ETSI TS 103 755 V1.1.1 (2022-06)

TECHNICAL SPECIFICATION

**Emergency Communications (EMTEL);
PEMEA ESInet Shared Services**

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 - APE 7112B
Association à but non lucratif enregistrée à la
Sous-Préfecture de Grasse (06) N° w061004871

Important notice

The present document can be downloaded from:
http://www.etsi.org/standards-search

The present document may be made available in electronic versions and/or in print. The content of any electronic and/or print versions of the present document shall not be modified without the prior written authorization of ETSI. In case of any existing or perceived difference in contents between such versions and/or in print, the prevailing version of an ETSI deliverable is the one made publicly available in PDF format at www.etsi.org/deliver.

Users of the present document should be aware that the document may be subject to revision or change of status. Information on the current status of this and other ETSI documents is available at https://portal.etsi.org/TB/ETSIDeliverableStatus.aspx

If you find errors in the present document, please send your comment to one of the following services:
https://portal.etsi.org/People/CommiteeSupportStaff.aspx

If you find a security vulnerability in the present document, please report it through our Coordinated Vulnerability Disclosure Program:
https://www.etsi.org/standards/coordinated-vulnerability-disclosure

Notice of disclaimer & limitation of liability

The information provided in the present deliverable is directed solely to professionals who have the appropriate degree of experience to understand and interpret its content in accordance with generally accepted engineering or other professional standard and applicable regulations.
No recommendation as to products and services or vendors is made or should be implied.
No representation or warranty is made that this deliverable is technically accurate or sufficient or conforms to any law and/or governmental rule and/or regulation and further, no representation or warranty is made of merchantability or fitness for any particular purpose or against infringement of intellectual property rights.
In no event shall ETSI be held liable for loss of profits or any other incidental or consequential damages.

Any software contained in this deliverable is provided "AS IS" with no warranties, express or implied, including but not limited to, the warranties of merchantability, fitness for a particular purpose and non-infringement of intellectual property rights and ETSI shall not be held liable in any event for any damages whatsoever (including, without limitation, damages for loss of profits, business interruption, loss of information, or any other pecuniary loss) arising out of or related to the use of or inability to use the software.

ETSI

Contents

Intellectual Property Rights

Essential patents

IPRs essential or potentially essential to normative deliverables may have been declared to ETSI. The declarations pertaining to these essential IPRs, if any, are publicly available for **ETSI members and non-members**, and can be found in ETSI SR 000 314: *"Intellectual Property Rights (IPRs); Essential, or potentially Essential, IPRs notified to ETSI in respect of ETSI standards"*, which is available from the ETSI Secretariat. Latest updates are available on the ETSI Web server (https://ipr.etsi.org/).

Pursuant to the ETSI Directives including the ETSI IPR Policy, no investigation regarding the essentiality of IPRs, including IPR searches, has been carried out by ETSI. No guarantee can be given as to the existence of other IPRs not referenced in ETSI SR 000 314 (or the updates on the ETSI Web server) which are, or may be, or may become, essential to the present document.

Trademarks

The present document may include trademarks and/or tradenames which are asserted and/or registered by their owners. ETSI claims no ownership of these except for any which are indicated as being the property of ETSI, and conveys no right to use or reproduce any trademark and/or tradename. Mention of those trademarks in the present document does not constitute an endorsement by ETSI of products, services or organizations associated with those trademarks.

DECT™, **PLUGTESTS™**, **UMTS™** and the ETSI logo are trademarks of ETSI registered for the benefit of its Members. **3GPP™** and **LTE™** are trademarks of ETSI registered for the benefit of its Members and of the 3GPP Organizational Partners. **oneM2M™** logo is a trademark of ETSI registered for the benefit of its Members and of the oneM2M Partners. **GSM**® and the GSM logo are trademarks registered and owned by the GSM Association.

Foreword

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

Modal verbs terminology

In the present document "**shall**", "**shall not**", "**should**", "**should not**", "**may**", "**need not**", "**will**", "**will not**", "**can**" and "**cannot**" are to be interpreted as described in clause 3.2 of the ETSI Drafting Rules (Verbal forms for the expression of provisions).

"**must**" and "**must not**" are **NOT** allowed in ETSI deliverables except when used in direct citation.

1 Scope

The present document describes interoperability, re-use and enhancement of PEMEA and Emergency Services IP network (ESInet) components to ensure seamless integration of Internet Apps and traditional telecommunications service provider solutions and future emergency services offerings. An understanding of the PEMEA architecture is specified in ETSI TS 103 478 [1] and the Core elements for network independent access to emergency services in ETSI TS 103 479 [2], currently named Next Generation 112 (NG112) architecture.

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.

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

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 necessary for the application of the present document.

[1] ETSI TS 103 478 (V1.2.1): "Emergency Communications (EMTEL); Pan-European Mobile Emergency Application".

NOTE: Available at https://www.etsi.org/deliver/etsi_ts/103400_103499/103478/01.02.01_60/ts_103478v010201p.pdf.

[2] ETSI TS 103 479 (V1.1.1): "Emergency Communications (EMTEL); Core elements for network independent access to emergency services".

NOTE: Available at https://www.etsi.org/deliver/etsi_ts/103400_103499/103479/01.01.01_60/ts_103479v010101p.pdf.

[3] IANA language subtag registry.

NOTE: Available at http://www.iana.org/assignments/language-subtag-registry/language-subtag-registry.

[4] IETF RFC 5222: "LoST: A Location-to-Service Translation Protocol", August 2008.

NOTE: Available at https://datatracker.ietf.org/doc/html/rfc5222.

[5] IETF RFC 5031: "A Uniform Resource Name (URN) for Emergency and Other Well-Known Services", January 2008.

NOTE: Available at https://datatracker.ietf.org/doc/html/rfc5031.

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]   IETF RFC 7235: "Hypertext Transfer Protocol (HTTP/1.1): Authentication", June 2014.

NOTE: Available at https://datatracker.ietf.org/doc/html/rfc7235.

3   Definition of terms, symbols and abbreviations

3.1   Terms

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

security: techniques and methods used to ensure:

- *authentication* of entities accessing resources or data

- *authorization* of authenticated entities prior to accessing or obtaining resources and/or data

- *privacy* of user data ensuring access only to authenticated and authorized entities

- *secrecy* of information transferred between two authenticated and authorized entities

trusted: identity of entity assured through an approved authentication mechanism and the entity authorized to perform the action

3.2   Symbols

Void.

3.3   Abbreviations

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

AP	Application Provider
App	Application
ASP	Aggregation Service Provider
BCF	Border Control Function
ECRF	Emergency Call Routing Function
EDR	Emergency Data Received (message)
EDS	Emergency Data Send (message)
ESInet	Emergency Services IP network
ESRP	Emergency Service Routing Proxy
ETSI	European Telecommunications Standards Institute
HTTP	Hyper-Text Transfer Protocol
IETF	Internet Engineering Task Force
IM	Instant Messenger
LoST	Location to Service Translation
OTT	Over-The-Top
PEMEA	Pan-European Mobile Emergency Application

PIDF-LO   Presence Information Document Format Location Object
PIM   PSAP Interface Module
PRF   Policy Routing Function
PSAP   Public Safety Answering Point
PSP   PSAP Service Provider
RTT   Real-Time Text
SIP   Session Initiation Protocol
SIPS   SIP Secure
SPIF   SIP PEMEA Interworking Function
URI   Uniform Resource Identifier
URN   Uniform Resource Name
XML   eXtensible Markup Language

4   Integrated network view

4.1   Introduction

The ESInet and PEMEA architecture have nodes that perform similar functions but in quite different ways.
Consequently there is a need for some of the functions to sit side by side, while some of the more common
functionalities can be shared.

4.2   PEMEA ESInet interworking beyond the SPIF

ETSI TS 103 478 [1] defines a basic interworking between PEMEA and SIP via an entity called the SIP PEMEA
Interworking Function (SPIF). In this approach, in the absence of a global forest guide network or local public ECRF,
an OTT terminal can acquire the SIP address of the local ESInet BCF using the PEMEA network. This approach
requires "terminating" the PEMEA signalling at the edge of the emergency network in the SPIF, which consists of a
PIM coupled with a SIP-proxy. Such a system allows for basic PEMEA capabilities such as user information and
updated location to be provided to Public Safety Answering Points (PSAPs) inside the ESInet, however, it does not
allow advanced PEMEA services to be propagated to, and used by PSAPs as there is no way to signal these capabilities
to the PSAP.

The present document does not explore the SPIF further, but rather moves the decision point inside the ESInet to the
PIM associated with the terminating PSAP. There are a number of advantages to this approach including supporting
advanced PEMEA services as well as situations where some services will be delivered via SIP and others via PEMEA
giving the PSAP the flexibility to choose.

4.3   PEMEA ESInet interworking architecture

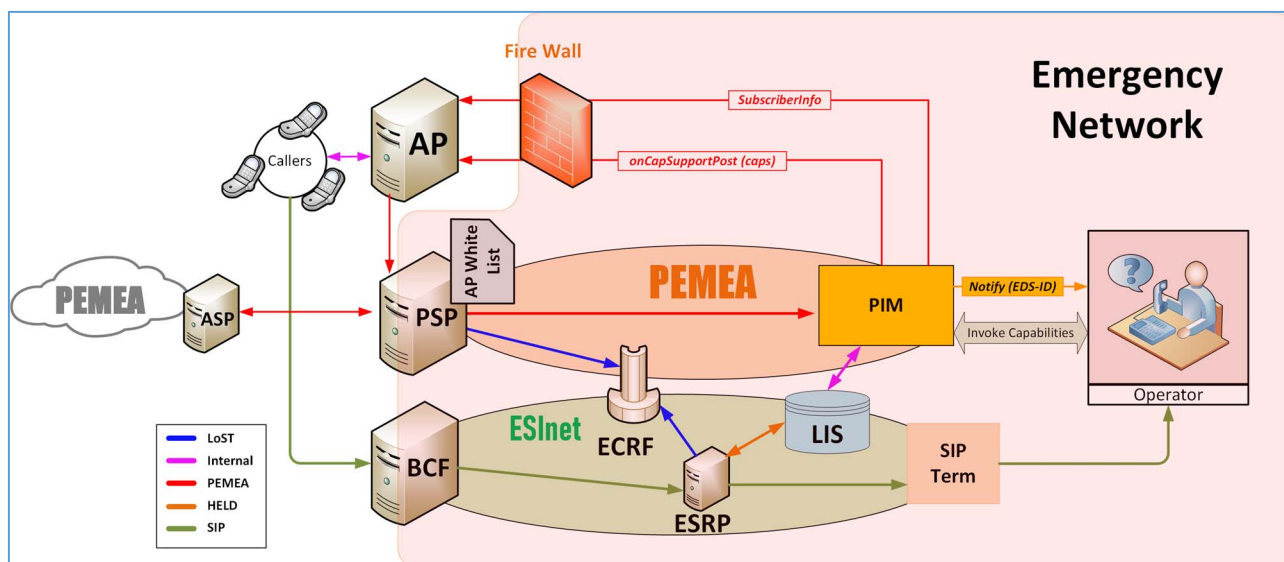The architecture for PEMEA and ESInet node sharing is shown in Figure 1.

Figure 1: PEMEA and ESInet shared services network architecture

The main operations and interfaces are described in more detail in subsequent clauses of the present document. The PSP acts as the gatekeeping into the shared services network. As described in ETSI TS 103 478 [1], a PSP has a specific relationship with AP that are directly connected to it and these will, in most circumstance, be permitted to communicate with the local PSAP. Whilst PEMEA has been designed to allow applications to roam anywhere in Europe, certain PSAP regions may wish to restrict their access to only certain application providers. The PSP implements this functionality through a permissive white list. This ensures that only valid PEMEA entities that are also on this white list are permitted to enter the shared services network.

5   PEMEA ECRF definitions and procedures

5.1   Overview

The Emergency Call Routing Function (ECRF) uses the Location Service Translation (LoST) protocol as defined in IETF RFC 5222 [4] to transform a location and service identifier into a series of destination identifiers, usually Universal Resource Identifiers (URIs). Different URI types are used for different protocol types, for example SIP or SIPS would be used for the delivery of SIP-based communication services. Similarly, HTTPS URIs destination can be used for the delivery of PEMEA communication messages, and this can be handled natively by the LoST protocol with no required changes to the IETF RFC 5222 LoST protocol specification [4].

5.2   PEMEA service identifiers

5.2.1   Overview

PEMEA was conceived with a single, central service identifier in mind, as a consequence, natively per ETSI TS 103 478 [1], it does not have a concept of sub-services, such as police, fire and ambulance which are easily defined by the service urns used within the ESInet signalling. Despite the promotion of the common 112 number for emergency services in Europe, many member states operate independent numbers for different services and this is a capability that needs to be folded into PEMEA. The support for these services is defined in the subsequent clauses. The guidelines in PEMEA regarding non-understood extensions applies and any implementation that does not understand the service tags extension shall ignore them but pass them through in any EDS routing.

5.2.2   Definition

PEMEA has a philosophy of defining generic containers into which specific capabilities and definitions are bound. Service tag definitions will follow this same approach. The serviceTags element will consist of one or more serviceTags, where each serviceTag consists of a name attribute and a value.

Table 1

Attribute	Meaning
name	This is the identifier of the specific service type. For example: name="serviceUrn". In this case it is saying that the value associated with the service name is to be interpreted as a service urn.
value	Is of type token or of type URI. Complex values are not supported in serviceTags. URIs to retrieve complex values from an external source are a matter for further study.

Specifying a new service requires defining the value type and specifying a new unique name.

   EXAMPLE:

```
<serviceTags xmlns="urn:pemea:apps:xml:ns:pemea:servicetags">
   <service name="serviceUrn">urn:service:sos:police</service>
   <service name="forwardLanguage">en</service>
   <service name="forwardMedia">audio</service>
   <service name="reverseLangage">fr</service>
   <service name="reverseMedia">text</service>
</serviceTags>
```

The present document specifies five service options, though not all are relevant to the ECRF routing, the others may be used for policy routing and direction further in the processing pipeline.

Table 2

Name	Value type	Description
serviceUrn	URI	This is the service URN aligning with the service that the user of the application selected. This is the service URN that will be included in any location-based route determination, whether internal to the PSP or ECRF. Service resolution from sub service to top-level service is applied as specified in IETF RFC 5031 [5].
forwardLanguage	Token	This specifies the language that the caller wishes to convey information to the call-taker with. It is a single valid language from [3].
forwardMedia	Token	This specifies the media type that the caller wishes to convey information to the call-taker with. Only one value may be specified. The present document defines the following values: • Text • Audio • Video • Audio_Video
reverseLanguage	Token	This specifies the caller's preferred language to receive information from the call-taker. It is a single valid language from [3].
reverseMedia	Token	This specifies the media type the caller wishes the call-taker to use when conveying information. Only one value may be specified. The present document defines the following values: • Text • Audio • Video • Audio_Video

Use of serviceTags and services is option, and each service shall be have meaning without being dependent on another service being present. Each service should only appear once in the serviceTag list, duplicated service names shall be ignored.

The serviceTags element is sent in the EDS and shall be placed after the accessData element (if one exists) and should be placed before the PIDF-LO.

5.2.3 Service tags schema

The EDS is specified as XML and to maintain compatibility the serviceTags element and services are also specified as XML.

```xml
<xs:schema
    targetNamespace="urn:pemea:apps:xml:ns:pemea:servicetags"
    xmlns:xs="http://www.w3.org/2001/XMLSchema"
    xmlns:pemeast="urn:pemea:apps:xml:ns:pemea:servicetags"
    xmlns:xml="http://www.w3.org/XML/1998/namespace"
    elementFormDefault="qualified" attributeFormDefault="unqualified">

  <xs:annotation>
    <xs:documentation>
        The present document defines PEMEA service tags.
    </xs:documentation>
  </xs:annotation>

  <xs:import namespace="http://www.w3.org/XML/1998/namespace"
             schemaLocation="http://www.w3.org/2001/xml.xsd"/>

  <!-- define the basic value type URI or token -->
  <xs:simpleType name="valueType">
    <xs:union>
      <xs:simpleType>
        <xs:restriction base="xs:token">
          <xs:enumeration value="any"/>
        </xs:restriction>
      </xs:simpleType>
      <xs:simpleType>
        <xs:restriction base="xs:anyURI">
          <xs:minLength value="1"/>
        </xs:restriction>
      </xs:simpleType>
    </xs:union>
  </xs:simpleType>

  <!-- serviceType -->
  <xs:complexType name="serviceType">
    <xs:simpleContent>
      <xs:extension base="pemeast:valueType">
        <xs:attribute name="name" type="xs:token" />
      </xs:extension>
    </xs:simpleContent>
  </xs:complexType>

  <!-- serviceTagType -->
  <xs:complexType name="serviceTagType">
    <xs:complexContent>
      <xs:restriction base="xs:anyType">
        <xs:sequence>
         <xs:element name="service" type="pemeast:serviceType" minOccurs="1" maxOccurs="unbounded"/>
        </xs:sequence>
      </xs:restriction>
    </xs:complexContent>
  </xs:complexType>

  <!-- ServiceTags element -->
  <xs:element name="serviceTags" type="pemeast:serviceTagType"/>
</xs:schema>
```

5.3 PSP to ECRF query response procedures

A PSP receiving an EDS shall determine where to send it. If the PSP is associated with a PSAP inside an ESInet, then the PSP shall:

1) On receipt of an EDS the PSP shall examine the EDS for a serviceTags element to determine which service URN to use:

   a) If a serviceTags element is not found then the PSP shall use a service URN of urn:service:sos.

   b) If a serviceTags element is present, but does not contain a service of type serviceUrn then the PSP shall use a service URN of urn:service:sos.