          Offer/Answer Considerations for G723 Annex A and G729 Annex B

Abstract

   This document provides the offer/answer considerations for the annexa
   parameter of G723 and the annexb parameter of G729, G729D, and G729E
   when the value of the annexa or annexb parameter does not match in
   the Session Description Protocol (SDP) offer and answer.

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   and how to provide feedback on it may be obtained at
   http://www.rfc-editor.org/info/rfc7261.

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1. Introduction

   [RFC4856] describes the annexa parameter for G723 as follows:

      annexa: indicates that Annex A, voice activity detection, is used
      or preferred. Permissible values are "yes" and "no" (without the
      quotes); "yes" is implied if this parameter is omitted.

   Also, [RFC4856] describes the annexb parameter for G729, G729D, and
   G729E as follows:

      annexb: indicates that Annex B, voice activity detection, is used
      or preferred. Permissible values are "yes" and "no" (without the
      quotes); "yes" is implied if this parameter is omitted.

   However, a problem arises when the value of the annexa or annexb
   parameter does not match in the SDP [RFC4566] offer and answer.

   For example, if the offer has G729 with annexb=yes and the answer has
   G729 with annexb=no, it can be interpreted in two different ways:

   o The offerer and answerer proceed as if G729 is negotiated with
      annexb=yes, or

   o The offerer and answerer proceed as if G729 is negotiated with
      annexb=no.

Since this is not clear in the existing specifications, various
implementations have interpreted the offer/answer in their own ways,
resulting in a different codec being chosen to call failure, when the
parameter value does not match in the offer and answer.

[RFC3264] requires SDP extensions that define new fmtp parameters to
specify their proper interpretation in offer/answer. This document
specifies the proper interpretation for the annexa and annexb
parameters in offer/answer.

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 [RFC2119].

3. Offer/Answer Considerations

The general objective of the offer/answer considerations is to make
sure that if the offerer or answerer indicates it does not support
Annex A or Annex B, then Annex A or Annex B is not used.

3.1. Considerations for Use of Comfort Noise Frames

[RFC3551] states that:

> Receivers MUST accept comfort noise frames if restriction of their
> use has not been signaled. The MIME registration for G729 in RFC
> 3555 specifies a parameter that MAY be used with MIME or SDP to
> restrict the use of comfort noise frames.

Hence, if the SDP offer or answer indicates that comfort noise is not
supported, comfort noise frames MUST NOT be used.

3.2. Offer/Answer Considerations for G723 Annex A

When the offer or answer has G723 and the annexa parameter is absent,
the offerer or answerer knows that it has implied the default
"annexa=yes". This is because the annexa attribute is part of the
original registration of audio/G723 [RFC4856]. All implementations
that support G723 understand the annexa attribute. Hence, this case
MUST be considered as if the offer or answer has G723 with
annexa=yes.

When the offer has G723 with annexa=yes and the answer has G723 with
annexa=no, the offerer and answerer MUST proceed as if G723 is
negotiated with annexa=no.

When the offer has G723 with annexa=no, after the offer/answer
completion the offerer and answerer MUST proceed as if G723 is
negotiated with annexa=no.

   When the offer has G723 with annexa=no, the reason for not
   mandating that the answer MUST have annexa=no for G723 is that
   there are implementations that omit the annexa parameter in
   answer. In such cases, the offerer and answerer proceed as if
   G723 is negotiated with annexa=no.

When the offer has G723 with no annexa parameter and the answer has
G723 with annexa=yes, the offerer and answerer MUST proceed as if
G723 is negotiated with annexa=yes.

3.3. Offer/Answer Considerations for G729 Annex B, G729D Annex B, and
      G729E Annex B

In this section, G729 represents any of G729 or G729D or G729E.

When the offer or answer has G729 and the annexb parameter is absent,
the offerer or answerer knows that it has implied the default
"annexb=yes". This is because the annexb attribute is part of the
original registration of audio/G729 [RFC4856]. All implementations
that support G729 understand the annexb attribute. Hence, this case
MUST be considered as if the offer or answer has G729 with
annexb=yes.

When the offer has G729 with annexb=yes and the answer has G729 with
annexb=no, the offerer and answerer MUST proceed as if G729 is
negotiated with annexb=no.

When the offer has G729 with annexb=no, after the offer/answer
completion the offerer and answerer MUST proceed as if G729 is
negotiated with annexb=no.

   When the offer has G729 with annexb=no, the reason for not
   mandating that the answer MUST have annexb=no for G729 is that
   there are implementations that omit the annexb parameter in the
   answer. In such cases, the offerer and answerer proceed as if
   G729 is negotiated with annexb=no.

When the offer has G729 with no annexb parameter and the answer has
G729 with annexb=yes, the offerer and answerer MUST proceed as if
G729 is negotiated with annexb=yes.

4. Examples

4.1. Offer with G729 annexb=yes and Answer with G729 annexb=no

        [Offer with G729 annexb=yes]

        v=0
        o=alice 2890844526 2890844526 IN IP4 host.atlanta.example.com
        s=
        c=IN IP4 host.atlanta.example.com
        t=0 0
        m=audio 49170 RTP/AVP 18
        a=rtpmap:18 G729/8000
        a=fmtp:18 annexb=yes

        [Answer with G729 annexb=no]

        v=0
        o=bob 1890844326 1890844326 IN IP4 host.bangalore.example.com
        s=
        c=IN IP4 host.bangalore.example.com
        t=0 0
        m=audio 19140 RTP/AVP 18
        a=rtpmap:18 G729/8000
        a=fmtp:18 annexb=no

   In the above example, the offerer and answerer proceed as if G729 is
   negotiated with annexb=no.

4.2. Offer with G729 annexb=yes and Answer with G729 and No annexb
      Parameter

        [Offer with G729 annexb=yes]

        v=0
        o=alice 2890844526 2890844526 IN IP4 host.atlanta.example.com
        s=
        c=IN IP4 host.atlanta.example.com
        t=0 0
        m=audio 49170 RTP/AVP 18
        a=rtpmap:18 G729/8000
        a=fmtp:18 annexb=yes

[Answer with G729 and no annexb parameter]

```
v=0
o=bob 1890844326 1890844326 IN IP4 host.bangalore.example.com
s=
c=IN IP4 host.bangalore.example.com
t=0 0
m=audio 19140 RTP/AVP 18
a=rtpmap:18 G729/8000
```

In the above example, the offerer and answerer proceed as if G729 is negotiated with annexb=yes.

4.3. Offer with G729 and No annexb Parameter and Answer with G729 annexb=no

[Offer with G729 and no annexb parameter]

```
v=0
o=alice 2890844526 2890844526 IN IP4 host.atlanta.example.com
s=
c=IN IP4 host.atlanta.example.com
t=0 0
m=audio 49170 RTP/AVP 18
a=rtpmap:18 G729/8000
```

[Answer with G729 annexb=no]

```
v=0
o=bob 1890844326 1890844326 IN IP4 host.bangalore.example.com
s=
c=IN IP4 host.bangalore.example.com
t=0 0
m=audio 19140 RTP/AVP 18
a=rtpmap:18 G729/8000
a=fmtp:18 annexb=no
```

In the above example, the offerer and answerer proceed as if G729 is negotiated with annexb=no.

5. Security Considerations

The guidelines described in [RFC6562] are to be followed for Use of Voice Activity Detection (i.e., Annex A or Annex B) with the Secure Real-time Transport Protocol (SRTP).

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7. Normative References

[RFC2119]   Bradner, S., "Key words for use in RFCs to Indicate
            Requirement Levels", BCP 14, RFC 2119, March 1997.

[RFC3264]   Rosenberg, J. and H. Schulzrinne, "An Offer/Answer Model
            with Session Description Protocol (SDP)", RFC 3264, June
            2002.

[RFC3551]   Schulzrinne, H. and S. Casner, "RTP Profile for Audio and
            Video Conferences with Minimal Control", STD 65, RFC 3551,
            July 2003.

[RFC4566]   Handley, M., Jacobson, V., and C. Perkins, "SDP: Session
            Description Protocol", RFC 4566, July 2006.

[RFC4856]   Casner, S., "Media Type Registration of Payload Formats in
            the RTP Profile for Audio and Video Conferences", RFC
            4856, February 2007.

[RFC6562]   Perkins, C. and JM. Valin, "Guidelines for the Use of
            Variable Bit Rate Audio with Secure RTP", RFC 6562, March
            2012.

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