Content-ID header field in Session Initiation Protocol (SIP)
draft-ietf-sipcore-content-id-10

Abstract

   This document specifies the Content-ID header field for usage in the
   Session Initiation Protocol (SIP). The document also updates RFC
   5621, which only allows a Content-ID URL to reference a body part
   that is part of a multipart message-body. This update enables a
   Content-ID URL to reference a complete message-body and metadata
   provided by some additional SIP header fields.

   This document updates RFC 5368 and RFC 6442, by clarifying their
   usage of the SIP Content-ID header field.

Status of This Memo

   This Internet-Draft is submitted in full conformance with the
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   This Internet-Draft will expire on March 6, 2018.

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1. Introduction

1.1. Identifying a body part

A SIP message consists of a start-line, one or more header fields, an
empty line indicating the end of the header fields, and an optional
message-body, as specified in [RFC3261].

The message-body can be a non-multipart message-body or a multipart
message-body as specified in [RFC3261].

[RFC5621] defines generic handling of a multipart message-body in a
SIP message.

A multipart message-body contains zero, one or several body parts,
encoded using [RFC2045] format.

A body part in the multipart message-body is described using header
fields such as Content-Disposition, Content-Encoding, and Content-
Type, which provide information on the content of the body part, as
specified in [RFC5621]. A body part in the multipart message-body
can also contain a Content-ID header field with an ID value uniquely
identifying the body part, as specified in [RFC2045].

1.2. Referencing a body part

A SIP header field can reference a body part using a Content-ID URL,
as specified in [RFC5621].

The Content-ID URL is specified in [RFC2392]. [RFC2392] specifies
how to identify the body part referenced by a Content-ID URL. The
Content-ID URL value is included in the Content-ID header field of
the body part.

Examples of SIP header fields referencing a body part using a
Content-ID URL are:

o [RFC6442] specifies how a Geolocation header field references a
   body part using a Content-ID URL, for providing location
   information.
o [RFC5368] specifies how a Refer-To header field references a body
   part using a Content-ID URL, to provide a list of targets.

1.3. Problem statement

It is currently not specified how to uniquely identify a complete
message-body of a SIP message using a Content-ID header field, and
how to reference a complete message-body using a Content-ID URL.

NOTE: In [RFC5621], the Content-ID URL references a specific body
part only.

Some existing specifications, such as [RFC5368], contain examples
that show usage of a SIP Content-ID header field referencing a
complete message-body, even though such usage has never been
specified. Many implementors have interpreted these examples to
indicate that such usage is allowed by the corresponding
specification, despite the absence of language allowing it. This

document updates the normative language in the affected documents to
explicitly allow such usage.

1.4. Consequences

The examples below shows the consequences of the problem described
above.

1.4.1. Example 1

If a User Agent Client (UAC) sends an INVITE request conveying
location as specified in [RFC6442], if the UAC decides not to include
an SDP offer, and if the location is conveyed by value, then the UAC
needs to include only one MIME entity in the INVITE request. This
MIME entity can be, for example, of the application/pidf+xml MIME
type.

However, due to [RFC6442] requiring inclusion of a Geolocation header
field referencing the body part with the location information, the
UAC includes a multipart message-body with single body part in the
INVITE request, and includes the location information of application/
pidf+xml MIME type and an associated Content-ID header field in the
body part.

```
Example message (SIP INVITE):

INVITE sips:bob@biloxi.example.com SIP/2.0
Via: SIPS/2.0/TLS pc33.atlanta.example.com;branch=z9hG4bK74bf9
Max-Forwards: 70
To: Bob <sips:bob@biloxi.example.com>
From: Alice <sips:alice@atlanta.example.com>;tag=9fxced76sl
Call-ID: 3848276298220188511@atlanta.example.com
Geolocation: <cid:target123@atlanta.example.com>
Geolocation-Routing: no
Accept: application/sdp, application/pidf+xml
CSeq: 31862 INVITE
Contact: <sips:alice@atlanta.example.com>
Content-Type: multipart/mixed; boundary=boundary1
Content-Length: ...

--boundary1
Content-Type: application/pidf+xml
Content-ID: <target123@atlanta.example.com>

<?xml version="1.0" encoding="UTF-8"?>
<presence
  xmlns="urn:ietf:params:xml:ns:pidf"
```

```
        xmlns:gp="urn:ietf:params:xml:ns:pidf:geopriv10"
        xmlns:gbp="urn:ietf:params:xml:ns:pidf:geopriv10:basicPolicy"
        xmlns:cl="urn:ietf:params:xml:ns:pidf:geopriv10:civicAddr"
        xmlns:gml="http://www.opengis.net/gml"
        xmlns:dm="urn:ietf:params:xml:ns:pidf:data-model"
        entity="pres:alice@atlanta.example.com"
        >
        <dm:device id="target123-1">
          <gp:geopriv>
            <gp:location-info>
              <gml:location>
                <gml:Point srsName="urn:ogc:def:crs:EPSG::4326">
                  <gml:pos>32.86726 -97.16054</gml:pos>
                </gml:Point>
              </gml:location>
            </gp:location-info>
            <gp:usage-rules>
              <gbp:retransmission-allowed>false
              </gbp:retransmission-allowed>
              <gbp:retention-expiry>2010-11-14T20:00:00Z
              </gbp:retention-expiry>
            </gp:usage-rules>
            <gp:method>802.11</gp:method>
          </gp:geopriv>
          <dm:deviceID>mac:1234567890ab</dm:deviceID>
          <dm:timestamp>2010-11-04T20:57:29Z</dm:timestamp>
        </dm:device>
      </presence>
      --boundary1--
```

1.4.2. Example 2

   If a UAC sends an REFER request including a list of targets as
   specified in [RFC5368], then the UAC needs to include only one MIME
   entity in the REFER request. This MIME entity is of the application/
   resource-lists+xml MIME type.

   However, due to [RFC5368] requiring inclusion of a Refer-To header
   field referencing the body part containing the list of targets, the
   UAC includes a multipart message-body with single body part in the
   REFER request, and includes the list of targets of application/
   resource-lists+xml MIME type and an associated Content-ID header
   field in the body part.

   Example message (SIP REFER):

   REFER sip:conf-123@example.com;gruu;opaque=hha9s8d-999a SIP/2.0
   Via: SIP/2.0/TCP client.chicago.example.com;branch=z9hG4bKhjhs8ass83
   Max-Forwards: 70
   To: "Conference 123" <sip:conf-123@example.com>
   From: Carol <sip:carol@chicago.example.com>;tag=32331
   Call-ID: d432fa84b4c76e66710
   CSeq: 2 REFER
   Contact: <sip:carol@client.chicago.example.com>
   Refer-To: <cid:cn35t8jf02@example.com>
   Refer-Sub: false
   Require: multiple-refer, norefersub
   Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, SUBSCRIBE, NOTIFY
   Allow-Events: dialog
   Accept: application/sdp, message/sipfrag
   Content-Type: multipart/mixed; boundary=boundary1
   Content-Length: ...

   --boundary1
   Content-Type: application/resource-lists+xml
   Content-Disposition: recipient-list
   Content-ID: <cn35t8jf02@example.com>

   <?xml version="1.0" encoding="UTF-8"?>
   <resource-lists
     xmlns="urn:ietf:params:xml:ns:resource-lists"
     xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
     >
     <list>
       <entry uri="sip:bill@example.com?method=BYE"/>
       <entry uri="sip:joe@example.org?method=BYE"/>
       <entry uri="sip:ted@example.net?method=BYE"/>
     </list>
   </resource-lists>
   --boundary1--

1.5. Solution

   In order to solve the problems described above, this document:

   o Specifies and registers the Content-ID header field as a SIP
      header field; and
   o Specifies that, when used as a SIP header field, the Content-ID
      header field identifies the complete message-body, and metadata
      provided by some additional SIP header fields, of the SIP message;
      and

   o Updates [RFC5621], to enable a Content-ID URL to reference a
      complete message-body and metadata provided by some additional SIP
      header fields.
   o Updates [RFC5368] and [RFC6442] by adding explicit text saying
      that a SIP Content-ID header field can be used.

1.6. Backward compatibility

   If an existing specification only defines the usage of a multipart
   message-body for carrying a single body part to be referenced by a
   Content-ID URL, implementations MUST NOT carry the MIME entity in a
   non-multipart message-body unless the specification is updated to
   explicitly allow it.

2. Conventions

   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].

3. Content-ID header field

3.1. Introduction

   This section defines the usage of the Content-ID header field for
   SIP.

3.2. Syntax

   The ABNF [RFC5234] for the Content-ID header field is:

```
Content-ID = "Content-ID" HCOLON msg-id

msg-id     = "<" id-left "@" id-right ">"
```

NOTE: id-left and id-right are specified in [RFC5322]. HCOLON is
defined in [RFC3261].

NOTE: When used in a SIP header field, the msg-id syntax has been
simplified, compared to the syntax in [RFC5322], to disallow the use
of comments and to adopt to the SIP usage of leading white space.

The value of Content-Id header field value must be unique in the
context of a given SIP message, including any embedded MIME
Content-Id header field values. Note that the SIP Content-ID header
field value is not expected to be unique among all SIP messages; it
has no meaning outside of the message in which it is included.

3.3. Semantics

The Content-ID header field included in the header fields of a SIP
message identifies the message-body of the SIP message, and the
metadata provided by:

o a MIME-Version header field, if included in the header fields of
   the SIP message; and
o any 'Content-' prefixed header fields (including the Content-ID
   header field itself) included in the header fields of the SIP
   message.

The Content-ID header field can be included in any SIP message which
is allowed to contain a message-body.

NOTE: The message-body identified by the Content-ID header field can
be a non-multipart message-body or a multipart message-body.

3.4. Procedures

3.4.1. User Agent (UA) procedures

A UA MAY include a Content-ID header field in any SIP message that is
allowed to contain a message-body.

A UA MUST NOT include a Content-ID header field in any SIP message
that is not allowed to contain a message-body.

The UA MUST set the value of the Content-ID header field to a value
that is unique in the context of the SIP message.

3.4.2. Proxy procedures

A proxy MUST NOT add a Content-ID header field in a SIP message.

A proxy MUST NOT modify a Content-ID header field included in a SIP message.

A proxy MUST NOT delete a Content-ID header field from a SIP message.

3.4.3. Example

The figure shows an example from [RFC5368], where the SIP Content-ID header field is used to reference the message-body (non-multipart) of a SIP message.

```
REFER sip:conf-123@example.com;gruu;opaque=hha9s8d-999a  SIP/2.0
Via: SIP/2.0/TCP client.chicago.example.com
        ;branch=z9hG4bKhjhs8ass83
Max-Forwards: 70
To: "Conference 123" <sip:conf-123@example.com>
From: Carol <sip:carol@chicago.example.com>;tag=32331
Call-ID: d432fa84b4c76e66710
CSeq: 2 REFER
Contact: <sip:carol@client.chicago.example.com>
Refer-To: <cid:cn35t8jf02@example.com>
Refer-Sub: false
Require: multiple-refer, norefersub
Allow: INVITE, ACK, CANCEL, OPTIONS, BYE, REFER, SUBSCRIBE, NOTIFY
Allow-Events: dialog
Accept: application/sdp, message/sipfrag
Content-Type: application/resource-lists+xml
Content-Disposition: recipient-list
Content-Length: 362
Content-ID: <cn35t8jf02@example.com>

<?xml version="1.0" encoding="UTF-8"?>
<resource-lists xmlns="urn:ietf:params:xml:ns:resource-lists"
        xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <list>
    <entry uri="sip:bill@example.com?method=BYE" />
    <entry uri="sip:joe@example.org?method=BYE" />
    <entry uri="sip:ted@example.net?method=BYE" />
  </list>
</resource-lists>
```

4. Update to RFC 5368

   This section updates the second paragraph in section 7 of [RFC5368],
   by allowing usage of either a MIME Content-ID header field or a SIP
   Content-ID header field to label the body part or the message-body
   carrying the URI list.

OLD TEXT:

   The Refer-To header field of a REFER request with multiple REFER-
   Targets MUST contain a pointer (i.e., a Content-ID Uniform Resource
   Locator (URL) as per RFC 2392 [RFC2392]) that points to the body part
   that carries the URI list. The REFER-Issuer SHOULD NOT include any
   particular URI more than once in the URI list.

NEW TEXT:

   The Refer-To header field of a REFER request with multiple REFER-
   Targets MUST contain a pointer (i.e., a Content-ID Uniform Resource
   Locator (URL) as per RFC 2392 [RFC2392]) that points to the body part
   or message-body that carries the URI list. The REFER-Issuer SHOULD
   NOT include any particular URI more than once in the URI list. The
   REFER request can use either a MIME Content-ID header field [RFC4483]
   or a SIP Content-ID header field [RFCXXXX] to label the body part or
   the message-body.

5. Update to RFC 5621

   This section updates section 9.1 of [RFC5621], by allowing a Content-
   ID URL to reference a message-body and the related metadata
   (Section 3.3), in addition to allowing a reference to a body part.

OLD TEXT:

   Content-ID URLs allow creating references to body parts. A given
   Content-ID URL [RFC2392], which can appear in a header field or
   within a body part (e.g., in an SDP attribute), points to a
   particular body part.

NEW TEXT:

   Content-ID URLs allow the creation of references to body parts or
   message-bodies (and the header fields describing the
   message-bodies). A given Content-ID URL [RFC2392], which can appear
   in a header field or within a body part (e.g., in an SDP attribute),
   points to a particular body part or the message-body (and the
   header fields describing the message-body).

6. Update to RFC 6442

   This section updates the second paragraph in section 3.1 of
   [RFC6442], by allowing usage of either a MIME Content-ID header field
   or a SIP Content-ID header field to label the body part or the
   message-body carrying the location data.

OLD TEXT:

   In Figure 1, Alice is both the Target and the LS that is conveying
   her location directly to Bob, who acts as an LR. This conveyance is
   point-to-point: it does not pass through any SIP-layer intermediary.
   A Location Object appears by-value in the initial SIP request as a
   MIME body, and Bob responds to that SIP request as appropriate.
   There is a 'Bad Location Information' response code introduced within
   this document to specifically inform Alice if she conveys bad
   location to Bob (e.g., Bob "cannot parse the location provided", or
   "there is not enough location information to determine where Alice
   is").

NEW TEXT:

   In Figure 1, Alice is both the Target and the LS that is conveying
   her location directly to Bob, who acts as an LR. This conveyance is
   point-to-point: it does not pass through any SIP-layer intermediary.
   A Location Object appears by-value in the initial SIP request as a
   MIME body, and Bob responds to that SIP request as appropriate.
   Either a MIME Content-ID header field [RFC4483] or the SIP Content-ID
   header field [RFCXXXX] MUST be used to label the location
   information. There is a 'Bad Location Information' response code
   introduced within this document to specifically inform Alice if she
   conveys bad location to Bob (e.g., Bob "cannot parse the location
   provided", or "there is not enough location information to determine
   where Alice is").

7. Security considerations

   The Content-ID header field value MUST NOT reveal sensitive user
   information.

   If the message-body associated with the Content-ID header field is an
   encrypted body, it MUST NOT be possible to derive a key that can be
   used to decrypt the body from the Content-ID header field value.

8. IANA considerations

   This specification registers a new SIP header field according to the
   procedures in [RFC3261].

8.1. Header field

The header field described in Section 3 has been registered in the
"Header Fields" sub-registry of the "Session Initiation Protocol
(SIP) Parameters" registry by adding a row with these values:

[RFC EDITOR NOTE: Please replace XXXX with the RFC number of this
document when publishing]

   Header Name: Content-ID

   compact:

   Reference: RFCXXXX

9. Change log

[RFC EDITOR NOTE: Please remove this section when publishing]

Changes from draft-ietf-sipcore-content-id-09

o Editorial change based on comment from Adam Roach.

Changes from draft-ietf-sipcore-content-id-08

o Editorial change based on comment from Ben Campbell.

Changes from draft-ietf-sipcore-content-id-07

o Updates to affected RFCs.
o Editorial changes and clarifications based on IESG review.

Changes from draft-ietf-sipcore-content-id-06

o Editorial changes and clarifications based on Gen-ART review from
   Elwyn Davies.

Changes from draft-ietf-sipcore-content-id-05

o Changes based on AD comments from Ben Campbell:
o - Clarifying that Content-ID header field value is unique within
   the scope of a SIP message.

Changes from draft-ietf-sipcore-content-id-04

o Minor editorial fix.

Changes from draft-ietf-sipcore-content-id-03

o Changes based on doc shepherd review:
o - Reference to RFC 5234 added.
o - SIP message example added.
o - Editorial changes.

Changes from draft-ietf-sipcore-content-id-02

o Editorial changes based on comments from Paul Kyzivat.

Changes from draft-ietf-sipcore-content-id-01

o Update to RFC 5621 added.
o Editorial changes.

10. References

10.1. Normative references

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[RFC5234]   Crocker, D., Ed. and P. Overell, "Augmented BNF for Syntax
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[RFC5322]   Resnick, P., Ed., "Internet Message Format", RFC 5322,
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[RFC3261]   Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston,
            A., Peterson, J., Sparks, R., Handley, M., and E.
            Schooler, "SIP: Session Initiation Protocol", RFC 3261,
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   [RFC5621] Camarillo, G., "Message Body Handling in the Session
              Initiation Protocol (SIP)", RFC 5621,
              DOI 10.17487/RFC5621, September 2009, <https://www.rfc-
              editor.org/info/rfc5621>.

10.2. Informative references

   [RFC5368] Camarillo, G., Niemi, A., Isomaki, M., Garcia-Martin, M.,
              and H. Khartabil, "Referring to Multiple Resources in the
              Session Initiation Protocol (SIP)", RFC 5368,
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   [RFC6442] Polk, J., Rosen, B., and J. Peterson, "Location Conveyance
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