

# SDP negotiation of DataChannel sub-protocols

draft-ejzak-mmusic-data-channel-sdpneg-02

draft-ejzak-dispatch-msrp-usage-data-channel-01

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# Problem Statement

- How to negotiate use of well-defined sub-protocols over DataChannels
  - For sub-protocols that usually use SDP for negotiation, e.g., MSRP, BFCP, T140, T38
  - To support e2e signaling between different endpoint types via protocols that depend on SDP for media negotiation (e.g., SIP)
  - To allow interworking through gateways to endpoints that do not support DataChannels
  - To also support non-WebRTC endpoints
  - To support e2e negotiation of new protocols using DataChannel transport such as clue control

# DataChannel external negotiation

- The proposal of this draft is that negotiation gets bolted on top of the rtcweb data channel to configure particular channels that are established using the rtcweb data channel protocol.
- Some mechanism other than the data channel control protocol is used between peers to negotiate the data channel parameters for each bi-directional data channel. This is SDP offer / answer
  - In particular, the stream identifier is selected
- The SCTP protocol at each peer is told of the agreed data channel parameters and the DC is available for use as soon as the SCTP association is established

# New attribute a=dcmap

- Attribute for data channel negotiation (a=dcmap)
  - Stream identifier (indicates actual stream identifier within the association used to form the channel)
  - Sub-protocol (indicates the protocol expected to be exchanged via the channel)
  - Label (indicates name of the channel)
  - Reliability (max-retr indicates the data channel is unreliable, and therefore the max times the message will be retransmitted; max-time indicates the data channel is unreliable and gives lifetime of the message)
  - Order of delivery (ordered indicates that DATA chunks are preserved in order)
  - Priority (currently missing in definition)

# New attribute a=dcsa

- Attribute for data channel sub-protocol (a=dcsa)
  - Stream id
  - Attribute from RFC 4566

# Example SDP offer

```
m=application 10001 DTLS/SCTP webrtc-datachannel  
a=sctp-port 5000  
a=dcmap:2 subprotocol="MSRP";label="MSRP"  
a=dcsa:2 accept-types:message/cpim text/plain text/
```

# Changes and open issues since last presentation

- 2 revisions
- From -01 version
  - Formal syntax for dcmmap and dcsa attribute lines.
  - Making subprotocol as an optional parameter in dcmmap.
  - Specifying disallowed parameter combinations for max-time and max-retr.
  - Clarifications on data channel close procedures
- From -00 version
  - Revisions to identify difference between internal and external negotiation and their usage.
  - Introduction of more generic terminology, e.g. "application" instead of "browser".
  - Clarification of how "max-retr and max-time affect the usage of unreliable and reliable data channels.
  - Updates of examples to take into account the SDP syntax changes introduced with draft-ietf-mmusic-sctp-sdp-07.
  - Removal of the SCTP port number from the a=dcmmap and a=dcsa attributes as this is now contained in the a=sctp-port attribute, and as draft-ietf-mmusic-sctp-sdp-07 supports only one SCTP association on top of the DTLS connection.

# Identified changes to draft-ejzak-mmusic-data-channel-sdpneg-02

- Based on list discussion (lots of useful comments from Paul Kyzivat and Christian Groves):
- Section 5.1.13 (subprotocol parameter)
- Removal of the "[ACTION ITEM]" paragraph.
  - As draft-ietf-rtcweb-data-protocol we could refer to IANA's WebSocket Subprotocol Name Registry defined in [RFC6455].
- Whole document
- Replacement of "unreliable" with "partially reliable".
  - To use same terminology as draft-ietf-rtcweb-data-channel and draft-ietf-rtcweb-data-protocol "in most places".
  - (draft-ietf-rtcweb-data-channel-12 and draft-ietf-rtcweb-data-protocol-08 do also use "unreliable" at some places.)
- Section 5.1.1.4 (max-retr parameter)



# Identified changes to draft-ejzak-mmusic-data-channel-sdpneg-02

- Clarification of semantic if max-retr parameter is not present in a=dcmap attribute line
  - Christian agrees to replace "The max-retr parameter is optional with default value unbounded." with "The max-retr parameter is optional. If the max-retr parameter is not present, then the maximal number of retransmissions is determined as per the generic SCTP retransmission rules as specified in [RFC 4960]."
- Section 5.1.1.5 (max-time parameter)
  - Clarification of semantic if max-time parameter is not present in a=dcmap attribute line
    - Replace "The max-time parameter is optional with default value unbounded." with "The max-time parameter is optional. If the max-time parameter is not present, then the generic SCTP retransmission timing rules apply as specified in [RFC 4960]."
- Section 6 (Examples)
  - Correction of typo
    - In first two SDP offer examples in the a=dcmap attribute lines, 'label="BGCP"' should be replaced with 'label="BFCP"'

# Open issues

- Section 5.1.1.1 (dcmmap attribute)
- Definition of ABNF rule "dcmmap-opt"
  - The current draft contains following comment: "Either only maxretr-opt or maxtime-opt is present. Both MUST not be present."
  - Christian Groves proposed to change the formal definition of "dcmmap-opt" in order to syntactically enforce this restriction.
  - However, don't think that Christian's proposed change would work.
  - Paul Kyzivat also thinks that this would not work, suggests a potential alternative ABNF rule modification, which would still not solve the issue completely, and actually proposes to keep the constraints in text.
- Explicit "Channel type" and "Reliability Parameter" parameters versus attributes "max-retr", "max-time" and "ordered"
  - Christian asks "*... is there a reason why the draft doesn't follow the parameter structure of I-D.ietf-rtcweb-data-channel if its trying to emulate the information? i.e. a channel type and a reliability parameter. With these two parameters it's clear what type of data channel is being asked for rather than relying on the absence of parameters and also avoids having to specify valid combinations. It would allow support of new types (via the IANA registry) without new parameters.*"

# Open issues

- a=dcmap's SCTP stream id usage
  - In an email discussion just with us (not on the MMUSIC list) Christian Groves discusses SCTP stream id implications on the H.248 interface (related to H.248 stream id usage).
  - This discussion is especially about mixed DCEP based in-band and SDP offer/answer based out-of-band data channel negotiation.  
*In his last related email he says: "[CNG] Yes I agree mixing external and in-band "negotiation" does cause issues with a decomposed MGC/MG if both allocate SCTP Stream IDs, i.e. both are used to "negotiate" and "establish". However if the external method is only used to "negotiate" and the inband is used to "establish" then minimises the issues.*  
*I think the draft could easily be updated by indicating that if a=dcmap: has the value 0-65535 that it means that the external mechanism is used to negotiate and establish the subprotocol on that SCTP StreamID. If a=dcmap contains alpha label that means it is only used to negotiate the protocols used for the association. DCEP is used to assign the SCTP StreamIDs. By using an alpha label it means the existing mechanism for correlating dcmmap and dcsa can be used. "*
  - Should we consider following his proposal? (More detailed investigations would certainly be required in order to fully understand potential consequences.)
- Syntax of "label" parameter
  - In an email just to us (not on the MMUSIC list) Christian Groves proposes to replace the a=dcmap parameter "label" with e.g. "dclabel" (or similar) in order to avoid potential confusions with the "label" attribute as specified in RFC 4574.
  - RFC 4574's "label" attribute could theoretically be part of an a=dcsa attribute line if used as attribute of a data channel sub-protocol.
  - I myself would agree to Christian's proposal.
- IANA considerations – to provide

# MSRP over DataChannels

- One DC per MSRP session
- MSRP URI adds “dc” transport option
- msrp-scheme is always “MSRPS” with DC transport
- Use default DC reliability parameters (reliable, ordered) with binary format
- dcsa attributes can include: path, accept-types, accept-wrapped-types, max-size, sendonly, etc., setup, msrp-cema, [file attributes from RFC5547]

# Example SDP for MSRP over DC

```
m=application 10001 DTLS/SCTP webrtc-datachannel
a=fmtp:webrtc-datachannel max-message-size=100000
a=sctp-port 5000
a=setup:actpass
a=connection:new
a=fingerprint:SHA-1 \
    4A:AD:B9:B1:3F:82:18:3B:54:02:12:DF:3E:5D:49:6B:19:E5:7C:AB
a=dcmap:0 subprotocol="BFCP";label="BFCP"
a=dcmap:2 subprotocol="MSRP";label="MSRP"
a=dcsa:2 accept-types:message/cpim text/plain text/
a=dcsa:2 path:msrp://alice.example.com:10001/2s93i93idj;dc
```

# MSRP configurations supported

- e2e MSRP over data channel(s)
  - As described
- Via gateway to TLS/TCP transport
  - Using CEMA or MSRP B2BUA to interwork MSRP over DC with MSRP over TLS/TCP
  - MSRP transport related attributes (a=setup) and related semantics do not apply when data channel is used as transport.

# Changes planned to MSRP usage document

- Planned changes based on discussion
  - Syntax issue in a=dcmap attribute line examples
  - Spaces after ";" should be removed in the attribute line's parameter list.
- Open issue
  - Section 5.1.1.1 (Use of dcmap attribute)
    - Subprotocol identifier "MSRP"
      - "MSRP" is so far not registered as WebSocket sub-protocol on <http://www.iana.org/assignments/websocket/websocket.xml#subprotocol-name>
      - Should we add corresponding registration request/proposal to Section 8 (IANA Considerations)? Would draft-ejzak-mmusic-msrp-usage-data-channel be the right place for this?

# CLUE

- “CLUE” protocol name yet to be added to the 'Protocol Registry' defined by [I-D.ietf-rtcweb-data-protocol]. Would expect to be defined by [I-D.ietf-holmberg-clue-datachannel].



# Proposed work plan

- draft-ejzak-mmusic-data-channel-sdpneg-02
- draft-ejzak-mmusic-msrp-usage-data-channel-01
- One draft for each additional protocol to be supported (or inclusion in existing draft):
  - BFCP, T140, clue control, (T38?, others?)