A Mechanism for Transporting User to User Call Control Information in SIP

draft-ietf-cuss-sip-uui-05

Abstract

There is a class of applications which benefit from using SIP to exchange User to User Information (UUI) data during session establishment. This information, known as call control UUI data, is a small piece of data inserted by an application initiating the session, and utilized by an application accepting the session. The rules which apply for a certain application are defined by a UUI package. This UUI data is opaque to SIP and its function is unrelated to any basic SIP function. This document defines a new SIP header field, User-to-User, to transport UUI data, along with an extension mechanism.

Status of this Memo

This Internet-Draft is submitted to IETF 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 September 13, 2012.

Copyright Notice

Copyright (c) 2012 IETF Trust and the persons identified as the document authors. All rights reserved.

This document is subject to BCP 78 and the IETF Trust’s Legal Provisions Relating to IETF Documents
Table of Contents

1. Overview ................................................................. 3
2. Terminology .............................................................. 3
3. Requirements Discussion ................................................. 3
4. Normative Definition ................................................... 5
   4.1. Syntax for UUI Header Field ..................................... 5
   4.2. Source Identity of UUI data ..................................... 6
5. Guidelines for UUI Packages ........................................... 8
6. IANA Considerations .................................................... 10
   6.1. Registration of User-to-User Header Field ...................... 10
   6.2. Registration of User-to-User Header Field Parameters ....... 10
   6.3. Registration of UUI Packages .................................. 10
   6.4. Registration of UUI Content Parameters ....................... 11
   6.5. Registration of UUI Encoding Parameters ...................... 11
   6.6. Registration of SIP Option Tag ................................ 11
7. Security Considerations ............................................... 12
8. Appendix - Other Possible Mechanisms ................................ 12
   8.1. Why INFO is Not Used ............................................ 12
   8.2. Why Other Protocol Encapsulation UUI Mechanisms are Not Used ......................................................... 13
   8.3. MIME body Approach ............................................... 13
   8.4. URI Parameter .................................................... 14
9. Acknowledgements ...................................................... 15
10. References .............................................................. 15
   10.1. Informative References ........................................ 15
   10.2. Normative References ........................................... 16
Authors’ Addresses ....................................................... 17
1. Overview

This document describes the transport of User to User Information (UUI) data using SIP [RFC3261]. A mechanism is defined for the transport of general application UUI data and for the transport of call control related ITU-T Q.931 User to User Information Element (UU IE) [Q931] and ITU-T Q.763 User to User Information Parameter [Q763] data in SIP. UUI data is widely used in the PSTN today for contact centers and call centers. There is also a trend for the related applications to transition from ISDN to SIP. The UUI extension for SIP may also be used for native SIP UAs implementing similar services and to interwork with ISDN services. Note that in most cases, there is an a priori understanding between the UAs in regard to what to do with received UUI data.

This mechanism was designed to meet the use cases, requirements, and call flows for SIP call control UUI detailed in [I-D.ietf-cuss-sip-uui-reqs]. All references to requirement numbers (REQ-N) and figure numbers refer to this document.

The mechanism is a new SIP header field, along with a new SIP option tag. The header field carries the UUI data, along with parameters indicating the encoding of the UUI data, the UUI package, and optionally the content of the UUI data. The package definition contains details about how a particular application can utilize the UUI mechanism. The header field can be included (sometimes called "escaped") into URIs supporting referral and redirection scenarios. In these scenarios, History-Info is used to indicate the inserter of the UUI data. The SIP option tag can be used to indicate support for the header field. Support for the UUI header field indicates that a UA is able to extract the information in the UUI data and pass it up the protocol stack. Individual packages using the UUI mechanism can utilize SIP media feature tags to indicate that a UA supports a particular UUI package. Guidelines for defining UUI packages are provided.

2. 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 BCP 14, RFC 2119 [RFC2119].

3. Requirements Discussion

This section describes how the User-to-User header field meets the
requirements in [I-D.ietf-cuss-sip-uui-reqs]. The header field can be included in INVITE requests and responses and BYE requests and responses, meeting REQ-1 and REQ-2.

For redirection and referral use cases and REQ-3, the header field shall be included (escaped) into the Contact or Refer-To URI. Currently, UAs that support attended transfer support the ability to include a Replaces header field into a Refer-To URI, and when acting upon this URI add the Replaces header field to the triggered INVITE. This logic and behavior is identical for the UUI header field. The UA processing the REFER or the 3xx to the INVITE will need to support the UUI mechanism, as UAs in general do not process unknown included header fields.

Since SIP proxy forwarding and retargeting does not affect header fields, the header field meets REQ-4.

The UUI header field will carry the UUI data and not a pointer to the data, so REQ-5 is met.

Since the basic design of the UUI header field is similar to the ISDN UUI service, interworking with PSTN protocols will be straightforward and will be documented in a separate specification, meeting REQ-6.

Requirements REQ-7, REQ-8, and REQ-10 relate to discovery of the mechanism and supported packages, and hence applications. REQ-7 relates to support of the UUI header field, while REQ-8 relates to routing based on support of the UUI header field. REQ-7 is met by defining a new SIP option tag ‘uui’. The use of a Require:uui in a request, or Supported:uui in an OPTIONS response could be used to require or discover support of the mechanism. The presence of a Supported:uui or Require:uui header field can be used by proxies to route to an appropriate UA, meeting REQ-8. However, note that only UAs are expected to understand the UUI data - proxies and other intermediaries do not. REQ-10 is met by utilizing SIP feature tags [RFC3840]. For example, the feature tag ‘sip.uui-isdn’ could be used to indicate support of the ISDN UUI package, or ‘sip.uui-pk1’ could be used to indicate support for a particular package, pk1.

Proxies commonly apply policy to the presence of certain SIP header fields in requests by either passing them or removing them from requests. REQ-9 is met by allowing proxies and other intermediaries to remove UUI header fields in a request or response based on policy.

Carrying UUI data elements of at least 129 octets is trivial in the UUI header field, meeting REQ-11. Note that very large UUI data elements should be avoided, as SIP header fields have traditionally not been large.
To meet REQ-12 for the redirection and referral use cases, History-Info [I-D.ietf-sipcore-rfc4244bis] can be used. In these retargeting cases, the changed Request-URI will be recorded in the History-Info header field along with the identity of the element that performed the retargeting.

The requirement for integrity protection in REQ-13 could be met by the use of an S/MIME signature over a subset of header fields, as defined in Section 23.4 of RFC 3261 "SIP Header Privacy and Integrity using S/MIME: Tunneling SIP". The requirement of REQ-14 for end-to-end privacy could be met using S/MIME or using encryption at the application layer. Note that the use of S/MIME to secure the UUI data will result in an additional body being added to the request. Hopwise TLS allows the header field to meet REQ-15 for hop-by-hop security.

4. Normative Definition

This document defines a new SIP header field "User-to-User" to transport call control UUI data to meet the requirements in [I-D.ietf-cuss-sip-uui-reqs].

To help tag and identify the UUI data used with this header field, "package", "content", and "encoding" parameters are defined. The "package" parameter identifies the package which defines the generation and usage of the UUI data for a particular application. For the case of interworking with the ISDN UUI Service, the ISDN UUI Service interworking package is used. If the "package" parameter is not present, interworking with the ISDN UUI Service MUST be assumed. The "content" parameter identifies the actual content of the UUI data. If not present, the content MUST be assumed to be unknown as it is in the ISDN UUI Service. Newly defined UUI packages MUST define a new "content" value. The "encoding" parameter indicates the method of encoding the information in the UUI data. This specification only defines "encoding=hex". If the "encoding" parameter is not present, "hex" MUST be assumed.

UUI data is considered an opaque series of octets. This mechanism SHOULD NOT be used to convey a URL or URI; the Call-Info header field [RFC3261] is used for this purpose.

4.1. Syntax for UUI Header Field

The User-to-User header field can be present in INVITE requests and responses only and in BYE requests and responses. Note that only end-to-end responses can be used, e.g. 1xx (excluding 100), 2xx, and 3xx responses.
The following syntax specification uses the augmented Backus-Naur Form (BNF) as described in RFC 5234 and extends RFC 3261.

```
UUI        = "User-to-User" HCOLON uui-value *(COMMA uui-value)
uui-value  = uui-data *(SEMI uui-param)
uui-data   = token / quoted-string
uui-param  = pkg-param / cont-param / enc-param / generic-param
pkg-param  = "package" EQUAL token
cont-param = "content" EQUAL token
enc-param  = "encoding" EQUAL ("hex" / token)
```

The rules for how many User-to-User header field of each package may be present in a request or a response are defined for each package. The syntax allows any combination of individual User-to-User header fields or User-to-User header fields with multiple comma separated UUI data elements. Multiple User-to-User header fields MAY be present in a request or response. Any size limitations on the UUI data for a particular purpose must be defined by the related UUI package.

UAs SHOULD ignore UUI data from packages or encoding that they do not understand.

If an element supports this specification, it SHOULD include any UUI data included in a redirection URI. Note that redirection can occur multiple times to a request.

Here is an example of an included User-to-User header field from the redirection response F2 of Figure 3:

```
<allOneLine>
Contact: <sip:+12125551212@gateway.example.com?User-to-User=
56a390f3d2b7310023a%3Bencoding%3Dhex%3Bpackage%3Dfoo%3B
content%3Dbar>
</allOneLine>
```

The resulting INVITE F5 would contain:

```
User-to-User: 56a390f3d2b7310023a;encoding=hex;purpose=foo;content=bar
```

4.2. Source Identity of UUI data

It is important for the recipient of UUI data to know the identity of the UA that inserted the UUI data. In a request without a History-Info [I-D.ietf-sipcore-rfc4244bis] header field, the identity of the entity which inserted the UUI data will be assumed to be the source of the SIP message. For a SIP request, typically this is the UA identified by the URI in the From header field or a P-Asserted-
Identity [RFC3325] header field. In a request with a History-Info header field, the recipient needs to parse the Targeted-to-URIs present (hi-targeted-to-uri) to see if any included User-to-User header fields are present. If an included User-to-User header field is present and matches the UUI data in the request, this indicates that redirection has taken place, resulting in the inclusion of UUI data in the request. The inserter of the UUI data will be the UA identified by the Targeted-to-URI of the History-Info element prior to the element with the included UUI data. In a response, the inserter of the UUI data will be the identity of the UA that generated the response. Typically, this is the UA identified in the To header field of the response. Note that any updates to this identity by use of the SIP Connected Identity extension [RFC4916] or others will update this information.

For an example of History-Info and redirection, consider Figure 2 from [I-D.ietf-cuss-sip-uui-reqs] where the Originating UA is Carol, the Redirector Bob, and the Terminating UA Alice. The INVITE F4 containing UUI data could be:

```
INVITE sips:alice@example.com SIP/2.0
Via: SIP/2.0/TLS lab.example.com:5061
 ;branch=z9hG4bKnashds9
To: Bob <sips:bob@example.com>
From: Carol <sips:carol@example.com>;tag=323sf33k2
Call-ID: dfaosidfoiwe83ifkdf
Max-Forwards: 70
Contact: <sips:carol@lab.example.com>
Supported: histinfo
User-to-User: 342342ef34;encoding=hex
History-Info: <sips:bob@example.com>;index=1
  <allOneLine>
History-Info: <sips:alice@example.com?Reason=SIP%3Bcause%3D302
 &User-to-User=342342ef34%3Bencoding%3Dhex>;index=1.1;rc=1
</allOneLine>
```

Without the redirection captured in the History-Info, Alice would conclude the UUI data was inserted by Carol. However, the History-Info containing UUI data (index=1.1) indicates that the inserter was Bob (index=1).

Note that the <allOneLine> tag convention from SIP Torture Test Messages [RFC4475] is used to show that there are no line breaks in the actual message syntax.

To enable maintaining a record of the inserter identity of UUI data, UAs supporting this mechanism SHOULD support History-Info [I-D.ietf-sipcore-rfc4244bis] and include Supported: histinfo in all
requests and responses.

5. Guidelines for UUI Packages

UUI packages defined using this SIP UUI mechanism MUST publish a standards track RFC which describes the usage. Note that this mechanism is not suitable for the transport of arbitrary data between UAs. The following guidelines are provided to help determine if this mechanism is appropriate or some other SIP mechanism should be used. The SIP UUI mechanism is applicable when all of the following conditions be met:

1. The information is generated and consumed by an application during session setup using SIP, but the application is not necessarily SIP aware.

2. The behavior of SIP entities that support it is not significantly changed (as discussed in Section 4 of [RFC5727]).

3. User Agents (UAs) are the generators and consumers of the UUI data. Proxies and other intermediaries may route based on the presence of a User-to-User header field or a particular package tag but do not otherwise consume or generate the UUI data.

4. There are no overriding privacy issues associated with the information being transported (e.g., geolocation or emergency-related information are examples of inappropriate UUI data).

5. The UUI data is not being utilized for user-to-user Remote Procedure Call (RPC) calls.

UUI packages define the semantics for a particular application usage of UUI data. The content defines the syntax of the UUI data, while the encoding defines the encoding of the UUI data. Each content is defined as a stream of octets, which allows multiple encodings of that content. For example, packages may define:

1. The SIP methods and responses in which the UUI data may be present.

2. The maximum number of UUI data elements that may be inserted into a request or response. (The default is one per encoding.) Note that a UA may still receive a request with more than this maximum number due to redirection. The package must define how to handle this situation.
3. The default values for content and encoding if they are not present. If the same UUI data may be inserted multiple times with different encodings, the packages must state this. A package may support and define multiple encodings and contents, and reuse encodings and contents defined by other packages.

4. Any size limitations on the UUI data. Size should be specified in terms of the octet stream output of the content, since the size of the resulting uui-data element will vary depending on the encoding scheme.

New "package" values MUST describe the new application which is utilizing the UUI data and provide some use case examples. The default "content" value and other allowed contents MUST be defined or referenced in another document for the package. Any restrictions on the size of the UUI data must be described. In addition, a package may define a Media Feature tag per RFC 3840 [RFC3840] to indicate support for this UUI package. For example, the media feature tag sip.uui-pk1 could be defined to indicate support for a UUI package named pk1. The definition of a new SIP option tag solely to identify support for a UUI package is NOT RECOMMENDED unless there are additional SIP behaviors needed to implement this feature.

For an example UUI package definition, see [I-D.drage-cuss-sip-uui-isdn].

This specification defines only the value of "hex" for the "encoding" parameter. Hex encoding, as used for UUI data is defined to use only the characters 0-9, A-F, or a-f. Hex encoded UUI data MUST have an even number of octets, and is considered invalid if has an odd number. Hex encoding is normally done as a token, although quoted-string is permitted, in which case the quotes are ignored. Hex encoding yields a sequence of octets, one octet per two hex digits, in the same order, with the first digit of each pair defining the high order four bits of the octet and the second digit providing the low order four bits.

New "encoding" values MUST reference a common encoding scheme or define the exact new encoding scheme. New values can be defined and added to the IANA registry with a standards track RFC, which needs to discuss the issues in this section.

New "content" values MUST describe the content of the UUI data and give some example use cases. The default "encoding" and other allowed encoding methods must be defined for this new content. Note that a content value can be used by multiple UUI packages. In this case, the semantics and usage of the content is defined by the package.
6. IANA Considerations

6.1. Registration of User-to-User Header Field

This document defines a new SIP header field named "User-to-User".

The following row shall be added to the "Header Fields" section of
the SIP parameter registry:

<table>
<thead>
<tr>
<th>Header Name</th>
<th>Compact Form</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>User-to-User</td>
<td></td>
<td>[RFCXXXX]</td>
</tr>
</tbody>
</table>

Editor’s Note: [RFCXXXX] should be replaced with the designation of
this document.

6.2. Registration of User-to-User Header Field Parameters

This document defines the parameters for the header field defined in
the preceding section. The header field "User-to-User" can contain
the parameters "encoding", "content", and "package".

The following rows shall be added to the "Header Field Parameters and
Parameter Values" section of the SIP parameter registry:

<table>
<thead>
<tr>
<th>Header Field</th>
<th>Parameter Name</th>
<th>Predefined Values</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>User-to-User</td>
<td>encoding</td>
<td>hex</td>
<td>[RFCXXXX]</td>
</tr>
<tr>
<td>User-to-User</td>
<td>content</td>
<td></td>
<td>[RFCXXXX]</td>
</tr>
<tr>
<td>User-to-User</td>
<td>package</td>
<td></td>
<td>[RFCXXXX]</td>
</tr>
</tbody>
</table>

Editor’s Note: [RFCXXXX] should be replaced with the designation of
this document.

6.3. Registration of UUI Packages

This specification establishes the uui-packages sub-registry under
http://www.iana.org/assignments/sip-parameters. New uui-packages
shall be registered by standards track RFC publication.

The descriptive text for the table of uui-content is:
UUI Packages provides information about the usage of the UUI data in a User-to-User header field [RFCXXXX].

+------------+-------------------------------------------+-----------+
| Package    | Description                               | Reference |
+------------+-------------------------------------------+-----------+

6.4. Registration of UUI Content Parameters

This specification establishes the uui-content sub-registry under http://www.iana.org/assignments/sip-parameters. New uui-content values shall be registered by standards track RFC publication.

The descriptive text for the table of uui-content is:

UUI Content provides information about the content of the UUI data in a User-to-User header field [RFCXXXX].

+------------+-------------------------------------------+-----------+
| Content    | Description                               | Reference |
+------------+-------------------------------------------+-----------+

6.5. Registration of UUI Encoding Parameters

This specification establishes the uui-encoding sub-registry under http://www.iana.org/assignments/sip-parameters and initiates its population with the table below. Additional uui-encoding values shall be registered by a standards track RFC publication.

The descriptive text for the table of uui-encoding is:

UUI Encoding provides information about the encoding of the UUI data in a User-to-User header field [RFCXXXX].

+------------+-------------------------------------------+-----------+
| Encoding   | Description                               | Reference |
| hex        | The UUI data is encoded using hexadecimal |           |
+------------+-------------------------------------------+-----------+

6.6. Registration of SIP Option Tag

This specification registers a new SIP option tag, as per the guidelines in Section 27.1 of [RFC3261].

This document defines the SIP option tag "uui".

The following row has been added to the "Option Tags" section of the
SIP Parameter Registry:

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>uui</td>
<td>This option tag is used to indicate that a UA supports and understands the User-to-User header field.</td>
<td>[RFCXXXX]</td>
</tr>
</tbody>
</table>

Editor’s Note: [RFCXXXX] should be replaced with the designation of this document.

7. Security Considerations

User to user information can potentially carry sensitive information that might require privacy or integrity protection. Standard deployed SIP security mechanisms such as TLS transport, offer these properties on a hop-by-hop basis. To preserve multi-hop or end-to-end confidentiality and integrity of UUI data, approaches using S/MIME or IPSec can be used, as discussed in the draft. However, the lack of deployment of these mechanisms means that applications can not in general rely on them. As such, applications are encouraged to utilize their own security mechanisms.

If the UUI data was included by the UA originator of the SIP request or response, normal SIP mechanisms can be used to determine the identity of the inserter of the UUI data. If the UUI data was included by a UA that was not the originator of the request, History-Info can be used to determine the identity of the inserter of the UUI data. UAs can apply policy based on the origin of the UUI data using this information.

8. Appendix - Other Possible Mechanisms

Two other possible mechanisms for transporting UUI data will be described: MIME body and URI parameter transport.

8.1. Why INFO is Not Used

Since the INFO method [RFC6086], was developed for ISUP interworking of user-to-user information, it might seem to be the logical choice here. For non-call control user-to-user information, INFO can be utilized for end to end transport. However, for transport of call control user-to-user information, INFO can not be used. As the call flows in [I-D.ietf-cuss-sip-uui-reqs] show, the information is
related to an attempt to establish a session and must be passed with the session setup request (INVITE), responses to that INVITE, or session termination requests. As a result, it is not possible to use INFO in these cases.

8.2. Why Other Protocol Encapsulation UUI Mechanisms are Not Used

Other protocols have the ability to transport UUI data. For example, consider the ITU-T Q.931 User to User Information Element (UU IE) [Q931] and the ITU-T Q.763 User to User Information Parameter [Q763]. In addition, NSS (Narrowband Signaling System) [Q1980] is also able to transport UUI data. Should one of these protocols be in use, and present in both User Agents, then utilizing these other protocols to transport UUI data might be a logical solution. Essentially, this is just adding an additional layer in the protocol stack. In these cases, SIP is not transporting the UUI data; it is encapsulating another protocol, and that protocol is transporting the UUI data. Once a mechanism to transport that other protocol using SIP exists, the UUI data transport function is essentially obtained without any additional effort or work.

However, the authors believe that SIP needs to have its own native UUI data transport mechanism. It is not reasonable for a SIP UA to have to implement another entire protocol (either ISDN or NSS, for example) just to get the very simple UUI data transport service. Of course, this work does not preclude anyone from using other protocols with SIP to transport UUI data.

8.3. MIME body Approach

One method of transport is to use a MIME body. This is in keeping with the SIP-T architecture [RFC3372] in which MIME bodies are used to transport ISUP information. Since the INVITE will normally have an SDP message body, the resulting INVITE with SDP and UUI data will be multipart MIME. This is not ideal as many SIP UAs do not support multipart MIME INVITEs.

A bigger problem is the insertion of a UUI message body by a redirect server or in a REFER. The body would need to be encoded in the Contact URI of the 3xx response or the Refer-To URI of a REFER. Currently, the authors are not aware of any UAs that support this capability today for any body type. As such, the complete set of semantics for this operation would need to be determined and defined. Some issues will need to be resolved, such as, do all the Content-* header fields have to be included as well? And, what if the included Content-Length does not agree with the included body?

Since proxies cannot remove a body from a request or response, it is
not clear how this mechanism could meet REQ-9.

The requirement for integrity protection could be met by the use of an S/MIME signature over the body, as defined in Section 23.3 of RFC 3261 "Securing MIME bodies". Alternatively, this could be achieved using RFC 4474 [RFC4474]. The requirement for end-to-end privacy could be met using S/MIME encryption or using encryption at the application layer. However, note that neither S/MIME or RFC 4474 enjoys deployment in SIP today.

An example:
<allOneLine>
Contact: <sip:+12125551212@gateway.example.com?Content-Type=application/uui&body=ZeGl9i2icVqaNVailT6F5iJ90m6mvuTS40K05M0vDk0Q4Xs>
</allOneLine>

As such, the MIME body approach meets REQ-1, REQ-2, REQ-4, REQ-5, REQ-7, REQ-11, REQ-13, and REQ-14. Meeting REQ-12 seems possible, although the authors do not have a specific mechanism to propose. Meeting REQ-3 is problematic, but not impossible for this mechanism. However, this mechanism does not seem to be able to meet REQ-9.

8.4. URI Parameter

Another proposed approach is to encode the UUI data as a URI parameter. This URI parameter could be included in a Request-URI or in the Contact URI or Refer-To URI. It is not clear how it could be transported in a responses which does not have a Request-URI, or in BYE requests or responses.

An INVITE sent to this Contact URI would contain UUI data in the Request-URI of the INVITE. The URI parameter has a drawback in that a URI parameter carried in a Request-URI will not survive retargeting by a proxy as shown in Figure 2 of [I-D.ietf-cuss-sip-uui-reqs]. That is, if the URI is included with an Address of Record instead of a Contact URI, the URI parameter in the Request-URI will not be copied over to the Contact URI, resulting in the loss of the information. Note that if this same URI was present in a Refer-To header field, the same loss of information would occur.

The URI parameter approach would meet REQ-3, REQ-5, REQ-7, REQ-9, and REQ-11. It is possible the approach could meet REQ-12 and REQ-13.
The mechanism does not appear to meet REQ-1, REQ-2, REQ-4, and REQ-14.

9. Acknowledgements

Joanne McMillen was a major contributor and co-author of earlier versions of this document. Thanks to Paul Kyzivat for his contribution of hex encoding rules. Thanks to Spencer Dawkins, Keith Drage, Vijay Gurbani, and Laura Liess for their review of the document. The authors wish to thank Francois Audet, Denis Alexeitsev, Paul Kyzivat, Cullen Jennings, and Mahalingam Mani for their comments.

10. References

10.1. Informative References


[ETSI] "ETSI ETS 300 207-1 Ed.1 (1994), Integrated Services Digital Network (ISDN); Diversion supplementary services".


[I-D.drage-cuss-sip-uui-isdn]
10.2. Normative References


[RFC3840] Rosenberg, J., Schulzrinne, H., and P. Kyzivat,
"Indicating User Agent Capabilities in the Session Initiation Protocol (SIP)", RFC 3840, August 2004.

Authors’ Addresses

Alan Johnston
Avaya
St. Louis, MO  63124

Email: alan.b.johnston@gmail.com

James Rafferty
Dialogic

Email: james.rafferty@dialogic.com
Interworking ISDN Call Control User Information with SIP

draft-ietf-cuss-sip-uui-isdn-03

Abstract

The motivation and use cases for interworking and transporting ITU-T
DSS1 User-user information element data in SIP are described in the
"Problem Statement and Requirements for Transporting User to User
Call Control Information in SIP" document. As networks move to SIP
it is important that applications requiring this data can continue to
function in SIP networks as well as the ability to interwork with
this ISDN service for end-to-end transparency. This document
defines a usage of the User-to-User header field to enable
interworking with this ISDN service.

This document covers the interworking with both public ISDN and
private ISDN capabilities, so the potential interworking with QSIG
will also be addressed.

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 September 14, 2012.

Copyright Notice

Copyright (c) 2012 IETF Trust and the persons identified as the
document authors. All rights reserved.
This document is subject to BCP 78 and the IETF Trust’s Legal Provisions Relating to IETF Documents (http://trustee.ietf.org/license-info) in effect on the date of publication of this document. Please review these documents carefully, as they describe your rights and restrictions with respect to this document. Code Components extracted from this document must include Simplified BSD License text as described in Section 4.e of the Trust Legal Provisions and are provided without warranty as described in the Simplified BSD License.

Table of Contents

1. Terminology ........................................ 3
2. Overview ........................................... 3
3. Summary of the ISDN User-to-User Service ............ 3
   3.1. The service ................................... 3
   3.2. Impacts of the ISDN service on SIP operation .... 5
4. Relation to SIP-T .................................. 6
5. Transition away from ISDN .......................... 6
6. ISDN Usage of the User-to-User Header Field ....... 7
7. UAC requirements ................................... 8
8. UAS requirements ................................... 9
9. UUI contents ........................................ 10
10. Considerations for ISDN interworking gateways .... 11
11. Coding requirements ............................... 11
12. Media Feature Tag ................................ 12
13. IANA Considerations ................................ 12
14. Security Considerations ........................... 13
15. Acknowledgements ................................ 14
16. Changes since previous versions ................... 14
17. References .......................................... 17
   17.1. Normative References ......................... 17
   17.2. Informative References ....................... 17
Authors’ Addresses ................................... 18
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 BCP 14, RFC 2119 [RFC2119].

2. Overview

This document describes a usage of the User-to-User header field defined in [I-D.ietf-cuss-sip-uui] to enable the transport of User to User Information (UUI) in ISDN interworking scenarios using SIP [RFC3261]. Specifically, this document discusses the interworking of call control related ITU-T DSS1 User-user information element [Q931], [Q957.1] and ITU-T Q.763 User-to-user information parameter [Q763] data in SIP. UUI is widely used in the PSTN today in contact centers and call centers which are transitioning away from ISDN to SIP.

This usage is not limited to scenarios where interworking will occur. Rather it describes a usage where interworking is possible if interworking is met. That does not preclude its usage directly between two SIP terminals.

3. Summary of the ISDN User-to-User Service

3.1. The service

ISDN defines a number of related services. Firstly there is a user signalling bearer service, which uses the information elements / parameters in the signalling channel to carry the data, and does not establish a related circuit-switched connection. For DSS1, this is specified in ITU-T Recommendation Q.931 section 3.3 and section 7 [Q931]. It also defines a user-to-user signalling supplementary service, which uses the information elements / parameters in the signalling channel to carry additional data, but which is used in conjunction with the establishment of a related circuit-switched connection. This reuses the same information elements / parameters as the user signalling bearer service, with the addition of other signalling information, and for DSS1 this is specified in ITU-T Recommendation Q.957.1 [Q957.1].

ISDN defines three variants of the user-to-user signalling supplementary service as follows:
UUS1: User-to-user information exchanged during the setup and clearing phases of a call, by transporting User-to-user information element within call control messages. This in itself has two subvariants, UUS1 implicit and UUS1 explicit. UUS1 explicit uses additional supplementary service control information to control the request and granting of the service, as in UUS2 and UUS3. In UUS1 implicit, it is the presence of the user signalling data itself that constitutes the request for the service. UUS1 explicit as a result also allows the requester to additionally specify whether the parallel circuit-switched connection should proceed if the UUS1 service cannot be provided (preferred or required);

UUS2: User-to-user information exchanged from the sender’s point of view during call establishment, between the DSS1 ALERTING and DSS1 CONNECT messages, within DSS1 USER INFORMATION messages; and

UUS3: User-to-user information exchanged while a call is in the Active state, within DSS1 USER INFORMATION messages.

The service is always requested by the calling user.

This document defines only the provision of the ISDN UUS1 implicit supplementary service to interworking scenarios, this being the most widely deployed and used of the various ISDN user-to-user services, and indeed the one that matches the requirements specified in draft-ietf-cuss-sip-uui-reqs [I-D.ietf-cuss-sip-uui-reqs].

The above come from the ISDN specifications defined for public networks. There are a parallel set of ISDN specifications defined for private networks (QSIG). These specifications do not define a UUS1 implicit supplementary service. However, implementation of such a UUS1 implicit supplementary service for private networks can readily be constructed in a proprietary fashion based on the specifications for public networks, and evidence suggests that some vendors have done so. On this basis, there is no reason why this package cannot also be used to support interworking with such a private network service, on the assumption that the constraints are exactly the same as those for the public network.

The ISDN UUS1 service has the following additional characteristics as to the data that can be transported:

The maximum number of octets of user information that can be transported in 128 octets plus a protocol discriminator. It is noted that some early ISDN implementations had a limitation of 32 octets, but it is understood that these are not currently deployed. While this package does not prohibit longer data
fields, the mechanism at any interworking point is to discard data elements that are too long to handle. The handled length can normally be assumed to be 128 octets.

The content of the user information octets is described by a single octet protocol discriminator (see table 4-26 of ITU-T Recommendation Q.931) [Q931]. That protocol discriminator may describe the protocol used within the user data, the structure of the user data, or leave it entirely open. Note that not all values within the protocol discriminator necessarily make sense for use in the user to user service, as the content is aligned with the protocol discriminator that appears at the start of all DSS1 messages (see table 4-1 of ITU-T Recommendation Q.931) [Q931]. The protocol discriminator value has no impact on the interworking capability.

Only a single user information can be transported in each message.

The ISDN service works without encryption or integrity protection. The user trusts the intermediate network elements, and therefore the operator of those elements, not to modify the data, and to deliver all the data to the remote user. On a link by link basis, message contents are protected at layer 2 by standard CRC mechanisms - this allows loss on a link level basis to be detected, but does not guard against fraudulent attacks on the link itself. This does not prevent the use of additional encryption or integrity protection within the UUI data itself, although the limit on the size of the UUI data (protocol discriminator plus 128 octets) will restrict this.

3.2. Impacts of the ISDN service on SIP operation

The ISDN service has the following impacts that need to be understood within the SIP environment.

Call transfer ISDN call transfer cancels all user-to-user supplementary services. In the ISDN, if user-to-user data is required after call transfer, then UUS3 has to be renegotiated, which is not provided by this SIP extension. The impact of this restriction on the SIP environment is that UUI header fields cannot be exchanged in transactions clearing down the SIP dialog after call transfer has occurred.

Conference ISDN conferencing allows the user to still exchange user-to-user data after the conference is created. As far as UUS1 is concerned, it is not permitted.
The ISDN three-party supplementary service is similar in many ways to conferencing, but is signalled using a different mechanism. This means that on clearing, the controller using UUS1 implicit does have the choice of sending data to either or both remote users. Because SIP conferencing cannot completely emulate the ISDN three-party supplementary service at the served user, UUS1 implicit is not possible.

**Diversion** When ISDN diversion occurs, any UUS1 user-to-user data is sent to the forwarded-to-user (assuming that the call meets requirements for providing the service - this is impacted by the explicit service only). If the type of diversion is such that the call is also delivered to the forwarding user, they will also receive any UUS1 user-to-user data.

4. Relation to SIP-T

A method of transport of ISDN UUI is to use SIP-T [RFC3372] and transport the UUI information end-to-end, as part of an ISUP message or QSIG message) as a MIME body. If the SIP-T method of encapsulation of ISDN instead of interworking is used, this is a reasonable mechanism and does not require any extensions to existing SIP-T. However, if true ISDN interworking is being done, this approach is not reasonable. Instead, the better approach is to interwork the ISDN UUI using the native SIP UUI transport mechanism, the User-to-User header field. The rest of this document describes this approach.

5. Transition away from ISDN

This interworking usage of the SIP UUI mechanism will likely begin with one User Agent being an ISDN gateway while the other User Agent is a native SIP endpoint. As networks transition away from ISDN, it is possible that both User Agents could become native SIP endpoints. In this case, there is an opportunity to transition away from this ISDN usage to a more general usage of [I-D.ietf-cuss-sip-uui].

The SIP UUI mechanism provides a way to achieve this transition. As an endpoint moves from being an ISDN gateway to a native SIP endpoint, and a package for some form of enhanced UUI has been standardized, the endpoint can carry the UUI data both as ISDN and as some other package in parallel, and in the same messages or in different messages depending on the needs of the application. This will permit the other endpoint to use the UUI according to the ISDN package if it is an ISDN gateway or the enhanced package if it is a native SIP endpoint.
6. ISDN Usage of the User-to-User Header Field

This document defines the package for the ISDN interworking of UUI which is to interoperate with ISDN User to User Signaling (UUS), a supplementary service in which the user is able to send/receive a limited amount of information to/from another ISDN user over the signalling channel in association with a call to the other ISDN user.

Two examples of ISDN UUI with redirection (transfer and diversion) are defined in [ANSII] and [ETSI].

One objective of the design of this package has been to keep the functionality at the interworking point as simple as possible. Therefore responsibility for respecting the limits has been transferred to the end UA. If an interworking point is reached, and the limitations are not met, then the UUI data will not be transferred, although the SIP request will otherwise be interworked. As a result there is also only one encoding value specified.

The general principals of this package of the UUI mechanism are therefore as follows:

That the sending application is expected to limit their sending requirements to the subset provided by the ISDN UUI service.

That the SIP UA will not allow the reception of more that one User-to-User header field of the "isdn-uui" package in the same SIP request or response, and will only allow it in a request or response of the appropriate method (INVITE or BYE). What happens to User-to-User header fields relating to different packages is outside the scope of this document.

That an interworking point trying to interwork UUI data that is too long will discard the UUI data, but proceed with the interworking. There is no notification of such discard back to the sending user. If the SIP user knows that it is interworking with the ISDN, then the UUI application at the SIP endpoint should limit its communication to 128 octet packets plus the protocol discriminator, in the knowledge that discard will occur if it does not. The UUI application at the SIP endpoint has complete control over what occurs. It should be noted that this was exactly the envisaged operation when early ISDN implementations that only supported 32 octets interworked with those supporting 128 octets. It also corresponds to the interworking with ISDNs that do not support the supplementary service at all, as discard will occur in these circumstances as well. Note that failure to include the user-user data into the ISDN SETUP message (when discard occurs) will result in the service being unavailable for the remainder of
the call when UUS1 implicit operation is used.

7. UAC requirements

The UAC MUST meet the requirements of [I-D.ietf-cuss-sip-uui] in addition to the requirements defined in this document.

The UAC MUST only use this package of the UUI mechanism extension in association with the initial INVITE method and the BYE method relating to an INVITE dialog. Usage on transactions associated with any other type of dialog, or on methods not associated with a dialog is precluded. Usage on other methods within the INVITE dialog, and on re-INVITE transactions with the INVITE dialog, is also precluded.

If the UAC wishes to use or permit the sending of UUI data at any point in the dialog, the UAC MUST include in the INVITE request for that dialog a User-to-User header field. The UAC SHOULD set the "package" header field parameter to "isdn-uui". Non-inclusion of the "package" header field parameter is permitted, but this is primarily to allow earlier implementations to support this package. This initial header field constitutes the implicit request to use the UUI service, and is therefore included even when there is no data except the protocol discriminator octet to send at that point in time.

The UAC MUST NOT include the User-to-User header field with a "package" header field parameter set to "isdn-uui", or with no "package" header field parameter", in any message of an INVITE dialog if the original INVITE request did not include the User-to-User header field, either with a "package" header field parameter set to "isdn-uui", or with no "package" header field parameter included.

When sending UUI for the ISDN package, if the "package" header field is included, the UAC MUST set the User-to-User "package" header field parameter to "isdn-uui". The UAC MUST NOT include more than one User-to-User header field for this package in any SIP request or response.

When receiving UUI, when multiple User-to-User header fields are received in the same response with the "package" header field parameter to "isdn-uui", or with no "package" header field parameter, or with some combination of these, the UAS MUST discard all these header fields. There are no mechanisms for determining which was the intended data packet so all are discarded.

The application designer will need to take into account the ISDN service restrictions; failure to do so can result in information being discarded at any interworking point with the ISDN. This
document makes no further normative requirements based on those constraints, because those constraints may vary from one ISDN to another. It is reasonable to expect that a limitation of 128 octets (plus a protocol discriminator) can be imposed by the ISDN, and therefore UUI data longer than this will never reach the destination if such interworking occurs. Note that the 128 octet limit (plus a protocol discriminator) applies before the encoding (or after the decoding) using the "hex" encoding. The "hex" encoding is defined in [I-D.ietf-cuss-sip-uui].

[I-D.ietf-cuss-sip-uui] defines a "uui" option tag for use with the UUI mechanism extension. Because for the ISDN UUI service, the service is service 1 implicit, the inclusion of the "uui" option tag in a Supported header field conveys no additional information over and above the presence of the User-to-User header field with the "package" header field parameter to "isdn-uui" in the INVITE request. While there is no harm in including the "uui" option tag, and strictly it should be included if the extension is supported, it performs no function. The presence of the "uui" option tag in the Require header field of an INVITE request will cause the request to fail if it reaches a UAS or ISDN interworking gateway that does not support this extension; such a usage is not precluded although it does not form part of the package.

8. UAS requirements

The UAS MUST meet the requirements of [I-D.ietf-cuss-sip-uui] in addition to the requirements defined in this document.

The UAS MUST only use this package of the UUI mechanism extension in association with the initial INVITE method and the BYE method relating to an INVITE dialog. Usage on transactions associated with any other type of dialog, or on methods not associated with a dialog is precluded. Usage on other methods within the INVITE dialog, and on re-INVITE transactions with the INVITE dialog, is also precluded.

The UAS MUST NOT include the User-to-User header field with a "package" header field parameter set to "isdn-uui", or with no "package" header field parameter", in any message of an INVITE dialog if the original INVITE request did not include the User-to-User header field, either with a "package" header field parameter set to "isdn-uui", or with no "package" header field parameter included.

The UAS MAY include the User-to-User header field in responses to the initial INVITE request, or the BYE requests or responses for the dialog, only where the original INVITE request included a User-to-User header field with the "package" header field parameter to "isdn-
uui", or where no "package" header field parameter was included.
When sending UUI for the ISDN package, the UAS SHOULD set the User-
to-User "package" header field parameter to "isdn-uui". Non-
inclusion of the "package" header field parameter is permitted, but
this is primarily to allow earlier implementations to support this
package. The UAS MUST NOT include more than one User-to-User header
field for this package in any SIP request or response.

Where the UAS is acting as a redirect server, the UAS MUST NOT
include the User-to-User header field in the header URI parameter in
a 3xx response to an incoming request.

When receiving UUI, when a User-to-User header field is received in a
request that is not from the originating user with the "package"
header field parameter to "isdn-uui", or with no "package" header
field parameter, the UAC MUST discard this header field.

When receiving UUI, when multiple User-to-User header fields are
received from the originating user in the same request with the
"package" header field parameter to "isdn-uui", or with no "package"
header field parameter, or with some combination of these, the UAC
MUST discard all these header fields. There are no mechanisms for
determining which was the intended data packet so all are discarded.

9. UUI contents

These requirements apply when the "package" header field parameter is
set to "isdn-uui", or with no "package" header field parameter.
Processing for User-to-User header fields sent or received with
values other than this value are outside the scope of this document,
and the appropriate package document for that value applies.

The default and only content defined for this package is "isdn-uui".
When sending UUI, the sending SIP entity MAY, but need not, include a
"content" header field with a value set to "isdn-uui". A receiving
SIP entity MUST ignore a received User-to-User header field if the
"content" header field parameter is present and the value is some
other value that "isdn-uui".

The default and only encoding defined for this package is "hex".
When sending UUI, the sending SIP entity MAY, but need not, include
an "encoding" header field with a value set to "hex". A receiving
SIP entity MUST ignore a received User-to-User header field if the
"encoding" header field parameter is present and the value is some
other value that "hex".

When sending UUI, the sending application MUST include a protocol
discriminator octet, conforming to table 4-26 of ITU-T Recommendation Q.931 [Q931] as the first octet of the UUI data. It is up to the receiving application what it does with this value. This document places no other normative requirement on the use of the protocol discriminator; it is required at interworking gateways to allow mapping into the appropriate fields in the ISDN protocols, but otherwise the usage is entirely up to the application, and outside the scope of this document. Valid values are identified and documented by ITU-T, and there is no IANA registry for these values.

10. Considerations for ISDN interworking gateways

ISDN interworking gateways MUST support the requirements defined for UAS and UAC operation.

ISDN interworking gateways MUST support only the "isdn-uui" package on dialogs that are interworked.

ISDN interworking gateways will take octet structured data from the ISDN side and encode it using the "hex" encoding scheme defined in [I-D.ietf-cuss-sip-uui] for inclusion as the uui-data in the User-to-User header field. In the reverse direction, it will take valid uui-data according to the "hex" encoding scheme, and decode it to octet structured data for sending to the ISDN side.

When mapping data content from the ISDN to the SIP signalling, or from SIP signalling to the ISDN, the gateway needs to assume that all content is octet structured binary, irrespective of the value of the received protocol discriminator. There are no requirements in the ISDN to ensure that the content matches the value of the protocol discriminator, and it is for the application usage to sort out any discrepancy. The same applies to the ISDN protocol discrimination defined table 4-26 of ITU-T Recommendation Q.931 [Q931] as the first octet of the UUI data; the interworking gateway will not perform any additional checking of this value.

[I-D.ietf-cuss-sip-uui] defines a "uui" option tag for use with the UUI mechanism extension. The option tag is not interworked at an ISDN interworking gateway. The ISDN interworking gateways MUST NOT take the omission of the "uui" option tag in a received INVITE request to indicate that interworking of a received header field is not to be performed.

11. Coding requirements

This document defines "isdn-uui" as a new value of the User-to-User
This document defines "isdn-uui" as a new value of the User-to-User "content" header field parameter. A content value of "isdn-uui" indicates that the contents have a first octet that is a protocol discriminator (see table 4-26 of ITU-T Recommendation Q.931) [Q931] followed by uui-data that can be subject to a length limitation (before encoding or after decoding) that is generally 128 octets.

12. Media Feature Tag

This document defines a new media feature tag "sip.uui-isdn". This feature tag indicates that this UUI package is supported by the sender, and its usage is entirely in accordance with RFC 3840 [RFC3840]. This document makes no additional provisions for the use of this feature tag.

13. IANA Considerations

This document adds the following row to the "UUI packages" sub-registry of the SIP parameter registry:

Value: isdn-uui

Description: The associated application is being used with constraints suitable for interworking with the ISDN user-to-user service, and therefore can be interworked at ISDN gateways.

Reference: RFCXXXX

Contact:

This document adds the following row to the "UUI content" subregistry of the SIP parameter registry:

Value: isdn-uui

Description: The associated contents conforms to the content associated with the ISDN user-to-user service. In the presence of the "package" header field parameter set to "isdn-uui" this is the default meaning and therefore need not be included in this case.

Reference: RFCXXXX

Contact:
This document defines the following media feature tag which is added to the features.sip-tree of the Media Feature tags registry:

Media feature-tag name: sip.uui-isdn

ASN.1 Identifier: 1.3.6.1.8.4.x

Summary of the media feature indicated by this tag: This media feature-tag when used in a Contact header field of a SIP request or a SIP response indicates that the entity sending the SIP message supports the UUI package "uui-isdn".

Values appropriate for use with this feature-tag: none

Examples of typical use: Indicating that a mobile phone supports SRVCC for calls in alerting phase.

Related standards or documents: RFCXXXX

Security Considerations: Security considerations for this media feature-tag are discussed in section 11.1 of RFC 3840 [RFC3840]

Editor’s Note: [RFCXXXX] should be replaced with the designation of this document.

14. Security Considerations

This document contains no specific requirements in regard to security over and above those specified in [I-D.ietf-cuss-sip-uui]. The overlying use case will define the security measures required. The underlying user-to-user extension provides a number of tools that can meet certain security requirements. As a level of guidance, data that is used to assist in selecting which SIP UA should respond to the call would not be expected to carry any higher level of security than a media feature tag. Information that might otherwise reveal private information about an individual, or where a level of authenticity needs to be guaranteed, may need a higher level of protection, and may indeed not be suitable for this package, particularly taking into account the statement in the following paragraph.

As this capability is defined to interwork with the ISDN, if the ISDN forms part of the route, any usage needs to assume that the security level of the ISDN is the highest level of security available. As the ISDN security is itself not definable on an end-to-end basis, this can be an unknown quantity. This is because ISDN security exists on a hop-by-hop basis, and is only as secure as the least secure
component. This can be high in some places (e.g. it can require 
physical access to a secure building) and in other places it can be 
low (e.g. the point where an ISDN access enters a building). If this 
level of security is not sufficient, then either a different user-to-
user package, or indeed, a different method of data transfer, needs 
to be selected by the application user.

15. Acknowledgements

Joanne McMillen was a major contributor and co-author of earlier 
versions of this document.

Thanks to Spencer Dawkins, Vijay Gurbani, and Laura Liess for their 
review of earlier versions of this document. The authors wish to 
thank Francois Audet, Denis Alexeitsev, Paul Kyzivat, Cullen 
Jennings, Mahalingam Mani and Celine Serrut-Valette for their 
comments.

16. Changes since previous versions

Note to RFC editor: This section is to be deleted before final 
publication.

Changes since made in the creation of the 
draft-ietf-cuss-sip-uui-isdn-03 version from the 
draft-ietf-cuss-sip-uui-isdn-02 version.

Clarification added that the default content is "isdn-uui".

Clarification added that the default encoding is "hex".

Changeout of "payload" terminology to "UUI data".

Changes since made in the creation of the 
draft-ietf-cuss-sip-uui-isdn-02 version from the 
draft-ietf-cuss-sip-uui-isdn-01 version.

The inclusion of the "package" header field parameter has be 
downgraded to "RECOMMENDED", with the purpose stated as being for 
interworking. Changes have been made to the procedures at the 
receiving side to allow for the non-inclusion of the "package" 
header field parameter. The effect of this is that the absence of 
the "package" header field parameter means by default the use of 
the "uui-isdn" package.
Clarification that the package is not to be used on re-INVITE transactions or on other transactions within an INVITE dialog.

Further clarification on using this package in conjunction with other packages.

Closure of the remaining open issue relating to use of UUS1 in conjunction with the ISDN conference service - UUS1 is not possible after the conference is created.

A number of editorial changes have been made.

Changes since made in the creation of the draft-ietf-cuss-sip-uui-isdn-01 version from the draft-ietf-cuss-sip-uui-isdn-00 version.

QSIG does not define a UUS service. As such changes are made to indicate that it is possible to support a proprietary service on QSIG based on the public ISDN standards, and interworking with such proprietary versions is supported. The associated contributors note regarding interactions with other QSIG services has therefore been removed with this amendment.

Added additional paragraph above the objectives of the interworking design.

Made clear that the 128 octets apply before encoding in "hex". Reference added to the generic UUI document for the encoding of "hex".

Indicated that it is the "content" header field parameter set to "isdn-uui" that defines the structure of the uui-data, with the first octet being a protocol discriminator and the remaining octets potentially being limited to 128 octets.

Aligned the IANA registration section with the registries created by the generic UUI document.

Added reference to the generic UUI document to the security considerations section.

Changes since made in the creation of the draft-ietf-cuss-sip-uui-isdn-00 version from the draft-drage-cuss-sip-uui-isdn-01 version.

Removed overburdening of the word "application". Changed the name of the "app" header field parameter in the mechanism draft to "package" header field parameter. This had a consequential impact...
on the ISDN document. The word "application" is now solely reserved for the name of the functionality that passes the UUI to the SIP functionality to send, and to which the UUI is delivered on receipt by the SIP functionality. As well as the change of the name of the header field parameter, this resulted in a number of instances of the word "application" becoming "package". A couple of instances relating to the coding of the "content" header field parameter have become "SIP entity".

Section 5 needed substantial rewording as it no longer applied in this manner. Modified the text to indicate that if one wants to use an enhanced UUI where both endpoints are SIP, but still work with the ISDN, then one will have to same information using two different packages, one the ISDN one, and the other some enhanced package.

In section 8, a couple of requirements relating to the "content" header field parameter really related to the "package" header field parameter (formerly "app" header field parameter). These are corrected.

Updated references from "draft-johnston-cuss-sip-uui" to "draft-ietf-cuss-sip-uui".

Made clear throughout the document that the UUI payload is a protocol discriminator plus 128 octets of data.

Made clearer that it is the initial INVITE request and responses and the BYE request and responses only that carry the information in this package.

Made clear that there are no normative requirements on the protocol discriminator. In particular text is added to the end of section 9.

Removed the following text from section 7, as it is a duplicate of the text in section 9:

"When sending UUI, the sending application MUST include a protocol discriminator octet, conforming to table 4-26 of ITU-T Recommendation Q.931 [Q931] as the first octet of the payload information."

Defined a media feature tag specific for the package. It has been proposed to do this for all packages. "sip.uui-isdn" has been added.
Corrected the short title for the draft.

Changes since made in the creation of the
draft-drage-cuss-sip-uui-isdn-01 version from the
draft-drage-cuss-sip-uui-isdn-00 version.

Closure of a number of open issues identified in the -00 version
and the creation of appropriate procedures for the UAC, the UAS,
and the ISDN interworking gateway.

17. References

17.1. Normative References

[RFC2119]  Bradner, S., "Key words for use in RFCs to Indicate

[RFC3261]  Rosenberg, J., Schulzrinne, H., Camarillo, G., Johnston,
A., Peterson, J., Sparks, R., Handley, M., and E.
Schooler, "SIP: Session Initiation Protocol", RFC 3261,
June 2002.

for Telephones (SIP-T): Context and Architectures",

[RFC3840]  Rosenberg, J., Schulzrinne, H., and P. Kyzivat,
"Indicating User Agent Capabilities in the Session

[I-D.ietf-cuss-sip-uui]
Johnston, A. and J. Rafferty, "A Mechanism for
Transporting User to User Call Control Information in
SIP", draft-ietf-cuss-sip-uui-05 (work in progress),
March 2012.

[Q931]     "ITU-T Recommendation Q.931: Digital subscriber Signalling
System No. 1 - Network layer; ISDN user-network interface
layer 3 specification for basic call control",

17.2. Informative References

[I-D.ietf-cuss-sip-uui-reqs]
Johnston, A. and L. Liess, "Problem Statement and
Requirements for Transporting User to User Call Control
Information in SIP", draft-ietf-cuss-sip-uui-reqs-09 (work
in progress), January 2012.


[ANSII] "ANSI T1.643-1995, Telecommunications-Integrated Services Digital Network (ISDN)-Explicit Call Transfer Supplementary Service".

[ETSI] "ETSI ETS 300 207-1 Ed.1 (1994), Integrated Services Digital Network (ISDN); Diversion supplementary services".

Authors’ Addresses

Keith Drage (editor)
Alcatel-Lucent
Quadrant, Stonehill Green, Westlea
Swindon
UK

Email: keith.drage@alcatel-lucent.com

Alan Johnston
Avaya
St. Louis, MO 63124
United States

Email: alan.b.johnston@gmail.com