Pan-European eCall and TPS eCall data exchange

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Presentation outline

• Interoperability among PSAPs
  – PSAP models
  – The concept of “Incident form”
  – The proposed standard: CAP

• Interaction with TPSPs
  – EN-16102 and beyond
  – CAP for TPSPs
  – Unsolved problems
Interoperability among PSAPs

- Emergency call to 112
- Call taker qualifies the call and locates the caller
- Dispatcher sends the most appropriate type of resources
PSAP models

• Model no.1
PSAP models

- Model no.2

- First level PSAP filters calls ONLY.
PSAP models

- Model no.3

- First level PSAP filters calls AND gathers initial information.
PSAP models

• Model no.4
PSAP models

• Model no.5
The concept of “Incident form”

Incident form

<table>
<thead>
<tr>
<th>Caller number</th>
<th>Caller location</th>
<th>Call qualification</th>
<th>Other data</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Names</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Notes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Etc.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Etc.</td>
</tr>
</tbody>
</table>
The concept of “Incident form”
MSD-to-PSAP-to-PSAP: today

- The MSD is received by PSAP A
- Incident form is transmitted to PSAP B
- “Incident form” (if existing) is built using a proprietary format
  - this prevents interoperability in multi-PSAP cooperation environments
  - each receiving PSAP should know and interpret many different formats
• The MSD is received by PSAP A
• Incident form is transmitted to PSAP B
• Different, proprietary Incident forms are replaced by a common, standard format: CAP
  – interoperability is much easier, as only MSD and CAP knowledge is required
  – “future-proof” solution, thanks to the extensibility and flexibility of the CAP structure
Interoperability among PSAPs

- Proposed solution works well for models no.1, no.2, no.3
- Can work for model no.4
- Probably not required in model no.5
- Works well for cross-border scenarios
Recap of the CAP Structure

**alert**
- Message ID (identifier)
- Sender ID (sender)
- Sent Date/Time (sent)
- Message Status (status)
- Message Type (msgType)
- Source (source)
- Scope (scope)
- Restriction (restriction)
- Addresses (addresses)
- Handling Code (code)
- Note (note)
- Reference IDs (references)
- Incident IDs (incidents)

Elements in **boldface** are mandatory; elements in *italics* have default values that will be assumed if the element is not present; asterisks (*) indicate that multiple instances are permitted.

**info**
- Language (language)
- Event Category (category)
- Event Type (event)
- Response Type (responseType)
- Urgency (urgency)
- Severity (severity)
- Certainty (certainty)
- Audience (audience)
- Event Code (eventCode)
- Effective Date/Time (effective)
- Onset Date/Time (onset)
- Expiration Date/Time (expires)
- Sender Name (senderName)
- Headline (headline)
- Event Description (description)
- Instructions (instruction)
- Information URL (web)
- Contact Info (contact)
- Parameter (parameter)

**resource**
- Description (resourceDesc)
- MIME Type (mimeType)
- File Size (size)
- URI (uri)
- Dereferenced URI (derefUri)
- Digest (digest)

**area**
- Area Description (areaDesc)
- Area Polygon (polygon)
- Area Circle (circle)
- Area Geocode (geocode)
- Altitude (altitude)
- Ceiling (ceiling)
Mapping and carrying MSD information with CAP: objectives and rationale

- To design a **Pan-European, flexible and extensible** “CAP profile”, for exchanging eCall related information between PSAPs, with the following principles:
  - the CAP “envelope” will contain the information to
    - (i) uniquely identify the messages
    - (ii) link updates to the original alert, and
    - (iii) specify the intended recipient(s)
  - the whole MSD content is carried as a “resource”, **base64 encoded**
  - MSD mandatory fields **mapped and carried within specific CAP fields**, to be immediately accessible even before decoding the whole MSD
Mapping and carrying MSD information within CAP: results of the analysis #1

- Mapping of mandatory MSD fields
  - 16 out of 18 can be mapped onto CAP fields, in many cases using `alert.info.parameter` fields
  - MSD “version” and MSD “identifier” would be accessible after decoding the CAP “MSD resource”

- Mapping of optional and additional MSD fields
  - optional fields (e.g. number of passengers), if used, may be directly mapped to CAP `alert.info.parameter` fields or not, according to their relevance
  - additional data may be always left for later handling, i.e. after the CAP “MSD resource” is decoded by the PSAP
Mapping and carrying MSD information within CAP: results of the analysis #2

• Mandatory CAP fields
  – most of them must be inserted by the sender, while preparing the message for other PSAPs
    • these are the ones containing information about the sender and the intended recipient(s), as well as the sending time of the message
  – other may be compiled using pre-defined values or rules
    • this is the case, for example, of alert.info.event and alert.info.category fields

• Optional CAP fields
  – some of them, like the alert.info.headline, may be built from some information available in the MSD message
Points deserving further analysis

• Do we need to insert the mandatory MSD “version” and MSD “identifier” fields directly as CAP fields (e.g. as parameters)?

• Handling of MSD additional data
  – Check what additional data is commonly used in eCall
  – Do we need to have some of such additional information directly in the CAP message, e.g. as parameters fields?

• Definition of the exact rules for compiling mandatory CAP fields, such as:
  – `alert.info.event`, `alert.info.category`, `alert.info.urgency`, `alert.info.severity`, `alert.info.certainty`
Interaction with TPSPs

- Considerations based on EN 16102
Interaction with TPSPs

TPSP 1

PSAP 1

TPSP 2

PSAP 2

TPSP 2

PSAP 3
EN 16102 transitional arrangement: web service pull mechanism

EN 16102, page 44, picture B.1

- TSD information (MSD plus optional data) is published in a web service
- Availability of new emergency data is notified to the PSAP via voice call
- PSAP gets access to the web service, using the provided login credentials
TPSP-to-PSAP TSD transfer: proposed approach

• The **TPSP system** is able to generate a TSD, including MSD and other optional data

• A **TSD-to-CAP Adapter** (part of the TPSP system or outside of it) converts TSD into a CAP, including **MSD** and **TSD** information (see previous slides)

• A **CAP Web Feed Share** (on each TPSP) will be able to:
  – identify the relevant PSAP for the emergency message, based on registered rules
  – publish the CAP messages in a structured format, in dedicated and protected Web Feeds, one for each registered PSAP authority
  – Web Feeds of CAP messages will be pulled by the PSAPs
  – Having the information in a structured format (Web Feed) and not as unstructured Web pages, will enable machine-to-machine communication and data handling
TPSP Set of Data (TSD): current reference XML representation according to EN 16102

- XML Schema Definition (XSD) of the TSD message
- Includes:
  - TPS-eCall-UID and TPS-eCall-SID fields
  - TPS callback number and Vehicle phone number fields
  - reference to the XSD of the enclosed MSD message, according to the EN 15722
  - reference to an additional XSD, describing the way of including Additional Information

- The proposed Additional Information structure for TSD contains more than 50 XML fields
  - no one of these fields is mandatory
Mapping and carrying TSD information with CAP: rationale and objectives

- Consider the former proposal for MSD mapping with CAP, for *PSAP-to-PSAP* communication
- Design a **Pan-European, flexible and extensible eCall “CAP profile”**, used both for *PSAP-to-PSAP* and for *TPSP-to-PSAP* communication
  - PSAPs need to understand and manage the same data format (CAP) in both cases
  - the CAP “envelope” will contain information to (i) uniquely identify the messages, (ii) link updates to the original alert, and (iii) specify the intended recipient(s) for each of the different communication chains (TPSP-to-PSAP and PSAP-to-PSAP)
  - the **whole TSD message**, including the **Additional Information** (only in *TPSP-to-PSAP*) and the **whole MSD message** (also in *PSAP-to-PSAP*) are carried as CAP “resource” blocks, each of them base64 encoded
  - **most relevant MSD information** (e.g. mandatory fields), mapped and carried within specific CAP fields, in order to be immediately and easily accessible even before decoding the whole MSD (PSAP side)
  - **most relevant TSD information** (*UID, SID, Callback Number* and *Vehicle Phone Number*), carried as additional CAP “parameter” blocks, to be immediately accessible (PSAP side)
  - **most relevant or common TSD Additional Information**, if identified, can be easily added as additional CAP “parameter” blocks, as well
Interaction with TPSPs

TPSP 1 -- PSAP 1
TPSP 2 -- PSAP 2
TPSP 2 -- PSAP 3
Interaction with TPSPs
Points deserving further analysis in TPSP-to-PSAP communication

• Rules / differences in compiling mandatory CAP fields, in TSPS-to-PSAP and PSAP-to-PSAP communication, such as:
  – alert.info.event, alert.info.category, alert.info.urgency, alert.info.severity, alert.info.certainty

• Concept for creating a registry of communicating TPSP and PSAP authorities, and for the definition of the addressing rules
  – ownerships and maintenance issues

• Missing common PSAP E164 phone database registry
The floor is open for discussion

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