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TECHNICAL SPECIFICATION

Universal Mobile Telecommunications System (UMTS);
LTE;
Interworking between the IP Multimedia (IM)
Core Network (CN) subsystem (IMS)
and MSC Server for IMS Centralized Services (ICS)
(3GPP TS 29.292 version 15.5.0 Release 15)

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Modal verbs terminology

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1 Scope

IMS Centralized Services (ICS) enable the delivery of IM CN subsystem based multimedia telephony and supplementary services as defined in 3GPP TS 24.173 [4] to users regardless of the attached access network type; e.g. CS domain access or IP-CAN.

The present document specifies the principles of interworking between the IM CN subsystem and CS domain in order to enable ICS for UEs using CS domain access.

The present document addresses the area of registration procedures interworking between the CS domain and IM CN subsystem.

The present document addresses the areas of control and user plane interworking between the IM CN subsystem and CS domain through an MSC Server enhanced for ICS and CS-MGW respectively. This includes the signalling procedures between the MSC Server and CS-MGW. For the specification of control plane interworking, present document defines the protocol interworking between the 3GPP profile of SIP as described in 3GPP TS 24.229 [2] and NAS signalling as described in 3GPP TS 24.008 [3] required for the support of IM CN subsystem based multimedia telephony and supplementary services.

The present document addresses the area of supplementary service configuration interworking between the CS domain and IM CN subsystem.

The present document is applicable to the MSC Server and CS-MGW.

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

[2] 3GPP TS 24.229: "IP Multimedia Call Control Protocol based on SIP and SDP".

[3] 3GPP TS 24.008: "Mobile radio interface layer 3 specification; Core Network protocols; Stage 3".

[4] 3GPP TS 24.173: "IMS multimedia telephony communication service and supplementary services; Stage 3".

[5] 3GPP TS 23.292: "IP Multimedia Subsystem (IMS) Centralized Services; Stage 2".

[6] 3GPP TS 23.002: "Network Architecture".

[7] 3GPP TS 24.292: "IP Multimedia (IM) Core Network (CN) subsystem Centralized Services (ICS); Stage 3".

[8] 3GPP TS 23.018: "Basic call handling; Technical realization".

[9] 3GPP TS 22.003: "Circuit Teleservices supported by a Public Land Mobile Network (PLMN)".

[10] 3GPP TS 23.003: "Numbering, addressing and identification".

[11] 3GPP TS 29.232: "Media Gateway Controller (MGC) – Media Gateway (MGW) interface; Stage 3".

[12] 3GPP TS 24.081: "Line Identification Supplementary Services – Stage 3".

[13] Void

[14] 3GPP TS 24.608: "Terminating Identification Presentation (TIP) and Terminating Identification Restriction (TIR) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[15] 3GPP TS 25.414: "UTRAN Iu interface data transport and transport signalling".

[16] 3GPP TS 25.415: "UTRAN Iu interface user plane protocols".

[17] 3GPP TS 25.411: "UTRAN Iu interface layer 1".

[18] 3GPP TS 29.414: "Core network Nb data transport and transport signalling".

[19] 3GPP TS 48.004: "Base Station System – Mobile-services Switching Centre (BSS – MSC) interface; Layer 1 specification".

[20] 3GPP TS 29.002: "Mobile Application Part (MAP) specification".

[21] Void.

[22] 3GPP TS 26.226: "CTM Cellular Text telephony Modem, General description".

[23] 3GPP TS 24.604: "Communication Diversion (CDIV) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[24] 3GPP TS 24.082: "Call Forwarding (CF) supplementary services; Stage 3".

[25] 3GPP TS 24.072: "Call Deflection (CD) Supplementary Service; Stage 3".

[26] 3GPP TS 24.083: "Call Waiting (CS) and Call Hold (HOLD) supplementary services; Stage 3".

[27] 3GPP TS 24.610: "Communication HOLD (HOLD) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[28] 3GPP TS 26.114: "IP Multimedia Subsystem (IMS); Multimedia Telephony; Media handling and interaction".

[29] 3GPP TS 24.080: "Mobile radio interface layer 3 supplementary services specification; Formats and coding".

[30] 3GPP TS 24.088: "Call Barring (CB) Supplementary Service – Stage 3".

[31] 3GPP TS 24.611: "Anonymous Communication Rejection (ACR) and Communication Barring (CB); using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[32] 3GPP TS 24.091: "Explicit Call Transfer (ECT) supplementary service; Stage 3".

[33] 3GPP TS 24.629: "Explicit Communication Transfer (ECT) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[34] 3GPP TS 24.084: "Multi Party (MPTY) supplementary service – Stage 3".

[35] 3GPP TS 24.605: "Conference (CONF) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[36] 3GPP TS 24.147: "Conferencing using the IP Multimedia (IM) Core Network (CN) subsystem; Stage 3".

[37] 3GPP TS 23.009: "Handover procedures".

[38] 3GPP TS 48.103: "Base Station System – Media GateWay (BSS-MGW) interface; User Plane transport mechanism".

[39] 3GPP TS 23.205: "Bearer Independent switched core network; Stage 2".

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[40] 3GPP TS 23.231: "SIP-I based circuit-switched core network; Stage 2".

[41] 3GPP TS 24.010: "Mobile radio interface layer 3 Supplementary services specification; General aspects".

[42] 3GPP TS 24.623: "Extensible Markup Language (XML) Configuration Access Protocol (XCAP) over the Ut interface for Manipulating Supplementary Services".

[43] 3GPP TS 24.607: "Originating Identification Presentation (OIP) and Originating Identification Restriction (OIR) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[44] 3GPP TS 24.615: "Communication Waiting (CW) using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[45] IETF RFC 3326: "The Reason Header Field for the Session Initiation Protocol (SIP)".

[46] 3GPP TS 29.163: "Interworking between the IP Multimedia (IM) Core Network (CN) subsystem and Circuit Switched (CS) networks".

[47] IETF RFC 5009: "Private Header (P-Header) Extension to the Session Initiation Protocol (SIP) for Authorization of Early Media".

[48] IETF RFC 3168: "The Addition of Explicit Congestion Notification (ECN) to IP".

[49] IETF RFC 6679: "Explicit Congestion Notification (ECN) for RTP over UDP".

[50] IETF RFC 3959: "The Early Session Disposition Type for the Session Initiation Protocol (SIP)".

[51] 3GPP TS 24.182: "IP Multimedia Subsystem (IMS) Customized Alerting Tones (CAT); Protocol specification".

[52] 3GPP TS 24.642: "Completion of Communications to Busy Subscriber (CCBS) and Completion of Communications by No Reply (CCNR) using IP Multimedia (IM) Core Network (CN) subsystem".

[53] 3GPP TS 24.093: "Completion of Calls to Busy Subscriber (CCBS); Stage 3".

[54] 3GPP TS 22.153: "Multimedia Priority Service".

[55] IETF RFC 4458: "Session Initiation Protocol (SIP) URIs for Applications such as Voicemail and Interactive Voice Response (IVR)".

[56] 3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".

[57] IETF RFC 3262: "Reliability of provisional responses in Session Initiation Protocol (SIP)".

[58] IETF RFC 3312: "Integration of Resource Management and Session Initiation Protocol (SIP)".

[59] IETF RFC 4032: "Update to the Session Initiation Protocol (SIP) Preconditions Framework".

[60] IETF RFC 5245: "Interactive Connectivity Establishment (ICE): A Protocol for Network Address Translator (NAT) Traversal for Offer/Answer Protocols".

[61] 3GPP TS 26.441: "Codec for Enhanced Voice Services (EVS); General Overview".

[62] 3GPP TS 26.445: "Codec for Enhanced Voice Services (EVS); Detailed Algorithmic Description".

[63] IETF RFC 5939:"Session Description Protocol (SDP) Capability Negotiation".

[64] 3GPP TS 23.333:" Multimedia Resource Function Controller (MRFC) - Multimedia Resource Function Processor (MRFP) Mp interface: Procedures Descriptions".

[65] IETF RFC 8197: "A SIP Response Code for Unwanted Calls".

[66] IETF RFC 8224: "Authenticated Identity Management in the Session Initiation Protocol (SIP)".

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[67] ITU-T Recommendation Q.850 (05/1998) including Amendment 1 (07/2001): "Usage of cause and location in the Digital Subscriber Signalling System No. 1 and the Signalling System No. 7 ISDN User Part".

[68] IETF RFC 8606: "ISDN User Part (ISUP) Cause Location Parameter for the SIP Reason Header Field".

3 Definitions and abbreviations

3.1 Definitions

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

ICE lite: The lite implementation of the Interactive Connectivity Establishment (ICE) specified in IETF RFC 5245 [60].

Full ICE: The full implementation of the Interactive Connectivity Establishment (ICE) specified in IETF RFC 5245 [60].

NAS signalling: layer 3 signalling carried over CS domain access between the UE and MSC Server as defined in 3GPP TS 24.008 [3].

For the purposes of the present document, the following terms and definitions given in 3GPP TS 24.629 [33] apply:

transferee

transferor

transfer target

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Full standard:
https://standards.iteh.ai/catalog/standards/sist/3562bc31-4403-476f-b3e6-552524cad331/etsi-ts-129-292-v15.5.0-2019-10

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].

3PCC	3rd Party Call Control
ACR	Anonymous Communication Rejection
BAIC	Barring of All Incoming Calls
BAOC	Barring of All Outgoing Calls
BIC-Roam	Barring of Incoming Calls when Roaming outside the home PLMN country
BOIC	Barring of Outgoing International Calls
BOIC-exHC	Barring of Outgoing International Calls except those directed to the Home PLMN Country
CB	Communication Barring
CCBS	Completion of Communication to Busy Subscriber
CCNL	Completion of Communications on Not Logged-in
CCNR	Completion of Communications on No Reply
CD	Communication Deflection
CDIV	Communication DIVersion
CFNL	Communication Forwarding on Not Logged-in
CFNR	Communication Forwarding No Reply
CFNRc	Communication Forwarding on subscriber Not Reachable
CFU	Communication Forwarding Unconditional
CONF	CONFerence
CS	Circuit Switched
CS-MGW	Circuit Switched Media Gateway
ECN	Explicit Congestion Notification
ECT	Explicit Communication Transfer

EVS	Enhanced Voice Services
GRUU	Globally Routable User Agent URI
HOLD	communication HOLD
ICB	Incoming Communication Barring
ICE	Interactive Connectivity Establishment
ICS	IM CN subsystem Centralized Services
IMS-MGW	IP Multimedia Subsystem-Media Gateway Function
IuFP	Iu Framing Protocol
MboIP	Mb over IP
MRFP	Media Resource Function Processor
MPS	Multimedia Priority Service
NAS	Non Access Stratum
OCB	Outgoing Communication Barring
OIP	Originating Identification Presentation
OIR	Originating Identification Restriction
RTCP	RTP Control Protocol
SDPCapNeg	SDP Capability Negotiation
TDM	Time Division Multiplex
TIP	Terminating Identification Presentation
TIR	Terminating Identification Restriction

4 Interworking overview

4.1 Interworking reference model

Figure 4.1.1 details the reference model required to support interworking between the 3GPP IM CN subsystem and CS domain access for IM basic voice calls and supplementary services.

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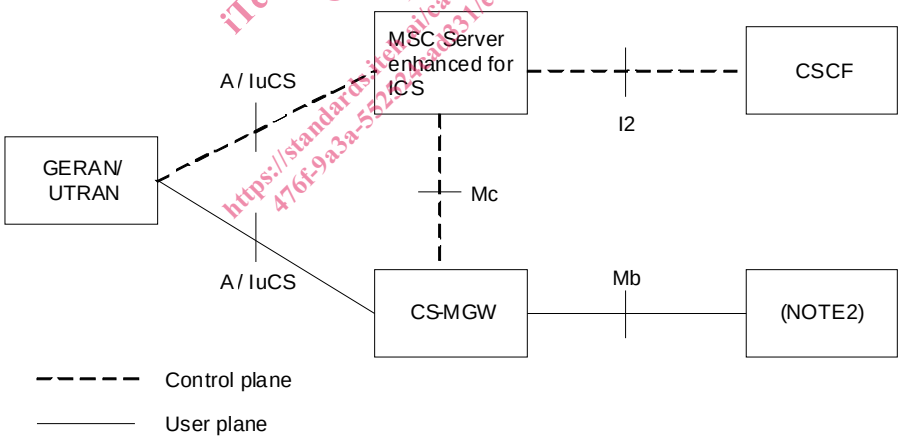
Full standard:
https://standards.iteh.ai/catalog/standards/sist/3562bc31-4603-476f-9a3a-552224ad331/etsi-ts-129-292-v15.5.0-2019-10



NOTE 1: The logical split of the signalling and bearer path between the CS access network and MSC Server enhanced for ICS is as shown; however, the signalling and bearer may be directly connected to the MGW.

NOTE 2: The CS-MGW may be connected via the Mb reference point to various network entities, such as a UE (via a GTP tunnel to a GGSN), an MRFP, or an IMS-MGW, or a remote CS-MGW.

Figure 4.1.1: MSC Server – IM CN subsystem interworking reference model

4.2 Interworking reference points and interfaces

The reference points and network interfaces shown in figure 4.1.1 are as described: