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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).

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Executive summary

The Pan-European Mobile Emergency Application (PEMEA) architecture provides a framework to enable applications supporting emergency calling functionality to contact emergency services while roaming. PEMEA caters for a range of communications extension capabilities, including services for people with disabilities. Service continuity is important, and of particular concern during technology rollouts prior to service ubiquity being achieved. The present document describes the PEMEA Service Discovery capability, enabling App users to determine in advance of placing a PEMEA communication request whether PEMEA or a particular communication technology is available to service the caller's needs in a certain area. This allows the App users to make an informed choice on how best to reach emergency services.

Introduction

PEMEA was originally designed to allow mobile emergency applications to roam across Europe. Deployment of PEMEA is not yet ubiquitous and not all regions where it is deployed offer all of the available PEMEA services. ETSI TS 103 478 [1] does not define a mechanism to determine if the region that a caller is in supports PEMEA or what services of PEMEA it does support. The present document describes an extension capability for PEMEA for determining if PEMEA is supported in a region and what capabilities the PEMEA deployment provides.

The present document assumes a working knowledge of PEMEA and familiarity with the PEMEA specification ETSI TS 103 478 [1].

1 Scope

The present document describes the PEMEA Service Discovery capability and the need for this functionality. The required entities and actors are identified along with the protocol, specifying message exchanges between entities. The message formats are specified and procedural descriptions of expected behaviours under different conditions are detailed.

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 TS 103 478: "Emergency Communications (EMTEL); Pan-European Mobile Emergency Application".
- [2] ETSI TS 103 755: "Emergency Communications (EMTEL); PEMEA ESInet Shared Services".

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.

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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.

Not applicable.

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
App	Application
CPE	Customer Premises Equipment
EDS	Emergency Data Send (message)
Pa	PEMEA Application to AP interface
PEMEA	Pan-European Mobile Emergency Application
PIM	PSAP Interface Module
PSAP	Public Safety Answering Point
PSP	PSAP Service Provider
tPSP	terminating PSP
URI	Universal Resource Identifier
XML	eXtensible Markup Language

4 PEMEA capability extensions

4.1 Overview of extensions in PEMEA

PEMEA extension capabilities are defined in ETSI TS 103 478 [1] and are implemented through the use of "reach-back" URIs. The Application Provider (AP) node advertises capabilities as part of the initial forward message through the network, the Emergency Data Send (EDS) message, and the terminating PSAP Service Provider (PSP) or PSAP responds with the subset of capabilities that it supports, thus binding the emergency session between the AP and the terminating emergency node.

Specifically, the capabilities are sent as information elements in the `apMoreInformation` element of the EDS message. The information element and `apMoreInformation` structures are defined in clauses 10.3.11 and 10.3.12 of ETSI TS 103 478 [1]. An information element in a PEMEA EDS message identifies a capability and each capability is made up of three distinct parts:

- `typeOfInfo`: what function does the information element serve;
- `protocol`: the specific semantics for using the function;
- `value`: the URI through which the service is invoked.

Table 10 in ETSI TS 103 478 [1] identifies an initial set of "typeOfInfo" values used to specify a range of capability extensions for PEMEA. However, beyond the `Location_Update` and `SIP_Request` values described in Table 11 of ETSI TS 103 478 [1], protocols are left for further study and definition in subsequent specifications such as the present document.

4.2 Service support indication and response

4.2.1 Service definition

ETSI TS 103 478 [1] defines the initial service extensions, *typeOfInfo*, in Table 10. This list is initial, not exhaustive and the intent was always that additional service types would be developed. The present document defines a new and concrete definition of the "Discovery" capability and associated protocol element. The definition in Table 1 of the present document is an addition to the existing entries in Table 10 of ETSI TS 103 478 [1].

Table 1: PEMEA Discovery definition

Info type Value	Protocol Token	Description
Discovery	PEMEA	Used to request available PEMEA services for a user's current location.

The protocol token value of "PEMEA" is selected. It is conceived that other discovery techniques may be devised in the future, however, these would require the definition of a new protocol token value.

An *information* element in ETSI TS 103 478 [1] requires a URI value so that the receiving PIM can "reach-back" to invoke the service, and this requirement is enforced in the PEMEA XML schema. Since the PEMEA Discovery capability is never intended to be invoked the value of this URI is largely immaterial. However, to avoid any confusion, the value of the URI to be used for this capability shall be the same as the URI placed in the onCapSupportPost element in the EDS message conveying this capability to the PIM.

4.2.2 Service support indication

An AP needing to indicate that the Application it is serving wants information about local PEMEA services would include the following information element in the *apMoreInformation* element of an EDS message:

```
<information typeOfInfo="Discovery" protocol="PEMEA">
  https://ap.example.pemea.help/48sne8aopaop
</information>
```

5 PEMEA node procedures

5.1 App and AP procedures

The AP shall provide the App a means over the Pa interface to signal the App's desire to send a Discovery message to determine what local PEMEA services are available should an emergency call need to be placed.

The App shall include in its request for Discovery message from the AP:

- the device or user identifier;
- the device location;
- user information;
- all capabilities and extensions that the App supports.

If the App supports ServiceTags as specified in ETSI TS 103 755 [2], and provides a Service indicator in the Discovery message request over Pa then the AP shall use the Service indicator provided by the App. If no Service indicator is provided then the AP shall not include a ServiceTag in the outbound EDS message.

The AP shall construct an EDS message in the normal manner and send the relevant information by reference or by value through the PEMEA network. The *apMoreInformation* element in the EDS message shall contain the Discovery→PEMEA capability with the URI value being the same as the onCapSupportPost URI.

The AP shall invalidate all reach-back URIs provided in the *information* elements prior to sending the EDS message, unless a capability specification explicitly calls for the reach-back URI to remain valid when used in conjunction with the Discovery→PEMEA capability. The onErrorPost and onCapSupportPost URIs shall remain active and reachable.

On receipt of an error message from the PEMEA network indicating that the EDS message cannot be delivered because there is no PEMEA service at the user's location, the AP shall notify the App over the Pa interface that no PEMEA service is available.

On receipt of an onCapSupportPost message from the terminating node, the AP shall:

- Accept the data and respond to the tPSP/PIM with a 410 "Gone" response, indicating that the service is no longer available.
- Notify the App of all capabilities supported by the terminating PSAP.
- Delete the discovery call context and invalidate all remaining URIs associated with the context. This directive may be over-ridden by future capability specifications should the capability require the long-term use of its reach-back URIs outside the context of a call.

- Drop any connections that may exist with the App over Pa associated with the Discovery→PEMEA call.

The App should take appropriate action regarding call methods based on the information provided in the Discovery→PEMEA response.

5.2 Terminating node procedures

5.2.1 Discovery→PEMEA capability support response

A terminating node that can support the Discovery→PEMEA capability includes this capability in the apMoreInformation element returned to the AP in the onCapSupportPost. This is described in clause 11.1.4 of ETSI TS 103 478 [1] with the value for Discovery→PEMEA provided in the example below, along with any other capabilities that it supports.

```
<apMoreInformation xmlns="urn:pemea:apps:xml:ns:pemea:base">
  <information typeOfInfo="RTT" protocol="PEMEA"/>
  <information typeOfInfo="IM" protocol="PEMEA"/>
  <information typeOfInfo="Discovery" protocol="PEMEA"/>
</apMoreInformation>
```

5.2.2 tPSP/PIM procedures for supporting Discovery→PEMEA

A tPSP/PIM implementing this capability shall immediately on receipt of an EDS message containing the Discovery→PEMEA capability, construct an onCapSupportPost message.

A terminating node may only support some capabilities for specific callerId types. The onCapSupportPost message shall contain all capabilities that the terminating node supports from the set of capabilities provided in the EDS message for the provided callerId type. The onCapSupportPost message shall include the Discovery→PEMEA capability.

The tPSP/PIM shall send the onCapSupportPost message to the URI included in the onCapSupportPost URI of the EDS message.

The tPSP/PIM shall expect a 410 "Gone" response from the AP, however, it shall not try to resend the onCapSupportPost regardless of the code returned by the AP.

The tPSP/PIM shall not create a context for the call and shall not notify the PSAP or PSAP call-taker of the EDS message arrival.

Once the onCapSupportPost message for the EDS message containing the Discovery→PEMEA capability has been sent, then no further processing of the call by the tPSP/PIM is required.

5.2.3 tPSP/PIM procedures when Discovery→PEMEA is not supported

If the tPSP/PIM does not support or understand this capability then the Discovery→PEMEA capability shall not be included in the onCapSupportPost message sent to the AP.

The tPSP/PIM shall respond to the AP with an onCapSupport post message in the usual fashion. If the tPSP/PIM is awaiting a voice-call before sending the onCapSupportPost message to ensure that data has been sent to the correct PSAP then it shall continue to do this.

If the tPSP/PIM sends the onCapSupportPost message to the AP prior to notifying the PSAP-CPE or PSAP call-take of the EDS message arrival, then the tPSP/PIM should not notify the PSAP-CPE or PSAP call-taker if it receives the 410 "Gone" response from the AP. This is expected PEMEA behaviour.

The tPSP/PIM should notify the PSAP-CPE or PSAP call-taker of the arrival of the EDS message in the usual fashion unless the EDS message was auto-answered by the tPSP/PIM and the 410 "Gone" error was received.

On receipt of the 410 "Gone" error from the AP when the onCapSupportPost message is sent, the tPSP/PIM shall delete any context associated with the EDS context.

History

Document history		
V1.1.1	December 2022	Publication