**3GPP TSG|WG-SA2 Meeting #158 S2-230xxxx**

**Goteborg, Sweden, August 21 – 25, 2023** **(revision of S2-2309135)**

**Source: China Mobile**

**Title: New SID: Study on system architecture for next generation real time communication services phase 2**

**Document for: Approval**

**Agenda Item: 10.5**

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 system architecture for next generation real time communication services phase 2

Acronym: FS\_NG\_RTC\_Ph2

Unique identifier:

Potential target Release: Rel-19

# 1 Impacts

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

# 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\* |

**\* Other = e.g. testing**

## 2.2 Parent Work Item

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

|  |
| --- |
| Parent Work / Study Items  |
| Acronym | Working Group | Unique ID | Title (as in 3GPP Work Plan) |
|  |  |  |  |

### 2.3 Other related Work Items and dependencies

|  |
| --- |
| Other related Work /Study Items (if any) |
| Unique ID | Title | Nature of relationship |
| 770003 | Study on enhancements to IMS for new real time communication services | *Study Item of Stage 1 requirements* |
| 790003 | Enhancements to IMS for new real time communication services | *Work Item of Stage 1 requirements* |
| 850042 | Study on evolution of IMS multimedia telephony service | *Study Item of Stage 1 requirements* |
| 920036 | Evolution of IMS Multimedia Telephony Service | *Work Item of Stage 1 requirements* |
| 940066 | Study on system architecture for next generation real time communication services | *Study Item of Stage 2 architecture and procedures* |
| 970014 | System architecture for Next Generation Real time Communication services | *Work Item of Stage 2 architecture and procedures* |
| 990023 | CT1 aspects of NG\_RTC | *Work Item of Stage 3* |
| 990087 | CT4 aspects of NG\_RTC | *Work Item of Stage 3* |
| 850003 | Study on security support for Next Generation Real Time Communication services | *Study Item of Stage 3* |
| 990049 | PS Data Off for IMS Data Channel Service | *Work Item of Stage 1 requirements* |
| 950005 | Study on Localized Mobile Metaverse Services | *Study Item of Stage 1 requirements* |

# 3 Justification

The system architecture for the next generation real time communication services based on IMS enhancement requirements has been studied in Rel-18 and the following three key issues have been concluded in TR 23.700-87.

- KI#1: Enhancement to support Data Channel usage in IMS network.

- KI#2: IMS based AR telephony communication.

- KI#4: Study of Applicability of Service based principles to IMS media control interfaces.

Based on the conclusions, the architecture, interfaces and procedures of IMS data channel and AR communication service based on IMS data channel are standardized in TS 23.228, TS 24.186, TS 29.175 and TS 29.176. These normative work enables operators to deploy IMS data channel related services in their networks. But there are still some issues to be addressed.

**Observation 1: Issues left from Rel-18 need to be addressed in Rel-19.**

1. The uncompleted KI#3 "Third party specific user identities" from Rel-18 need to be concluded, and then the enhancement to architecture, interfaces and procedures to provide data verified OIP (Originating Identification Presentation) service need to be normalized in Rel-19.

2. Exposing the IMS data channel capability to the enterprise/verticals via DC3 and DC4 needs study and conclusion in Rel-19. That is, standardize DCSF services and interaction between the DCSF and the DC Application Server, and possibly enhance NEF services to expose IMS data channel network capability to the enterprises/verticals. Collaboration with SA6 to specify IMS network capability exposure APIs may also be needed.

**Observation 2: Interworking of IMS data channel is not fully supported.**

IMS data channel interworking is not covered in Rel-18 time frame and need to be studied and standardized to enable the operators to provide IMS data channel related services for their subscribers on interworking cases. The following scenarios need to be considered and studied:

- Interworking of IMS data channel, including the scenario of providing IMS bootstrap data channel and data channel applications between DCMTSI UE and MTSI UE, as well as data channel supported network and not supported network.

**Observation 3: IMS DC services and operational aspects need to be further enhanced.**

1. In S2-2303966 from SA1, it provides the following information. Therefore, how to handle services over IMS data channel as the 3GPP PS Data Off Exempt services needs to be studied and normalized.

*SA1 agreed the attached Release 19 CR to TS 22.011 to define IMS Data Channel as part of the 3GPP PS Data Off Exempt Services.*

2. Rel-18 only considers IMS data channel accompanying audio/video media in an IMS session. In some enterprise/vertical scenarios, audio and video media in an IMS session is not necessary. Therefore, IMS data channel without accompanying audio/video media in an IMS session need to be considered in Rel-19 to support these scenarios.

**Observation 4: IMS real-time communication capabilities (audio, video, message) exposure to the enterprises/verticals is still not supported.**

3GPP has not yet supported the exposure of IMS legacy real-time communication capabilities including audio, video and message, which is now necessary to provide an entire real-time communication service solution to enterprises/vertical customers along with IMS data channel, XR and other enhanced real-time services. Therefore it is proposed to also standardize the exposure mechanism and the services exposed by the IMS AS, the S-CSCF, and/or IP-SM-GW to the enterprise/verticals. Collaboration with SA6 may also be needed.

**Observation 5: Enhancement to IMS media plane to support the use cases of IMS based Metaverse services required by Rel-19 SA1.**

The term "metaverse" has been used in various ways to refer to the broader implications of AR and VR. It is used to refer to a persistent, shared, perceived set of interactive perceived spaces. As described in 3GPP TR 22.856, Rel-19 SA1 already defined some use cases of mobile Metaverse services in IMS network, such as collaborative and concurrent engineering in product design using metaverse services, IMS-based 3D Avatar Communication, digital asset container information access and certification, etc. The requirements on IMS network to support these use cases are shown below.

 *[PR 5.3.6.2-1] The 5G system shall enhance the interaction between IMS CN and 5G CN to allow 5G CN to provide the IMS CN with real-time feedback in support of XR communication among multiple users simultaneously.*

 *[P.R. 5.11.6-1] The IMS shall allow multimedia conversational communications between two or more users providing real time conversational transfer of animated user digital representation and speech data.*

*[PR 5.13.6-1] The 5G system shall support allow a user to securely manage a digital asset container (e.g. store and update the information associated with this user).*

NOTE: How to use the digital asset in IMS real-time communication is also need to be studied.

*[PR 5.16.6.2-6] Subject to regulatory requirements, user’s consent and operator’s policy, the IMS shall support the capabilities of rendering the avatar based on the body movement information (e.g. body motion or facial expression) of a human user.*

To implement those immersive and XR real-time communication, media capabilities with complex computational processing, such as video synthesis, media rendering, speech/face recognition, video quality enhancement and so on, are required and most of them are based on Artificial Intelligence (AI).

It’s important to enhance IMS media plane with these new media process capabilities, including AI based media process capabilities and the following aspects are needed to study:

- The impact to IMS network architecture, interfaces and signalling procedures to support new media process capabilities, including AI based media process capabilities.

- How to deploy, negotiate and invoke these new media process capabilities flexibly and efficiently.

- How to implement the use cases of mobile Metaverse services in IMS network required in 3GPP TR 22.856.

- How to utilize the XR media enhancements in Rel-18.

**Observation 6: IMS SBA need to be enhanced further.**

In Rel-18, service registration and discovery for DCSF, MRF and MF were specified. It is benifit to have more IMS entities leveraging the advantage of SBA. It is proposed to support service registration and service discovery for I-CSCF, S-CSCF and IMS AS in Rel-19.

# 4 Objective

The objective is to study the enhancement to the IMS network architecture, interfaces and procedures for the next generation real time communication services requirements on phase 2.

The study will investigate the solutions to support the following aspects:

- WT-1: Study on the enhancements to IMS capability exposure framework

- WT-1.1: enhance the IMS architecture to define event subscription mechanism for a specific IMS subscriber / groups of IMS subscribers, to enable subscription to various IMS events of IMS data channel services.

- WT-1.2: whether and how to support exposure of existing IMS services (IMS voice/video call, message).

NOTE 1: Existing OMA work needs to be considered. API defintion will be conducted by SA6.

- WT-1.3: define events and services that can be subscribed.

- WT-2: Support interworking of IMS data channel

- WT-2.1: study how to provide IMS data channel applications to the subscriber who is using a MTSI UE where it is appropriate depending on the applications;

- WT-2.2: study how to handle the IMS session between DCMTSI UEs when one of the networks does not support IMS data channel capability. This work depends on SA4 supporting such capability. Solutions need to be backward compatible with Rel-18 solutions.

- WT-3: Study on how to support verified OIP service for 3rd party in IMS sessions and align with SA3 on third party identity authentication.

- WT-4: Enhancements to IMS data channel related services and operational aspects.

- WT-4.1: how to support standalone IMS data channel without accompanying audio/video/messaging media in an IMS session.

- WT-4.3: how to support 3GPP PS Data Off for IMS data channel and applications over IMS data channel.

- WT-4.4: study enhancements of IMS DC architecture and procedure to support multiplexing a SCTP connection for multiple DC applications.

WT-5: Study whether and how to enhance IMS architecture, procedures, interfaces for supporting avatar call (including multi-party communication) and communication with accessibility. This includes service/capability negotiation, enabling transition and transcoding between video and avatar media and avatar representation in the UE and in the IMS network, considering UE capability, network condition, and user preference.

NOTE 2: This WT studies usage of avatar representation in avatar call and the relation to IMS identities.

NOTE 3: Coordination and alignment with SA4 on service/capability negotiation and transcoding aspects are required.

WT-6: Study service registration and discovery for IMS nodes, i.e. I/S-CSCF and IMS AS.

The impact on 5GS if any should be identified as appropriate in this study.

TU estimates and dependencies

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Work Task ID** | **TU Estimate****(Study)** | **TU Estimate****(Normative)** | **RAN Dependency****(Yes/No/Maybe)**  | **Inter Work Tasks Dependency** Editor’s Note: This column should highlight if WT#x is self-contained, or is depended on completion of other WTs |
| WT#1 | 2 | 2 | No | self-contained |
| WT#2 | 1 | 1 | No | self-contained |
| WT#3 | 1 | 1 | No | self-contained |
| WT#4 | 1.5 | 1.5 | No | self-contained |
| WT#5 | 2 | 2 | No | self-contained |
| WT#6 | 0.5 | 0.5 | No | self-contained |

Total TU estimates for the study phase: 8

Total TU estimates for the normative phase: 8

Total TU estimates: 8 + 8 = 16

# 5 Expected Output and Time scale

|  |
| --- |
| 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 |
| Internal TR | 23.xxx | Study on system architecture enhancement for next generation real time communication phase 2 | TSG SA#105 (September, 2024) | TSG SA#105 (September, 2024) |  |
|  |  |  |  |  |  |

|  |
| --- |
| Impacted existing TS/TR {One line per specification. Create/delete lines as needed} |
| TS/TR No. | Description of change  | Target completion plenary# | Remarks |
| 23.228 | Enhancements on architecture and procedures of IMS network to support features concluded in TR 23.xxx. | TSG SA#106 (December, 2024) | This TS covers Stage 2 |
|  |  |  |  |

# 6 Work item Rapporteur(s)

# 7 Work item leadership

SA2

# 8 Aspects that involve other WGs

Charging aspects: SA5.

Security aspects: SA3.

Media aspects : SA4.

Service exposure: SA6.

# 9 Supporting Individual Members

|  |
| --- |
| Supporting IM name |
| Apple? |
| AT&T? |
| ChinaMobile |
| CISA? |
| Deutsche Telekom? |
| Huawei |
| MediaTek? |
| Ministère Economie et Finances? |
| MITRE? |
| Nokia? |
| NTT DOCOMO? |
| Orange? |
| Peraton Lab? |
| Philips? |
| Qualcomm? |
| Samsung? |
| Telecom Italia? |
| TELEFONICA? |
| THALES? |
| T-Mobile USA? |
| Verizon? |
| vivo? |
| Vodafone? |
| ZTE? |