**Agenda item:** 10.5

**Source:** Intel

**Title: Discussion on the usage of 5GMS for iRTCW**

**Document for** Discussion andAgreement

# Introduction

This contribution discusses the usage of using 5GMS [1] architecture for WebRTC signaling and data channel. It is partially addressing objects 5 and 6 of SP-220214 [2].

# 5GMS for iRTC signaling and data channel.

In a nutshell, WebRTC communication requires two major components: 1) a signaling/control plane and 2) a transport/data plane. The basic design principle of WebRTC is to enable Peer-to-Peer communication without the intervention of the media-aware middlebox. The general guideline is that participants should be minimum depending on various considerations such as UE capability, media codecs, etc. However, scalability can be achieved when media-aware middleboxes are in place such as an MCU/SFU.

C1. It is good to identify the need for a middle box.Shuai/ I am open to suggestions for extra wording necessary for middleboxes.

The 5GMS defined media-streaming architecture for both uplink and downlink streaming. A 5GMS-aware application is enabled to utilize the M5 interface for media session handling and the M4 interface for streaming transport handling. This contribution is trying to identify the possible usage of 5GMS for iRTC signaling and streaming based on 5GMS existing interfaces.

We have identified that 1) 5GMS AF may be used as a WebRTC signaling control component 2) 5GMS AS may be used as a media server for WebRTC uplink and downlink streaming.

Q1. What does the phrase highlighted above mean? What is the role of 5GMS AF here?

Shuai/ in 5GMS, AF is used between UE/MSH and DN for session establishment. Here we are saying WebRTC control plane signaling may be using the m5 link.

Two new interfaces are introduced for WebRTC control plane establishment.

1. RTC-1: an interface between AF and WebRTC signaling server.
2. RTC-2: an interface between the WebRTC signaling server and the STUN/TURN server.

Note: The assumption is STUN/TURN server is a single entity.

Q2. Why do we have to model WebRTC signalling server and STUN/TURN server different from AF or AS? Cannot we model WebRTC signalling server and STUN/TURN server as another AF or AS?

Shuai/ The idea is to utilize existing 5GMS architecture for both WebRTC signaling control and data channel transport. In 5GMS, AF and AS are two different entities. AF for session handling and control, AS for media streaming. For your second question, here we propose a necessary interface between the signalling server and STUN/TURN. I guess we model it as a AF. (see next question for more explaiantions)

Q3. Do we need to standardize RTC-2, the IF between WebRTC signaling server and STUN/TURN server?

Shuai/. Currently, I don’t think we have a clear picture how STUN/TURN server look like inside of5GS. Is it a separate entity? Is it just API defined in AF? The suggestion here is merely to emphasize there might be a need for that interface. Even though we might end up with just an API inside of AF, there might be a need for an API for typical AF functions to communicate with STUN/TURN functions.

Current PD has identified four WebRTC Collaboration scenarios. In this contribution, we dissect each collaboration mode and introduce the basic workflow using 5GMS for WebRTC data and control plane.

C2. Basic workflows are very helpful to understand the overall picture. On the other hand, the description below needs more elaboration. Shuia/ some of the text below assumes general content regarding 5GMS. But I will try my best to add more explanatory text.

2.1 5G support for OTT WebRTC.

Refer to Figure 2-1, both WebRTC signaling and STUN/TURN service are offered by the WebRTC application provider. M5 interface in 5GMS may be used to establish a WebRTC control plane through AF using RTC-1 interface with a Signaling server. RTC-2 is used between the signaling server and STUN/TURN for UE NAT traversal.

Q4. The highlighted sentence above is not clear. What do you mean by “establish a WebRTC control plane” ?

Shuai/ The assumption here is m4 link has been established between UE/MSH and 5GMS AF. in this case, since services like STUN/TURN is deployed by the application provider, not an entity from a PLMN. Then there is a need for an interface to establish webRTC sessions among UEs. In this proposal, AF will forward any request from UE through RTC-1 link to the signaling server or STUN/TURN server.

For example, in Figure 2-1, UE-1 registers with PLMN-1. UE-2 and UE-3 registers with PLMN-2. UEs use their respective 5GMS AF to establish WebRTC signaling and control plane establishment with the WebRTC signaling server through the RTC-1 interface.

After the control plane has been established, UE may request a PDU session through 5GMS AF with PCF using the N5 interface.

Q5. The highlighted sentence above is not clear. What does “the control plane has been established” mean?

Shuai/ I agree establishment itself may not be enough here. What I meant to say is that all the UEs try to establish WebRTC connections among each other. Each AF will utilize RTC-1 interface to communicate with the signaling server. The signaling server does its magic to exchange session parameters in order to enable all UE can communicate with each other .

Assuming the PDU session is created successfully and 5QI has been assigned to UE, gNB and UPF, the data plane may go through m4 interface, which is the PDU session between UE and UPF.

Q6. The above sentence refers to PDU session establishment for U-plane. When does the call setup procedures between UE and WebRTC signaling server happen?

Shuai/ It should happen when WebRTC enabled UE try to communicate through m4 interface with AF. Either AF immediately communicate with PCF to assign proper QoS OR after feedback from signaling server is not decided. UE-1 may start streaming its WebRTC session using the m4u interface. Media data may be stored and hosted in 5GMS AS. UE-2 and UE-3 may use the m4d interface to download UE-1’s WebRTC media data through AS.

Q7. Do these flows imply that the media for UE-2 and UE-3 always go through AS? The same concept is proposed in FS\_eiRTCW.

Shuai/ I would assume it depends on how many UEs in the call right? In this scenario, I assume there are multiple UEs, not a direct peer-2-peer.



Figure 2-1 5G Support for OTT WebRTC

2.2 MNO-provided trusted WebRTC functions

Refer to Figure 2-2, the WebRTC signaling service is offered by the WebRTC application provider. STUN/TURN service is offered through individual PLMN. The WebRTC signaling process is similar to clause 2.1.



Figure 2-2 MNO-provided trusted WebRTC Functions

2.3 MNO-facilitated WebRTC services

Refer to Figure 2-3, both WebRTC signaling, and STUN/TURN service are offered by the PLMN. In this case, all UEs are registered to the same PLMN. The WebRTC signaling process is similar to clause 2.1.

C3. In this collaboration scenario, the role of WebRTC signaling process very important. The work flows should be elaborated.

Shuai/ I would assume Signalling server role is important for all the cases. Do you have a particular use cases where we should emphasis more?



Figure 2-3 MNO-facilitated WebRTC services

2.4. Inter-operable WebRTC services

Refer to Figure 2-4, both WebRTC signaling, and STUN/TURN service are offered by the PLMN.

In this case, UE-1 is registered with PLMN-1. UE-2 and UE-3 are registered with PLMN. The WebRTC signaling process is similar to clause 2.1. In order to support inter-operability among different PLMN, a 5GMS AS entity may be deployed in a WebRTC application provider in order for UEs from different PLMN to upload and download their media traffic.



Figure 2-4 Inter-operable WebRTC services

For each above-mentioned use case, there is a need to:

* Identify the API and parameters necessary for RTC-1 between 5GMS AF and WebRTC signaling server.
* Identify the API and parameters necessary for RTC-2 between the WebRTC signaling server and STUN/TURN server.

# Proposal

We propose to agree and document the 5GMS use cases for the WebRTC signal and data channel mentioned in clause 2 into clause 9 of PD.

# References

[1] TS 26.501 v17.1.0, 5G Media Streaming (5GMS); General description and architecture

[2] SP-220241, Draft New WID on immersive Real-time Communication for WebRTC