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## IMS services interaction

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# IMS services interaction

Noel Crespi

3GPP TSG-SA WG2 Meeting #77  
Shenzhen, China, 18 - 22 January 2010

S2-100343

CR-Form-v9.6
<b>CHANGE REQUEST</b>
23.228 CR 0904 rev - Current version: 9.2.0

For [HELP](#) on using this form look at the pop-up text over the symbols. Comprehensive instructions on how to use this form can be found at <http://www.3gpp.org/specs/CR.htm>.

Proposed change affects: UICC apps  ME  Radio Access Network  Core Network

<b>Title:</b>	IMS Services interaction																
<b>Source to WG:</b>	Orange, Institut Telecom, NTT DOCOMO																
<b>Source to TSG:</b>	S2																
<b>Work item code:</b>	TE110																
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Use one of the following categories: <table style="width: 100%; font-size: small;"> <tr> <td>F (correction)</td> <td>R99 (Release 1999)</td> </tr> <tr> <td>A (corresponds to a correction in an earlier release)</td> <td>Rel-4 (Release 4)</td> </tr> <tr> <td>B (addition of feature)</td> <td>Rel-5 (Release 5)</td> </tr> <tr> <td>C (functional modification of feature)</td> <td>Rel-6 (Release 6)</td> </tr> <tr> <td>D (editorial modification)</td> <td>Rel-7 (Release 7)</td> </tr> <tr> <td></td> <td>Rel-8 (Release 8)</td> </tr> <tr> <td></td> <td>Rel-9 (Release 9)</td> </tr> <tr> <td></td> <td>Rel-10 (Release 10)</td> </tr> </table>		F (correction)	R99 (Release 1999)	A (corresponds to a correction in an earlier release)	Rel-4 (Release 4)	B (addition of feature)	Rel-5 (Release 5)	C (functional modification of feature)	Rel-6 (Release 6)	D (editorial modification)	Rel-7 (Release 7)		Rel-8 (Release 8)		Rel-9 (Release 9)		Rel-10 (Release 10)
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Detailed explanations of the above categories can be found in 3GPP <a href="#">TR 21.900</a> .																	

<b>Reason for change:</b>	In their LS in S1-094250 / S2-100041, SA1 reminded that the following requirement has been specified in TS 22.228, clause 5: "Within each IP multimedia session, one or more IP multimedia applications shall be supported. It shall be possible to support multiple IP multimedia applications to efficiently provide a coherent and consistent IP multimedia service experience. Such support involves identifying which applications are invoked per subscriber, understanding the appropriate order of the set of applications, and resolving application interactions during the session." CT1 has expressed the need to have stage-2 requirements specified for IMS services interactions before they proceed with specifying a solution to avoid conflicting interactions between services provided by different Application Servers. Additionally, text in clause 4.16.1 seems to imply that MMTel functionalities can only be provided by a single AS, which is in contradiction with TS 24.173 clause 4.1A.2.
<b>Summary of change:</b>	Addition of text specifying the requirements to be fulfilled to allow avoidance of conflicting interactions between supplementary services. Clarification of text related to TAS for alignment with TS 24.173.
<b>Consequences if not approved:</b>	Stage-1 requirement not fulfilled. Conflicting interactions between services provided by different Application Servers cannot be avoided.

<b>Clauses affected:</b>	4.2.1.x (new), 4.2.4, 4.16.1																
<b>Other specs affected:</b>	<table border="1" style="font-size: x-small;"> <tr> <td></td> <td>Y</td> <td>N</td> <td></td> </tr> <tr> <td></td> <td>X</td> <td></td> <td>Other core specifications</td> </tr> <tr> <td></td> <td>X</td> <td></td> <td>Test specifications</td> </tr> <tr> <td></td> <td>X</td> <td></td> <td>O&amp;M Specifications</td> </tr> </table>		Y	N			X		Other core specifications		X		Test specifications		X		O&M Specifications
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<b>Other comments:</b>																	

**Commentaire [H1]:** Document numbers are allocated by the Working Group Secretary. Use the format of document number specified by the [3GPP Working Procedures](#).

**Commentaire [H2]:** Enter the specification number in this box. For example, 04.08 or 31.102. Do not prefix the number with anything. i.e. do not use "TS", "GSM" or "3GPP" etc.

**Commentaire [H3]:** Enter the CR number here. This number is allocated by the 3GPP support team. It consists of at least four digits, padded with leading zeros if necessary.

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**Commentaire [H5]:** Enter the version of the specification here. This number is the version of the specification to which the CR was written and (normally) to which it will be applied if it is approved. Make sure that the latest version of the specification (of the relevant release) is used when creating the CR. If unsure what the latest version is, go to <http://www.3gpp.org/specs/specs.htm>.

**Commentaire [H6]:** For help on how to fill out a field, place the mouse pointer over the special symbol closest to the field in question.

**Commentaire [H7]:** Mark one or more of the boxes with an X.

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**Commentaire [H9]:** Enter a concise description of the subject matter of the CR

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**Commentaire [H12]:** Enter the acronym for the work item which is

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**Commentaire [H14]:** Enter a single letter corresponding to the most appropri

**Commentaire [H15]:** Enter a single release code from the list below.

**Commentaire [H16]:** Enter text which explains why the change is necessary.

**Commentaire [H17]:** Enter text which describes the most important component

**Commentaire [H18]:** Enter here the consequences if this CR were to be rejec

**Commentaire [H19]:** Enter the number of each clause which contains

**Commentaire [H20]:** Tick "yes" box if any other specifications are affected b

**Commentaire [H21]:** List here the specifications which are affected or the C

**Commentaire [H22]:** Enter any other information which may be needed by the

## Change #1

### 3.1 Definitions

Refer to TS 23.002 [1] for the definitions of some terms used in this document.

For the purposes of the present document the terms and definitions given in TR 21.905 [68] and the following apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [68].

For the purposes of the present document, the following terms and definitions given in TS 23.003 [24] apply:

#### **Public User Identity**

**Alias Public User Identities:** A Public User Identity is an alias of another Public User Identity if both identities belong to the same implicit registration set, are linked to the same service profile and have the same service data configured for each and every service.

**ALG:** Application Level Gateway (ALG) is an application specific functional entity that allows communication between disparate address realm or IP versions, e.g. an IPv6 node to communicate with an IPv4 node and vice versa, when certain applications carry network addresses in the payloads like SIP/SDP. NA(P)T-PT or NA(P)T is application unaware whereas ALGs are application specific translation entities that allow a host running an application to communicate transparently with another host running the same application but in a different IP version or IP address realm. See IETF RFC 2663 [34] for more details.

For IMS, an IMS ALG provides the necessary application function for SIP/SDP protocols in order to communicate between different address realms or IP versions, e.g. IPv6 and IPv4 SIP applications.

**Entry point:** In the case that border control concepts are to be applied in an IM CN subsystem, then these are to be provided by capabilities within the IBCF, and the IBCF acts as an entry point for this network (instead of the I-CSCF). In this case the IBCF and the I-CSCF can be co-located as a single physical node. If border control concepts are not applied, then the I-CSCF is considered as an entry point of a network. If the P-CSCF is in the home network, then the I-CSCF is considered as an entry point for this document.

**Exit point:** If operator preference requires the application of border control concepts then these are to be provided by capabilities within the IBCF, and requests sent towards another network are routed via a local network exit point (IBCF), which will then forward the request to the other network (discovering the entry point if necessary).

**IP-Connectivity Access Network:** refers to the collection of network entities and interfaces that provides the underlying IP transport connectivity between the UE and the IMS entities. An example of an "IP-Connectivity Access Network" is GPRS.

**Subscriber:** A Subscriber is an entity (comprising one or more users) that is engaged in a Subscription with a service provider. The subscriber is allowed to subscribe and unsubscribe services, to register a user or a list of user authorised to enjoy these services, and also to set the limits relative to the use that users make of these services.

**Inter-IMS Network to Network Interface:** The interface which is used to interconnect two IM CN subsystem networks. This interface is not constrained to a single protocol.

**Network Address Translation (NA(P)T):** method by which IP addresses are mapped from one group to another, transparently to end users. Network Address Port Translation, or NA(P)T is a method by which many network addresses and their TCP/UDP (Transmission Control Protocol/User Datagram Protocol) ports are translated into a single network address and its TCP/UDP ports. See RFC 3022 [65] for further details.

**NAT-PT/NAPT-PT:** NAT-PT uses a pool of globally unique IPv4 addresses for assignment to IPv6 nodes on a dynamic basis as sessions are initiated across the IP version boundaries. NAT-PT binds addresses in IPv6 network with addresses in IPv4 network and vice versa to provide transparent routing between the two IP domains without requiring any changes to end points, like the UE. NAT-PT needs to track the sessions it supports and mandates that inbound and outbound data for a specific session traverse the same NAT-PT router.

NAPT-PT provides additional translation of transport identifier (e.g., TCP and UDP port numbers, ICMP query identifiers). This allows the transport identifiers of a number of IPv6 hosts to be multiplexed into the transport identifiers of a single assigned IPv4 address. See IETF RFC 2766 [33] for more details.

**Transport address:** A unique identifier of transport-layer address, i.e. a combination of a network address, protocol identifier and port number. For example an IP address and a UDP port.

**IMS application:** An IMS application is an application that uses an IMS communication service(s) in order to provide a specific service to the end-user. An IMS application utilises the IMS communication service(s) as they are specified without extending the definition of the IMS communication service(s).

**IMS application reference:** An IMS application reference is the means by which an IMS communication service identifies an IMS application.

**IMS communication service:** An IMS communication service is a type of communication defined by a service definition that specifies the rules and procedures and allowed medias for a specific type of communication and that utilises the IMS enablers.

**IMS communication service identifier:** An IMS communication service identifier uniquely identifies the IMS communication service associated with the particular IMS request.

**IMC:** IMS Credentials as defined in TR 21.905 [68].

**IMS enabler:** An IMS enabler is a set of IMS procedures that fulfils specific function. An IMS enabler may be used in conjunction with other IMS enablers in order to provide an IMS communication service.

**Instance identifier:** An identifier, that uniquely identifies a specific UE amongst all other UEs registered with the same Public User Identity.

**Local Service Number:** A local service number is a telephone number in non international format. A local service number is used to access a service that may be located in the home network of the user (home local service number) or the roamed network of the user (geo-local service number).

**Geo-local service number:** A local service number that is used to access a service in the roamed network (a local service where the subscriber is located).

**Home local service number:** A local service number is used to access a service that is located in the home network of the user.

**IP Flow:** Unidirectional flow of IP packets with the following properties:

- same source IP address and port number;
- same destination IP address and port number;
- same transport protocol (port numbers are only applicable if used by the transport protocol).

**Media Flow:** One or more IP flows carrying a single media instance, e.g., an audio stream or a video stream. In the context of this specification the term Media Flow is used instead of IP Flow regardless of whether the actual IP packet corresponds to media plane information (e.g. audio RTP flow) or control signalling (e.g. RTCP or SIP Signalling).

**STUN:** Simple Traversal of UDP Through NAT (STUN), provides a toolkit of functions. These functions allow entities behind a NAT to learn the address bindings allocated by the NAT, to keep those bindings open, and communicate with other STUN-aware devices to validate connectivity. See RFC 5389 [47] for further details.

**STUN Relay:** Is a usage of STUN, that allows a client to request an address on the STUN server itself, so that the STUN server acts as a relay. See draft-ietf-behave-turn [46] for further details.

**STUN Keep-alive:** Is a usage of STUN, to keep NAT bindings open.

**Outbound:** Managing Client Initiated Connections in the Session Initiation Protocol (Outbound) defines behaviours for User Agents, registrars and proxy servers that allow requests to be delivered on existing connections established by the User Agent. See RFC 5626 [48] for further details.

**Preferred Circuit Carrier Selection:** An IMS service that allows the subscriber to select a long distance circuit carrier per call when dialling a call origination.

**Preferred Circuit Carrier Access:** An IMS service that allows a specific long distance circuit carrier to be selected for a long distance call.

**IP-SM-GW (IP short message gateway):** An IP-SM-GW is an AS providing the support of Short Message Service of the IMS domain. See more details in TS 23.204 [56].

**Service Feature:** A reusable capability provided to a user by one or more services in one or more Application Servers.

## 4.2.1 Home-network based services

...

### 4.2.1.x Dynamic services interactions handling

To avoid conflicting interactions between the services or Service Features that they execute, different ASs involved in the same session (on the originating and terminating sides), should be able to exchange the following information:

- Indication of services or Service Features that should not be performed, possibly under conditions.

If the AS receives a SIP message containing service interactions information indicating that a service or Service Feature hosted by the AS should not be executed and local operator policy allows taking into account this information, the AS should not execute the service logic associated to this service or Service Feature for the ongoing session.

If a service or Service Feature provided by the AS is known as incompatible with another service or with an action, the AS should include a piece of service interaction information in SIP signalling indicating the name of the incompatible service or Service Feature.

A trust domain shall apply for service interaction information exchange. Service interaction information shall neither be sent to nor accepted from entities outside the trust domain.

Mise en forme : Puces et numéros

## Change #2

## 4.2.4 IP multimedia Subsystem Service Control Interface (ISC)

The ISC interface is between the Serving CSCF and the service platform(s).

An Application Server (AS) offering value added IM services resides either in the user's home network or in a third party location. The third party could be a network or simply a stand-alone AS.

The Serving-CSCF to AS interface is used to provide services residing in an AS. Two cases were identified:

- Serving-CSCF to an AS in Home Network.
- Serving-CSCF to an AS in External Network (e.g., Third Party or Visited)

The SIP Application Server may host and execute services. The SIP Application Server can influence and impact the SIP session on behalf of the services and it uses the ISC interface to communicate with the S-CSCF. The S-CSCF shall be able to supply the AS with information to allow it to execute multiple services in order within a single SIP transaction.

The ISC interface shall be able support subscription to event notifications between the Application Server and S-CSCF to allow the Application Server to be notified of the implicit registered Public User Identities, registration state and UE capabilities and characteristics in terms of SIP User Agent capabilities and characteristics.

The S-CSCF shall decide whether an Application Server is required to receive information related to an incoming initial SIP request to ensure appropriate service handling. The decision at the S-CSCF is based on (filter) information received from the HSS. This filter information is stored and conveyed on a per Application Server basis for each user. It shall be possible to include a service indication in the filter information, which is used to identify services and the order that they are executed on an Application Server within a single SIP transaction. The name(s)/address(es) information of the Application Server (s) are received from the HSS.

For an incoming SIP request, the S-CSCF shall perform any filtering for ISC interaction before performing other routing procedures towards the terminating user, e.g. forking, caller preferences etc.

The S-CSCF does not handle service interaction issues.

Once the IM SSF, OSA SCS or SIP Application Server has been informed of a SIP session request by the S-CSCF, the IM SSF, OSA SCS or SIP Application Server shall ensure that the S-CSCF is made aware of any resulting activity by sending messages to the S-CSCF.

From the perspective of the S-CSCF, the "SIP Application server", "OSA service capability server" and "IM-SSF" shall exhibit the same interface behaviour.

When the name/address of more than one Application Server is transferred from the HSS, the S-CSCF shall contact the Application Servers in the order supplied by the HSS. The response from the first Application Server shall be used as the input to the second Application Server. Note that these multiple Application Servers may be any combination of the SIP Application server, OSA service capability server, or IM-SSF types.

The S-CSCF does not provide authentication and security functionality for secure direct third party access to the IM subsystem. The OSA framework provides a standardized way for third party secure access to the IM subsystem.

If a S-CSCF receives a SIP request on the ISC interface that was originated by an Application Server destined to a user served by that S-CSCF, then the S-CSCF shall treat the request as a terminating request to that user and provide the terminating request functionality as described above. Both registered and unregistered terminating requests shall be supported.

It shall be possible for an Application Server to generate SIP requests and dialogs on behalf of users. Requests originating sessions on behalf of a user are forwarded to the S-CSCF serving the user, if the AS has knowledge of the S-CSCF assigned to that user and the S-CSCF shall perform regular originating procedures for these requests.

Originating requests on behalf of registered and unregistered users shall be supported.

More specifically the following requirements apply to the IMS Service control interface:

1. The ISC interface shall be able to convey charging information as per TS 32.240 [25] and TS 32.260 [26].
2. The protocol on the ISC interface shall allow the S-CSCF to differentiate between SIP requests on Mw, Mm and Mg interfaces and SIP Requests on the ISC interface.
3. [The ISC interface shall allow the exchange of information between Application Servers within a trust domain, for the avoidance of conflicting interactions between the services or Service Features that they execute, as specified in clause 4.2.1.x.](#)

#### Figure 4.3: Void

Besides the Cx interface the S-CSCF supports only one standardised protocol for service control, which delegates service execution to an Application Server. The protocol to be used on the ISC interface shall be SIP (as defined by IETF RFC 3261 [12], other relevant IETF RFC's, and additional enhancements introduced to support 3GPP's needs on the Mw, Mm, Mg interfaces). On the ISC interface, extensions to SIP shall be avoided but are not expressly prohibited.

The notion of a "SIP leg" used throughout this specification is identical to the notion of a call leg which is the same as a SIP dialog defined by IETF RFC 3261 [12]. The same SIP leg that is received by the S-CSCF on the Mw, Mm and Mg interfaces is sent on the ISC interface. The same SIP leg that is received by the S-CSCF on the ISC interface is sent on the Mw, Mm and Mg interfaces.

Concerning the relationship between the SIP legs of the ISC interface and the SIP legs of the Mw, Mm, and Mg interfaces the S-CSCF acts as a SIP proxy, as shown in Figures 4.3a – 4.3e below.

Figures 4.3a-4.3e below depict the possible high-level interactions envisioned between the S-CSCF and the Application Server.

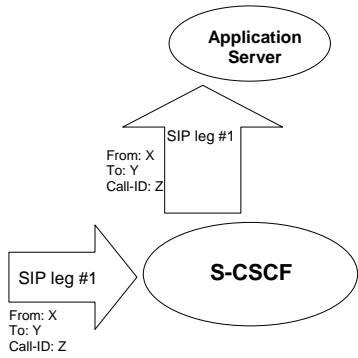


Figure 4.3a: Application Server acting as terminating UA, or redirect server

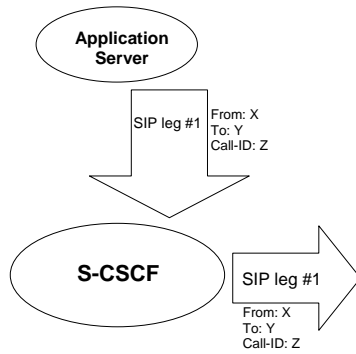


Figure 4.3b: Application Server acting as originating UA

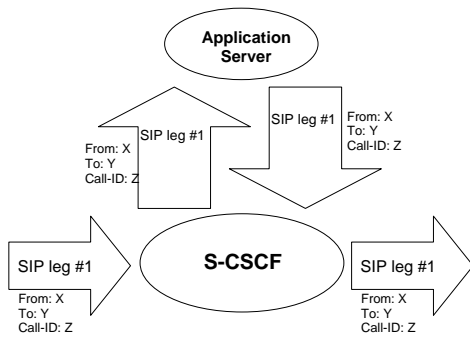


Figure 4.3c: Application Server acting as a SIP proxy

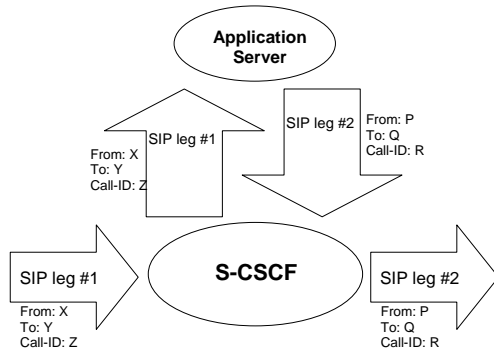


Figure 4.3d: Application Server performing 3<sup>rd</sup> party call control

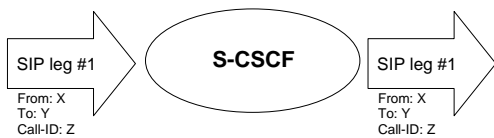


Figure 4.3e: A SIP leg is passed through the S-CSCF without Application Server involvement

## Change #3

### 4.16 Support of multimedia telephony

#### 4.16.1 Telephony Application Server

The Telephony Application Server is a SIP-AS providing the network support for the multimedia telephony service, TS 22.173 [53]. Whether to allocate the functionality to one or more Application Servers is an implementation decision. If specific procedures and message flows include or require media interaction, the TAS and MRFC may be collocated.

## End of changes