**3GPP TSG SA4 WG4 Meeting #129-e *S4-241447***

**Online, August 19 2024- August 23 2024**

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| *CR-Form-v12.3* | | | | | | | | |
| **Pseudo CHANGE REQUEST** | | | | | | | | |
|  | | | | | | | | |
|  | **TR 26.822** | **CR** | **-** | **rev** | **-** | **Current version:** | **0.1.1** |  |
|  | | | | | | | | |
| *For* [***HE******LP***](http://www.3gpp.org/3G_Specs/CRs.htm#_blank)*on using this form: comprehensive instructions can be found at* [*http://www.3gpp.org/Change-Requests*](http://www.3gpp.org/Change-Requests)*.* | | | | | | | | |
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| ***Proposed change affects:*** | UICC apps |  | ME |  | Radio Access Network |  | Core Network |  |

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| ***Title:*** | [FS\_5G\_RTP] Key Issue #9 RTP Multiplexing KI Description text update | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Source to WG:*** | Huawei, Hisilicon | | | | | | | | | |
| ***Source to TSG:*** | SA WG4 | | | | | | | | | |
|  |  | | | | | | | | | |
| ***Work item code:*** | FS\_5G\_RTP\_Ph2 | | | | |  | ***Date:*** | | | 12/8/2024 |
|  |  | | | |  | |  | | |  |
| ***Category:*** | **C** |  | | | | | ***Release:*** | | | 19 |
|  | *Use one of the following categories:* ***F*** *(correction)* ***A*** *(mirror corresponding to a change in an earlier release)* ***B*** *(addition of feature),* ***C*** *(functional modification of feature)* ***D*** *(editorial modification)*  Detailed explanations of the above categories can be found in 3GPP [TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm). | | | | | | | | *Use one of the following releases: Rel-8 (Release 8) Rel-9 (Release 9) Rel-10 (Release 10) Rel-11 (Release 11) … Rel-17 (Release 17) Rel-18 (Release 18) Rel-19 (Release 19)  Rel-20 (Release 20)* | |
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| ***Reason for change:*** | | Current KI #9 description mentions that UDP multiplexing is commonly used in RTP, while this is not the case in practice. In addition current practice should also be explored in this Key issue for multiplexing content over RTP. In addition multiplexing should be studied in the context of PDU Set marking and 5G QoS and results should be coordinated with SA2. | | | | | | | | |
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| ***Summary of change:*** | | Update the text to reflect the current RTP adoption | | | | | | | | |
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| ***Consequences if not approved:*** | | Unclear key issue description. | | | | | | | | |
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| ***Clauses affected:*** | | 5.9 | | | | | | | | |
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|  | | **Y** | **N** |  | | | |  | | |
| ***Other specs*** | |  | **x** | Other core specifications | | | | TS/TR ... CR ... | | |
| ***affected:*** | |  | **x** | Test specifications | | | | TS/TR ... CR ... | | |
| ***(show related CRs)*** | |  | **x** | O&M Specifications | | | | TS/TR ... CR ... | | |
|  | |  | | | | | | | | |
| ***Other comments:*** | |  | | | | | | | | |
|  | |  | | | | | | | | |
| ***This CR's revision history:*** | |  | | | | | | | | |

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| CHANGE 1 |

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 26.522: "5G Real-time Media Transport Protocol Configurations".

[3] 3GPP TS 23.501: "System architecture for the 5G System (5GS)".

[4] IETF RFC 8872: "Guidelines for Using the Multiplexing Features of RTP to Support Multiple Media Streams".

[5] IETF RFC 5761: "Multiplexing RTP Data and Control Packets on a Single Port".

[6] 3GPP TR 23.700-70: "Study on architecture enhancement for Extended Reality and Media service (XRM); Phase 2".

[7] IETF RFC 8285 (2017): "A General Mechanism for RTP Header Extensions", D. Singer, H. Desineni, R. Even.

[8] IETF RFC 3711: "The Secure Real-time Transport Protocol (SRTP)".

[9] IETF RFC 9335: "Completely Encrypting RTP Header Extensions and Contributing Sources".

[10] IETF RFC 6904 (2013): "Encryption of Header Extensions in the Secure Real-time Transport Protocol (SRTP)", J. Lennox.

[11] IETF RFC 8402 (2018): "Segment Routing Architecture".

[12] IETF RFC 791 (1981): "Internet Protocol".

[13] IETF RFC 5109: "RTP Payload Format for Generic Forward Error Correction (ULP FEC): Uneven Level Protection, different redundancies for different packets with different importance".

[14] IETF RFC 8627: "RTP Payload Format for Flexible Forward Error Correction (Flex FEC): flexible FEC".

[15] IETF RFC 6681: "Raptor Forward Error Correction (FEC) Schemes for FECFRAME: FEC scheme based on the Raptor".

[16] IETF RFC 6865: "Simple Reed-Solomon Forward Error Correction (FEC) Scheme for FECFRAME: FEC scheme based on Reed-Solomon".

[17] IETF RFC 5053: "Raptor Forward Error Correction Scheme for Object Delivery".

[18] IETF RFC 6330: "RaptorQ Forward Error Correction Scheme for Object Delivery".

[19] IETF RFC 6363: “Forward Error Correction (FEC) Framework”.

[20] IETF RFC 8854: “WebRTC Forward Error Correction Requirements”.

[21] 3GPP TR 38.340: "Study on User Equipment (UE) power saving in NR".

[22] IETF RFC 8298: "Self-Clocked Rate Adaptation for Multimedia".

[23] Enhancing Video Network Resiliency With LTR and RS Code | At Scale Conferences, available online: https://atscaleconference.com/enhancing-video-network-resiliency-with-ltr-and-rs-code/

[24] P. Aggarwal et al., [2304.03732] Enabling immersive experiences in challenging network conditions (arxiv.org)

[25] Nvidia GeForce Now, Video FEC for WebRTC presentation 17 Nov. 2022, available online: https://www.youtube.com/watch?v=igm7QkqxHqk&ab\_channel=KrankyGeek

[26] Holmer S., et al., Handling Packet Loss in WebRTC, 2013 IEEE International Conference on Image Processing, available online: <https://static.googleusercontent.com/media/research.google.com/en//pubs/archive/41611.pdf>.

[27] A Google Congestion Control Algorithm for Real-Time Communication, draft-ietf-rmcat-gcc-02, 2016.

[28] WebRTC source code: https://source.chromium.org/chromium/chromium/src/+/main:third\_party/webrtc, retrieved May 1, 2024.

[29] IETF RFC 8698: "Network-Assisted Dynamic Adaptation: A Unified Congestion Control Scheme for Real-Time Media", 2020.

[30] Self-Clocked Rate Adaptation for Multimedia, draft-johansson-ccwg-rfc8298bis-screamv2-00, 2024.

[31] IETF RFC 4588: "RTP Retransmission Payload Format".

[32] 3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia telephony; Media handling and interaction".

[yy] IETF RFC 2250 RTP Payload Format for MPEG1/MPEG2 Video

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| CHANGE 1 |

## 5.9 Key Issue #9: Feasibility of RTP multiplexing options for transport of XR media streams

### 5.9.1 Description

RTP originally relied on UDP multiplexing for carriage of different media streams (using different UDP ports for each stream and RTCP).

However, in practice assigning additional UDP ports has been problematic, and RTP based multiplexing is used as an alternative.

For RTP multiplexing of streams in a single RTP session, the SSRC is generally used as described in RFC 8872 [4].

In addition, combining RTCP and RTP on the same port is referred to as RTP/RTCP multiplexing.

In this case, the RTP and RTCP traffic can be multiplexed and demultiplexed using the shared second Byte of the UDP payload (i.e., the RTCP packet type and the RTP M bit & RTP payload type) as described in RFC 5761 [5].

In WebRTC the same port may be used for RTP, RTCP and different streams.

In addition, other forms of multiplexing may be used to support carriage of different streams over RTP that have been popular in the media industry (e.g. MPEG-2 based multiplexing).

For example in MPEG-2 TS over RTP [yy] the small TS packets of 188 bytes can be interleaved in an RTP packet. So in this case an RTP packet contains multiple small transport stream packets that could be audio, video or even metadata related to a television program. This would lead to RTP packet including multiple media types.

It is proposed to:

- Study and document existing options for RTP multiplexing.

- Identify the potential gaps on support of different use cases.

- Identify and document other popular ways of supporting multiplexed content in RTP transmission if any

- Study and identify how multiplexed RTP can benefit from PDU Set marking header extensions.

- Study the relevance of identifying multiplexed streams in 5GS and explore potential benefits of additional support in 5GS.

NOTE: This issue may require coordination with SA2. Additional support in 5GS refers to the multiplexed traffic detection and QoS Flow mapping in FS\_XRM\_Ph2.