**Source:** Nokia Corporation[[1]](#footnote-1)

**Title: [5G\_RTP] Different options for real-time metadata transport**

**Document for** Agreement

**Agenda item:** 10.8

# Introduction

This contribution discusses the different available options for transport of real-time metadata, including the potential solutions contributed to the RTC SWG so far. Although the contribution is registered to 5G\_RTP (since two of the discussed options are RTP-based), non-RTP based transport of metadata using WebRTC data channels is also considered.

# Real-time transport of interaction metadata

There are at least three different ways to transport real-time metadata using the existing technologies in 3GPP:

1. WebRTC data channel
2. RTP header extension
3. New RTP payload format

A potential solution for **Option 1** was proposed in S4-221557 at SA4 #121. The solution proposes to use the SCTP chunk payload data type format to carry the interaction metadata. A generic data channel payload format for timed metadata including a timestamp is added to the chunk user data section.

Data channel is a flexible option for metadata transport since it allows carriage of metadata not directly associated to media and enables differentiation in terms of reliability, priority and ordering requirements by setting up data channels with different properties. On the downside, there is no inherent timing and FEC mechanisms in SCTP.

A potential solution for **Option 2** was presented in S4-221555 at SA4 #121. The solution proposes a RTP header extension design to carry metadata while media content is carried in the RTP payload. According to the proposed solution, a single metadata type or multiple metadata types can be carried in the header extension.

RTP header extension solution has the advantage that the transported metadata is time-synchronized to the media data. Moreover, all the robustness and timing mechanisms provided by RTP are included (e.g. timestamp, FEC). However, it only makes sense if a media stream exists. In case no media stream is present, transmission of RTP packets with empty/dummy payloads would be required. Another concern is the potentially large size of the RTP headers, depending on the metadata type. RTP header extensions can also be silently discarded by a receiver, if the latter is unable to parse them.

**Option 3** is the usage of a separate RTP stream where the interaction metadata is carried in the RTP payload. In RTP, the details of media encoding, such as signal sampling rate, frame size and timing, are specified in RTP payload formats. Hence, sending interaction metadata in a separate RTP stream requires defining a new RTP payload format for interaction metadata. Such a payload format would enable the usage of all RTP mechanisms (timing, robustness etc.) while providing a generic format that can cover all types of interaction metadata.

RTP payload formats are typically developed in IETF. However, definition of a new payload format typically takes around 2 years in IETF meaning that for 3GPP, the developed format would at the earliest be useful in Rel. 19. In MeCAR, 3GPP has mainly considered the interaction metadata types defined in the XR standards so far (e.g., OpenXR) that have applications reaching beyond 3GPP. This raises the question whether a potential payload format for interaction metadata would not also be useful in other (non-3GPP) applications.

As a summary, the advantages and disadavantages of the discussed options are given in the following table.

|  |  |  |
| --- | --- | --- |
|  | **Advantages** | **Disadvantages** |
| 1. **WebRTC data channel**
 | * Allows carriage of metadata without a media RTP stream.
* Differentiation in terms of reliability, priority and ordering requirements for different data channels
 | * No timing mechanism / timestamp in SCTP
* No FEC mechanism in SCTP
 |
| 1. **RTP header extension**
 | * Useful for a quick solution in Rel. 18
* Time-synchronized to media stream
* Enables usage of mechanism already provided by RTP (robustness, timing etc.)
* May be silently discarded by a receiver, if it does not understand the header extension, without aborting the ongoing multimedia session.
 | * Only feasible when the sender of the metadata is also sending a media stream.
* May cause large RTP headers
 |
| 1. **New RTP payload format**
 | * Can be a generic format covering all types of interaction metadata
* All RTP mechanisms can be used
* Can be used in non-3GPP environments
 | * Defining a new payload format may take around 2 years if done in IETF. This mean this solution can be useful earliest in Rel. 19.
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# Proposal

This discussion gives an overview of the existing options and aims to start a discussion on their feasibility in 3GPP. However, it doesn’t mean that these options are mutually exclusive; multiple solutions may also co-exist addressing different requirements. We would like to collect opinions from the RTC SWG group on the merits of the different options and open questions. We propose to include section 2 in the 5G\_RTP permanent document for further consideration.

**References**

[1] S4-221557, Real-time metadata transport over data channel, SA4 #121

[2] S4-221555, Real-time metadata transport over RTP, SA4 #121

1. Contact: Igor Curcio, Saba Ahsan, Serhan Gül, Nokia Technologies, Finland. Emails: íigor.curcio, saba.ahsan, serhan.guelý@nokia.com. [↑](#footnote-ref-1)