Using the SDP Offer/Answer Mechanism for DTLS
draft-ietf-mmusic-dtls-sdp-00.txt

Abstract

   This draft defines the SDP offer/answer procedures for negotiating
   and establishing a DTLS association. The draft also defines the
   criteria for when a new DTLS association must be established.

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1. Introduction

[RFC5763] defines SDP Offer/Answer procedures for SRTP-DTLS. This
draft defines the SDP Offer/Answer [RFC3264] procedures for
negotiation DTLS in general, based on the procedures in [RFC5763].

This draft also defines the usage of the SDP 'connection' attribute
with DTLS. The attribute is used in SDP offers and answers to
explicitly indicate whether a new DTLS association is to be
established.

As defined in [RFC5245], when Interactive Connectivity Establishment
(ICE) [RFC5245] is used, the ufrag value is changed both when ICE is
negotiated, and when ICE restart [RFC5245] occurs. These events do
not always require a new DTLS association to be established, but
currently there is no way to explicitly indicate in an SDP offer or
answer whether a new DTLS association is required. To solve that
problem, this draft defines the usage of the SDP 'connection'
attribute with DTLS. The attribute is used in SDP offers and answers
to explicitly indicate whether a new DTLS association is to be
established/re-established. The attribute can be used both with and
without ICE.

2. Establishing a new DTLS Association

2.1. General

As defined in [RFC5763], an endpoint MUST indicate (in an offer or
answer) that a new DTLS association to established in the following
cases:

o   The DTLS roles change;

o   The fingerprint (certificate) value changes;

o   The local transport parameters (IP address and/or port) of at
    least one endpoint change; or

o   If ICE is used and the ufrag value changes, and there is no
    explicit indication (SDP 'connection' attribute) that a new DTLS
    association shall not be established;

When a new DTLS association is established, an endpoint MUST use a
new set of transport parameters (IP address and port combination).

2.2. ICE Considerations

An ICE restart [RFC5245] does not by default require a new DTLS
association to be established. A new DTLS association needs to be
established only if or more of the criteria listed in Section 2.1 is
fulfilled (e.g. if the local transport paramters change).

As defined in [RFC5763], each ICE candidate associated with a
component is treated as being part of the same DTLS association.
Therefore, from a DTLS perspective it is not considered a change of
local transport parameters when an endpoint switches between those
ICE candidates.

2.3. SIP Considerations

When the Session Initiation Protocol (SIP) [RFC3261] is used as the
signal protocol for establishing a multimedia session, dialogs
[RFC3261] might be established between the caller and multiple
callees. This is referred to as forking. If forking occurs,
separate DTLS associations MUST be established between the caller and
each callee.

3. Abbreviations

TBD

4. Conventions

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].

5. SDP Connection Attribute for DTLS

5.1. General

The SDP 'connection' attribute [RFC4145] was originally defined for connection-oriented protocols, e.g. TCP and TLS. This section defines how the attribute is used with DTLS.

A 'connection' attribute value of 'new' indicates that a new DTLS association MUST be established. A 'connection' attribute value of 'existing' indicates that a new DTLS association MUST NOT be established.

When used with DTLS, there is no default value defined for the attribute. Implementations that wish to use the attribute MUST explicitly include it in SDP offers and answers. If an offer or answer does not contain an attribute, other means needs to be used in order for endpoints to determine whether an offer or answer is associated with an event that requires the DTLS association to be re-established.

6. SDP Offer/Answer Procedures

6.1. General

This section defines the SDP offer/answer procedures for using the SDP 'connection' attribute for DTLS. The section also describes how the usage of the SDP 'setup' attribute and the SDP 'fingerprint' attribute [RFC4572] is affected.

The procedures in this section are based on the procedures for SRTP-DTLS [RFC5763], with the addition of usage of the SDP 'connection' attribute.

6.2. Generating the Initial SDP Offer

   When the offerer sends the initial offer, and the offerer wants to
   establish a DTLS association, it MUST insert an SDP 'connection'
   attribute with a 'new' value in the offer. In addition, the offerer
   MUST insert an SDP 'setup' attribute according to the procedures in
   [RFC4572], and an SDP 'fingerprint' attribute according to the
   procedures in [RFC4572], in the offer.

   If ICE is used, the offerer MUST insert the SDP 'ice-ufrag' and 'ice-
   pwd' attributes according to the procedures in [RFC5245] in the
   offer.

6.3. Generating the Answer

   If an answerer receives an offer that contains an SDP 'connection'
   attribute with a 'new' value, the answerer MUST insert a 'new' value
   in the associated answer. The same applies if the answerer receives
   an offer that contains an SDP 'connection' attribute with a 'new'
   value, but the answerer determines (based on the criteria for
   establishing a new DTLS association) that a new DTLS association is
   to be established. In addition, the answerer MUST insert an SDP
   'setup' attribute according to the procedures in [RFC4572], and an
   SDP 'fingerprint' attribute according to the procedures in [RFC4572],
   in the answer.

   If the answerer does not accept the establishment of the DTLS
   association, it MUST reject the "m=" lines associated with the
   suggested DTLS association [RFC3264].

   If an answerer receives an offer that contains a 'connection'
   attribute with an 'existing' value, and if the answerer determines
   that a new DTLS association does not need to be established, it MUST
   insert a connection attribute with an 'existing' value in the
   associated answer. In addition, the answerer MUST insert an SDP
   'setup' attribute with a value that does not change the previously
   negotiated DTLS roles, and an SDP 'fingerprint' attribute with a
   value that does not change the fingerprint, in the answer.

   If the answerer receives an offer that does not contain an SDP
   'connection' attribute, the answerer MUST NOT insert a 'connection'
   attribute in the answer.

   If ICE is used, the answerer MUST insert the SDP 'ice-ufrag' and
   'ice-pwd' attributes according to the procedures in [RFC5245] in the
   answer.

If a new DTLS association is to be established, and if the answerer becomes DTLS client, the answerer MUST initiate the procedures for establishing the DTLS association. If the answerer becomes DTLS server, it MUST wait for the offerer to establish the DTLS association.

6.4. Offerer Processing of the SDP Answer

When an offerer receives an answer that contains an SDP 'connection' attribute with a 'new' value, and if the offerer becomes DTLS client, the offerer MUST establish a DTLS association. If the offerer becomes DTLS server, it MUST wait for the answerer to establish the DTLS association.

If the answer contains an SDP 'connection' attribute with an 'existing' value, the offerer will continue using the previously established DTLS association. It is considered an error case if the answer contains a 'connection' attribute with an 'existing' value, and a DTLS association does not exist.

6.5. Modifying the Session

When the offerer sends a subsequent offer, and the offerer wants to establish a new DTLS association, the offerer MUST insert an SDP 'connection' attribute with a 'new' value in the offer. In addition, the offerer MUST insert an SDP 'setup' attribute according to the procedures in [RFC4572], and an SDP 'fingerprint' attribute according to the procedures in [RFC4572], in the offer.

when the offerer sends a subsequent offer, and the offerer does not want to establish a new DTLS association, if a previously established DTLS association exists, the offerer MUST insert an SDP 'connection' attribute with an 'existing' value in the offer. In addition, the offerer MUST insert an SDP 'setup' attribute with a value that does not change the previously negotiated DTLS roles, and an SDP 'fingerprint' attribute with a value that does not change the fingerprint, in the offer.

If ICE is used, the offerer MUST insert the SDP 'ice-ufrag' and 'ice-pwd' attributes according to the procedures in [RFC5245] in the subsequent offer.

7. RFC Updates

Here we will add the RFC updates that are needed.

8. Security Considerations

This draft does not modify the security considerations associated with DTLS, or the SDP offer/answer mechanism. The draft simply clarifies the procedures for negotiating and establishing a DTLS association.

9. IANA Considerations

TBD

10. Acknowledgements

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11. Change Log

[RFC EDITOR NOTE: Please remove this section when publishing]

Changes from draft-holmberg-mmusic-sdp-dtls-01

o - draft-ietf-mmusic version of draft submitted.

o - Draft file name change (sdp-dtls -> dtls-sdp) due to collision with another expired draft.

Changes from draft-holmberg-mmusic-sdp-dtls-00

o - Editorial changes and clarifications.

12. Normative References

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Authors' Addresses

   Christer Holmberg
   Ericsson
   Hirsalantie 11
   Jorvas 02420
   Finland

   Email: christer.holmberg@ericsson.com

   Roman Shpount
   TurboBridge
   4905 Del Ray Avenue, Suite 300
   Bethesda, MD 20814
   USA

   Phone: +1 (240) 292-6632
   Email: rshpount@turbobridge.com