WebRTC Data Channels

draft-ietf-rtcweb-data-channel-00

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Outline

- WebRTC framework:
  non-media data transport aspects

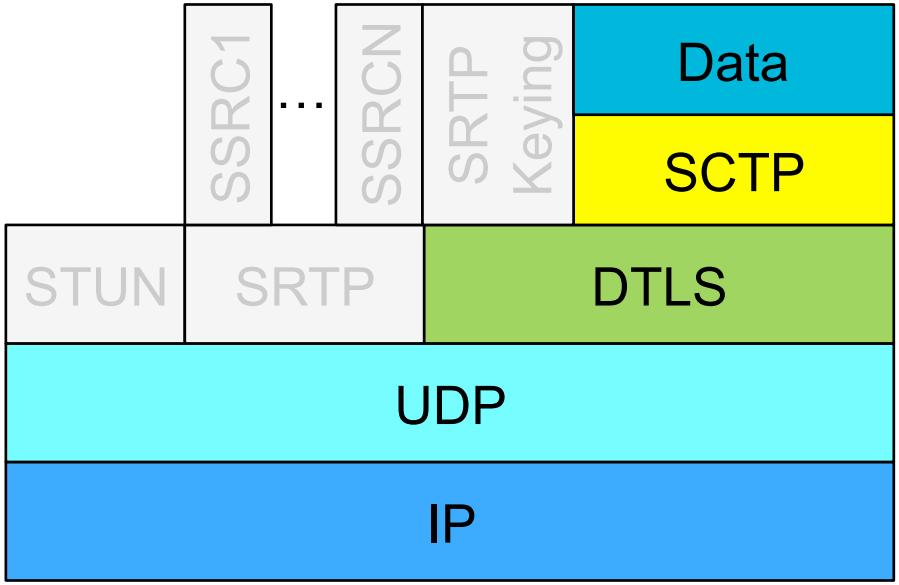
- Architectural overview of SCTP usage
  in WebRTC context

Data Channel Requirements

- Multiple data channels
- Reliable and unreliable
- MUST be congestion-controlled
- Provide relative priority
- Data streams MUST be encrypted
- MUST provide message fragmentation support
- Quality open-source userland implementation needed for deployment
- See draft for other implementation requirements

Protocol Stack

› consensus for SCTP encapsulated on DTLS



Datagrams over SCTP over DTLS over UDP

I-D.tuexen-tsvwg-sctp-dtls-encaps defines the SCTP usage on top of DTLS

The stack provides a NAT traversal solution together with

- Confidentiality
- Source authenticated
- Integrity protected transfer

SCTP also provides

- Support of multiple streams
- Ordered and unordered delivery of user messages
- Reliable and partial-reliable transport of user messages
- Payload Protocol Identifier (PPID)

Envisioned Usage of SCTP

The appealing features of SCTP in the RTCWeb context are:

- TCP-friendly congestion control
- The congestion control is modifiable for integration with media stream congestion control.
- Support for multiple channels with different characteristics.
- Support for out-of-order delivery.
- Support for large datagrams and PMTU-discovery and fragmentation.
- Reliable or partial reliability support.
- Support of multiple streams.

Multihoming will not be used in this scenario.

Association Setup

- when the two endpoints of the WebRTC PeerConnection agree on opening it, as negotiated by JSEP (e.g. an SDP exchange);
  It would use the DTLS connection created at the start of the PeerConnection connection.

Number of simultaneous streams:

- Indicated by the application when opening the association,
- if no value is supplied, the default suggested value is 16
- more simultaneous streams can be added to an existing association [RFC6525] (but not removing)

Channel Definition

SCTP stream is an unidirectional logical channel existing within an SCTP association one to another SCTP endpoint.

bidirectional ***Data Channel*** is a pair of

- one incoming SCTP stream
- one outgoing SCTP stream.

N.B. *for a data channel, all messages share the same reliability parameters (i.e. this is different than raw SCTP)*

Channel Definition

Closing of a Data Channel

resetting the corresponding streams [RFC6525]
(i.e. Stream Sequence Numbers (SSNs) back to 'zero')

Note: It might be useful to use a specific pair of SCTP streams for transporting control information.

Usage of Payload Protocol Identifier

SCTP Payload Protocol Identifiers (PPIDs) can be used to signal the interpretation of the "Payload data", like:

- a string, ASCII or binary data.

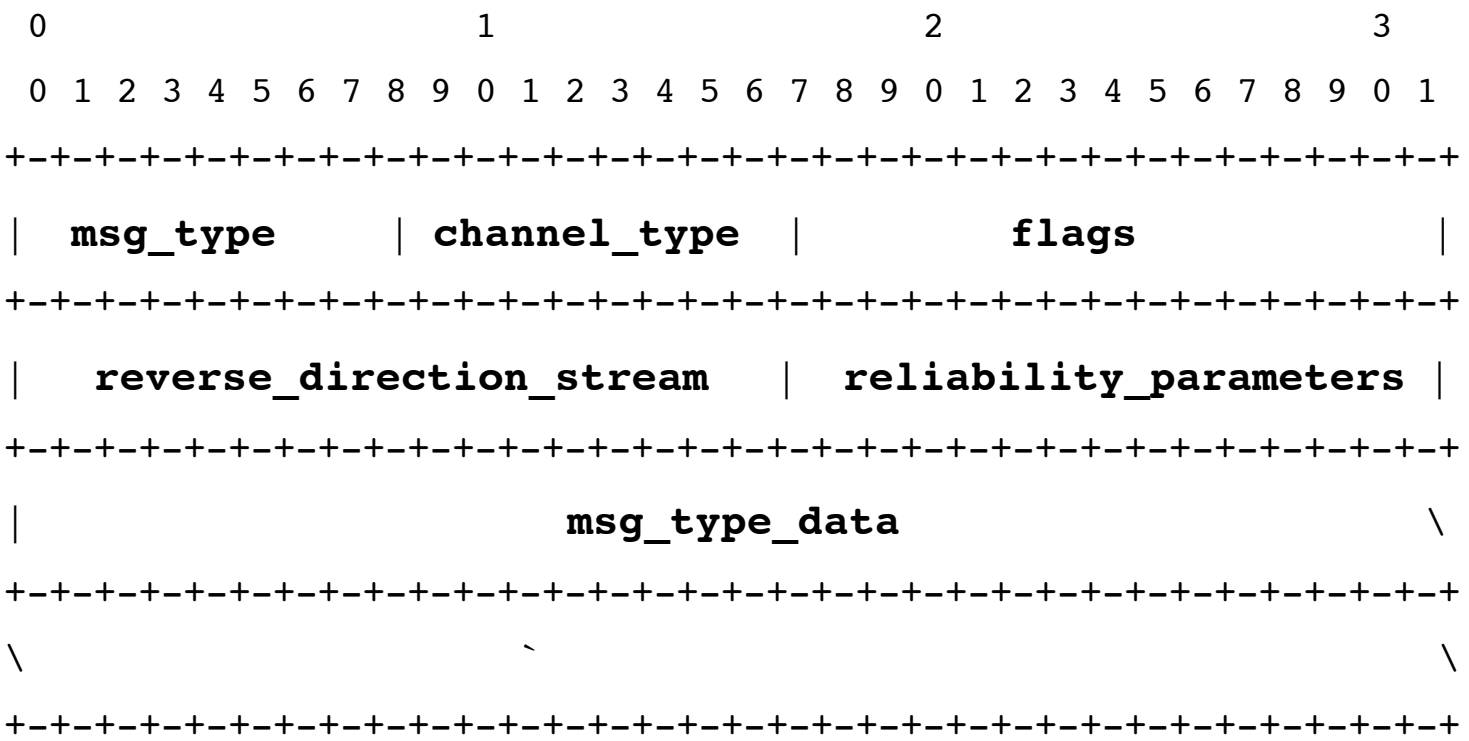
Minor Protocol and Message Format

draft-jesup-rcweb-data-protocol defines the minor protocol to set up and manage the bidirectional data channels.

WebRTC Data Channel Protocol

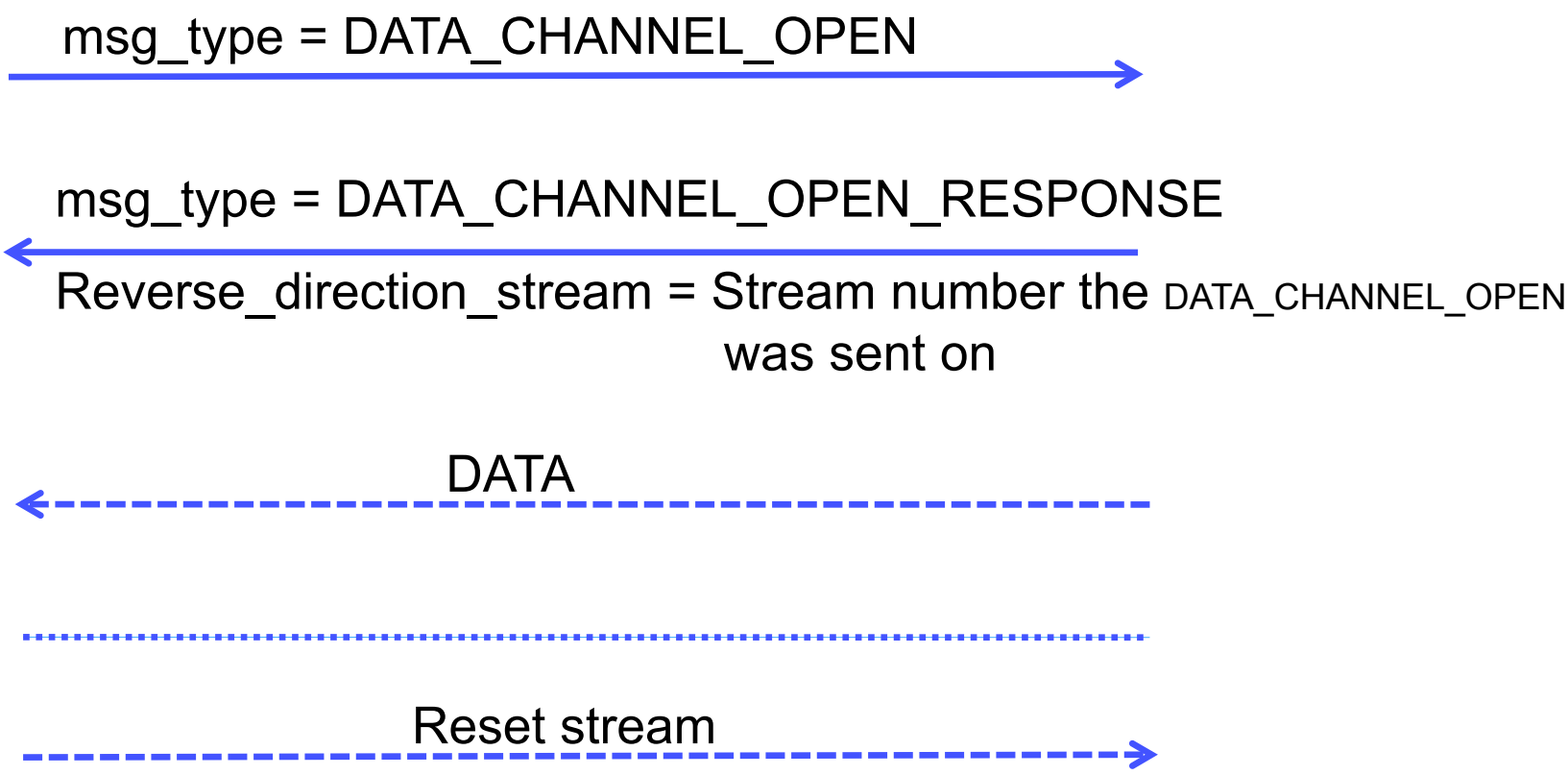
draft-jesup-rtcweb-data-protocol-00.txt

Control Message Format



Control Messages

Control Messages are sent to manage opening bidirectional channels setting PPID = WebRTC (TBD by IANA).



Data Messages

Data shall be sent using PPID's other than the WebRTC PPID.

The meaning of these data PPIDs and the format of the data shall be specific to the usage of this protocol, typically shall be provided to the higher layers to allow proper data decoding.

new SCTP Payload Protocol Identifiers (PPIDs)

WebRTC Control - #To Be Assigned

DOMString - #To Be Assigned

Binary Data - #To Be Assigned.