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Conference Establishment Using Request-Contained Lists in the Session
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Abstract

This document describes how to create a conference using SIP URI-list services. In particular, it describes a mechanism that allows a client to provide a conference server with the initial list of participants using an INVITE-contained URI-list.

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1. Introduction

Section 4.5 of [\[5\]](#) describes how to create a conference using ad-hoc SIP [\[4\]](#) methods. The client sends an INVITE request to a conference factory URI and receives the actual conference URI, which contains the "isfocus" feature tag, in the Contact header field of a response (typically a 200 OK).

Once the client obtains the conference URI, it can add participants to the newly created conference in several ways, which are described in [\[5\]](#).

Some environments have tough requirements regarding conference establishment time. They require the client to be able to request the creation of an ad-hoc conference and to provide the server with the initial set of participants in a single operation. This document describes how to meet this requirement using the mechanism to transport URI-lists in SIP messages described in [\[6\]](#).

2. Terminology

In this document, the key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" are to be interpreted as described in [BCP 14](#), [RFC 2119](#) [\[1\]](#) and indicate requirement levels for compliant implementations.

3. Providing a Conference Server with a URI-List

A client that wants to include the set of initial participants in its initial INVITE to create an ad-hoc conference, adds a body whose disposition type is 'recipient-list', as defined in [\[6\]](#), with a URI-list that contains the participants that the client wants the server to INVITE. The client sends this INVITE to the conference factory

URI.

4. URI-List Document

As described in [6], specifications of individual URI-list services, like the conferencing service described here, need to specify a default format for 'recipient-list' bodies used within the particular service.

The default format for 'recipient-list' bodies for conferencing UAs (User Agents) and servers is the XML resource list format [7]

extended with the XML Format Extension for Representing Capacity Attributes in Resource Lists [8]. So, conferencing UAs and servers handling 'recipient-list' bodies MUST support both of these formats and MAY support other formats.

As described in the XML Format Extension for Representing Capacity Attributes in Resource Lists [8], each URI can be tagged with a 'capacity' attribute set to either "to", "cc", or "bcc", indicating the capacity or role in which the recipient will get the INVITE request. Additionally, URIs can be tagged with the 'anonymize' attribute to prevent that the conference server discloses the target URI in a URI-list.

Additionally, the XML Format Extension for Representing Capacity Attributes in Resource Lists [8] defines a 'recipient-list-history' body that contains the list of recipients. The default format for 'recipient-list-history' bodies for conference services is also the XML resource list document format [7] extended with the XML Format Extension for Representing Capacity Attributes in Resource Lists [8]. Conferencing servers MUST support both of these formats; UASes MAY support these formats. Both conferencing servers and UASes MAY support other formats.

Nevertheless, the XML resource list document [7] provides features, such as hierarchical lists and the ability to include entries by reference relative to the XCAP root URI, that are not needed by the conferencing service defined in this document, which only needs to transfer a flat list of URIs between a UA and the conference server. Therefore, when using the default resource list document,

conferencing UAs SHOULD use flat lists (i.e., no hierarchical lists) and SHOULD NOT use <entry-ref> elements.

A conference factory application receiving a URI-list with more information than what has just been described MAY discard all the extra information.

Figure 1 shows an example of a flat list that follows the XML resource list document [7] extended with the XML Format Extension for Representing Capacity Attributes in Resource Lists [8].

```
<?xml version="1.0" encoding="UTF-8"?>
<resource-lists xmlns="urn:ietf:params:xml:ns:resource-lists"
  xmlns:cp="urn:ietf:params:xml:ns:capacity">
  <list>
    <entry uri="sip:bill@example.com" cp:capacity="to" />
    <entry uri="sip:joe@example.org" cp:capacity="cc" />
    <entry uri="sip:ted@example.net" cp:capacity="bcc" />
  </list>
</resource-lists>
```

Figure 1: URI-List

5. Conference Server Behavior

On reception of an INVITE request containing a 'recipient-list' body as described in [Section 3](#), a conference server MUST follow the rules described in [5] to create ad-hoc conferences. Once the ad-hoc conference is created, the conference server SHOULD attempt to add the participants in the URI-list to the conference as if their addition had been requested using any of the methods described in [5].

Once the conference server has created the ad-hoc conference and has attempted to add the initial set of participants, the conference server behaves as a regular conference server and MUST follow the rules in [5].

Note that the status code in the response to the INVITE does not provide any information about whether or not the conference server was able to bring the users in the URI-list into the conference. That is, a 200 (OK) means that the conference was created successfully, that the client that generated the INVITE is in the conference, and that the server understood the URI-list. If the client wishes to obtain information about the status of other users in the conference it SHOULD use general conference mechanisms, such as the conference package [9].

The incoming INVITE request typically contains a URI-list body or reference [6] with the actual list of recipients. If this URI-list includes resources tagged with the 'capacity' attribute set to a value of "to" or "cc", the conference server SHOULD include a URI-list in each of the outgoing INVITE requests. This list SHOULD be formatted according to the XML format for representing resource lists [7] and the capacity extension specified in [8]. The URI-list service MUST follow the procedures specified in XML format for representing resource lists [8] with respect handling of the 'anonymize', 'count' and 'capacity' attributes.

If the conference server includes a URI-list in an outgoing INVITE request, it MUST include a Content-Disposition header field [2] with the value set to 'recipient-list-history' and a 'handling' parameter [3] set to "optional".

6. Re-INVITES

The previous sections have specified how to include a URI-list in an initial INVITE request to a conference server. Once the INVITE-initiated dialog between the client and the conference server has been established, the client may need to send subsequent INVITE requests (typically referred to as re-INVITES) to the conference server to, for example, modify the characteristics of the media exchanged with the server.

At this point, there are no semantics associated with resource-list bodies in re-INVITEs (although future extensions may define them). Therefore, clients SHOULD NOT include resource-list bodies in re-INVITEs sent to a conference server.

A conference server receiving a re-INVITE with a resource-list body, following standard SIP procedures, rejects it with a 415 (Unsupported Media Type) response.

Note that a difference between an initial INVITE request and a re-INVITE is that while the initial INVITE is sent to the conference factory URI, the re-INVITE is sent to the URI provided by the server in a Contact header field when the dialog was established. Therefore, from the client's point of view, the resource identified by the former URI supports 'recipient-list' bodies while the resource identified by the latter does not support them.

[7.](#) Option-tag

This document defines the 'recipient-list-invite' option-tag for use in the Require and Supported SIP header fields.

This option-tag is used to ensure that a server can process the 'recipient-list' body used in an INVITE request. It also provides a mechanism to discover the capability of the server in responses to OPTIONS requests.

User agent clients generating an INVITE request containing a 'recipient-list' body, as described in previous sections, MUST include this option-tag in a Require header field. User agents that are able to receive and process INVITEs with a 'recipient-list' body,

as described in previous sections, SHOULD include this option-tag in a Supported header field when responding to OPTIONS requests.

Note that according to [Section 6](#), requests and responses coming from the URI of an ongoing conference would not carry this option-tag in a Supported header field. This is because the resource identified by the conference URI does not actually support this extension. On the other hand, the resource identified by the

conference factory URI does support this extension and, consequently, would include this option-tag in, for example, responses to OPTIONS requests.

8. Example

Figure 2 shows an example of operation. A UAC sends an INVITE request (F1) that contains an SDP body and a URI-list to the conference server. The conference server answers with a 200 (OK) response and generates an INVITE request to each of the URIs included in the URI-list. The conference server includes SDP and a manipulated URI-list in each of the outgoing INVITE requests.

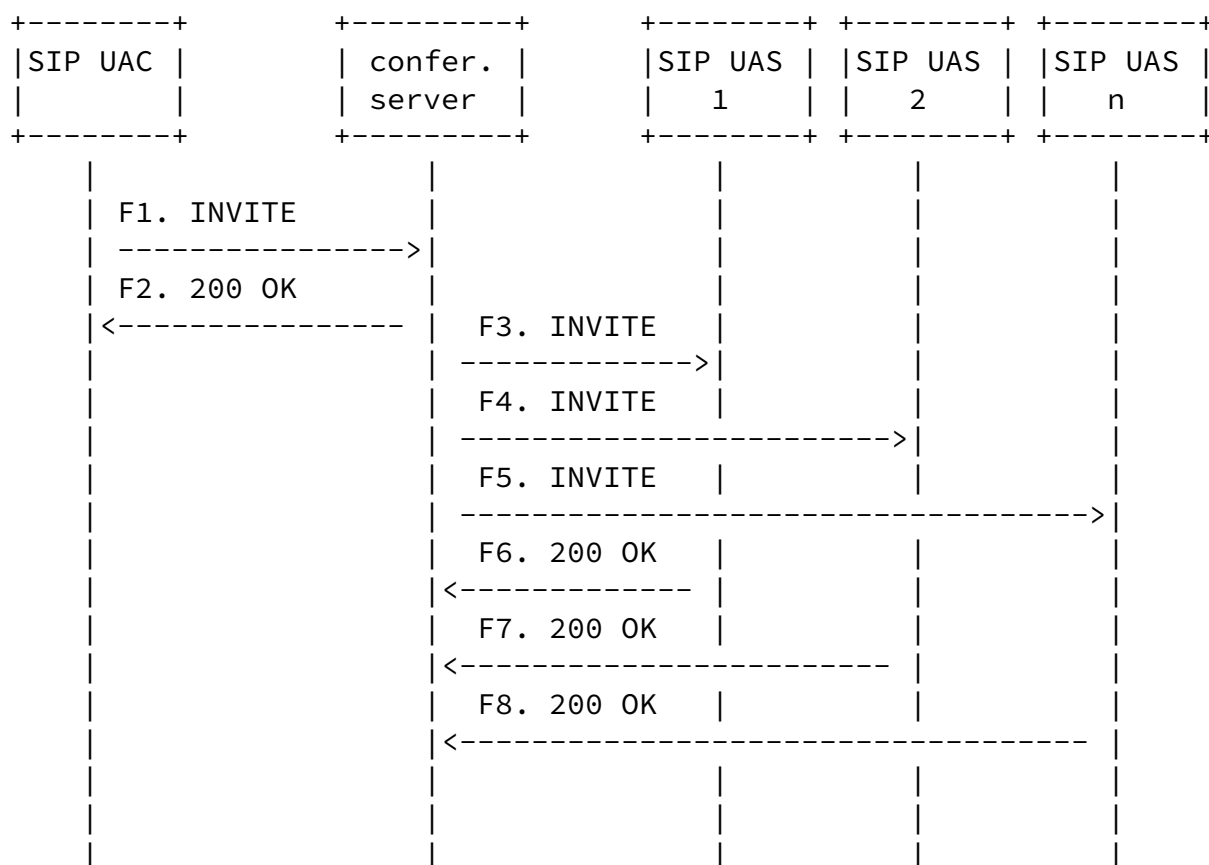


Figure 2: Example of operation

Figure 3 shows an example of the INVITE request F1, which carries a

multipart/mixed body composed of two other bodies: an application/sdp body that describes the session and an application/resource-lists+xml body that contains the list of target URIs.

```
INVITE sip:conf-fact@example.com SIP/2.0
Via: SIP/2.0/TCP atlanta.example.com
    ;branch=z9hG4bKKhjhs8ass83
Max-Forwards: 70
To: "Conf Factory" <sip:conf-fact@example.com>
From: Alice <sip:alice@example.com>;tag=32331
Call-ID: d432fa84b4c76e66710
CSeq: 1 INVITE
Contact: <sip:alice@atlanta.example.com>
Allow: INVITE, ACK, CANCEL, BYE, REFER
Allow-Events: dialog
Accept: application/sdp, message/sipfrag
Require: recipient-list-invite
Content-Type: multipart/mixed;boundary="boundary1"
Content-Length: 690
```

```
--boundary1
Content-Type: application/sdp
```

```
v=0
o=alice 2890844526 2890842807 IN IP4 atlanta.example.com
s=-
c=IN IP4 192.0.2.1
t=0 0
m=audio 20000 RTP/AVP 0
a=rtpmap:0 PCMU/8000
m=video 20002 RTP/AVP 31
a=rtpmap:31 H261/90000
```

```
--boundary1
Content-Type: application/resource-lists+xml
Content-Disposition: recipient-list
```

```
<?xml version="1.0" encoding="UTF-8"?>
<resource-lists xmlns="urn:ietf:params:xml:ns:resource-lists"
    xmlns:cp="urn:ietf:params:xml:ns:capacity">
  <list>
    <entry uri="sip:bill@example.com" cp:capacity="to" />
    <entry uri="sip:randy@example.net" cp:capacity="to"
        cp:anonymize="true"/>
    <entry uri="sip:eddy@example.com" cp:capacity="to"
        cp:anonymize="true"/>
    <entry uri="sip:joe@example.org" cp:capacity="cc" />
```

```
<entry uri="sip:carol@example.net" cp:capacity="cc"
                                cp:anonymize="true"/>
<entry uri="sip:ted@example.net" cp:capacity="bcc" />
<entry uri="sip:andy@example.com" cp:capacity="bcc" />
</list>
</resource-lists>
--boundary1--
```

Figure 3: INVITE request received at the conference server

The INVITE requests F3, F4, and F5 are similar in nature. All those INVITE requests contain a multipart/mixed body which is composed of two other bodies: an application/sdp body describing the session and an application/resource-lists+xml containing the list of recipients. The application/resource-lists+xml bodies are not equal to the application/resource-lists+xml included in the received INVITE request F1, because the conference server has anonymized those URIs tagged with the 'anonymize' attribute and has removed those URIs tagged with a "bcc" 'capacity' attribute. Figure 4 shows an example of the message F3.

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```
INVITE sip:bill@example.com SIP/2.0
Via: SIP/2.0/TCP conference.example.com
    ;branch=z9hG4bKhjhs8as454
Max-Forwards: 70
To: <sip:bill@example.com>
From: Conference Server <sip:conf34@example.com>;tag=234332
Call-ID: 389sn189dasdf
CSeq: 1 INVITE
Contact: <sip:conf34@conference.example.com>;isfocus
Allow: INVITE, ACK, CANCEL, BYE, REFER
Allow-Events: dialog, conference
Accept: application/sdp, message/sipfrag
Require: recipient-list-invite
Content-Type: multipart/mixed;boundary="boundary1"
Content-Length: 690
```

```
--boundary1
Content-Type: application/sdp
```

```
v=0
o=conf 2890844343 2890844343 IN IP4 conference.example.com
s=-
c=IN IP4 192.0.2.5
t=0 0
m=audio 40000 RTP/AVP 0
a=rtpmap:0 PCMU/8000
m=video 40002 RTP/AVP 31
a=rtpmap:31 H261/90000
```

```
--boundary1
Content-Type: application/resource-lists+xml
Content-Disposition: recipient-list-history; handling=optional
```

```
<?xml version="1.0" encoding="UTF-8"?>
<resource-lists xmlns="urn:ietf:params:xml:ns:resource-lists"
    xmlns:cp="urn:ietf:params:xml:ns:capacity">
  <list>
    <entry uri="sip:bill@example.com" cp:capacity="to" />
    <entry uri="sip:anonymous@anonymous.invalid" cp:capacity="to"
```

```
                                cp:count="2"/>
    <entry uri="sip:joe@example.org" cp:capacity="cc" />
    <entry uri="sip:anonymous@anonymous.invalid" cp:capacity="cc"
                                cp:count="1"/>
</list>
</resource-lists>
--boundary1--
```

Figure 4: INVITE request sent by the conference server

[9.](#) Security Considerations

This document discusses setup of SIP conferences using a request-contained URI-list. Both conferencing and URI-lists services have specific security requirements which will be summarized here. Conferences generally have authorization rules about who may or may not join a conference, what type of media may or may not be used, etc. This information is used by the focus to admit or deny participation in a conference. It is RECOMMENDED that these types of authorization rules be used to provide security for a SIP conference.

For this authorization information to be used, the focus needs to be able to authenticate potential participants. Normal SIP mechanisms including Digest authentication and certificates can be used. These conference specific security requirements are discussed further in the requirements and framework documents.

For conference creation using a list, there are some additional security considerations. The Framework and Security Considerations for SIP URI-List Services [[6](#)] discusses issues related to SIP URI-list services. Given that a conference server sending INVITEs to a set of users acts as an URI-list service, implementations of conference servers that handle lists MUST follow the security-related rules in [[6](#)]. These rules include mandatory authentication and authorization of clients, and opt-in lists.

[10.](#) IANA Considerations

This document defines the 'recipient-list-invite' SIP option-tag in [Section 7](#). It should be registered in the Option Tags subregistry under the SIP parameter registry. The following is the description

to be used in the registration.

Name	Description	Reference
recipient-list-invite	The body contains a list of URIs that indicates the recipients of the SIP INVITE request	[RFCXXXX]

Table 1: Registration of the 'recipient-list-invite' Option-Tag in SIP

Note to IANA and the RFC editor: replace RFCXXXX above with the RFC number of this specification.

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11. Acknowledges

Cullen Jennings, Hisham Khartabil, and Jonathan Rosenberg provided useful comments on this document. Miguel Garcia-Martin assembled the dependencies to the 'capacity' attribute extension.

12. References

12.1. Normative References

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- [2] Troost, R., Dorner, S., and K. Moore, "Communicating Presentation Information in Internet Messages: The Content-Disposition Header Field", [RFC 2183](#), August 1997.
- [3] Zimmerer, E., Peterson, J., Vemuri, A., Ong, L., Audet, F., Watson, M., and M. Zonoun, "MIME media types for ISUP and QSIG Objects", [RFC 3204](#), December 2001.
- [4] 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.

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- [6] Camarillo, G. and A. Roach, "Framework and Security Considerations for Session Initiation Protocol (SIP) Uniform Resource Identifier (URI)-List Services", [draft-ietf-sipping-uri-services-04](#) (work in progress), October 2005.
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- [8] Garcia-Martin, M. and G. Camarillo, "Extensible Markup Language (XML) Format Extension for Representing Capacity Attributes in Resource Lists", [draft-ietf-sipping-capacity-attribute-00](#) (work in progress), February 2006.

[12.2.](#) Informational References

- [9] Rosenberg, J., "A Session Initiation Protocol (SIP) Event Package for Conference State", [draft-ietf-sipping-conference-package-12](#) (work in progress), July 2005.

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