**Source: NTT**

**Title: Integration of RTC-X in RTC Architecture**

**Agenda Item: 10.10**

**Document for: Discussion and Agreement**

**Abstract:**

This discussion paper provides supplementary explanations regarding the integration of service control functions and RTC-X reference point into RTC architecture for the proposed new Study Item (FS\_iRTCW\_Ph2), "Enhancements of RTC architecture variant for collaboration scenario 3," as proposed in SA4#128.

# Introduction

According to 3GPP TR 26.930, Service control is a set of the features for RTC services, and its functionalities and possible APIs are documented in the TR. Service control can be used in scenarios where the RTC Application Provider utilizes the operator network functional blocks in RTC AS (e.g., WebRTC Signalling Function and Media Function) to provide RTC services.

The functionality of service control is assumed to be utilized by Content Provider (CP) through APIs that the Application Supporting Web Function (ASWF) within the operator's network's RTC AS exposes to the CP, as stated in 3GPP TR 26.930. However, the interface between ASWF and CP is currently FFS as RTC-X, and it is encouraged to organize early-stage discussions for future architectural extensions considering the current discussion on the common elements between RTC and Media Streaming in 3GPP TS 26.510.

This discussion paper provides supplementary explanations regarding the integration of RTC-X and service control functions, which are being considered in the proposed new SID, and presents a plan how to proceed the integration.

# 2. Discussion

## 2.1. Motivation for service control

RTC Application Providers that utilize operator assistance are referred to as Content Providers (CP) in 3GPP TR 26.930. By utilizing the service control functionalities provided by the operator, CPs can request the operator network functions to operate according to the requirements of the RTC services that CPs intend to provide. Service control also enables CPs to receive the notifications of the status changes of the resources allocated for CPs' services within the operator network.

Specifically, service control refers to RTC service-specific control functionalities such as:

* Flexible configuration of the rules for media and data forwarding performed in RTC AS based on RTC service requirements (such as video and audio routing for regular conference rooms, asymmetric media distribution for one-to-many webinars, private chats between participants).
* Allocating and releasing resources in RTC AS corresponding to VR spaces
* Controlling user connections for each VR space
* Event notification (e.g., changes in corresponding resources' availability in RTC AS, connection of new users).

In RTC services, it is necessary to manage complex media/data flows between multiple WebRTC endpoints, as well as the connections to individual media data and the state management of VR space.

The motivation behind introducing the service control functionality and its associated interface, RTC-X, is to present these service controls as APIs accessible from the CP. This enables the realization of RTC services aligned with the requirements of the CP by using operator assistance.

## 2.2. Options for architectural enhancement realizing RTC-X

### 2.2.1. General

Two options for reference points equivalent to RTC-X between CP and ASWF are compared in following clauses.

### 2.2.2. Option 1: RTC-1 with RTC-3

#### 2.2.2.1. General

In terms of provisioning session, service control seems to have similarities with Provisioning Session. Since Provisioning Session in RTC is provided via RTC-1, RTC-X mapped to RTC-1.

The service control requests sent via RTC-1 are received by the RTC AF. To relay the requests to the RTC AS which ASWF belongs to, functional extensions of RTC AF and extensions of RTC-3 are possibly required.

Fig 2.2.1-1: Architectural enhancement for option 1

In Option 1, service control procedures are performed through RTC AF. Below is an example call flow for when CP requests resource allocation corresponding to VR space to ASWF.



Fig 2.2.1-2: Option 1 example service control flow

#### 2.2.2.2. Evaluation

RTC-1 is already available for use. Also, RTC-1 has security mechanism for RTC application provider.

To relay requests from RTC AF to the ASWF in RTC AS, there may be a need for specifications corresponding to RTC-3, which is currently not covered by existing specification. However, as described in clause 4.2.5 of TS 26.506, WebRTC Signalling Function can be collocated/integrated with RTC AF. Therefore, functional extension can be possibly reduced in the integration of service control functionality.

Due to the following difference of characteristics, it is anticipated that service control will be implemented as a separate procedure rather than an extension of Provisioning Session. As described in clause 4.2.2 of TS 26.506 and clause 5.2.1 of TS 26.510, Provisioning is the operation for provisioning some features provided by AF and following functionalities are provided in RTC:

* QoS support for WebRTC sessions.
* Charging for WebRTC sessions.
* Collection of consumption and QoE metrics data related to WebRTC sessions.
* Offering Interactive Connectivity Establishment (ICE) functionality to support Network Address Traversal /NAT) such as Session Traversal Utilities for NAT (STUN) and Traversal Using Relays around NAT (TURN) servers.
* The WebRTC Signalling Function in the RTC AS, potentially offering interoperability with other compatible signalling servers.

On the other hand, service control provides functionalities (listed again):

* Flexible configuration of the rules for media and data forwarding performed in RTC AS based on RTC service requirements (such as video and audio routing for regular conference rooms, asymmetric media distribution for one-to-many webinars, private chats between participants).
* Allocating and releasing resources in RTC AS corresponding to VR spaces
* Controlling user connections for each VR space
* Event notification (e.g., changes in corresponding resources' availability in RTC AS, connection of new users).

### 2.2.3. Option 2: RTC-2

#### 2.2.3.1. General

In analogy of Media Delivery architecture, RTC-2 is potential interface between CP and RTC-AS although it is not currently specified in TS 26.506. In this option, RTC-X will be mapped to the interface.



Fig 2.3.1-1: Architectural enhancement for option 2

In Option 2, service control procedures are performed directly on the RTC AS. Below is an example call flow for when CP requests resource allocation corresponding to VR space to ASWF.



Fig 2.3.1-2: Option 2 example service control flow

#### 2.2.3.2. Evaluation

It is anticipated that the interface between RTC Application Provider and RTC AS will be designated as RTC-2, considering comparisons with M2. It is direct connection between the provider/consumer of service control functionality.

However, RTC-2 is not currently specified and M2, which is regarded as the basis of RTC-2, is a reference point for media. M2 is not for exposing/consuming service procedures. For avoiding confusion, RTC-2 seems not appropriate for service control.

### 2.2.4. Summary

Considering the need to harmonize the current deployment of the RTC architecture and mapping of RTC-X for service control, RTC-1 is thought to be more suitable.

As mentioned in clause 2.2.2.2, it is anticipated that Provisioning Session and Service Control will remain separate APIs rather than being integrated. However, RTC-1 provides security mechanism and ready for RESTful API.

Therefore, RTC-1 (potentially combined with RTC-3) is thought to be better option for RTC-X integration.

# 3. Proposal

It is proposed that the new study item (FS\_iRTW\_Ph2) consider the integration of RTC-X based on the summary of the discussion. For integrating RTC-X as RTC-1 (potentially combined with RTC-3), followings are encouraged to be addressed in the new study:

- Identifying the related architectural enhancement to utilize RTC-1 for service control.

- Gap analysis between the service control APIs and existing APIs over RTC-1 for identifying how to implement the service control APIs

# Appendix

Here is the RTC Architecture and Media Delivery Architecture in Release 18.



**Fig 1: Referenced RTC architecture specified in 3GPP TS 26.506**



**Fig 2: Referenced Media Delivery architecture specified in 3GPP TS 26.501**