Next-Generation Pan-European eCall
draft-ietf-ecrit-ecall-17.txt

Abstract

   This document describes how to use IP-based emergency services
   mechanisms to support the next generation of the pan European in-
   vehicle emergency call service defined under the eSafety initiative
   of the European Commission (generally referred to as "eCall"). eCall
   is a standardized and mandated system for a special form of emergency
   calls placed by vehicles, providing real-time communications and an
   integrated set of related data.

   This document also registers MIME Content Types and an Emergency Call
   Additional Data Block for the eCall vehicle data and metadata/control
   data, and an INFO package to enable carrying this data in INFO
   requests.

Status of This Memo

   This Internet-Draft is submitted in full conformance with the
   provisions of BCP 78 and BCP 79.

   Internet-Drafts are working documents of the Internet Engineering
   Task Force (IETF). Note that other groups may also distribute
   working documents as Internet-Drafts. The list of current Internet-
   Drafts is at http://datatracker.ietf.org/drafts/current/.

   Internet-Drafts are draft documents valid for a maximum of six months
   and may be updated, replaced, or obsoleted by other documents at any
   time. It is inappropriate to use Internet-Drafts as reference
   material or to cite them other than as "work in progress."

   This Internet-Draft will expire on April 19, 2017.

Copyright Notice

Table of Contents

1. Terminology

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in [RFC2119].

This document re-uses terminology defined in Section 3 of [RFC5012].

Additionally, we use the following abbreviations:

```
+--------+----------------------------------------+
| Term   | Expansion                              |
+--------+----------------------------------------+
| 3GPP   | 3rd Generation Partnership Project     |
|        |                                        |
| CEN    | European Committee for Standardization |
|        |                                        |
| EENA   | European Emergency Number Association  |
|        |                                        |
| ESInet | Emergency Services IP network          |
|        |                                        |
| IMS    | IP Multimedia Subsystem                |
|        |                                        |
| IVS    | In-Vehicle System                      |
|        |                                        |
| MNO    | Mobile Network Operator                |
|        |                                        |
| MSD    | Minimum Set of Data                    |
|        |                                        |
| PSAP   | Public Safety Answering Point          |
+--------+----------------------------------------+
```

2. Document Scope

This document is focused on the signaling, data exchange, and protocol needs of next-generation eCall (NG-eCall, also referred to as packet-switched eCall or all-IP eCall) within the SIP framework for emergency calls, as described in [RFC6443] and [RFC6881]. eCall itself is specified by 3GPP (3rd Generation Partnership Project) and CEN (European Committee for Standardization) and these specifications include far greater scope than is covered here.

The eCall service operates over cellular wireless communication, but this document does not address cellular-specific details, nor client domain selection (e.g., circuit-switched versus packet-switched). All such aspects are the purview of their respective standards bodies. The scope of this document is limited to eCall operating

within a SIP-based environment (e.g., 3GPP IMS Emergency Calling
[TS23.167]).

The technical contents of this document also provide a basis for
reuse and extension for related emergency call systems (which is why
there are extension points), but such reuse is a topic for other
documents.

Note that vehicles designed for multiple regions might need to
support eCall and other Advanced Automatic Crash Notification (AACN)
systems (such as described in [I-D.ietf-ecrit-car-crash]), but this
is out of scope of this document.

3. Introduction

Emergency calls made from vehicles (e.g., in the event of a crash)
assist in significantly reducing road deaths and injuries by allowing
emergency services to be aware of the incident, the state of the
vehicle, the location of the vehicle, and to have a voice channel
with the vehicle occupants. This enables a quick and appropriate
response.

The European Commission initiative of eCall was conceived in the late
1990s, and has evolved to a European Parliament decision requiring
the implementation of a compliant in-vehicle system (IVS) in new
vehicles and the deployment of eCall in the European Member States in
the very near future. Other regions are developing eCall-compatible
systems.

The pan-European eCall system provides a standardized and mandated
mechanism for emergency calls by vehicles. eCall establishes
procedures for such calls to be placed by in-vehicle systems,
recognized and processed by the mobile network, and routed to a
specialized PSAP where the vehicle data is available to assist the
call taker in assessing and responding to the situation. eCall
provides a standard set of vehicle, sensor (e.g., crash related), and
location data.

An eCall can be either user-initiated or automatically triggered.
Automatically triggered eCalls indicate a car crash or some other
serious incident. Manually triggered eCalls might be reports of
witnessed crashes or serious hazards. PSAPs might apply specific
operational handling to manual and automatic eCalls.

Legacy eCall is standardized (by 3GPP [SDO-3GPP] and CEN [CEN]) as a
3GPP circuit-switched call over GSM (2G) or UMTS (3G). Flags in the
call setup mark the call as an eCall, and further indicate if the
call was automatically or manually triggered. The call is routed to

an eCall-capable PSAP, a voice channel is established between the
vehicle and the PSAP, and an eCall in-band modem is used to carry a
defined set of vehicle, sensor (e.g., crash related), and location
data (the Minimum Set of Data or MSD) within the voice channel. The
same in-band mechanism is used for the PSAP to acknowledge successful
receipt of the MSD, and to request the vehicle to send a new MSD
(e.g., to check if the state of or location of the vehicle or its
occupants has changed). NG-eCall moves from circuit switched to all-
IP, and carries the vehicle data and eCall signaling as additional
data carried with the call. This document describes how IETF
mechanisms for IP-based emergency calls, including [RFC6443] and
[RFC7852] are used to provide the signaling and data exchange of the
next generation of pan-European eCall.

The European Telecommunications Standards Institute (ETSI) [SDO-ETSI]
has published a Technical Report titled "Mobile Standards Group
(MSG); eCall for VoIP" [MSG_TR] that presents findings and
recommendations regarding support for eCall in an all-IP environment.
The recommendations include the use of 3GPP IMS emergency calling
with additional elements identifying the call as an eCall and as
carrying eCall data and with mechanisms for carrying the data and
eCall signaling. 3GPP IMS emergency services support multimedia,
providing the ability to carry voice, text, and video. This
capability is referred to within 3GPP as Multimedia Emergency
Services (MMES).

A transition period will exist during which time the various entities
involved in initiating and handling an eCall might support next-
generation eCall, legacy eCall, or both. The issues of migration and
co-existence during the transition period are outside the scope of
this document.

This document indicates how to use IP-based emergency services
mechanisms to support next-generation eCall.

This document also registers MIME Content Types and an Emergency Call
Additional Data Block for the eCall vehicle data (MSD) and metadata/
control data, and an INFO package to enable carrying this data in
INFO requests.

The MSD is carried in the MIME type 'application/
emergencyCallData.eCall.MSD+per' and the metadata/control block is
carried in the MIME type 'application/emergencyCallData.control+xml'
(both of which are registered in Section 15) An INFO package is
defined (in Section 10) to enable these MIME types to be carried in
SIP INFO requests, per [RFC6086].

4. eCall Requirements

   eCall requirements are specified by CEN in [EN 16072] and by 3GPP in
   [TS22.101] clauses 10.7 and A.27. Requirements specific to vehicle
   data are contained in EN 15722 [msd].

5. Vehicle Data

   Pan-European eCall provides a standardized and mandated set of
   vehicle related data, known as the Minimum Set of Data (MSD). The
   European Committee for Standardization (CEN) has specified this data
   in EN 15722 [msd], along with both ASN.1 and XML encodings. Both
   circuit-switched eCall and this document use the ASN.1 PER encoding,
   which is specified in Annex A of EN 15722 [msd] (the XML encoding
   specified in Annex C is not used in this document).

   This document registers the 'application/
   emergencyCallData.eCall.MSD+per' MIME Content-Type to enable the MSD
   to be carried in SIP. As an ASN.1 PER encoded object, the data is
   binary and transported using binary content transfer encoding within
   SIP messages. This document also adds the 'eCall.MSD' entry to the
   Emergency Call Additional Data Blocks registry to enable the MSD to
   be recognized as such in a SIP-based eCall emergency call. (See
   [RFC7852] for more information about the registry and how it is
   used.)

   See Section 6 for a discussion of how the MSD vehicle data is
   conveyed in an NG-eCall.

6. Data Transport

   [RFC7852] establishes a general mechanism for attaching blocks of
   data to a SIP emergency call. This mechanism permits certain
   emergency call MIME types to be attached to SIP messages. This
   document makes use of that mechanism. This document also registers
   an INFO package (in Section 10) to enable eCall related data blocks
   to be carried in SIP INFO requests (per [RFC6086], new INFO usages
   require the definition of an INFO package).

   Note that if other data sets need to be transmitted in the future,
   the appropriate signalling mechanism for such data needs to be
   evaluated, including factors such as the size and frequency of such
   data.

   An In-Vehicle System (IVS) transmits an MSD (see Section 5) by
   encoding it per Annex A of EN 15722 [msd] and attaching it to a SIP
   message as a MIME body part per [RFC7852]. The body part is
   identified by its MIME content-type ('application/

emergencyCallData.eCall.MSD+per') in the Content-Type header field of
the body part. The body part is assigned a unique identifier which
is listed in a Content-ID header field in the body part. The SIP
message is marked as containing the MSD by adding (or appending to) a
Call-Info header field at the top level of the SIP message. This
Call-Info header field contains a CID URL referencing the body part's
unique identifier, and a 'purpose' parameter identifying the data as
the eCall MSD per the Emergency Call Additional Data Blocks registry
entry; the 'purpose' parameter's value is
'emergencyCallData.eCall.MSD'. Per [RFC6086], an MSD is carried in a
SIP INFO request by using the INFO package defined in Section 10.

A PSAP or IVS transmits a metadata/control object (see Section 9) by
encoding it per the description in this document and attaching it to
a SIP message as a MIME body part per [RFC7852]. The body part is
identified by its MIME content-type ('application/
emergencyCallData.control+xml') in the Content-Type header field of
the body part. The body part is assigned a unique identifier which
is listed in a Content-ID header field in the body part. The SIP
message is marked as containing the metadata/control object by adding
(or appending to) a Call-Info header field at the top level of the
SIP message. This Call-Info header field contains a CID URL
referencing the body part's unique identifier, and a 'purpose'
parameter identifying the data as an eCall metadata/control block per
the Emergency Call Additional Data Blocks registry entry; the
'purpose' parameter's value is 'emergencyCallData.control'. Per
[RFC6086], a metadata/control object is carried in a SIP INFO request
by using the INFO package defined in Section 10.

An MSD or a metadata/control block is always enclosed in a multipart
body part (even if it would otherwise be the only body part in the
SIP message), since as of the date of this document, the use of
Content-ID as a SIP header field is not defined (while it is defined
for use as a MIME header field).

A body part containing an MSD or metadata/control object has a
Content-Disposition header field value containing "By-Reference".

An In-Vehicle System (IVS) initiating an NG-eCall attaches an MSD to
the initial INVITE and optionally attaches a metadata/control object
informing the PSAP of its capabilities. The MSD body part (and
metadata/control and PIDF-LO body parts if included) have a Content-
Disposition header field with the value "By-Reference;
handling=optional". Specifying "handling=optional" prevents the
INVITE from being rejected if it is processed by a legacy element
(e.g., a gateway between SIP and circuit-switched environments) that
does not understand the MSD (or metadata/control object or PIDF-LO).
The PSAP creates a metadata/control object acknowledging receipt of

the MSD and attaches it to the SIP final response to the INVITE. A
metadata/control object is not attached to provisional (e.g., 180)
responses.

A PSAP is able to reject a call while indicating that it is aware of
the situation by including a metadata/control object acknowledging
the MSD and containing "received=true" in a final response using SIP
response code 600 (Busy Everywhere), 486 (Busy Here), or 603
(Decline).

If the IVS receives an acknowledgment for an MSD containing
"received=false", this indicates that the PSAP was unable to properly
decode or process the MSD. The IVS action is not defined (e.g., it
might only log an error). Since the PSAP is able to request an
updated MSD during the call, if an initial MSD is unsatisfactory in
any way, the PSAP can choose to request another one.

A PSAP can request that the vehicle send an updated MSD during a
call. To do so, the PSAP creates a metadata/control object
requesting an MSD and attaches it to a SIP INFO request and sends it
within the dialog. The IVS then attaches an updated MSD to a SIP
INFO request and sends it within the dialog. If the IVS is unable to
send an MSD, it instead sends a metadata/control object acknowledging
the request with the 'success' parameter set to 'false' and a
'reason' parameter (and optionally a 'details' parameter) indicating
why the request could not be accomplished. Per [RFC6086], metadata/
control objects and MSDs are sent using the INFO package defined in
Section 10 . In addition, to align with how an MSD or metadata/
control block is transmitted in a SIP message other than an INFO
request, a Call-Info header field is included in the SIP INFO request
to reference the MSD or metadata/control block. See Section 10 for
information about the use of INFO requests to carry data within an
eCall.

The IVS is not expected to send an unsolicited MSD after the initial
INVITE.

Support for the data blocks defined in [RFC7852] is NOT REQUIRED for
conformance with this document.

7. Call Setup

In circuit-switched eCall, the IVS places a special form of a 112
emergency call which carries an eCall flag (indicating that the call
is an eCall and also if the call was manually or automatically
triggered); the mobile network operator (MNO) recognizes the eCall
flag and routes the call to an eCall-capable PSAP; vehicle data is

transmitted to the PSAP via the eCall in-band modem (in the voice
channel).

```
   ///----\\\       112 voice call with eCall flag      +------+
  ||| IVS  |||--------------------------------------->+ PSAP |
   \\\----///   vehicle data via eCall in-band modem   +------+
```

Figure 1: circuit-switched eCall

For NG-eCall, the IVS establishes an emergency call using a Request-
URI indicating a manual or automatic eCall; the MNO (or ESInet)
recognizes the eCall URN and routes the call to an NG-eCall capable
PSAP; the PSAP interpets the vehicle data sent with the call and
makes it available to the call taker.

```
   ///----\\\      IMS emergency call with eCall URN    +------+
      IVS     -------------------------------------->+ PSAP |
   \\\----///    vehicle data included in call setup   +------+
```

Figure 2: NG-eCall

See Section 6 for information on how the MSD is transported within an
NG-eCall.

This document registers new service URN children within the "sos"
subservice. These URNs provide the mechanism by which an eCall is
identified, and differentiate between manually and automatically
triggered eCalls (which might be subject to different treatment,
depending on policy). The two service URNs are:
urn:service:sos.ecall.automatic and urn:service:sos.ecall.manual,
which requests resources associated with an emergency call placed by
an in-vehicle system, carrying a standardized set of data related to
the vehicle and incident.

Call routing is outside the scope of this document.

8. Test Calls

eCall requires the ability to place test calls (see [TS22.101] clause
10.7 and [EN_16062] clause 7.2.2). These are calls that are
recognized and treated to some extent as eCalls but are not given
emergency call treatment and are not handled by call takers. The
specific handling of test eCalls is not itself standardized;
typically, the test call facility allows the IVS or user to verify
that an eCall can be successfully established with voice
communication. The IVS might also be able to verify that the MSD was
successfully received.

A service URN starting with "test." indicates a test call. For
eCall, "urn:service:test.sos.ecall" indicates such a test feature.
This functionality is defined in [RFC6881].

This document registers "urn:service:test.sos.ecall" for eCall test
calls.

The CS-eCall test call facility is a non-emergency number so does not
get treated as an emergency call. For NG-eCall, MNOs, emergency
authorities, and PSAPs can determine how to treat a vehicle call
requesting the "test" service URN so that the desired functionality
is tested, but this is outside the scope of this document.

9. The Metadata/Control Object

eCall requires the ability for the PSAP to acknowledge successful
receipt of an MSD sent by the IVS, and for the PSAP to request that
the IVS send an MSD (e.g., the call taker can initiate a request for
a new MSD to see if there have been changes in the vehicle's state,
e.g., location, direction, number of fastened seatbelts).

This document defines a block of metadata/control data as an XML
structure containing elements used for eCall and other related
emergency call systems and extension points. (This metadata/control
block is in effect a high-level protocol between the PSAP and IVS.)
When the PSAP sends a metadata/control block in response to data sent
by the IVS in a SIP request other than INFO (e.g., the MSD in the
initial INVITE), the metadata/control block is sent in the SIP
response to that request (e.g., the response to the INVITE request).
When the PSAP sends a control block in other circumstances (e.g.,
mid-call), the control block is transmitted from the PSAP to the IVS
in a SIP INFO request within the established dialog. The IVS sends
the requested data (the MSD) in a new INFO request (per [RFC6086]).
This mechanism flexibly allows the PSAP to send eCall-specific data
to the IVS and the IVS to respond. INFO requests are sent using an
appropriate INFO Package. See Section 6 for more information on
attaching a metadata/control block to a SIP message. See Section 10
for information about the use of INFO requests to carry data within
an eCall.

When the IVS includes an unsolicited MSD in a SIP request (e.g., the
initial INVITE), the PSAP sends a metadata/control block indicating
successful/unsuccessful receipt of the MSD in the SIP response to the
request. This also informs the IVS that an NG-eCall is in operation.
If the IVS receives a SIP response without the metadata/control
block, it indicates that the SIP dialog is not an NG-eCall (e.g.,
some part of the call is being handled as a legacy call). When the
IVS sends a solicited MSD (e.g., in a SIP INFO request sent following

receipt of a SIP INFO request containing a metadata/control block
requesting an MSD), the PSAP does not send a metadata/control block
indicating successful or unsuccessful receipt of the MSD. (Normal
SIP retransmission handles non-receipt of requested data; note that,
per [RFC6086], a 200 OK response to an INFO request indicates only
that the receiver has successfully received and accepted the INFO
request, it says nothing about the acceptability of the payload.) If
the IVS receives a request to send an MSD but it is unable to do so
for any reason, the IVS sends a metadata/control object acknowledging
the request and containing "success=false" and "reason" set to an
appropriate code.

This provides flexibility to handle various circumstances. For
example, if a PSAP is unable to accept an eCall (e.g., due to
overload or too many calls from the same location), it can reject the
INVITE. Since a metadata/control object is also included in the SIP
response that rejects the call, the IVS knows if the PSAP received
the MSD, and can inform the vehicle occupants that the PSAP
successfully received the vehicle location and information but can't
talk to the occupants at that time. Especially for SIP response
codes that indicate an inability to conduct a call (as opposed to a
technical inability to process the request), the IVS can also
determine that the call was successful on a technical level (e.g.,
not helpful to retry as a CS-eCall). (Note that there could be edge
cases where the PSAP response is not received by the IVS, e.g., if an
intermediary sends a CANCEL, and an error response is forwarded
towards the IVS before the error response from the PSAP is received,
the response will be dropped, but these are unlikely to occur here.)

The metadata/control block is carried in the MIME type 'application/
emergencyCallData.control+xml'.

The metadata/control block is designed for use with pan-European
eCall and also eCall-like systems (i.e., in other regions), and has
extension points. Note that eCall-like systems might define their
own vehicle data blocks, and so might need to register a new INFO
package to accomodate the new data content type and the metadata/
control object.

9.1. The Control Block

The control block is an XML data structure allowing for
acknowledgments, requests, and capabilities information. It is
carried in a body part with a specific MIME content type. Three
elements are defined for use within a control block:

ack   Acknowledges receipt of data or a request.

   capabilities Used in a control block sent from the IVS to the PSAP
                 (e.g., in the initial INVITE) to inform the PSAP of the
                 vehicle capabilities. Child elements contain all
                 actions and data types supported by the vehicle. It is
                 OPTIONAL for the IVS to send this block. Omitting the
                 block indicates that the IVS supports only the
                 mandatory functionality defined in this document.

   request   Used in a control block sent by the PSAP to the IVS, to
                 request the vehicle to perform an action.

   The <ack> element indicates the object being acknowledged and reports
   success or failure.

   The <request> element contains attributes to indicate the request and
   to supply related information. The 'action' attribute is mandatory
   and indicates the specific action. An IANA registry is created in
   Section 15.8.1 to contain the allowed values.

   The <capabilities> element has child <request> elements to indicate
   the actions supported by the IVS.

9.1.1. The <ack> element

   The <ack> element acknowledges receipt of an eCall data object or
   request. An <ack> element references the Content-ID of the object
   being acknowledged. The PSAP MUST send an <ack> element
   acknowledging receipt of an unsolicited MSD (e.g., sent by the IVS in
   the INVITE); this <ack> element indicates if the PSAP considers the
   MSD successfully received or not. An <ack> element is not sent for a
   <capabilities> element.

   The <ack> element has the following attributes:

9.1.1.1. Attributes of the <ack> element

   The <ack> element has the following attributes:

   Name: ref
   Usage: Mandatory
   Type: anyURI
   Direction: Sent in either direction
   Description: References the Content-ID of the body part being
      acknowledged.
   Example: <ack received="true" ref="1234567890@atlanta.example.com"/>

   Name: received
   Usage: Conditional: mandatory in an <ack> element sent by a PSAP

      Type: Boolean
      Direction: In this document, sent from the PSAP to the IVS
      Description: Indicates if the referenced object was considered
         successfully received or not.
      Example: <ack received="true" ref="1234567890@atlanta.example.com"/>

9.1.1.2. **Child Element of the <ack> element**

   For extensibility, the <ack> element has the following child element:

   Name: actionResult
   Usage: Optional
   Direction: Sent from the IVS to the PSAP
   Description: An <actionResult> element indicates the result of an
      action (other than a successfully executed 'send-data' action).
      The <ack> element contains an <actionResult> element for each
      <request> element that is not a successfully executed 'send-data'
      action. The <actionResult> element has the following attributes:

      Name: action
      Usage: Mandatory
      Type: token
      Description: Contains the value of the 'action' attribute of the
         <request> element

      Name: success
      Usage: Mandatory
      Type: Boolean
      Description: Indicates if the action was successfully
         accomplished

      Name: reason
      Usage: Conditional
      Type: token
      Description: Used when 'success' is "false", this attribute
         contains a reason code for a failure. A registry for reason
         codes is defined in Section 15.8.2.

      Name: details
      Usage: optional
      Type: string
      Description: Contains further explanation of the circumstances of
         a success or failure. The contents are implementation-specific
         and human-readable.

9.1.1.3. Ack Examples

```
<?xml version="1.0" encoding="UTF-8"?>
<emergencyCallData.control
    xmlns="urn:ietf:params:xml:ns:EmergencyCallData:control"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation=
        "urn:ietf:params:xml:ns:EmergencyCallData:control">

<ack received="true" ref="1234567890@atlanta.example.com"/>

</emergencyCallData.control>
```

                  Figure 3: Ack Example from PSAP to IVS

9.1.2. The <capabilities> element

   The <capabilities> element is transmitted by the IVS to indicate to
   the PSAP its capabilities. No attributes for this element are
   currently defined. The following child elements are defined:

9.1.2.1. Child Elements of the <capabilities> element

   The <capabilities> element has the following child elements:

   Name: request
   Usage: Mandatory
   Description: The <capabilities> element contains a <request> child
      element per action supported by the vehicle.

   Examples:
      <request action="send-data" supported-values="eCall.MSD" />

   It is OPTIONAL for the IVS to support the <capabilities> element. If
   the IVS does not send a <capabilities> element, this indicates that
   the only <request> action supported by the IVS is 'send-data' with
   'datatype' set to 'eCall.MSD'.

9.1.2.2. Capabilities Example

```
<?xml version="1.0" encoding="UTF-8"?>
<EmergencyCallData.Control
    xmlns="urn:ietf:params:xml:ns:EmergencyCallData:control"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation="urn:ietf:params:xml:ns:EmergencyCallData:control">

<capabilities>
    <request action="send-data" supported-values="eCall.MSD"/>
</capabilities>

</EmergencyCallData.Control>
```

Figure 4: Capabilities Example

9.1.3. The <request> element

A <request> element appears one or more times on its own or as a
child of a <capabilities> element. It allows the PSAP to request
that the IVS perform an action. The only action that MUST be
supported is to send an MSD. The following attributes and child
elements are defined:

9.1.3.1. Attributes of the <request> element

The <request> element has the following attributes:

```
Name:  action
Usage:  Mandatory
Type:  token
Direction:  Sent in either direction
Description:  Identifies the action that the vehicle is requested to
   perform (in a <request> element within a <capabilities> element,
   indicates an action that the vehicle is capable of performing).
   An IANA registry is established in Section 15.8.1 to contain the
   allowed values.
Example:  action="send-data"

Name:  msgid
Usage:  Conditional
Type:  int
Direction:  Sent in either direction
Description:  Defined for extensibility.
Example:  msgid="3"

Name:  persistance
Usage:  Optional
Type:  duration
```

      Direction: Sent in either direction
      Description: Defined for extensibility. Specifies how long to carry
         on the specified action. If absent, the default is for the
         duration of the call.
      Example: persistance="PT1H"

      Name: datatype
      Usage: Conditional
      Type: token
      Direction: Sent in either direction
      Description: Mandatory with a "send-data" action within a <request>
         element that is not within a <capabilities> element. Specifies
         the data block that the IVS is requested to transmit, using the
         same identifier as in the 'purpose' attribute set in a Call-Info
         header field to point to the data block. Permitted values are
         contained in the 'Emergency Call Data Types' IANA registry
         established in [RFC7852]. Only the "eCall.MSD" value is mandatory
         to support.
      Example: datatype="eCall.MSD"

      Name: supported-values
      Usage: Conditional
      Type: string
      Direction: Sent from the IVS to the PSAP
      Description: Defined for extensibility. Used in a <request> element
         that is a child of a <capability> element, this attribute lists
         all supported values of the action type. Permitted values depend
         on the action value. Multiple values are separated with a
         semicolon.

      Name: requested-state
      Usage: Conditional
      Type: token
      Direction: Sent from the PSAP to the IVS
      Description: Defined for extension. Indicates the requested state
         of an element associated with the request type. Permitted values
         depend on the request type.

      Name: element-ID
      Usage: Conditional
      Type: token
      Direction: Sent from the PSAP to the IVS
      Description: Defined for extension. Identifies the element to be
         acted on. Permitted values depend on the request type.

9.1.3.2. Request Example

```
<?xml version="1.0" encoding="UTF-8"?>
<emergencyCallData.control
    xmlns="urn:ietf:params:xml:ns:EmergencyCallData:control"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation=
        "urn:ietf:params:xml:ns:EmergencyCallData:control">

<request action="send-data" datatype="eCall.MSD"/>

</emergencyCallData.control>
```

Figure 5: Request Example

10. The emergencyCallData.eCall.MSD INFO package

   This document registers the 'emergencyCallData.eCall.MSD' INFO
   package.

   Both endpoints (the IVS and the PSAP equipment) include
   'emergencyCallData.eCall.MSD' in a Recv-Info header field per
   [RFC6086] to indicate ability to receive INFO requests carrying data
   as described here.

   Support for the 'emergencyCallData.eCall.MSD' INFO package indicates
   the ability to receive eCall related body parts as specified in [TBD:
   THIS DOCUMENT].

   An INFO request message carrying body parts related to an emergency
   call as described in [TBD: THIS DOCUMENT] has an Info-Package header
   field set to 'emergencyCallData.eCall.MSD' per [RFC6086].

   The requirements of Section 10 of [RFC6086] are addressed in the
   following sections.

10.1. Overall Description

   This section describes "what type of information is carried in INFO
   requests associated with the Info Package, and for what types of
   applications and functionalities UAs can use the Info Package."

   INFO requests associated with the emergencyCallData.eCall.MSD INFO
   package carry data associated with emergency calls as defined in
   [TBD: THIS DOCUMENT]. The application is vehicle-initiated emergency
   calls established using SIP. The functionality is to carry vehicle

data and metadata/control information between vehicles and PSAPs.
Refer to [TBD: THIS DOCUMENT] for more information.

10.2. Applicability

This section describes "why the Info Package mechanism, rather than
some other mechanism, has been chosen for the specific use-case...."

The use of INFO is based on an analysis of the requirements against
the intent and effects of INFO versus other approaches (which
included SIP MESSAGE, SIP OPTIONS, SIP re-INVITE, media plane
transport, and non-SIP protocols). In particular, the transport of
emergency call data blocks occurs within a SIP emergency dialog, per
Section 6, and is normally carried in the initial INVITE and its
response; the use of INFO only occurs when emergency-call-related
data needs to be sent mid-call. While MESSAGE could be used, it is
not tied to a SIP dialog as is INFO and thus might not be associated
with the dialog. SIP OPTIONS or re-INVITE could also be used, but is
seen as less clean than INFO. SUBSCRIBE/NOTIFY could be coerced into
service, but the semantics are not a good fit, e.g., the subscribe/
notify mechanism provides one-way communication consisting of (often
multiple) notifications from notifier to subscriber indicating that
certain events in notifier have occurred, whereas what's needed here
is two-way communication of data related to the emergency dialog.
Use of the media plane mechanisms was discounted because the number
of messages needing to be exchanged in a dialog is normally zero or
very few, and the size of the data is likewise very small. The
overhead caused by user plane setup (e.g., to use MSRP as transport)
would be disproportionately large.

Based on the the analyses, the SIP INFO method was chosen to provide
for mid-call data transport.

10.3. Info Package Name

The info package name is emergencyCallData.eCall.MSD

10.4. Info Package Parameters

None

10.5. SIP Option-Tags

None

10.6. **INFO Request Body Parts**

   The body for an emergencyCallData.eCall.MSD info package is a
   multipart body which MAY contain zero or one application/
   emergencyCallData.eCall.MSD+per part (containing an MSD) and zero or
   more application/emergencyCallData.control+xml (containing a
   metadata/control object) parts.

   The body parts are sent per [RFC6086], and in addition, to align with
   with how these body parts are sent in SIP messages other than INFO
   requests, each associated body part is referenced by a Call-Info
   header field at the top level of the SIP message. The body part has
   a Content-Disposition header field set to "By-Reference".

   An MSD or metadata/control block is always enclosed in a multipart
   body part (even if it would otherwise be the only body part in the
   SIP message), since as of the date of this document, the use of
   Content-ID as a SIP header field is not defined (while it is defined
   for use as a MIME header field). The innermost multipart that
   contains only body parts associated with the INFO package has a
   Content-Disposition value of Info-Package.

   See [TBD: THIS DOCUMENT] for more information.

10.7. **Info Package Usage Restrictions**

   Usage is limited to vehicle-initiated emergency calls as defined in
   [TBD: THIS DOCUMENT].

10.8. **Rate of INFO Requests**

   The rate of SIP INFO requests associated with the
   emergencyCallData.eCall.MSD info package is normally quite low (most
   dialogs are likely to contain zero INFO requests, while others can be
   expected to carry an occasional request).

10.9. **Info Package Security Considerations**

   The MIME content type registations for the data blocks that can be
   carried using this INFO package contains a discussion of the security
   and/or privacy considerations specific to that data block. The
   "Security Considerations" and "Privacy Considerations" sections of
   [TBD: THIS DOCUMENT] discuss security and privacy considerations of
   the data carried in eCalls.

10.10. Implementation Details

See [TBD: THIS DOCUMENT] for protocol details.

10.11. Examples

See [TBD: THIS DOCUMENT] for protocol examples.

11. Examples

Figure 6 illustrates an eCall. The call uses the request URI
'urn:service:sos.ecall.automatic' service URN and is recognized as an
eCall, and further as one that was invoked automatically by the IVS
due to a crash or other serious incident. In this example, the
originating network routes the call to an ESInet which routes the
call to the appropriate NG-eCall capable PSAP. The emergency call is
received by the ESInet's Emergency Services Routing Proxy (ESRP), as
the entry point into the ESInet. The ESRP routes the call to a PSAP,
where it is received by a call taker. In deployments where there is
no ESInet, the originating network routes the call directly to the
appropriate NG-eCall capable PSAP, an illustration of which would be
identical to the one below except without an ESInet or ESRP.

```
             +------------+  +---------------------------------------+
             |            |  |                  +-------+            |
             |            |  |                  | PSAP2 |            |
             |            |  |                  +------+             |
             |            |  |                                       |
             |            |  |  +------+      +-------+              |
   Vehicle-->|            |  |--+->| ESRP |---->| PSAP1 |--> Call-Taker |
             |            |  |  +------+      +-------+              |
             |            |  |                                       |
             |            |  |                  +-------+            |
             |            |  |                  | PSAP3 |            |
             | Originating|  |                  +-------+            |
             |   Mobile   |  |                                       |
             |  Network   |  |                  ESInet               |
             +------------+  +---------------------------------------+
```
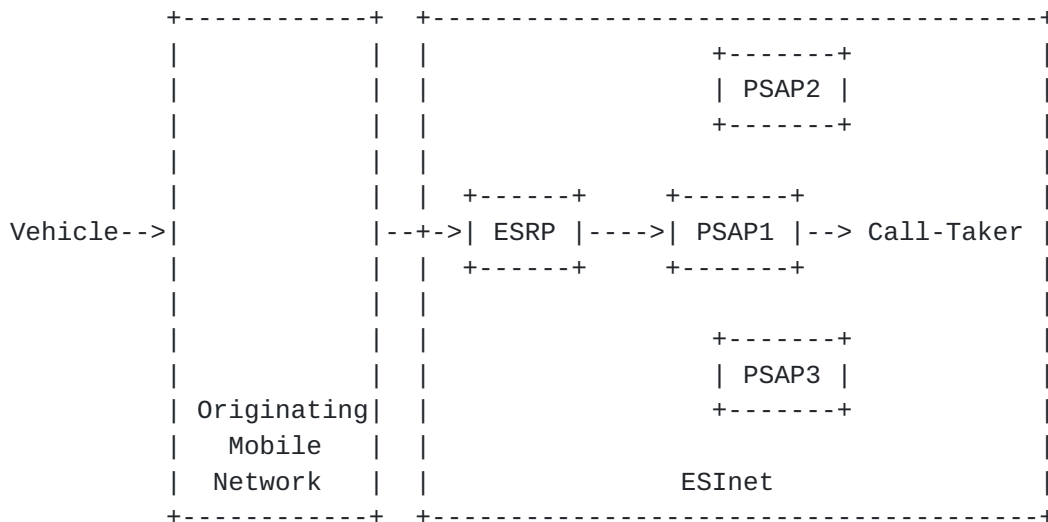
Figure 6: Example of NG-eCall Message Flow

Figure 7 illustrates an eCall call flow with a mid-call PSAP request
for an updated MSD. The call flow shows the IVS initiating an
emergency call, including the MSD in the INVITE. The PSAP includes
in the 200 OK response a metadata/control object acknowledging
receipt of the MSD. During the call, the PSAP sends a request for an

MSD in an INFO request. The IVS sends the requested MSD in a new
INFO request.

```
            IVS                                         PSAP
             |(1) INVITE (eCall MSD)                     |
             |------------------------------------------>|
             |                                           |
             |(2) 200 OK (eCall metadata [ack MSD])      |
             |<------------------------------------------|
             |                                           |
             |(3) start media stream(s)                  |
             |...........................................|
             |                                           |
             |(4) INFO (eCall metadata [request MSD])    |
             |<------------------------------------------|
             |                                           |
             |(5) 200 OK                                 |
             |------------------------------------------>|
             |                                           |
             |(6) INFO (eCall MSD)                        |
             |------------------------------------------>|
             |                                           |
             |(7) 200 OK                                 |
             |<------------------------------------------|
             |                                           |
             |(8) BYE                                    |
             |<------------------------------------------|
             |                                           |
             |(9) end media streams                      |
             |...........................................|
             |                                           |
             |(10) 200 OK                                |
             |------------------------------------------>|
```
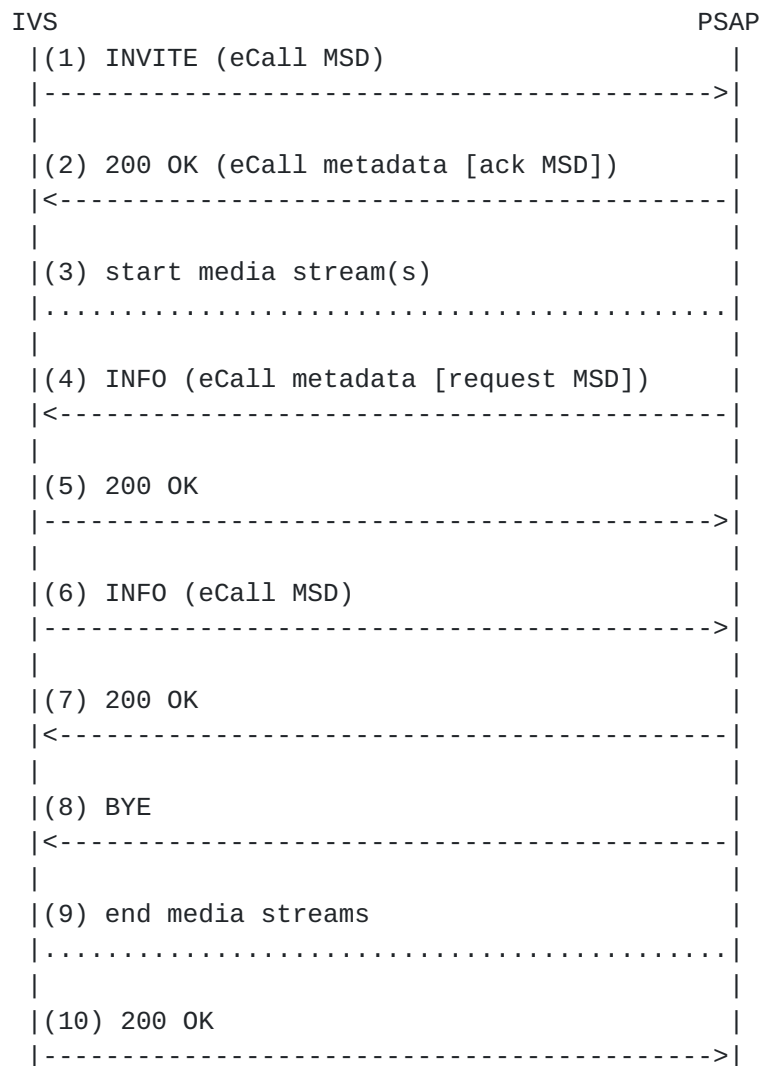
Figure 7: NG-eCall Call Flow Illustration

The example, shown in Figure 8, illustrates a SIP eCall INVITE that
contains an MSD. For simplicity, the example does not show all SIP
headers, nor the SDP contents, nor does it show any additional data
blocks added by the IVS or the originating mobile network. Because
the MSD is encoded in ASN.1 PER, which is a binary encoding, its
contents cannot be included in a text document.

```
INVITE urn:service:sos.ecall.automatic SIP/2.0
To: urn:service:sos.ecall.automatic
From: <sip:+13145551111@example.com>;tag=9fxced76sl
Call-ID: 3848276298220188511@atlanta.example.com
Geolocation: <cid:target123@example.com>
Geolocation-Routing: no
Call-Info: <cid:1234567890@atlanta.example.com>;
           purpose=emergencyCallData.eCall.MSD
Accept: application/sdp, application/pidf+xml,
        application/emergencyCallData.control+xml
CSeq: 31862 INVITE
Recv-Info: emergencyCallData.eCall.MSD
Allow: INVITE, ACK, PRACK, INFO, OPTIONS, CANCEL, REFER, BYE,
        SUBSCRIBE, NOTIFY, UPDATE
Content-Type: multipart/mixed; boundary=boundary1
Content-Length: ...

--boundary1
Content-Type: application/sdp

    ...Session Description Protocol (SDP) goes here...

--boundary1
Content-Type: application/emergencyCallData.eCall.MSD+per
Content-ID: <1234567890@atlanta.example.com>
Content-Disposition: by-reference;handling=optional

    ...MSD in ASN.1 PER encoding goes here...

  --boundary1--
```

                     Figure 8: SIP NG-eCall INVITE

Continuing the example, Figure 9 illustrates a SIP 200 OK response to
the INVITE of Figure 8, containing a control block acknowledging
successful receipt of the eCall MSD. (For simplicity, the example
does not show all SIP headers.)

```
SIP/2.0 200 OK
To: <sip:+13145551111@example.com>;tag=9fxced76sl
From: Exemplar PSAP <urn:service:sos.ecall.automatic>
Call-ID: 3848276298220188511@atlanta.example.com
Call-Info: <cid:2345678901@atlanta.example.com>;
           purpose=emergencyCallData.control
Accept: application/sdp, application/pidf+xml,
        application/emergencyCallData.control+xml,
        application/emergencyCallData.eCall.MSD+per
CSeq: 31862 INVITE
Recv-Info: emergencyCallData.eCall.MSD
Allow: INVITE, ACK, PRACK, INFO, OPTIONS, CANCEL, REFER, BYE,
       SUBSCRIBE, NOTIFY, UPDATE
Content-Type: multipart/mixed; boundary=boundaryX
Content-Length: ...

--boundaryX
Content-Type: application/sdp

     ...Session Description Protocol (SDP) goes here...

--boundaryX
Content-Type: application/emergencyCallData.control+xml
Content-ID: <2345678901@atlanta.example.com>
Content-Disposition: by-reference

<?xml version="1.0" encoding="UTF-8"?>
<emergencyCallData.control
    xmlns="urn:ietf:params:xml:ns:EmergencyCallData:control"
    xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
    xsi:schemaLocation=
        "urn:ietf:params:xml:ns:EmergencyCallData:control">

<ack received="true" ref="1234567890@atlanta.example.com"/>
</emergencyCallData.control>

--boundaryX--
```

                  Figure 9: 200 OK response to INVITE

   Figure 10 illustrates a SIP INFO request containing a metadata/
   control block requesting an eCall MSD. (For simplicity, the example
   does not show all SIP headers.)

```
      INFO sip:+13145551111@example.com SIP/2.0
      To: <sip:+13145551111@example.com>;tag=9fxced76sl
      From: Exemplar PSAP <urn:service:sos.ecall.automatic>
      Call-ID: 3848276298220188511@atlanta.example.com
      Call-Info: <cid:3456789012@atlanta.example.com>;
                 purpose=emergencyCallData.control
      Accept: application/sdp, application/pidf+xml,
              application/emergencyCallData.control+xml,
              application/emergencyCallData.eCall.MSD+per
      CSeq: 41862 INFO
      Info-Package: emergencyCallData.eCall.MSD
      Allow: INVITE, ACK, PRACK, INFO, OPTIONS, CANCEL, REFER, BYE,
             SUBSCRIBE, NOTIFY, UPDATE
      Content-Type: multipart/mixed; boundary=boundaryZZZ
      Content-Dispositio: Info-Package
      Content-Length: ...

      --boundaryZZZ
      Content-Disposition: by-reference
      Content-Type: application/emergencyCallData.control+xml
      Content-ID: <3456789012@atlanta.example.com>

      <?xml version="1.0" encoding="UTF-8"?>
      <emergencyCallData.control
          xmlns="urn:ietf:params:xml:ns:EmergencyCallData:control"
          xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
          xsi:schemaLocation=
              "urn:ietf:params:xml:ns:EmergencyCallData:control">

      <request action="send-data" datatype="eCall.MSD"/>

      </emergencyCallData.control>
       --boundaryZZZ--
```

                       Figure 10: INFO requesting MSD

   Figure 11 illustrates a SIP INFO request containing an MSD. For
   simplicity, the example does not show all SIP headers. Because the
   MSD is encoded in ASN.1 PER, which is a binary encoding, its contents
   cannot be included in a text document.

```
    INFO urn:service:sos.ecall.automatic SIP/2.0
    To: urn:service:sos.ecall.automatic
    From: <sip:+13145551111@example.com>;tag=9fxced76sl
    Call-ID: 3848276298220188511@atlanta.example.com
    Call-Info: <cid:4567890123@atlanta.example.com>;
               purpose=emergencyCallData.eCall.MSD
    Accept: application/sdp, application/pidf+xml,
            application/emergencyCallData.control+xml
    CSeq: 51862 INFO
    Info-Package: emergencyCallData.eCall.MSD
    Allow: INVITE, ACK, PRACK, INFO, OPTIONS, CANCEL, REFER, BYE,
           SUBSCRIBE, NOTIFY, UPDATE
    Content-Type: multipart/mixed; boundary=boundaryLine
    Content-Disposition: Info-Package
    Content-Length: ...

    --boundaryLine
    Content-Type: application/emergencyCallData.eCall.MSD+per
    Content-ID: <4567890123@atlanta.example.com>
    Content-Disposition: by-reference

        ...MSD in ASN.1 PER encoding goes here...

    --boundaryLine--
```

                     Figure 11: INFO containing MSD

12. Security Considerations

   The security considerations described in [RFC5069] apply here.

   In addition to any network-provided location (which might be
   determined solely by the network, or in cooperation with or possibly
   entirely by the originating device), an eCall carries an IVS-supplied
   location within the MSD. This is likely to be useful to the PSAP,
   especially when no network-provided location is included, or when the
   two locations are independently determined. Even in situations where
   the network-supplied location is limited to the cell site, this can
   be useful as a sanity check on the device-supplied location contained
   in the MSD.

   The document [RFC7378] discusses trust issues regarding location
   provided by or determined in cooperation with end devices.

   Security considerations specific to the mechanism by which the PSAP
   sends acknowledgments and requests to the vehicle are discussed in
   the "Security Considerations" block of Section 15.3.

   Data received from external sources inherently carries implementation
   risks. For example, depending on the platform, buffer overflows can
   introduce remote code execution vulnerabilities, null characters can
   corrupt strings, numeric values used for internal calculations can
   result in underflow/overflow errors, malformed XML objects can expose
   parsing bugs, etc. Implementations need to be cognizant of the
   potential risks, observe best practices (which might include
   sufficiently capable static code analysis, fuzz testing, component
   isolation, avoiding use of unsafe coding techniques, third-party
   attack tests, signed software, over-the-air updates, etc.), and have
   multiple levels of protection. Implementors need to be aware that,
   potentially, the data objects described here and elsewhere might be
   malformed, might contain unexpected characters, excessively long
   attribute values, elements, etc.

   The security considerations discussed in [RFC7852] apply here (see
   especially the discussion of TLS, TLS versions, cypher suites, and
   PKI).

   When vehicle data or control/metadata is contained in a signed or
   encrypted body part, the enclosing multipart (e.g., multipart/signed
   or multipart/encrypted) has the same Content-ID as the enclosed data
   part. This allows an entity to identify and access the data blocks
   it is interested in without having to dive deeply into the message
   structure or decrypt parts it is not interested in. (The 'purpose'
   parameter in a Call-Info header field identifies the data and
   contains a CID URL pointing to the data block in the body, which has
   a matching Content-ID body part header field).

13. Privacy Considerations

   The privacy considerations discussed in [RFC7852] apply here. The
   MSD carries some identifying and personal information (mostly about
   the vehicle and less about the owner), as well as location
   information, and so needs to be protected against unauthorized
   disclosure. Local regulations may impose additional privacy
   protection requirements.

   Privacy considerations specific to the data structure containing
   vehicle information are discussed in the "Security Considerations"
   block of Section 15.2.

   Privacy considerations specific to the mechanism by which the PSAP
   sends acknowledgments and requests to the vehicle are discussed in
   the "Security Considerations" block of Section 15.3.

14. XML Schema

This section defines an XML schema for the control block. The text
description of the control block in Section 9.1 is normative and
supersedes any conflicting aspect of this schema.

```
    <artwork>
    <![CDATA[
 <?xml version="1.0"?>
 <xs:schema
     targetNamespace="urn:ietf:params:xml:ns:EmergencyCallData:control"
     xmlns:xs="http://www.w3.org/2001/XMLSchema"
     xmlns:pi="urn:ietf:params:xml:ns:EmergencyCallData:control"
     xmlns:xml="http://www.w3.org/XML/1998/namespace"
     elementFormDefault="qualified"
     attributeFormDefault="unqualified">

     <xs:import namespace="http://www.w3.org/XML/1998/namespace"
         schemaLocation="http://www.w3.org/2009/01/xml.xsd"/>

     <xs:element name="EmergencyCallData.control"
                 type="pi:controlType"/>

     <xs:complexType name="controlType">
         <xs:complexContent>
             <xs:restriction base="xs:anyType">
                 <xs:choice>
                     <xs:element name="capabilities"
                                 type="pi:capabilitiesType"/>
                     <xs:element name="request" type="pi:requestType"/>
                     <xs:element name="ack" type="pi:ackType"/>
                     <xs:any namespace="##any" processContents="lax"
                             minOccurs="0"
                             maxOccurs="unbounded"/>
                 </xs:choice>
                 <xs:anyAttribute/>
             </xs:restriction>
         </xs:complexContent>
     </xs:complexType>

     <xs:complexType name="ackType">
         <xs:complexContent>
             <xs:restriction base="xs:anyType">
                 <xs:sequence minOccurs="1" maxOccurs="unbounded">
                     <xs:element name="actionResult" minOccurs="0"
                                 maxOccurs="unbounded">
                         <xs:complexType>
```

```
                              <xs:attribute name="action"
                                      type="xs:token"
                                      use="required"/>
                          <xs:attribute name="success"
                                      type="xs:boolean"
                                      use="required"/>
                          <xs:attribute name="reason"
                                      type="xs:token">
                              <xs:annotation>
                                  <xs:documentation>conditionally
                                       mandatory when @success='false'
                                      to indicate reason code for a
                                      failure </xs:documentation>
                              </xs:annotation>
                          </xs:attribute>
                          <xs:attribute name="details"
                                      type="xs:string"/>
                          <xs:anyAttribute processContents="skip"/>
                      </xs:complexType>
                  </xs:element>
                  <xs:any namespace="##any" processContents="lax"
                          minOccurs="0"
                          maxOccurs="unbounded"/>
              </xs:sequence>
              <xs:attribute name="ref"
                          type="xs:anyURI"
                          use="required"/>
              <xs:attribute name="received"
                          type="xs:boolean"/>
              <xs:anyAttribute/>
          </xs:restriction>
      </xs:complexContent>
  </xs:complexType>

  <xs:complexType name="capabilitiesType">
      <xs:complexContent>
          <xs:restriction base="xs:anyType">
              <xs:sequence minOccurs="1" maxOccurs="unbounded">
                  <xs:element name="request"
                          type="pi:requestType"
                          minOccurs="1"
                      maxOccurs="unbounded"/>
                  <xs:any namespace="##any" processContents="lax"
                           minOccurs="0"
                          maxOccurs="unbounded"/>
              </xs:sequence>
              <xs:anyAttribute/>
          </xs:restriction>
```

```
                </xs:complexContent>
            </xs:complexType>

            <xs:complexType name="requestType">
                <xs:complexContent>
                    <xs:restriction base="xs:anyType">
                        <xs:choice minOccurs="1" maxOccurs="unbounded">
                            <xs:any namespace="##any" processContents="lax"
                                    minOccurs="0"
                                    maxOccurs="unbounded"/>
                        </xs:choice>
                        <xs:attribute name="action" type="xs:token" use="required"/
>
                        <xs:attribute name="msgid" type="xs:unsignedInt"/>
                        <xs:attribute name="persistence" type="xs:duration"/>
                        <xs:attribute name="datatype" type="xs:token"/>
                        <xs:attribute name="supported-values" type="xs:string"/>
                        <xs:attribute name="element-id" type="xs:token"/>
                        <xs:attribute name="requested-state" type="xs:token"/>
                        <xs:anyAttribute/>
                    </xs:restriction>
                </xs:complexContent>
            </xs:complexType>

       </xs:schema>
```

Figure 12: Control Block Schema

15. IANA Considerations

This document formalizes the "EmergencyCallData" media (MIME) subtype
tree. This tree is used only for content associated with emergency
communications. New subtypes in this tree can be registered by the
IETF or by other standards organizations working with emergency
communications, using the "Specification Required" rule, which
implies expert review. The designated expert is the ECRIT working
group.

15.1. Service URN Registrations

IANA is requested to register the URN 'urn:service:sos.ecall' under
the sub-services 'sos' registry defined in Section 4.2 of [RFC5031].

This service requests resources associated with an emergency call
placed by an in-vehicle system, carrying a standardized set of data
related to the vehicle and incident. Two sub-services are registered
as well:

urn:service:sos.ecall.manual

   Used with an eCall invoked due to manual interaction by a vehicle
   occupant.

urn:service:sos.ecall.automatic

   Used with an eCall invoked automatically, for example, due to a
   crash or other serious incident.

IANA is also requested to register the URN
'urn:service:test.sos.ecall' under the sub-service 'test' registry
defined in Setcion 17.2 of [RFC6881].

15.2. MIME Content-type Registration for 'application/ emergencyCallData.eCall.MSD+per'

IANA is requested to add application/emergencyCallData.eCall.MSD+per
as a MIME content type, with a reference to this document, in
accordance to the procedures of RFC 6838 [RFC6838] and guidelines in
RFC 7303 [RFC7303].

   MIME media type name: application

   MIME subtype name: emergencyCallData.eCall.MSD+per

   Mandatory parameters: none

   Optional parameters: none

   Encoding scheme: binary

   Encoding considerations: Uses ASN.1 PER, which is a binary
   encoding; when transported in SIP, binary content transfer
   encoding is used.

   Security considerations: This content type is designed to carry
   vehicle and incident-related data during an emergency call. This
   data contains personal information including vehicle VIN,
   location, direction, etc. Appropriate precautions need to be
   taken to limit unauthorized access, inappropriate disclosure to
   third parties, and eavesdropping of this information. In general,
   it is acceptable for the data to be unprotected while briefly in
   transit within the Mobile Network Operator (MNO); the MNO is
   trusted to not permit the data to be accessed by third parties.
   Sections 7 and Section 8 of [RFC7852] contain more discussion.

   Interoperability considerations: None

Published specification: Annex A of EN 15722 [msd]

Applications which use this media type: Pan-European eCall compliant systems

Additional information: None

Magic Number: None

File Extension: None

Macintosh file type code: 'BINA'

Person and email address for further information: Randall Gellens, rg+ietf@randy.pensive.org

Intended usage: LIMITED USE

Author: The MSD specification was produced by the European Committee For Standardization (CEN). For contact information, please see <http://www.cen.eu/cen/Pages/contactus.aspx>.

Change controller: The European Committee For Standardization (CEN)

15.3. MIME Content-type Registration for 'application/ emergencyCallData.control+xml'

IANA is requested to add application/emergencyCallData.control+xml as a MIME content type, with a reference to this document, in accordance to the procedures of RFC 6838 [RFC6838] and guidelines in RFC 7303 [RFC7303].

MIME media type name: application

MIME subtype name: emergencyCallData.control+xml

Mandatory parameters: none

Optional parameters: charset

Indicates the character encoding of the XML content.

Encoding considerations: Uses XML, which can employ 8-bit characters, depending on the character encoding used. See Section 3.2 of RFC 7303 [RFC7303].

Security considerations:

This content type carries metadata and control information and requests, such as from a Public Safety Answering Point (PSAP) to an In-Vehicle System (IVS) during an emergency call.

Metadata (such as an acknowledgment that data sent by the IVS to the PSAP was successfully received) has limited privacy and security implications. Control information (such as requests from the PSAP that the vehicle perform an action) has some privacy and security implications. The privacy concern arises from the ability to request the vehicle to transmit a data set, which as described in Section 15.2, can contain personal information. The security concern is the ability to request the vehicle to perform an action. Control information needs to originate only from a PSAP or other emergency services provider, and not be modified en-route. The level of integrity of the cellular network over which the emergency call is placed is a consideration: when the IVS initiates an eCall over a cellular network, in most cases it relies on the MNO to route the call to a PSAP. (Calls placed using other means, such as Wi-Fi or over-the-top services, generally incur somewhat higher levels of risk than calls placed "natively" using cellular networks.) A call-back from a PSAP merits additional consideration, since current mechanisms are not ideal for verifying that such a call is indeed a call-back from a PSAP in response to an emergency call placed by the IVS. See the discussion in Section 12 and the PSAP Callback document [RFC7090].

Sections 7 and Section 8 of [RFC7852] contain more discussion.

Interoperability considerations: None

Published specification: This document

Applications which use this media type: Pan-European eCall compliant systems

Additional information: None

Magic Number: None

File Extension: .xml

Macintosh file type code: 'TEXT'

Person and email address for further information: Randall Gellens, rg+ietf@randy.pensive.org

Intended usage: LIMITED USE

Author: The IETF ECRIT WG.

Change controller: The IETF ECRIT WG.

15.4. Registration of the 'eCall.MSD' entry in the Emergency Call Additional Data Blocks registry

This specification requests IANA to add the 'eCall.MSD' entry to the Emergency Call Additional Data Blocks registry, with a reference to this document.

15.5. Registration of the 'control' entry in the Emergency Call Additional Data Blocks registry

This specification requests IANA to add the 'control' entry to the Emergency Call Additional Data Blocks registry, with a reference to this document.

15.6. Registration of the emergencyCallData.eCall Info Package

IANA is requested to add emergencyCallData.eCall to the Info Packages Registry under "Session Initiation Protocol (SIP) Parameters", with a reference to this document.

15.7. URN Sub-Namespace Registration

15.7.1. Registration for urn:ietf:params:xml:ns:eCall

This section registers a new XML namespace, as per the guidelines in RFC 3688 [RFC3688].

URI: urn:ietf:params:xml:ns:eCall

Registrant Contact: IETF, ECRIT working group, <ecrit@ietf.org>, as delegated by the IESG <iesg@ietf.org>.

XML:

```
BEGIN
<?xml version="1.0"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML Basic 1.0//EN"
    "http://www.w3.org/TR/xhtml-basic/xhtml-basic10.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
    <meta http-equiv="content-type"
          content="text/html;charset=iso-8859-1"/>
    <title>Namespace for eCall Data</title>
</head>
<body>
    <h1>Namespace for eCall Data</h1>
    <p>See [TBD: This document].</p>
</body>
</html>
END
```

15.7.2. Registration for urn:ietf:params:xml:ns:control

   This section registers a new XML namespace, as per the guidelines in
   RFC 3688 [RFC3688].

   URI: urn:ietf:params:xml:ns:control

   Registrant Contact: IETF, ECRIT working group, <ecrit@ietf.org>, as
      delegated by the IESG <iesg@ietf.org>.

   XML:

```
    BEGIN
    <?xml version="1.0"?>
    <!DOCTYPE html PUBLIC "-//W3C//DTD XHTML Basic 1.0//EN"
         "http://www.w3.org/TR/xhtml-basic/xhtml-basic10.dtd">
    <html xmlns="http://www.w3.org/1999/xhtml">
    <head>
         <meta http-equiv="content-type"
               content="text/html;charset=iso-8859-1"/>
         <title>Namespace for eCall Data:
               Control Block</title>
    </head>
    <body>
         <h1>Namespace for eCall Data</h1>
         <h2>Control Block</h2>
    <p>See [TBD: This document].</p>
    </body>
    </html>
    END
```

15.8. Registry creation

   This document creates a new registry called 'Metadata/Control Data'.
   The following sub-registries are created for this registry.

15.8.1. Action Registry

   This document creates a new sub-registry called "Action Registry".
   As defined in [RFC5226], this registry operates under "Expert Review"
   rules. The expert should determine that the proposed action is
   within the purview of a vehicle, is sufficiently distinguishable from
   other actions, and the action is clearly and fully described. In
   most cases, a published and stable document is referenced for the
   description of the action.

   The content of this registry includes:

   Name: The identifier to be used in the 'action' attribute of a
      control <request> element.

   Description: A description of the action. In most cases this will
      be a reference to a published and stable document. The
      description MUST specify if any attributes or child elements are
      optional or mandatory, and describe the action to be taken by the
      vehicle.

   The initial set of values is listed in Table 2.

```
+-----------+------------------------------------+
|   Name    |             Description             |
+-----------+------------------------------------+
| send-data | See Section 9.1.3.1 of this document |
+-----------+------------------------------------+
```

Table 2: Action Registry Initial Values

15.8.2. Reason Registry

This document creates a new sub-registry called "Reason Registry"
which contains values for the 'reason' attribute of the
<actionResult> element. As defined in [RFC5226], this registry
operates under "Expert Review" rules. The expert should determine
that the proposed reason is sufficiently distinguishable from other
reasons and that the proposed description is understandable and
correctly worded.

The content of this registry includes:

ID: A short string identifying the reason, for use in the 'reason'
   attribute of an <actionResult> element.

Description: A description of the reason.

The initial set of values is listed in Table 3.

```
+------------------+-------------------------------------------------+
| ID               | Description                                     |
+------------------+-------------------------------------------------+
| unsupported      | The 'action' value is not supported.           |
|                  |                                                 |
| damaged          | Required components are damaged.               |
|                  |                                                 |
| unable           | The action could not be accomplished (a        |
|                  | generic error for use when no other code is     |
|                  | appropriate).                                   |
|                  |                                                 |
| data-unsupported | The data item referenced in a 'send-data'      |
|                  | request is not supported.                       |
|                  |                                                 |
| security-failure | The authenticity of the request or the         |
|                  | authority of the requestor could not be         |
|                  | verified.                                       |
+------------------+-------------------------------------------------+
```

Table 3: Reason Registry

16. Contributors

   Brian Rosen was a co-author of the original document upon which this
   document is based.

17. Acknowledgements

   We would like to thank Bob Williams and Ban Al-Bakri for their
   feedback and suggestion; Rex Buddenberg, Lena Chaponniere, Keith
   Drage, Stephen Edge, Wes George, Ivo Sedlacek, and James Winterbottom
   for their review and comments; Robert Sparks and Paul Kyzivat for
   their help with the SIP mechanisms; Mark Baker and Ned Freed for
   their help with the media subtype registration issue. We would like
   to thank Michael Montag, Arnoud van Wijk, Gunnar Hellstrom, and
   Ulrich Dietz for their help with the original document upon which
   this document is based. Christer Holmberg deserves special mention
   for his many detailed reviews.

18. Changes from Previous Versions

18.1. Changes from draft-ietf-16 to draft-ietf-17

   o Clarify Content-Disposition value in INFO requests

18.2. Changes from draft-ietf-15 to draft-ietf-16

   o Various clarifications and simplifications
   o Added reference to 3GPP 23.167

18.3. Changes from draft-ietf-14 to draft-ietf-15

   o eCall body parts now always sent enclosed in multipart (even if
      only body part in SIP message) and hence always have a Content-
      Disposition of By-Reference
   o Fixed errors in attribute directionality text
   o Fixed typos.

18.4. Changes from draft-ietf-13 to draft-ietf-14

   o Added text to the IANA Considerations to formalize the
      EmergencyCallData media subtree
   o Fixed some typos

18.5. Changes from draft-ietf-12 to draft-ietf-13

   o Clarifications suggested by Christer
   o Corrections to Content-Disposition text and examples as suggested
      by Paul Kyzivat

   o Clarifications to Content-Disposition text and examples to clarify
      that handling=optional is only used in the initial INVITE

18.6. Changes from draft-ietf-11 to draft-ietf-12

   o Fixed errors in examples found by Dale
   o Removed enclosing sub-section of INFO package registration section
   o Added text per Christer and Dale's suggestions that the MSD and
      metadata/control blocks are sent in INFO with a Call-Info header
      field referencing them
   o Deleted Call Routing section (7.1) in favor of a statement that
      call routing is outside the scope of the document
   o Other text changes per comments received from Christer and Ivo.

18.7. Changes from draft-ietf-09 to draft-ietf-11

   o Renamed INFO package to emergencyCallData.eCall.MSD
   o Changed INFO package to only permit MSD and metadata/control MIME
      types
   o Moved <capabilities> element back from car-crash but made it
      OPTIONAL
   o Moved other extension points back from car-crash so that extension
      points are in base spec (and also to get XML schema to compile)
   o Text changes for clarification.

18.8. Changes from draft-ietf-08 to draft-ietf-09

   o Created a new "Data Transport" section that describes how the MSD
      and metadata/control blocks are attached, and then referred to
      that section rather than repeat the information about the CID and
      Call-Info and so forth, which means most references to the
      additional-data draft have now been deleted
   o Mentioned edge cases where a PSAP response to INVITE isn't
      received by the IVS
   o Reworded description of which status codes are used when a PSAP
      wishes to reject a call but inform the vehicle occupants that it
      is aware of the situation to be more definite
   o Added examples showing INFO
   o Added references for eCall test call requirement
   o Described meaning of eCall URNs in Section 8 as well as in IANA
      registration

18.9. Changes from draft-ietf-07 to draft-ietf-08

   o eCall MSD now encoded as ASN.1 PER, using binary content transfer
      encoding
   o Added text to point out aspects of call handling and metadata/
      control usage, such as use in rejected calls, and solicited MSDs

o Revised use of INFO to require that when a request for an MSD is
   sent in INFO, the MSD sent in response is in its own INFO, not the
   response to the requesting INFO
o Added material to INFO package registation to comply with
   Section 10 of [RFC6086]
o Moved material not required by 3GPP into
   [I-D.ietf-ecrit-car-crash], e.g., some of the eCall metadata/
   control elements, attributes, and values
o Revised test call wording to clarify that specific handling is out
   of scope
o Revised wording throughout the document to simplify
o Moved new Section 7.1 to be a subsection of 7
o Moved new Section Section 10 to be a main section instead of a
   subsection of Section 9
o Revised SIP INFO usage and package registration per advice from
   Robert Sparks and Paul Kyzivat

18.10. **Changes from draft-ietf-06 to draft-ietf-07**

o Fixed typo in Acknowledgements

18.11. **Changes from draft-ietf-05 to draft-ietf-06**

o Added additional security and privacy clarifications regarding
   signed and encrypted data
o Additional security and privacy text
o Deleted informative section on ESINets as unnecessary.

18.12. **Changes from draft-ietf-04 to draft-ietf-05**

o Reworked the security and privacy considerations material in the
   document as a whole and in the MIME registation sections of the
   MSD and control objects
o Clarified that the <actionResult> element can appear multiple
   times within an <ack> element
o Fixed IMS definition
o Added clarifying text for the 'msgid' attribute

18.13. **Changes from draft-ietf-03 to draft-ietf-04**

o Added Privacy Considerations section
o Reworded most uses of non-normative "may", "should", "must", and
   "recommended."
o Fixed nits in examples

18.14. Changes from draft-ietf-02 to draft-ietf-03

   o Added request to enable cameras
   o Improved examples and XML schema
   o Clarifications and wording improvements

18.15. Changes from draft-ietf-01 to draft-ietf-02

   o Added clarifying text reinforcing that the data exchange is for
      small blocks of data infrequently transmitted
   o Clarified that dynamic media is conveyed using SIP re-INVITE to
      establish a one-way media stream
   o Clarified that the scope is the needs of eCall within the SIP
      emergency call environment
   o Added informative statement that the document may be suitable for
      reuse by other ACN systems
   o Clarified that normative language for the control block applies to
      both IVS and PSAP
   o Removed 'ref', 'supported-mime', and <media> elements
   o Minor wording improvements and clarifications

18.16. Changes from draft-ietf-00 to draft-ietf-01

   o Added further discussion of test calls
   o Added further clarification to the document scope
   o Mentioned that multi-region vehicles may need to support other
      crash notification specifications in addition to eCall
   o Added details of the eCall metadata and control functionality
   o Added IANA registration for the MIME content type for the control
      object
   o Added IANA registries for protocol elements and tokens used in the
      control object
   o Minor wording improvements and clarifications

18.17. Changes from draft-gellens-03 to draft-ietf-00

   o Renamed from draft-gellens- to draft-ietf-.
   o Added mention of and reference to ETSI TR "Mobile Standards Group
      (MSG); eCall for VoIP"
   o Added text to Introduction regarding migration/co-existence being
      out of scope
   o Added mention in Security Considerations that even if the network-
      supplied location is just the cell site, this can be useful as a
      sanity check on the IVS-supplied location
   o Minor wording improvements and clarifications

18.18. Changes from draft-gellens-02 to -03

   o Clarifications and editorial improvements.

18.19. Changes from draft-gellens-01 to -02

   o Minor wording improvements
   o Removed ".automatic" and ".manual" from
      "urn:service:test.sos.ecall" registration and discussion text.

18.20. Changes from draft-gellens-00 to -01

   o Now using 'EmergencyCallData' for purpose parameter values and
      MIME subtypes, in accordance with changes to [RFC7852]
   o Added reference to RFC 6443
   o Fixed bug that caused Figure captions to not appear

19. References

19.1. Normative References

   [EN_16062]
              CEN, , "Intelligent transport systems - eSafety - eCall
              High Level Application Requirements (HLAP) Using GSM/UMTS
              Circuit Switched Networks, EN 16062", April 2015.

   [EN_16072]
              CEN, , "Intelligent transport systems - eSafety - Pan-
              European eCall operating requirements, EN 16072", April
              2015.

   [msd]   CEN, , "Intelligent transport systems -- eSafety -- eCall
              minimum set of data (MSD), EN 15722", April 2015.

   [RFC2119] Bradner, S., "Key words for use in RFCs to Indicate
              Requirement Levels", BCP 14, RFC 2119,
              DOI 10.17487/RFC2119, March 1997,
              <http://www.rfc-editor.org/info/rfc2119>.

   [RFC3688] Mealling, M., "The IETF XML Registry", BCP 81, RFC 3688,
              DOI 10.17487/RFC3688, January 2004,
              <http://www.rfc-editor.org/info/rfc3688>.

   [RFC5031] Schulzrinne, H., "A Uniform Resource Name (URN) for
              Emergency and Other Well-Known Services", RFC 5031,
              DOI 10.17487/RFC5031, January 2008,
              <http://www.rfc-editor.org/info/rfc5031>.

   [RFC5226] Narten, T. and H. Alvestrand, "Guidelines for Writing an
              IANA Considerations Section in RFCs", BCP 26, RFC 5226,
              DOI 10.17487/RFC5226, May 2008,
              <http://www.rfc-editor.org/info/rfc5226>.

   [RFC6443] Rosen, B., Schulzrinne, H., Polk, J., and A. Newton,
              "Framework for Emergency Calling Using Internet
              Multimedia", RFC 6443, DOI 10.17487/RFC6443, December
              2011, <http://www.rfc-editor.org/info/rfc6443>.

   [RFC6838] Freed, N., Klensin, J., and T. Hansen, "Media Type
              Specifications and Registration Procedures", BCP 13,
              RFC 6838, DOI 10.17487/RFC6838, January 2013,
              <http://www.rfc-editor.org/info/rfc6838>.

   [RFC6881] Rosen, B. and J. Polk, "Best Current Practice for
              Communications Services in Support of Emergency Calling",
              BCP 181, RFC 6881, DOI 10.17487/RFC6881, March 2013,
              <http://www.rfc-editor.org/info/rfc6881>.

   [RFC7303] Thompson, H. and C. Lilley, "XML Media Types", RFC 7303,
              DOI 10.17487/RFC7303, July 2014,
              <http://www.rfc-editor.org/info/rfc7303>.

   [RFC7852] Gellens, R., Rosen, B., Tschofenig, H., Marshall, R., and
              J. Winterbottom, "Additional Data Related to an Emergency
              Call", RFC 7852, DOI 10.17487/RFC7852, July 2016,
              <http://www.rfc-editor.org/info/rfc7852>.

   [TS22.101]
              3GPP, , "3GPP TS 22.101: Technical Specification Group
              Services and System Aspects; Service aspects; Service
              principles".

19.2. Informative references

   [CEN]   "European Committee for Standardization",
              <http://www.cen.eu>.

   [I-D.ietf-ecrit-car-crash]
              Gellens, R., Rosen, B., and H. Tschofenig, "Next-
              Generation Vehicle-Initiated Emergency Calls", draft-ietf-
              ecrit-car-crash-12 (work in progress), September 2016.

   [MSG_TR]   ETSI, , "ETSI Mobile Standards Group (MSG); eCall for
              VoIP", ETSI Technical Report TR 103 140 V1.1.1 (2014-04),
              April 2014.

   [RFC5012] Schulzrinne, H. and R. Marshall, Ed., "Requirements for
              Emergency Context Resolution with Internet Technologies",
              RFC 5012, DOI 10.17487/RFC5012, January 2008,
              <http://www.rfc-editor.org/info/rfc5012>.

   [RFC5069] Taylor, T., Ed., Tschofenig, H., Schulzrinne, H., and M.
              Shanmugam, "Security Threats and Requirements for
              Emergency Call Marking and Mapping", RFC 5069,
              DOI 10.17487/RFC5069, January 2008,
              <http://www.rfc-editor.org/info/rfc5069>.

   [RFC6086] Holmberg, C., Burger, E., and H. Kaplan, "Session
              Initiation Protocol (SIP) INFO Method and Package
              Framework", RFC 6086, DOI 10.17487/RFC6086, January 2011,
              <http://www.rfc-editor.org/info/rfc6086>.

   [RFC7090] Schulzrinne, H., Tschofenig, H., Holmberg, C., and M.
              Patel, "Public Safety Answering Point (PSAP) Callback",
              RFC 7090, DOI 10.17487/RFC7090, April 2014,
              <http://www.rfc-editor.org/info/rfc7090>.

   [RFC7378] Tschofenig, H., Schulzrinne, H., and B. Aboba, Ed.,
              "Trustworthy Location", RFC 7378, DOI 10.17487/RFC7378,
              December 2014, <http://www.rfc-editor.org/info/rfc7378>.

   [SDO-3GPP]
              "3d Generation Partnership Project",
              <http://www.3gpp.org/>.

   [SDO-ETSI]
              "European Telecommunications Standards Institute (ETSI)",
              <http://www.etsi.org>.

   [TS23.167]
              3GPP, , "3GPP TS 23.167: IP Multimedia Subsystem (IMS)
              emergency sessions".

Authors' Addresses

   Randall Gellens
   Core Technology Consulting

   Email: rg+ietf@randy.pensive.org

Hannes Tschofenig
Individual

Email: Hannes.Tschofenig@gmx.net
URI: http://www.tschofenig.priv.at