telephone stanchions/boxes, fire alarms, etc. the use of which enables emergency calls to be made

Emergency Call Service Provider (ECSP): service provider that acts as a mediator between the voice service providers and the public safety answering point service providers

emergency caller: individual placing an emergency call to reach the suitable PSAP

emergency category: differentiator for a specific emergency service type

NOTE: Examples of emergency service types are ambulance, police, fire brigade, etc.

emergency response organization: local or national force established to provide assistance to citizens in the event of their being involved in an emergency situation and requiring specialized help

EXAMPLE: The police, fire service and emergency medical services.

emergency service: service that provides immediate and rapid assistance in situations where there is a direct risk to life or limb, individual or public health or safety, to private or public property, or the environment but not necessarily limited to these situations

emergency situation: abnormal situation of serious nature that develops suddenly and unexpectedly, of which the evolution is uncertain and which may turn into a crisis or cause damage and casualties

Location-by-Reference: representing location information indirectly using a location URI

Location-by-Value: using location information in the form of a location object (LO), such as a PIDF-LO

location identifier: public network identifier, which provides a location value

EXAMPLE: A cell ID or line ID (see ETSI TS 123 167 [12]).

NOTE: A location value can be obtained from a location identifier by applying a static mapping or the location identifier may be encoded in such a way that it contains a location value (e.g. a ZIP code).

location information: location value, and/or a location identifier and/or a location reference

location reference: identifies a location server and provides sufficient information to allow the location server to provide the location value for the UE

EXAMPLE: https://ls.example.com:49152/uri/w3g61nf5n66p0, IETF RFC 6753 [25].

location URI: identifier that serves as a reference to location information which is later used as input by a dereference protocol to retrieve location information

location value: civic or geodetic position

network-provided location information: any location information pertaining to the calling device that is determined, provided or verified by the ANP

Next Generation Network (NGN): packet-based network able to provide telecommunication services and able to make use of multiple broadband, QoS-enabled transport technologies and in which service-related functions are independent from underlying transport-related technologies

nomadic: having the ability to move across network access points

NOTE: A nomadic user can make calls from different locations. However, unlike a mobile user, the location of a nomadic user cannot change during a specific call.

originating network: access network in which the emergency call was placed

PSAP address: URI or an E.164 number identifying a PSAP or a group of PSAPs

PSAP Service Provider (PSP): service provider that provides connectivity to Public Safety Answering Points (PSAPs) and directs emergency calls from the ECSP to the PSAP

Public Safety Answering Point (PSAP): physical location where emergency calls are received under the responsibility of a public authority

regulatory domain: geographical area where a set of regulatory rules applies

telecommunication: any transmission, emission, or reception of signs, signals, writing, images, sounds or intelligence of any nature, by wire, radio, optical fibre or other electromagnetic system

user access: point of connection to a telecommunication network from which a call can be placed

NOTE: This includes public telephones and "emergency call facilities".

user equipment: device allowing a user access to network services

user-provided location information: any location information originating from user-equipment that is not independently verified by the ANP

Voice Service Provider (VSP): specific type of application service provider that provides voice related services and optionally text and video-related services, on IP

3.2 Abbreviations

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

AF	Application Function
ANP	Access Network Provider
APRI	Address Presentation Restriction Indicator
AVP	Attribute-Value-Pair
CID	Content ID
CLF	Connectivity session Location and repository Function
DNS	Domain Name Server
EC	European Commission
E-CSCF	Emergency-Call Session Control Function
ECSP	Emergency Call Service Provider
ESRF	Emergency Service Routing Function
ESRP	Emergency Service Routeing Proxy
ETSI	European Telecommunications Standards Institute
EU	European Union
FQDN	Fully Qualified Domain Name
GAD	Universal Geographical Area Description
GMLC	Gateway Mobile Location Centre
HELD	HTTP Enabled Location Delivery
HTTPS	Hypertext Transfer Protocol Secure
IANA	Internet Assigned Numbers Authority
IBCF	Interconnection Border Control Function
IE	Information Element
IETF	Internet Engineering Task Force
II-NNI	Inter-IMS Network to Network Interface
IMS	IP Multimedia Core Network Subsystem
IP	Internet Protocol
ISUP	ISDN User Part
ITU-T	International Telecommunications Union - Telecommunications
LbyR	Location-by-Reference
LbyV	Location-by-Value
LRF	Location Retrieval Function
LS	Location Server
MLP	Mobile Location Protocol
NAPTR	Naming Authority PoinTeR
NGN	Next Generation Network
OMA	Open Mobile Alliance
P-CSCF	Proxy-Call Session Control Function
PSAP	Public Safety Answering Point
PSP	PSAP Service Provider
PSTN	Public Switched Telephone Network
RDF	Routeing Determination Function
RFC	Request For Comment
SIP	Session Initiation Protocol
SIPS	Session Initiation Protocol Secure
UA	User Agent
UE	User Equipment

URI Uniform Resource Identifier
URL Uniform Resource Locator
URN Uniform Resource Name
VAE VSP Aggregating Entity
VAP VSP Aggregation Provider
VoIP Voice over Internet Protocol
VSP Voice Service Provider

4 Descriptions and assumptions

4.1 Introduction

ETSI ES 203 178 [1] defines the interfaces between functional entities in the functional architecture to support European requirements on emergency caller location determination and transport, and places requirements on each of these interfaces. However, it does not specify what protocols are available or might be used to implement the required functionality across each of the interfaces. The present document matches interfaces with existing protocols and where gaps exist clearly indicates what the gaps are.

Table 4.1 summarizes the interfaces defined in ETSI ES 203 178 [1] and categorizes them as being either in scope or out of scope for the present document. Interfaces deemed as "In Scope" have specific clauses detailing how to achieve the functionality specified in ETSI ES 203 178 [1]. The details may refer to other specification, profile or extend existing protocols, or define new protocols. Interfaces deemed "Out of Scope" do not have detailed specifications provided in the present document.

Table 4.1: Categories of Interfaces defined in ETSI ES 203 178 [1]

Interface	1st endpoint	2nd endpoint	Scope
ia	User equipment	VSP Call Control	Out of scope
ib	VSP Call Control	LS Discovery	In scope
ic	VSP Call Control	Location Server	In scope
id	Location Server	Route Server	In scope
ie	VSP Call Control/VAE	VAE/ESRF	In scope
if	ESRF/LS-Proxy	Location Server	In scope
ig	ESRF	Route Server	In scope
ih	ESRF	ESRP	In scope
ii	ESRP	PSTN-PSAP	In scope
ij	ESRP	IP-PSAP	In scope
ik	PSTN-PSAP	ESRF/LS-Proxy	In scope
il	IP-PSAP	Location Server	In scope
im	IP-PSAP	ESRF/LS-Proxy	In scope
in	ESRF	LS-Proxy	In scope

As is stated in ETSI ES 203 178 [1], some interfaces in the architecture are between functional entities belonging to different operators or providers and, as a consequence, these interfaces have interoperability requirements and shall be implemented following the present document by the related connected functional entities. The protocol selection for these interfaces can impose requirements on provider internal functionalities and some provider internal interfaces; the definition of these requirements is however outside the scope of the present document.

The EC standardisation mandate M/493 (see ETSI ES 203 178 [1], annex B) demands that "this work shall not be focused on NGN but shall address current implementations for all types of voice calls (fixed, mobile, static and nomadic VoIP) in EU countries". Consequently, the functional architecture is intended to be compatible with IMS-based deployments and specifications regarding emergency services provision. The present document includes statements on IMS/NGN implementation considerations per interface.

IMS considerations can include statements regarding the IMS protocol assignment, parameterization and control plane interworking.