T.140 Text Conversation over WebRTC Data Channels
draft-holmberg-mmusic-t140-usage-data-channel-00

Abstract

This document specifies how a WebRTC data channel can be used as a transport mechanism for the ITU-T Protocol for multimedia application text conversation (Recommendation ITU-T T.140), and how the SDP offer/answer mechanism can be used to negotiate such data channel, referred to as T.140 data channel.

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1. Introduction

The ITU-T Protocol for multimedia application text conversation (Recommendation ITU-T T.140) [T140] defines a protocol for text conversation, also known as realtime text or text telephony. The native transport for IP networks is based on the Real-time Transport Protocol (RTP) [RFC4103].

This document specifies how a WebRTC data channel [I-D.ietf-rtcweb-data-channel] can be used as a transport mechanism for T.140, and how the SDP offer/answer mechanism [I-D.ietf-mmusic-data-channel-sdpneg] can be used to negotiate such data channel.

In this document, a T.140 data channel refers to a WebRTC data channel for which the instantiated sub-protocol is "t140", and where the channel is negotiated using the SDP-based external negotiation method [I-D.ietf-mmusic-data-channel-sdpneg].

NOTE - This WebRTC term of a "T.140 data channel" is actually synonym to the originally introduced concept of a "T.140 data channel" for the T.140 protocol back in 1998, see Section 4.3 of [T140].

NOTE - The decision to transport realtime text over a data channel, instead of using RTP based transport [RFC4103], in WebRTC is constituted by use-case "U-C 5: Realtime text chat during an audio
and/or video call with an individual or with multiple people in a conference", see Section 3.2 of [I-D.ietf-rtcweb-data-channel].

The brief notation "T.140" is used as a synonym for the text conversation protocol according to [T140].

This document is based on an earlier Internet draft edited by Keith Drage, Juergen Stoetzer-Bradler and Albrecht Schwarz.

2. Conventions

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "NOT RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in BCP 14 [RFC2119] [RFC8174] when, and only when, they appear in all capitals, as shown here.

3. SDP Considerations

The generic SDP considerations, including the SDP Offer/Answer procedures, for negotiating a WebRTC data channel are defined in [I-D.ietf-mmusic-data-channel-sdpneg]. This section defines the SDP considerations that are specific to a T.140 data channel.

3.1. Use of dcmmap Attribute

An offerer and answerer MUST, in each offer and answer, include an SDP 'dcmmap' attribute [I-D.ietf-mmusic-data-channel-sdpneg] in the SDP media description (m= line) [RFC4566] describing the SCTP association [RFC4960] used to realize the T.140 data channel.

The offerer and answerer MUST include the following attribute parameters, and parameter values in the dcmmap attribute:

 - "label=" labelstring
 - "subprotocol=" "t140"

The offerer and answerer MUST NOT include the max-retr, max-time and ordered attribute parameters in the dcmmap attribute.

The offerer and answerer MAY, based on local policy, include the priority attribute parameter in the dcmmap attribute value.

Below is an example of the dcmmap attribute for a T.140 data channel with stream=3 and without any label:

```
a=dcmmap:3 subprotocol="t140"
```
3.2. Use of dcsa Attribute

An offerer and answerer MAY, in each offer and answer, include an SDP ‘dcsa’ attribute [I-D.ietf-mmusic-data-channel-sdpneg] in the SDP media description (m= line) describing the SCTP association used to realize the T.140 data channel.

If included, the ‘dcsa’ attribute contains the fmtp attribute used to indicate a maximum character transmission rate [RFC4103]. The ‘cps’ attribute parameter is used indicate the maximum character transmission rate that the endpoint that includes the attribute is able to handle. The ‘format’ attribute parameter is not used with T.140 data channels, and MUST be set to "-".

If not included, it indicates that no maximum character transmission rate is indicated. It does not mean that the default value of 30 applies [RFC4103].

The offerer and answerer MAY modify the ‘cpc’ attribute parameter value in subsequent offers and answers.

NOTE: The ‘cps’ attribute parameter is especially useful when a T.140 data channel endpoint is acting as a gateway [Section 5] and is interworking with a T.140 transport mechanism that have restrictions on how many characters can be sent per second.

Below is an example of the dcsa attribute for an T.140 data channel with a ‘cps’ attribute parameter with a attribute parameter value of 20:

a=dcsa:1 fmtp:- cps=20

3.3. Example

Below is an example of an SDP media description (m= line) describing an SCTP association used to realize a T.140 data channel.

m=application 911 UDP/DTLS/SCTP webrtc-datachannel
c=IN IP6 2001:db8::3
a=max-message-size:1000
a=sctp-port 5000
a=dcmap:1 label="text conversation";subprotocol="t140"
a=dcsa:1 fmtp:- cps=20
4. T.140 Considerations

4.1. Session Layer Functions

Section 6.1 of [T140] describes the generic T.140 session control functions at high-level and a signalling protocol independent manner. The list below describes how the functions are realized when using a T.140 data channel.

- Prepare session: An endpoint can indicate its support of T.140 data channels using signalling specific means (e.g., using SIP OPTIONS [RFC3261]), or by indicating the support in an offer or answer (Section 3)
- Initiate session: An offer used to request the establishment of a T.140 data channel (Section 3)
- Accept session: An answer used to accept a request to establish a T.140 data channel (Section 3)
- Deny session: An answer used to reject a request the establishment of a T.140 data channel, using the generic procedures for rejecting a data channel [I-D.ietf-mmusic-data-channel-sdpneg]
- Disconnect session: An offer or answer used to disable a previously established T.140 data channel, using the generic procedures for closing a data channel [I-D.ietf-mmusic-data-channel-sdpneg]
- Data: Data sent on an established T.140 data channel (Section 4.2)

4.2. Data Encoding and Sending

T.140 text is encoded and framed as T140blocks [RFC4103].

Each T140block is sent on the SCTP stream [RFC4960] used to realize the T.140 data channel using standard T.140 transmission procedures [T140]. One or more T140blocks can be sent in a single SCTP user message [RFC4960]. Unlike RTP based transport for realtime text [RFC4103], T.140 data channels do not use redundant transmission of text.

Data sending and reporting procedures conform to [T140].

See Section 8 of [T140] for coding details.

4.3. Data Buffering

As described in [T140], buffering can be used to reduce overhead, with the maximum buffering time being 500 ms. It can also be used for staying within the maximum character transmission rate (Section 3.2), if such has been provided by the peer.
5. Gateway Considerations

Multiple transport mechanisms have been defined for T.140 [T140], due to the long history and usage of the service in legacy packet-switched and circuit-switched networks. Some examples are listed below:

- IP text telephony in text conversation mode [RFC4103]
- IP text telephony in text relay mode, also known as Text-over-IP (ToIP) [V151]
- IP text telephony in text pass-through mode, also known as Voiceband-over-IP (VDoIP) [V152]
- PSTN text telephony

In addition to simply moving text between two transport mechanisms, a gateway might have to perform procedures related to events like inactivity of T.140 traffic, RTP packets received out of order and loss of incoming RTP packets.

The detailed gateway procedures for interworking between T.140 over data channel and other T.140 transport mechanisms are outside the scope of this document.

6. Security Considerations

The generic security considerations for WebRTC data channels are defined in [I-D.ietf-rtcweb-data-channel]. As data channels are always encrypted by design, the T.140 data channels will also be encrypted.

The generic security considerations for the SDP-based external negotiation method are defined in [I-D.ietf-mmusic-data-channel-sdpneg].

7. IANA considerations

[ RFC EDITOR NOTE: Please replace all instances of RFCXXXX with the RFC number of this document. ]

This document adds the subprotocol identifier "t140" to the "WebSocket Subprotocol Name Registry" as follows:

```
+--------------------------+-------------+
| Subprotocol Identifier:  | t140        |
| Subprotocol Common Name: | ITU-T T.140 |
| Subprotocol Definition:  | RFCXXXX     |
| Reference:               | RFCXXXX     |
+--------------------------+-------------+
```

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8. Acknowledgements

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9. References

9.1. Normative References


9.2. Informative References


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