             **The Early Session Disposition Type for the Session Initiation
                              Protocol (SIP)**
                  draft-camarillo-sipping-early-disposition-00.txt

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Abstract

   This document defines a new disposition type (early-session) for the
   Content-Disposition header field in SIP. The treatment of
   "early-session" bodies is similar to the treatment of "session"
   bodies. That is, they follow the offer/answer model. Their only
   difference is that session descriptions whose disposition type is
   "early-session" are used to establish early media sessions within
   early dialogs, as opposed to regular sessions within regular dialogs.

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1. Introduction

A SIP [2] user agent establishing an INVITE dialog may need to exchange media with the destination user agent (or user agents if the INVITE forks) or with application servers in the path before the dialog is established. Media exchanged this way is referred to as early media.

Section 3 describes the current approach to establish early media sessions in SIP are discusses its problems. Section 4 defines the "early-session" disposition type to resolve those problems.

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. Issues Related to Early Media Session Establishment

Traditionally, early media sessions have been established in the same way as regular sessions. That is, using an offer/answer exchange where the disposition type of the session descriptions is "session". Application servers perform an offer/answer exchange with the UAC to exchange early media exclusively, while UASs use the same offer/answer exchange, first to exchange early media, and once the regular dialog is established, to exchange regular media. There are issues related to both, application servers and UASs using this mechanism.

Application servers may not be able to generate an answer for an offer received in the INVITE. The UAC created the offer for the UAS, and so, it may have applied end-to-end encryption or have included information (e.g., related to key management) that the application server is not supposed to use. Therefore, application servers need a means to perform an offer/answer exchange with the UAC which is independent from the offer/answer exchange between both UAs.

UASs using the offer/answer exchange that will carry regular media to send and receive early media can cause media clipping, as described in Section 2.1.1 of [5]. Some UACs cannot receive early media from different UASs at the same time. So, when an INVITE forks and several UASs start sending early media, the UAC mutes all the UASs but one (which is usually randomly chosen). If the UAS that accepts the INVITE (i.e., sends a 200 OK) was muted, a new offer/answer exchange is needed to unmute it. This usually causes media clipping. Therefore, UASs need a means to perform an offer/answer exchange with

the UAC to exchange early media which is independent from the offer/ answer exchanged used to exchange regular media.

A potential solution to this need would be to establish a different dialog using a globally routable URI to perform an independent offer/ answer exchange. This dialog would be labelled as a dialog for early media and would be related to the original dialog somehow at the UAC. However, performing all the offer/answer exchanges within the original dialog has many advantages:

   It is simpler.

   It does not have synchronization problems, because all the early dialogs are terminated when the session is accepted.

   It does not require globally routable URIs.

   It does not introduce service interaction issues related to services that may be wrongly applied to the new dialog.

   It makes firewall management easier.

4. The Early Session Disposition Type

We define a new disposition type for the Content-Disposition header field: early-session. User agents MUST use early-session bodies to establish early media sessions in the same way as they use session bodies to establish regular sessions, as described in RFC 3261 [2] and in RFC 3264 [3]. Particularly, early-session bodies MUST follow the offer/answer model and MAY appear in the same messages as session bodies do with the exceptions of 2xx responses for an INVITE and ACKs.

If a UA needs to refuse an early-session offer, it MUST to so by refusing all the media streams in it. When SDP [4] is used, this is done by setting the port number of all the media streams to zero.

   This is the same mechanism that UACs use to refuse regular offers that arrive in a response to an empty INVITE.

An early media session established using early-session bodies MUST be terminated when its corresponding early dialog is terminated or it transitions to a regular dialog.

5. Option tag

We define an option tag to be used in Require and Supported header

fields. Its name is early-session. A UA adding the early-session
option tag to a message indicates that it understands the
early-session disposition type.

6. **Example**

Figure 1 shows the message flow between two UAs. INVITE (1) has an
early-session option tag in its Supported header field and the body
shown in Figure 2. The UAS sends back a response with two body parts
,as shown in Figure 3; one of disposition type session and the other
early-session. The session body part is the answer to the offer in
the INVITE. The early-session body part is an offer to establish an
early media session. When the UAC receives the 183 (Session Progress)
response, it sends the answer to the early-session offer in a PRACK,
as shown in Figure 4. This early media session is terminated when the
early dialog transitions to a regular dialog. That is, when the UAS
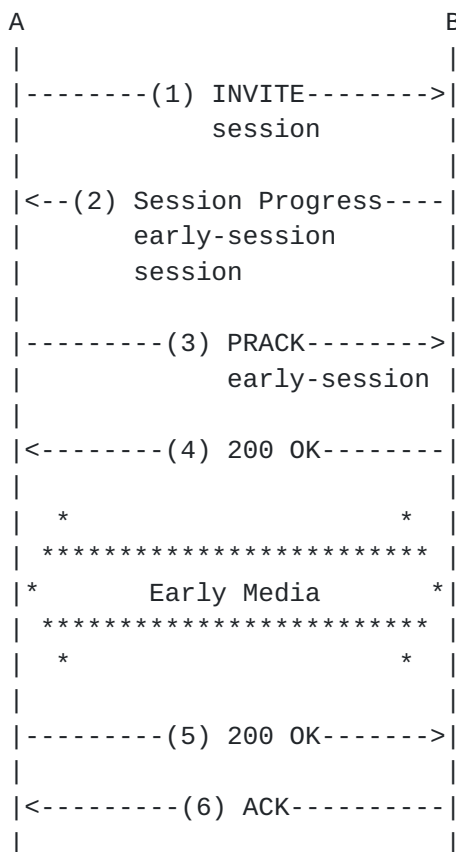sends the (5) 200 (OK) response for the INVITE.

```
     A                             B
     |                             |
     |--------(1) INVITE-------->|
     |           session          |
     |                             |
     |<--(2) Session Progress----|
     |        early-session       |
     |        session             |
     |                             |
     |---------(3) PRACK-------->|
     |            early-session   |
     |                             |
     |<--------(4) 200 OK--------|
     |                             |
     |    *                    *  |
     |  *********************** |
     |*        Early Media       *|
     |  *********************** |
     |    *                    *  |
     |                             |
     |---------(5) 200 OK------->|
     |                             |
     |<---------(6) ACK----------|
     |                             |
```

                         Figure 1

    Content-Type: application/sdp

```
Content-Disposition: session

v=0
o=alice 2890844730 2890844731 IN IP4 host.example.com
s=
c=IN IP4 192.0.0.1
t=0 0
m=audio 20000 RTP/AVP 0
```

Figure 2

```
Content-Type: multipart/mixed; boundary="--boundary1"
Content-Length: 399

--boundary1
Content-Type: application/sdp
Content-Disposition: session

v=0
o=Bob 2890844725 2890844725 IN IP4 host.example2.com
s=
c=IN IP4 192.0.0.2
t=0 0
m=audio 30000 RTP/AVP 0
--boundary1
Content-Type: application/sdp
Content-Disposition: early-session

v=0
o=Bob 2890844714 2890844714 IN IP4 host.example2.com
s=
c=IN IP4 192.0.0.2
t=0 0
m=audio 30002 RTP/AVP 0
--boundary1
```

Figure 3

```
Content-Type: application/sdp
Content-Disposition: early-session

v=0
o=alice 2890844717 2890844717 IN IP4 host.example.com
s=
c=IN IP4 192.0.0.1
t=0 0
```

m=audio 20002 RTP/AVP 0

                          Figure 4

7. IANA Considerations

This document defines a new Content-Disposition header field
disposition type (early-session) in Section 4. This value should be
registered in the IANA registry for Content-Dispositions with the
following description:

     early-session   the body describes an early communications
                      session, for example, an RFC 2327 SDP body

This document defines a SIP option tag (early-session) in Section 5.
It should be registered in the SIP parameters registry (http://
www.iana.org/assignments/sip-parameters) under "Option Tags", with
the following description.

    A UA adding the early-session option tag to a message indicates
    that it understands the early-session content disposition.

Normative References

   [1]   Bradner, S., "Key words for use in RFCs to Indicate Requirement
         Levels", BCP 14, RFC 2119, March 1997.

   [2]   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.

   [3]   Rosenberg, J. and H. Schulzrinne, "An Offer/Answer Model with
         Session Description Protocol (SDP)", RFC 3264, June 2002.

Informational References

   [4]   Handley, M. and V. Jacobson, "SDP: Session Description
         Protocol", RFC 2327, April 1998.

   [5]   Camarillo, G. and H. Schulzrinne, "Early Media and Ringback Tone
         Generation in the Session Initiation Protocol",
         draft-camarillo-sipping-early-media-02 (work in progress), July
         2003.

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