**3GPP TSG SA#95-e SP-220239**

**March 15–24, 2022, Electronic Meeting** **(WG Tdoc: S4-220334)**

**Source: SA2**

**Title: New Feasibility Study on the enhancements for immersive Real-time Communication for WebRTC**

**Document for: Agreement**

**Agenda Item: 6.4**

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: 950012

Potential target Release: Rel-18

# 1 Impacts

*{For Normative work, identify the anticipated impacts. For a Study, identify the scope of the study}*

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

# 2 Classification of the Work Item and linked work items

## 2.1 Primary classification

### This work item is a …

|  |  |
| --- | --- |
|  | **Feature** |
|  | **Building Block** |
|  | *Work Task* |
| X | **Study Item** |

## 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)** |
| FS\_5GSTAR | S4 | 880011 | Study on 5G Glass-type AR/MR Devices |
| iRTCW | S4 |  | 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** |
| 810006 | Extended Reality (XR) in 5G | Initial study on AR/MR and key use cases. |
| 850042 | Study on evolution of IMS multimedia telephony service | Feasibility study on AR call |
| 600040 | Study on Web Real Time Communication (WebRTC) access to IP Multimedia Subsystem (IMS); Stage 2 | Architectural study of WebRTC access to IMS (SA2) |
| 630014 | Study on enhancements to Web Real Time Communication (WebRTC) access to IP Multimedia Subsystem (IMS); Stage 2 | SA1/2/3 study to enhance WebRTC for accessing IMS |
|  | Media Capabilities for Augmented Reality (MeCAR) | Media capabilities of AR devices |
|  | 5G Generic Architecture for AR/MR Experience (5G\_AREA) | Stage-2 work on generic AR/MR media architecture (under preparation) |
|  | 5G Real-time Transport Protocols (5G\_RTP) | (under preparation) |
|  | Feasibility Study on Smartly Tethering AR Glasses (SmarTAR) | Study on tethered AR devices with enhanced end-to-end QoS |

# 3 Justification

Beyond traditional 3GPP MTSI services, real-time transport of media over 5G systems is needed in new areas: the transport of immersive media for XR conferencing services, as often illustrated in the use cases regarding Metaverse, and the transport of media between 3rd party applications in the device and network. To support these new features and applications it necessary to,

* Develop and enhance mechanisms to establish appropriate E2E QoS, media handling and adaptation, cross-layer optimizations, and QoE reporting, to support the more demanding data rate, latency, error rate, and capacity requirements needed for the real-time transport of immersive media.
* Develop non-vertical/modularized components (e.g., transport, session negotiation, QoS establishment) of a real-time transport session to serve as enablers for other services, features, and flexible collaboration models with 3rd party service providers and application developers. Develop APIs to enable the use of these components by services, features, mobile operating systems, and applications.
* Develop WebRTC-based components that are integrated into, and optimized for, the 5G system.
* Extend the functional components of a terminal to support immersive media (e.g., 3D video and spatial audio) and enable wireless or wired tethering with devices external to the UE.

In addition to the foreseen approach identified in TR 26.998 and taken in iRTCW (which does not address any details of C-plane signalling and simply makes use of the northbound APIs for end-to-end QoS), there is some room for defining a set of advanced detailed specifications (including C-plane signalling) for the common use in several WebRTC implementations. By relying on the modularity, extensibility and developer-friendliness, which are potentially provided by the WebRTC design principles, this approach with the common spec allows wider connectivity among different network operators and even OTTs while maintaining the key characteristics of WebRTC. This approach is different from the SIP/IMS-based approach (SIP/IMS encapsulated in WebRTC framework), which is already investigated in the previous work (e.g., TS 24.371) and highly tuned to network operators. Non-browser implementations will also be taken into account.

Support for E2E QoS, including the transport segments that are usually not managed by mobile network operators, is also an important aspect that requires further study.

NOTE – Activity in WebRTC Next Version (WebRTC-NV) should be taken into account.

# 4 Objective

In addition to the foreseen approach identified in TR 26.998 (Support of 5G glass-type AR/MR devices) and taken in WID on iRTCW (immersive Real-time Communication for WebRTC), which leaves C-plane signalling details open and simply makes use of the northbound APIs for end-to-end QoS), the possibility of another approach (i.e., defining a set of advanced details (including C-plane signalling) for the common and wider use among several WebRTC implementations) will be investigated under this SID.

It is proposed to conduct the following study:

Objective 1: Analyze gaps and identify required enhancements of terminal device and network architectures including additional functional entities (e.g., WebRTC Signalling Server, ICE-STUN Server, IMS Interworking Gateway, NNI Gateway).

Objective 2: Identify impacts on and possible enhancements for the WebRTC-based U-plane components in terms of adaptation, media handling, and cross-layer optimizations over 5G systems.
NOTE – WIDs on 5G\_RTP and iRTCW are taken into account as a basis.

Objective 3: Identify signalling protocol details (e.g., based on JSON) for the common WebRTC-based immersive RTC session management.

Objective 4: Identify information elements in the C/U-Plane signal (including NNI) to enhance connectivity of media sessions with carrier assistance for WebRTC-based applications (including OTT applications).

Objective 5: Identify the minimal functional capabilities needed to support the enhancements identified in Objectives 2, 3 and 4 (including transport, NAT-traversal, and XR conferencing), state transitions, and typical call flows.
NOTE - Detailed media descriptions for XR conferencing should be specified in the specifications focused on the codec and formats under other WIDs.

Objective 6: Identify collaboration formation with other WGs in 3GPP and SDOs including IETF and W3C.

Objective 7: Identify enhancements for E2E QoS realizations over 5G systems for communications between MNOs and WebRTC clients operating over non-5G links (e.g., Wi-Fi) using WebRTC-based transport. This also includes communication between WebRTC clients operating on tethering/tethered devices.
NOTE – SID SmarTAR is relevant.

Objective 8: Study security, QoE reporting, and rate adaptation in tethered use cases (including coordination of Uu and non-3GPP access).

The objectives in this SID should consider as a principle that the third party access to the operator network need to be controlled with SLAs and with secure access to protect the underlying network resources.

# 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* | *TBA*  | *Study on the enhancement for Immersive Real-Time communication for WebRTC* | *SA#99 (March 2023)* | *SA#100 (June 2023)* | *Naotaka MORITA* *(naotaka.morita@ntt-at.co.jp)* |
|  |  |  |  |  |  |

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

# 6 Work item Rapporteur(s)

*Naotaka MORITA, NTT,* *naotaka.morita@ntt-at.co.jp*

# 7 Work item leadership

SA4

# 8 Aspects that involve other WGs

Coordination with CT1, SA2, SA6 and RAN2 may be necessary to enable network function enhancements, cross layer optimizations for media transport and end-to-end QoS support for tethered devices.

# 9 Supporting Individual Members

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| **Supporting IM name** |
| NTT |
| Qualcomm Incorporated |
| Facebook |
| Tencent |
| Orange |
| KPN |
| Samsung Electronics, Co., LTD |
| AT&T |