6.2.  SDP Offerer Procedures

6.2.1.  General

   This section describes how an Offerer creates an SDP Offer which

   includes a BUNDLE group.

   An SDP Offer that includes a BUNDLE group can be categorized either

   as a Bundle Restart Offer (BRO) Section 6.2.2.1 or as a Bundle Sync

   Offer (BSO) Section 6.2.2.2.

6.2.2.  SDP Offer Types

6.2.2.1.  Bundle Restart Offer (BRO)

   A Bundle Restart Offer (BRO) is used to negotiate (or re-negotiate)

   the usage of the BUNDLE mechanism, and/or the bundle address used by

   the "m=" lines in a BUNDLE group.

   In a BRO, the Offerer assigns a unique set of transport parameters to at least one "m="

   line in a BUNDLE group.  The set of transport parameters that the Offerer prefers to use for the bundle are attached to the “m=” line that appears first in the BUNDLE group. All other “m=” lines in the BUNDLE group MUST either use the same transport parameters as this first line, or a unique set of transport parameters. After the first set of transport parameters "m=" lines with unique transport parameters can be removed from the

   BUNDLE group by the Answerer without also rejecting the “m=” line (see [xxx]), as the unique address can

   be used outside the BUNDLE group.

   In a BRO, the Offerer assigns, for each "m=" line in the BUNDLE

   group, either a unique set of transport parameters, or a previously negotiated bundle

   address, as long as a unique set of transport parameters is assigned to at least one "m="

   line in the BUNDLE group (if the same transport parameters are assigned to every

   "m=" line in the BUNDLE group, the SDP Offer is by definition a

   Bundle Sync Offer (BSO) Section 6.2.2.2.)

   If the Offerer does not know whether the

   Answerer supports the BUNDLE mechanism, the Offerer MUST initiate a

   BRO, and the Offerer MUST assign a unique address to all "m=" lines

   in the BUNDLE group.

   If, in the SDP Answer associated with the BRO, the offered BUNDLE

   group is accepted [ref-to-be-added], the Offerer MUST, for each "m="

   line in the BUNDLE group, start to use its local bundle address, and

   the remote bundle address, both selected by the Answerer [ref-to-be-

   added].  In addition, the Offerer MUST send a Bundle Sync Offer (BSO)

   Section 6.2.2.2, in which the bundle address is assigned to each "m="

   line in the BUNDLE group.

   NOTE: The Offerer needs to send the BSO as soon as possible, in order

   to make sure intermediaries are aware that the bundle address will be

   used for each "m=" line in the BUNDLE group.  However, the exact

   moment for sending the BSO might depend on other features and

   extensions (e.g. ICE) also used by the Offerer, that also require the

   sending of subsequent SDP Offers.

   Example: The example shows a BRO, where a unique address is assigned

   to each "m=" line in the BUNDLE group.  The Offerer requests the

   address associated with the audio "m=" line to be selected as its

   bundle address, by placing the mid value associated with the "m="

   line first in the SDP group:BUNDLE attribute mid list.

   SDP Offer (Bundle Restart Offer)

       v=0

       o=alice 2890844526 2890844526 IN IP4 [host.atlanta.com](http://host.atlanta.com)

       s=

       c=IN IP4 [host.atlanta.com](http://host.atlanta.com)

       t=0 0

       a=group:BUNDLE foo bar

       m=audio 10000 RTP/AVP 0 8 97

       a=mid:foo

       b=AS:200

       a=rtpmap:0 PCMU/8000

       a=rtpmap:8 PCMA/8000

       a=rtpmap:97 iLBC/8000

       m=video 20000 RTP/AVP 31 32

       a=mid:bar

       b=AS:1000

       a=rtpmap:31 H261/90000

       a=rtpmap:32 MPV/90000

6.2.2.2.  Bundle Sync Offer (BSO)

   A Bundle Sync Offer (BSO) is used when the Offerer does not want to

   re-negotiate the usage of the BUNDLE mechanism, and/or the bundle

   address.  The Offerer can, using a BSO, re-negotiate other parameters

   associated with the BUNDLE group.

   In a BSO, the Offerer MUST assign the same transport parameters to all "m="

   lines in a BUNDLE group.  As a result, "m=" lines cannot be removed from the

   BUNDLE group by the Answerer [ref-to-be-added] without also rejecting the lines. Without a separate set of transport parameters, an “m=” line

   cannot be used outside the BUNDLE group.

   Example: The example shows a BSO, where the same transport parameters are

   assigned to all "m=" lines in the BUNDLE group.

   SDP Offer (Bundle Sync Offer)

       v=0

       o=alice 2890844526 2890844526 IN IP4 [host.atlanta.com](http://host.atlanta.com)

       s=

       c=IN IP4 [host.atlanta.com](http://host.atlanta.com)

       t=0 0

       a=group:BUNDLE foo bar

       m=audio 10000 RTP/AVP 0 8 97

       a=mid:foo

       b=AS:200

       a=rtpmap:0 PCMU/8000

       a=rtpmap:8 PCMA/8000

       a=rtpmap:97 iLBC/8000

       m=video 10000 RTP/AVP 31 32

       a=mid:bar

       b=AS:1000

       a=rtpmap:31 H261/90000

       a=rtpmap:32 MPV/90000

6.2.3.  Use Cases

6.2.3.1.  Offerer Bundle Address Request

   In order to negotiate (or re-negotiate) the bundle address, the

   Offerer MUST send a BRO.  In the BRO, as the Offerer assigns a unique

   address to some (or all) "m=" lines in the BUNDLE group, the Offerer

   needs to indicate to the Answerer which address, associated with one

   of the "m=" lines in the BUNDLE group, it wishes to use as its local

   bundle address.  The first mid value in the SDP group:BUNDLE

   attribute mid value list represents the "m=" line address with the

   highest preference.

   The Answerer will select the local bundle address for the Offerer, as

   described in Section 6.3.3.  The Offerer MUST use the bundle address

   selected by the Answerer.  If the Offerer is not able to use that

   bundle address, it MUST either terminate the session, or send a new

   BRO.

   Example: The example shows a BRO, where a unique address is assigned

   to each "m=" line in the BUNDLE group.  The Offerer requests the

   address associated with the audio "m=" line to be selected as its

   bundle address, by placing the mid value associated with the "m="

   line first in the SDP group:BUNDLE attribute mid list.

   SDP Offer (Bundle Restart Offer)

       v=0

       o=alice 2890844526 2890844526 IN IP4 [host.atlanta.com](http://host.atlanta.com)

       s=

       c=IN IP4 [host.atlanta.com](http://host.atlanta.com)

       t=0 0

       a=group:BUNDLE foo bar

       m=audio 10000 RTP/AVP 0 8 97

       a=mid:foo

       b=AS:200

       a=rtpmap:0 PCMU/8000

       a=rtpmap:8 PCMA/8000

       a=rtpmap:97 iLBC/8000

       m=video 20000 RTP/AVP 31 32

       a=mid:bar

       b=AS:1000

       a=rtpmap:31 H261/90000

       a=rtpmap:32 MPV/90000

6.2.3.2.  Adding a media description to a BUNDLE group

   When adding an "m=" line to a BUNDLE group, the Offerer generates

   either a BRO or BSO.  In case of a BSO, the Offerer assigns the

   bundle address to each "m=" line (including the new one) in the

   BUNDLE group.  In case of a BRO, the Offerer assigns, for each "m="

   line (including the new one), either a unique address, or the bundle

   address (only the bundle address can be assigned to more than one

   "m=" line in the BUNDLE group).

   Example: The example shows a BRO, where a new "m=" line, identified

   by the "zen" mid value, is added to a BUNDLE group.  The bundle

   address is assigned to each of the current "m=" lines in the BUNDLE

   group, while a unique address is assigned to the new "m=" line.  The

   Offerer requests that the bundle address is not changed, by placing

   the mid value associated with the audio "m=" line, for which the

   previously negotiated bundle address is assigned, first in the SDP

   group:BUNDLE attribute mid list.

   SDP Offer (Bundle Restart Offer)

       v=0

       o=alice 2890844526 2890844526 IN IP4 [host.atlanta.com](http://host.atlanta.com)

       s=

       c=IN IP4 [host.atlanta.com](http://host.atlanta.com)

       t=0 0

       a=group:BUNDLE foo bar zen

       m=audio 10000 RTP/AVP 0 8 97

       a=mid:foo

       b=AS:200

       a=rtpmap:0 PCMU/8000

       a=rtpmap:8 PCMA/8000

       a=rtpmap:97 iLBC/8000

       m=video 10000 RTP/AVP 31 32

       a=mid:bar

       b=AS:1000

       a=rtpmap:31 H261/90000

       a=rtpmap:32 MPV/90000

       m=video 30000 RTP/AVP 60

       a=mid:zen

       b=AS:1000

       a=rtpmap:60 H261/90000

   Example: The example shows a BSO, where a new "m=" line, identified

   by the "zen" mid value, is added to a BUNDLE group.  The previously

   negotiated bundle address assigned to each "m=" line (the current

   ones and the new one) in the BUNDLE group.

   SDP Offer (Bundle Sync Offer)

       v=0

       o=alice 2890844526 2890844526 IN IP4 [host.atlanta.com](http://host.atlanta.com)

       s=

       c=IN IP4 [host.atlanta.com](http://host.atlanta.com)

       t=0 0

       a=group:BUNDLE foo bar zen

       m=audio 10000 RTP/AVP 0 8 97

       a=mid:foo

       b=AS:200

       a=rtpmap:0 PCMU/8000

       a=rtpmap:8 PCMA/8000

       a=rtpmap:97 iLBC/8000

       m=video 10000 RTP/AVP 31 32

       a=mid:bar

       b=AS:1000

       a=rtpmap:31 H261/90000

       a=rtpmap:32 MPV/90000

       m=video 10000 RTP/AVP 60

       a=mid:zen

       b=AS:1000

       a=rtpmap:60 H261/90000

6.2.3.3.  Removing A Media Description From A BUNDLE Group

   In order to remove an "m=" line from a BUNDLE group, the Offerer

   generates either a BRO or BSO.  The Offerer MUST remove the "m="

   line, and its associated mid value, from the BUNDLE group, and the

   Offerer MUST assign a unique address to the removed "m=" line.

   Example: The example shows a BSO, where an "m=" line is removed from

   a BUNDLE group.  The Offerer removes the mid ("zen") associated with

   the "m=" line from the SDP group:BUNDLE attribute mid value list, and

   assigns a unique address to the removed "m=" line.

   SDP Offer (Bundle Sync Offer)

       v=0

       o=alice 2890844526 2890844526 IN IP4 [host.atlanta.com](http://host.atlanta.com)

       s=

       c=IN IP4 [host.atlanta.com](http://host.atlanta.com)

       t=0 0

       a=group:BUNDLE foo bar

       m=audio 10000 RTP/AVP 0 8 97

       a=mid:foo

       b=AS:200

       a=rtpmap:0 PCMU/8000

       a=rtpmap:8 PCMA/8000

       a=rtpmap:97 iLBC/8000

       m=video 10000 RTP/AVP 31 32

       a=mid:bar

       b=AS:1000

       a=rtpmap:31 H261/90000

       a=rtpmap:32 MPV/90000

       m=video 40000 RTP/AVP 60

       b=AS:1000

       a=rtpmap:60 H261/90000

6.2.3.4.  Disabling A Media Description In A BUNDLE Group

   In order to disable an "m=" line in a BUNDLE group, the Offerer

   generates either a BRO or BSO.  The Offerer MUST remove the disabled

   "m=" line, and its associated mid value, from the BUNDLE group.  In

   addition, the Offerer assigns a zero port value to the "m=" line,

   according to the procedures in RFC 3264.

   Example: The example shows a BSO, where an "m=" line is disabled in

   (and removed from) a BUNDLE group.  The Offerer removes the mid

   ("zen") associated with the disabled "m=" line from the SDP

   group:BUNDLE attribute mid value list, and assigns a port zero value

   to the "m=" line.

   SDP Offer (Bundle Sync Offer)

       v=0

       o=alice 2890844526 2890844526 IN IP4 [host.atlanta.com](http://host.atlanta.com)

       s=

       c=IN IP4 [host.atlanta.com](http://host.atlanta.com)

       t=0 0

       a=group:BUNDLE foo bar

       m=audio 10000 RTP/AVP 0 8 97

       a=mid:foo

       b=AS:200

       a=rtpmap:0 PCMU/8000

       a=rtpmap:8 PCMA/8000

       a=rtpmap:97 iLBC/8000

       m=video 10000 RTP/AVP 31 32

       a=mid:bar

       b=AS:1000

       a=rtpmap:31 H261/90000

       a=rtpmap:32 MPV/90000

       m=video 0 RTP/AVP 60

       a=rtpmap:60 H261/90000

   OPEN ISSUE: It is FFS whether it is allowed to include a port zero

   media descriptions in a BUNDLE group.