**3GPP TSG SA WG4 RTC SWG 128 S4-240957**

**Jeju, Korea, 20 – 24 May, 2024 Revision of S4-240575**

**Source: Samsung Electronics CO., LTD, NTT, Vodafone**

**Title: [draft] SID on immersive Real-Time Communication for WebRTC, Phase 2**

**Document for: Approval**

**Agenda Item: 4.8**

3GPP™ Work Item Description

Information on Work Items can be found at <http://www.3gpp.org/Work-Items>
See also the [3GPP Working Procedures](http://www.3gpp.org/specifications-groups/working-procedures), article 39 and the TSG Working Methods in [3GPP TR 21.900](http://www.3gpp.org/ftp/Specs/html-info/21900.htm)

Title: Study on immersive Real-Time Communication for WebRTC, Phase 2

Acronym: FS\_iRTCW\_Ph2

Unique identifier:

Potential target Release: Rel-19

# 1 Impacts

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Affects: | UICC apps | ME | AN | CN | Others (specify) |
| Yes |  | X |  | X |  |
| No | X |  | X |  | X |
| Don't know |  |  |  |  |  |

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
| X | Study  |
|  | Normative – Stage 1 |
|  | Normative – Stage 2 |
|  | Normative – Stage 3 |
|  | Normative – Other\* |

## 2.2 Parent Work Item

For a brand-new topic, use “N/A” in the table below. Otherwise indicate the parent Work Item.

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| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
| GA4RTAR | S4 | 960044 | Generic architecture for RT and AR/MR media |
| iRTCW | S4 | 950014 | immersive Real-Time Communication for WebRTC |
| FS\_eiRTCW | S4 | 950012 | Feasibility Study on the enhancements for immersive Real-time Communication for WebRTC |

### 2.3 Other related Work Items and dependencies

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| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 960046 | Real-time Transport Protocols Configurations (5G\_RTP) | Media transport aspects and RTP profile for WebRTC. |
| 1030007 | Study of 5G Real-time Transport Protocol Configurations, Phase 2 | Media transport aspects and RTP profile for WebRTC. |
| 1030006 | Study on Advanced Media Delivery (FS\_AMD) | Further harmonization of RTC and Streaming for Advanced Media Delivery |
| 950015 | Media Capabilities for Augmented Reality (MeCAR) | Signalling and metadata for immersive media communication specified |
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# 3 Justification

In Release-18, SA4 addressed the work for specifying the initial set of 5G generic architecture and the protocols used for WebRTC-based Real-Time media Communication (RTC). The purpose of the work is to support WebRTC-based real-time media communication services (especially for immersive services) in different collaboration models between 5GS operators and third-party media communication service providers. As a result of the work, (a) TS 26.506 specifies RTC architecture, functionalities and call flows required for collaboration scenarios and (b) TS 26.113 specifies the protocols applicable over the interfaces of the RTC architecture.

In addition, SA4 had studied the possible enhancement of RTC architecture and its associated signalling protocols (FS\_eiRTCW, UID=950012) for some specific collaboration scenarios. This study does not provide any recommendation for normative works, but it contains some useful key findings to be considered as improved/extended RTC features in Release-19 timeframe.

To better support the immersive media communication over RTC for various service scenarios, the following number of key issues should be investigated further:

**1. Media capabilities, profiles and codecs for RTC.**
The parent work item, iRTCW (UID=950014) was intended to specify the immersive media components, but TS 26.113 primarily specifies the protocols and APIs for real-time communication, which are not restricted to specific profiles nor codecs. TS 26.119 has developed the immersive media codecs and profiles in Release-18 for generic service, it should be studied the suitable subset for real-time media communication in this study.

**2. Signalling and metadata to support immersive media capabilities**
TS 26.113 specified reference point of RTC-4s and RTC-4m for exchange of signalling and metadata information, respectively, However there needs more studies to improve the usage of these interfaces. Particularly, the device type and media capabilities identifiers specifically for UEs with immersive media capabilities are defined in TS 26.119, but 26.113 did not specify how these identifiers could be incorporated into RTC system. Also, 26.113 addressed some essential metadata (e.g,. depth sensors) in the Annex, but it remains as FFS how to make this usable. In this study, the requirements and the potential list of signalling and metadata are identified.

**3. Enhancements of RTC architecture variant for collaboration scenario 3.**TS 26.506 had specified the basic architecture for collaboration scenario 3, where all the required functional entities are located in the trusted DN. Then, it was further studied in Release-18 study (FS\_eiRTCW) to improve utility of RTC AS for RTC application providers and support of Web browser type applications, as provided in TR 26.930. As these enhanced features have potential impacts on the existing RTC architecture (e.g., adding new APIs exposed to content providers), it is worthwhile to investigate the followings in this study to conclude the recommendation for normative work from the key findings of TR 26.930, particularly:

- The potential enhancements of the functional architecture for supporting service control API exposed to RTC application providers and its API specification were provided in clause 5.6 of TR 26.930, based on the Derivative RTC architecture for collaboration scenario 3 defined in TS 26.506. However, the gap analysis between the service control APIs and existing APIs over RTC-1 is necessary for identifying how to implement the service control APIs into the latest version of the RTC architecture, considering harmonization with Generalized Media Delivery architecture.

- WebRTC signalling function (WSF) discovery mechanisms using MSH have been specified during Release-18. However, this mechanism is not applicable to Web App (i.e., Java application on a web browser). Then a WSF discovery mechanism applicable to Web App was studied and documented in clause 6.7 of TR 26.930. This mechanism is applicable to collaboration scenario 3 and has potential benefit in some use case (e.g., a UE can find an appropriate WSF among multiple WSFs in a single operator domain), but these use case(s) has not been documented in TR 26.930. Then it is encouraged to study and document the use case(s) of this mechanism.

**4. Empty RTC architecture variant for collaboration scenario 4.**While TS 26.506 identified four collaboration scenarios depending on the required functional entities in trusted DN, the collaboration scenario 4 (Inter-operable WebRTC services over multiple MNOs) was not specified due to less priority in the Release-18. TR 26.930 has provided the potential derivative RTC architecture for collaboration scenario 4. However, procedures and call flows for collaboration scenario 4 was not studied and documented in TR 26.930. Then, to conclude the recommendation for normative work from the key findings of TR 26.930, it is encouraged to specify procedures and call flows for collaboration scenario 4 and confirm the technical feasibility of the proposed derivative RTC architecture for collaboration scenario 4.

**5. WebRTC signalling protocol supporting collaboration scenario 4.**
TS 26.113 specification in Release-18 specified the signalling protocol of SWAP (Simple WebRTC Application Protocol) dedicated for collaboration scenario 3 (single operator scenario) but did not specify the signalling protocol which supports collaboration scenario 4 (supporting inter-MNO connection). TR 26.930 provides the WebRTC signalling protocol, RESPECT (REaltime&REality media Setup Protocol, Extensible and CompacT) which was motivated to support collaboration scenario 4 with Web-based technology by accommodating the extended features in RTC architecture. To conclude the recommendation for normative work from the key findings of TR 26.930, it is encouraged to study the potential improvement of the protocol for efficient alignment with the procedures and call flows.

**6. Support of tethered cases in RTC system.**
How to support tethered cases on RTC architecture was studied and documented in TR 26.930. Tethered case is one of the possible use cases of immersive RTC services, but the solutions were not completed during the Release-18 study, particularly for following aspects:

1. Identification of the supported scenario for tethered cases. (e.g., "Native WebRTC App/Web App" on the tethered device and "Native WebRTC App/Web App" on the UE.)

2. Capabilities required to tethered devices.

3. Evaluate the SA2 solution in TS 23.501 on E2E QoS when there are non-3GPP networks also involved for the use cases considered under SA4 and identify potential gaps and coordinate with SA2 for new solutions if needed

# 4 Objective

This study item aims to:

A. Document the following key issues in detail, and in particular how they relate to the existing RTC architecture and protocols specified in TS 26.506 and TS 26.113:

1. Media capabilities, profiles and codecs for RTC

2. Signalling and metadata to support immersive media capabilities

3. Enhancements of RTC architecture variant for collaboration scenario 3

4. Empty RTC architecture variant for collaboration scenario 4

5. WebRTC signalling protocol supporting collaboration scenario 4

6. Support of tethered cases in RTC system

NOTE 1: Item 2 & 3 (potentially relevant to Stage-2 specifications) may have higher urgency in the work plan considering Release-19 Stage-2 timeline.

B. Identify solutions for each of the key issues

C. Identify suitable one for key issues requiring solutions and recommend normative work to relevant specifications.

# 5 Expected Output and Time scale

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| --- |
| New specifications {One line per specification. Create/delete lines as needed} |
| Type  | TS/TR number | Title | For info at TSG#  | For approval at TSG# | Rapporteur |
| TR | 26.8xx | Enhancements on Real-Time Media Communication for WebRTC | SA#105 (Sept. 2024) | SA#106 (Dec. 2024) | TR Editor: Yoshihiro INOUE (Yoshihiro.inoue@ntt-at.co.jp) |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
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|  |  |  |  |

# 6 Work item Rapporteur(s)

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# 7 Work item leadership

SA4

# 8 Aspects that involve other WGs

Coordination with other WGs, e.g., SA2, CT1 and CT3, may be necessary for the architectural and protocol discussions.

# 9 Supporting Individual Members

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| Supporting IM name |
| NTT |
| Samsung Electronics, CO., LTD |
| Vodafone |
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