**3GPP TSG-CT WG1 Meeting #146C1-2401xx**

**Online, 22– 26 January 2024 (revision of C1-230127)**

**Source: Huawei, HiSilicon**

**Title: IMS Data Channel Interaction with ECT service**

**Spec: 3GPP TS 24.186 v1.0.0**

**Agenda item: 18.3.8**

**Document for: Decision**

**1. Introduction**

This p-CR provides the content of IMS data channel interaction with the ECT supplymentary service specified in 3GPP TS 24.629.

**2. Reason for Change**

The IMS data channel interaction with supplementary services needs to be defined for new 3GPP TS 24.186.

**3. Proposal**

It is proposed to agree the following changes to 3GPP TS 24.186 v1.0.0.

\* \* \* First Change \* \* \* \*

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 22.261: "Service requirements for the 5G system; Stage 1".

[3] 3GPP TS 23.228: "IP Multimedia Subsystem (IMS); Stage 2".

[4] 3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia Telephony; Media handling and interaction".

[5] IETF RFC 5688: "A Session Initiation Protocol (SIP) Media Feature Tag for MIME Application Subtype".

[6] IETF RFC 6809: "Mechanism to Indicate Support of Features and Capabilities in the Session Initiation Protocol (SIP)".

[7] IETF RFC 3264: "An Offer/Answer Model with the Session Description Protocol (SDP) ".

[8] 3GPP TS 22.173: "IP Multimedia Core Network Subsystem (IMS) Multimedia Telephony Service and supplementary services; Stage 1".

[9] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[10] 3GPP TS 24.173: "IMS Multimedia telephony communication service and supplementary services; Stage 3".

[11] 3GPP TS 24.275: "Management Object (MO) for Basic Communication Part (BCP) of IMS Multimedia Telephony (MMTEL) communication service".

[12] 3GPP TS 22.261: " Service requirements for the 5G System; Stage 1".

[13] 3GPP TR 22.873: "Study on evolution of the IP Multimedia Subsystem (IMS) multimedia telephony service".

[14] IETF RFC 8864: "Negotiation Data Channels Using the Session Description Protocol (SDP)".

[15] 3GPP TS 24.147: "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem".

[16] 3GPP TS 24.604: "Communication Diversion (CDIV) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[17] 3GPP TS 24.615: "Communication Waiting (CW) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[18] 3GPP TR 29.175: "IP Multimedia Subsystem; IP Multimedia Subsystem (IMS) Application Server (AS) Services; Stage 3".

[19] 3GPP TR 29.176: "IP Multimedia Subsystems (IMS); Media Function (MF) Services; Stage 3".

[xx] 3GPP TS 24.629: "Explicit Communication Transfer (ECT) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

\* \* \* Next Change \* \* \* \*

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in 3GPP TR 21.905 [1].

AR Augmented Reality

AS Application Server

CD Communication Deflection

CDIV Communication DIVersion

CFB Communication Forwarding Busy

CFNL Communication Forwarding on Not Logged-in

CFNR Communication Forwarding No Reply

CFNRc Communication Forwarding on subscriber Not Reachable

CFU Communication Forwarding Unconditional

CN Core Network

CONF Conference

CW Communication Waiting

DC Data Channel

ECT Explicit Communication Transfer

IM IP Multimedia

IMS IP Multimedia Core Network Subsystem

MF Media Function

MRF Multimedia Resource Function

MWI Message Waiting Indication

OIP Originating Identification Presentation

OIR Originating Identification Restriction

TIP Terminating Identification Presentation

TIR Terminating Identification Restriction

UE User Equipment

\* \* \* Next Change \* \* \* \*

## 10.x Explicit Communication Transfer (ECT)

#### 10.X.1 General

The explicit communication transfer (ECT) service provides a party involved in a communication to transfer that communication to a third party as defined in 3GPP TS 24.629 [xx].

There are three actors active in a transfer, they are acting in the following roles:

**transferor:** the party that initiates the transfer of the active communication that it has with the transferee;

**transferee:** the party which stays in the communication which is transferred;

**transfer target:** the party which the communication is transferred to and which replaces the transferor in the communication.

#### 10.X.2 Actions at the AS serving the transferor

On reception of REFER message, if ECT has been triggered as defined in 3GPP TS 24.629 [xx], the transferor's network functions:

- shall trigger the closing of all the established data channel on the transferor’s network (including the data channel between the transferor’s network and the transferor, the data channel between the transferor’s network and the transferee, the data channel between transferor’s network and the transfer target) as per procedures defined in clause 9.3.

- route the session setup INVITE request which includes audio, video and data channel media towards a REFER-TO user as defined in 3GPP TS 24.629 [xx]. The data channel media set up shall be performed between the transferee and the transfer target together with audio, video media negotiation as per procedures defined in clause 9.3.

#### 10.X.3 Actions at the AS serving the transferee

If the transferee's network has established data channel media with the transferor before the transfer happens, the transferee's network shall update the data channel between transferor and transferee’s network to the data channel between transfer target and transferee’s network, on reception of the re-INVITE message with the SDP offer of the transfer target from the transferor’s network during the session setup towards the transfer target.

#### 10.X.4 Actions at the AS serving the transfer target

In case of blind transfer, if the transfer target's network provides data channel service, on reception of incoming INVITE request from transferor’s network, the transfer target's network shall send the INVITE message to transfer target. On reception of the 18x/200 OK response from the transfer target, the transfer target's network shall trigger the reservation of the data channel media resources to establish the data channel for the transfer target and the transferee, together with audio, video media negotiation as per procedures defined in clause 9.3 and then sends the 18x/200 OK response to transferor’s network.

In case of consultative transfer, if the transfer target's network provides data channel service, on reception of incoming re-INVITE request with the SDP offer of transferee’s network from transferor’s network, the transfer target's network shall update the established data channel between transfer target’s network and transferor to data channel between transfer target’s network and transferee.

\* \* \* Next Change \* \* \* \*

## A.X Explicit Communication Transfer

### A.X.1 IMS serving the transferee provides data channel service

#### A.X.1.1 Blind Transfer



Figure A.X.1.1-1: Blind Transfer when IMS serving the transferee provides data channel service

Figure A.X.1.1-1 shows a call flow for blind transfer when IMS serving the transferee provides data channel service.

Step1: UE-A calls UE-B, UE-A sends an INVITE request towards the UE-B.

Step2: DC media resource is allocated by IMS-A for UE-A and UE-B.

Step3-6: UE-B answers the call, session connection is established between UE-A and UE-B. IMS-A establishes BDC connection for UE-A and UE-B. And then IMS-A establishes ADC connections between UE-A and UE-B.

Step7: UE-B starts transfer process.

Step8: UE-B sends a REFER message to transfer the call to UE-C.

Step9-10: IMS-B sends 202/NOTIFY to UE-B to accept the transfer request, and then sends BYE message to UE-B.

Step11-12: IMS-B sends an INVITE message to UE-C, UE-C replies SDP offer with data channel media in 18X/200 response.

Step13: IMS-B sends reINVITE message to IMS-A.

Step14-16: IMS AS of IMS-A notifies session modify event to the DCSF and as per media instruction request from the DCSF, the IMS AS sends media resource management request to MF/MRF to update the data channel media resources for UE-C.

Step17-19: IMS AS of IMS-A sends an reINVITE message carrying SDP offer with data channel media towards UE-A. UE-A replies SDP answer with data channel media in the 200 OK response.

Step20-22: IMS AS of IMS-A notifies session modify event to the DCSF and as per media instruction request from the DCSF, the IMS AS sends media resource management request to MF/MRF to update the data channel media resources for UE-A.

Step23: IMS AS of IMS-A sends a 200 OK message with updated data channel media to IMS-B.

Step24: IMS-B sends PRACK/ACK message towards UE-C.

Step25: The BDC media connection is established between IMS-A and UE-C.

Step26: The ADC media connections are established between UE-A and UE-C.

Step27: The session connection is established between UE-A and UE-C.

#### A.X.1.2 Consultation Transfer



Figure A.X.1.2-1: Consultative Transfer when IMS serving the transferee provides data channel service

Figure A.X.1.2-1 shows a call flow for consultative transfer when IMS serving the transferee provides data channel service.

Step1: UE-A calls UE-B, UE-A sends an INVITE request towards the UE-B.

Step2: DC media resource is allocated by IMS-A for UE-A and UE-B.

Step3-6: UE-B answers the call, session connection is established between UE-A and UE-B. IMS-A establishes BDC connection for UE-A and UE-B. And then IMS-A establishes ADC connections between UE-A and UE-B.

Step7-8: UE-B holds UE-A, and then calls UE-C.

Step9: When UE-C sends 180 ringing or 200 response, UE-B starts transfer process.

Step10: UE-B sends a REFER message to transfer the call to UE-C.

Step11-12: IMS-B sends 202/NOTIFY to UE-B to accept the transfer request, and then sends BYE message to UE-B.

Step13-15: IMS-B sends a media re-negotiation request to UE-A, UE-A replies SDP offer with data channel media.

Step16-18: IMS AS of IMS-A notifies session modify event to the DCSF and as per media instruction request from the DCSF, the IMS AS sends media resource management request to MF/MRF to update the data channel media resources for UE-A.

Step19: IMS AS sends a 200 OK response for reINVITE to the IMS-B with updated data channel media.

Step20-21: IMS-B sends a reINVITE message carrying SDP offer with data channel media towards UE-C, and receives 200 OK response for reINVITE carrying SDP answer with data channel media from UE-C.

Step22: IMS-B sends an ACK message carrying SDP answer with data channel media towards IMS-A.

Step23-25: IMS AS of IMS-A notifies session modify event to the DCSF and as per media instruction request from the DCSF, the IMS AS sends media resource management request to MF/MRF to update the data channel media resources for UE-C.

Step26: IMS AS of IMS-A sends an ACK message carrying SDP answer with data channel media towards UE-A.

Step27: The BDC media connection is established between IMS-A and UE-C.

Step28: The ADC media connections are established between UE-A and UE-C.

Step29: The session connection is established between UE-A and UE-C.

### A.X.2 IMS serving the transferor provides data channel service

#### A.X.2.1 Blind Transfer



Figure A.X.2.1-1: Blind Transfer when IMS serving the transferor provides data channel service

Figure A.X.2.1-1 shows a call flow for blind transfer when IMS serving the transferor provides data channel service.

Step1: UE-A calls UE-B, UE-A sends an INVITE request towards the UE-B.

Step2: DC media resource is allocated by IMS-B for UE-A and UE-B.

Step3-6: UE-B answers the call, session connection is established between UE-A and UE-B. IMS-B establishes BDC connection for UE-A and UE-B. And then IMS-B establishes ADC connections between UE-A and UE-B.

Step7: UE-B starts transfer process.

Step8: UE-B sends a REFER message to transfer the call to UE-C.

Step9-10: IMS-B sends 202/NOTIFY to UE-B to accept the transfer request, and then sends BYE message to UE-B.

Step11: IMS-B releases all the allocated data channel media resources on MF/MRF for UE-A, UE-B.

Step12-17: IMS-B sends an INVITE message to UE-C, the audio along with data channel media connections are established between UE-A and UE-C, the data channel media can be provided either by IMS-A or IMS-C or both.

#### A.X.2.2 Consultation Transfer

 

Figure A.X.2.2-1: Consultative Transfer when IMS serving the transferor provides data channel service

Figure A.X.2.2-1 shows a call flow for consultative transfer when IMS serving the transferor provides data channel service.

Step1: UE-A calls UE-B, UE-A sends an INVITE request towards the UE-B.

Step2: DC media resource is allocated by IMS-B for UE-A and UE-B.

Step3-6: UE-B answers the call, session connection is established between UE-A and UE-B. IMS-B establishes BDC connection for UE-A and UE-B. And then IMS-B establishes ADC connections between UE-A and UE-B.

Step7-8: UE-B holds UE-A, and then calls UE-C.

Step9: When UE-C sends 180 ringing or 200 response, UE-B starts transfer process.

Step10: UE-B sends a REFER message to transfer the call to UE-C.

Step11-12: IMS-B sends 202/NOTIFY to UE-B to accept the transfer request, and then sends BYE message to UE-B.

Step13: IMS-B releases all the allocated data channel media resources on MF/MRF for UE-A, UE-B and UE-C.

Step14-18: IMS-B sends a media re-negotiation request with to establish the connection between UE-A and UE-C.

Step19: The audio along with data channel media connections are established between UE-A and UE-C, the data channel media can be provided either by IMS-A or IMS-C or both.

### A.X.3 IMS serving the transfer target provides data channel service

#### A.X.3.1 Blind Transfer



Figure A.X.3.1-1: Blind Transfer when IMS serving the transfer target provides data channel service

Figure A.X.3.1-1 shows a call flow for consultative transfer when IMS serving the transfer target provides data channel service.

Step1: UE-A calls UE-B, UE-A sends an INVITE request towards the UE-B.

Step2: UE-B answers the call, session connection is established between UE-A and UE-B.

Step3: UE-B starts transfer process. UE-B sends a REFER message to transfer the call to UE-C.

Step4-5: IMS-B sends 202/NOTIFY to UE-B to accept the transfer request, and then sends BYE message to UE-B.

Step6: IMS-B sends an INVITE message towards UE-C.

Step7-9: IMS-C forwards the INVITE message to UE-C, on reception of 18X/200 message with data channel media from UE-C, IMS-C allocates the data channel media resources on MF/MRF for UE-A and UE-C.

Step10.: IMS-C sends the 18X/200 message to IMS-B.

Step11-12: IMS-B transfers the 18X/200 message to reINVITE message and sends it towards UE-A, UE-A responses 200 OK with data channel media answer to IMS-B.

Step13-14: IMS-B transfers the 200 OK message to PRACK/ACK message and sends it to IMS-C. IMS-C update data channel media on MF. Then IMS-C sends the PRACK/ACK message to UE-C.

Step16: The BDC media connections are established on MF/MRF of IMS-C for both UE-A and UE-C.

Step17: The ADC media connections are established between UE-A and UE-C.

Step18: The session connection is established between UE-A and UE-C.

#### A.X.3.2 Consultation Transfer

 

Figure A.X.3.2-1: Consultative Transfer when IMS serving the transfer target provides data channel service

Figure A.X.3.2-1 shows a call flow for consultative transfer when IMS serving the transfer target provides data channel service.

Step1: UE-A calls UE-B, UE-A sends an INVITE request towards the UE-B.

Step2: UE-B answers the call, session connection is established between UE-A and UE-B.

Step3-9: UE-B holds UE-A, and then calls UE-C, session connection is established between UE-B and UE-C. IMS-C establishes BDC connection for UE-B and UE-C. And then IMS-C establishes ADC connections between UE-B and UE-C.

Step10: UE-B starts transfer process. UE-B sends a REFER message to transfer the call to UE-C.

Step11-12: IMS-B sends 202/NOTIFY to UE-B to accept the transfer request, and then sends BYE message to UE-B.

Step13-15: IMS-B sends a media re-negotiation request with to establish the connection between UE-A and UE-C.

Step16: IMS-C updates the DC media connection for UE-A when receiving the updated data channel media from UE-A.

Step17-19: The media re-negotiation finished between UE-A and UE-C.

Step20: The BDC media connection is established on MF/MRF of IMS-C for UE-A.

Step21: The ADC media connections are established between UE-A and UE-C.

Step22: The session connection is established between UE-A and UE-C.

\* \* \* End of Changes \* \* \* \*