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Technical Report

3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Identification of Communication Services in IMS (Release 7)

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Foreword

This Technical Report has been produced by the 3rd Generation Partnership Project (3GPP).

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x the first digit:

1 presented to TSG for information;

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y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

During the definition of IMS, 3GPP has adopted the approach of defining a number of IMS enablers to be used by a number of services. The adoption of the IMS by other standardisation bodies such as OMA, TISPAN and ATIS is a testament to the success of this approach. With a system that supports a number of services on a common set of enablers leads to the need of identifying the communication service that is being invoked.

This technical report captures the results of a feasibility study into the identification of IMS communication services with a focus on the application of an IMS communication service identifier and the necessary administrative procedures.

A brief summary of the needs to identify a IMS communication service include:

- the IMS network is required to identify the correct application server(s) to link into the SIP call path over the ISC, when an application server is required;
- the media authorization policy may use a communication service identifier as input;
- it is desirable for the network to be able to authorize the use of a communication service;
- charging may use a communication service identifier as input;
- in a multi-UE scenario where a recipient has several UEs with different UE capabilities, it is useful to be able to route the SIP request to the UE(s) supporting a requested communication service;
- in order to enable the User Equipment to identify the correct application logic, while allowing for many services to be offered using the same enablers and media types;
- often interworking requires knowledge of the services being interworked, as such interworking between an IMS based service and a non-IMS based service may benefit from the identification of the requested communication service;
- allowing the network to authorise the use of the service for a particular user;
- communication service prioritisation in the case of network overload;
- to be an input into inter-operator interconnect service level agreements;
- provide a scope for the IOP specifications related to a particular communication service.

1 Scope

The scope of the technical report is to capture the results of a feasibility study in the needs of identifying IMS communication services with and in the need of the IMS communication service identifier.

This technical report contains the results into a study on the communication service identifier with a focus on the following aspects:

- a frame work description for the usage and applicability of the communication service identifier and its relationship with the PSI and other existing IMS mechanisms;
- identifying the architectural requirements for a communication service identifier that enable the usage scenarios identified in the above justification section;
- identifying requirements on compatibility and evolution of a communication service in relation to the communication service identifier;
- identify the methods for administrative procedures for a communication service identifier, including the requirements upon when a service identifier value is required to be allocated;

In addition alternative mechanisms to identify communication services may be identified.

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: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Vocabulary for 3GPP Specifications".

[2] RFC 2506: "Media Feature Tag Registration Procedure".

3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the definitions given in TR 21.905 [1] and the following definitions apply:

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.

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.

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.

3.2 Symbols

For the purposes of the present document, the symbols given in TR 21.905 [1] apply.

3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1] apply, in addition, the following abbreviations apply.

IANA Internet Assigned Numbers Authority (IANA)

4 Need of identifying IMS communication services

In order to support a number of communication services that utilise a common set of IMS enablers a means to identify the communication service being requested is of benefit. A pictorial summary is shown in figure 4-1.

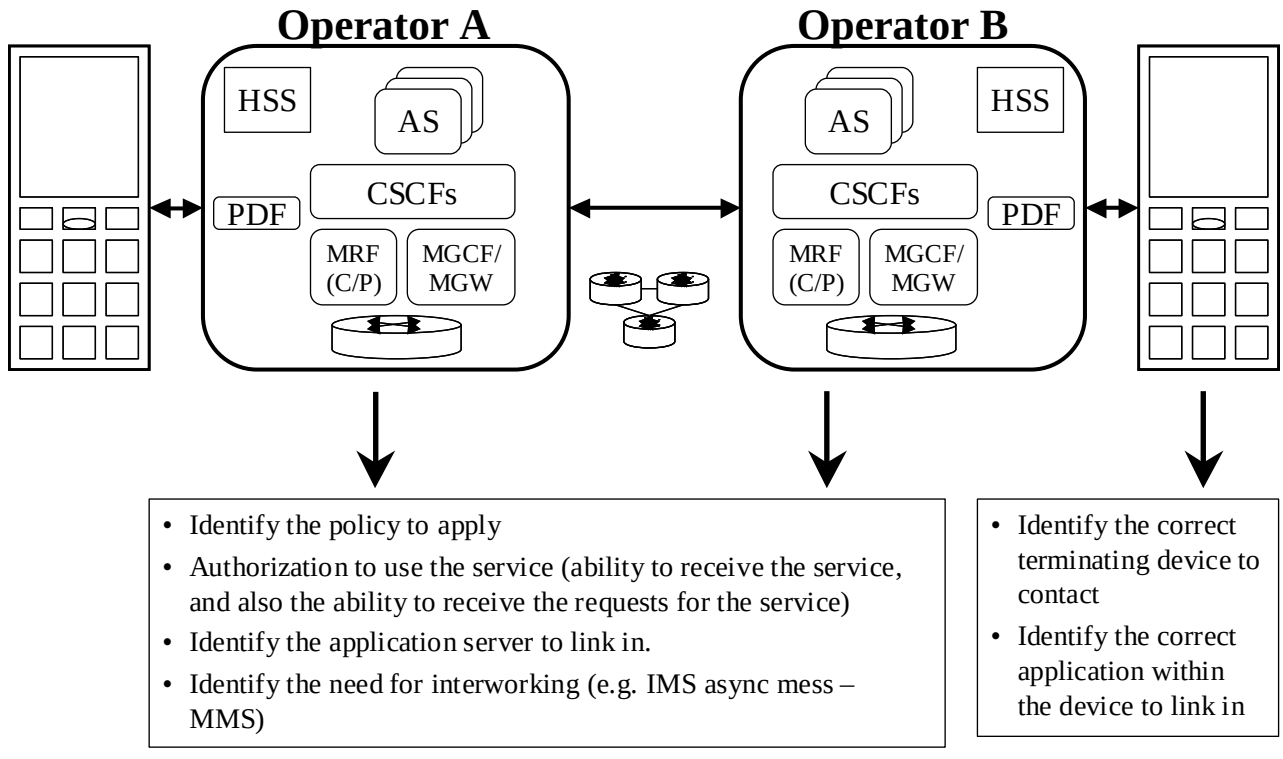

Figure 4-1: Need of identifying IMS communication services

In a multi-service architecture, a particular media (and enablers) can be used by a number of services. One example is that both PoC, and multimedia telephony (note) make use of AMR as the media. As such means other than the used media or enabler is required in order to identify that a particular service is being requested of invoked.

NOTE: Multimedia telephony is currently under definition.

The Public Service Identifier (PSI) is not used to identify the means of communication requested, but more a service that is routed to within the IMS network. The communication service describes the IMS services used to communicate with the service identified via the PSI. e.g. a service to that provides information on the closest train timetable may be

indicated by a PSI. The means to communication with this service (e.g. Multimedia telephony, PoC, etc.) is required to be identified.

The Public Service Identifier (PSI) is also not sufficient to identify communication between two terminals as the INVITE sent to the terminating network does not contain a PSI.

4.1 Identify the application server on the ISC interface

When an application server is required for the support of an IMS communication service, the application server can be linked by the S-CSCF over the ISC interface. When there are a number of services supported by a number of application servers over the ISC, then the S-CSCF requires sufficient information to link in the correct application servers for the requested service.

The mechanism that the S-CSCF uses in order to identify the application servers that are required to be contacted over the ISC interface is the initial filter criteria (iFC). The initial filter criteria (iFC) can react upon SIP headers or the body of the SIP message (e.g. SDP), and require sufficient input in order to identify the correct application server to invoke. As the media is not sufficient to identify the service, and there is not a SIP header to support the identification of a service, there is insufficient information in order to identify the correct application server to link in for a particular service.

The alternative approach of looping in a number of application servers is not only inefficient; it also has the disadvantage that it doesn't solve the problem. It just delegates the problem to a higher layer in the network – leaving the application servers themselves to determine whether they are supposed to react upon the SIP request. This approach also increases the problem of interference between applications.

4.2 Input into media authorisation policy

The media authorisation policy can different for different services using the same media. One example of this is that the media authorization policy for voice may be to allow streaming QoS and not conversational QoS for PoC, but when Multimedia telephony is used, the voice may be allowed to utilise conversational QoS.

4.3 Service authorisation

The identification of the service is required in order to determine whether a user is authorised to use the service or not. Authorisation is required for example, for charging.

4.4 Priority in the case of overload situations

The identification of a service can be used in when the network is experiencing overload, where either some services may be prioritised over other services.

4.5 Interworking identification

Identification of the enabler is not sufficient in order to identify the method of interworking, or whether interworking is should be performed at all. For example, the interworking of chat requires different considerations than when interworking asynchronous messaging with e.g. MMS.

4.6 Routing to the correct terminating device

The ability to identify the service requested can assist the terminating network in order to route messages to the UEs registered for that service in the case that multiple UEs have registered with a common Public user identifier.

4.7 Input into charging and accounting

The identified service can be input into the charging, allowing for charging based on the service requested, not just the media used.

The identified service may be input into the accounting agreements.

4.8 Identification of the application to invoke in the terminating terminal

The terminating terminal needs to understand the service in order to apply the correct procedures for the service. Basically, the correct user agent needs to be identified he terminating message.

4.9 Relationship to presence

Presence attributes are also used to identify a service as part of the presence tuple. For example, the following service-id is applied for PoC "<ot:service-id>org.openmobilealliance:PoC-Session</ot:service-id>". Co-ordination between the identifier that is used in the presence document and the service identifier to be used in the SIP signalling is required.

4.10 High level flows for identification of communication services

This section describes some of the flows illustrating the need for the identification of services.

4.10.1 Communication establishment to other users

4.10.1.1 Operator policy allowing communication between User A and User B

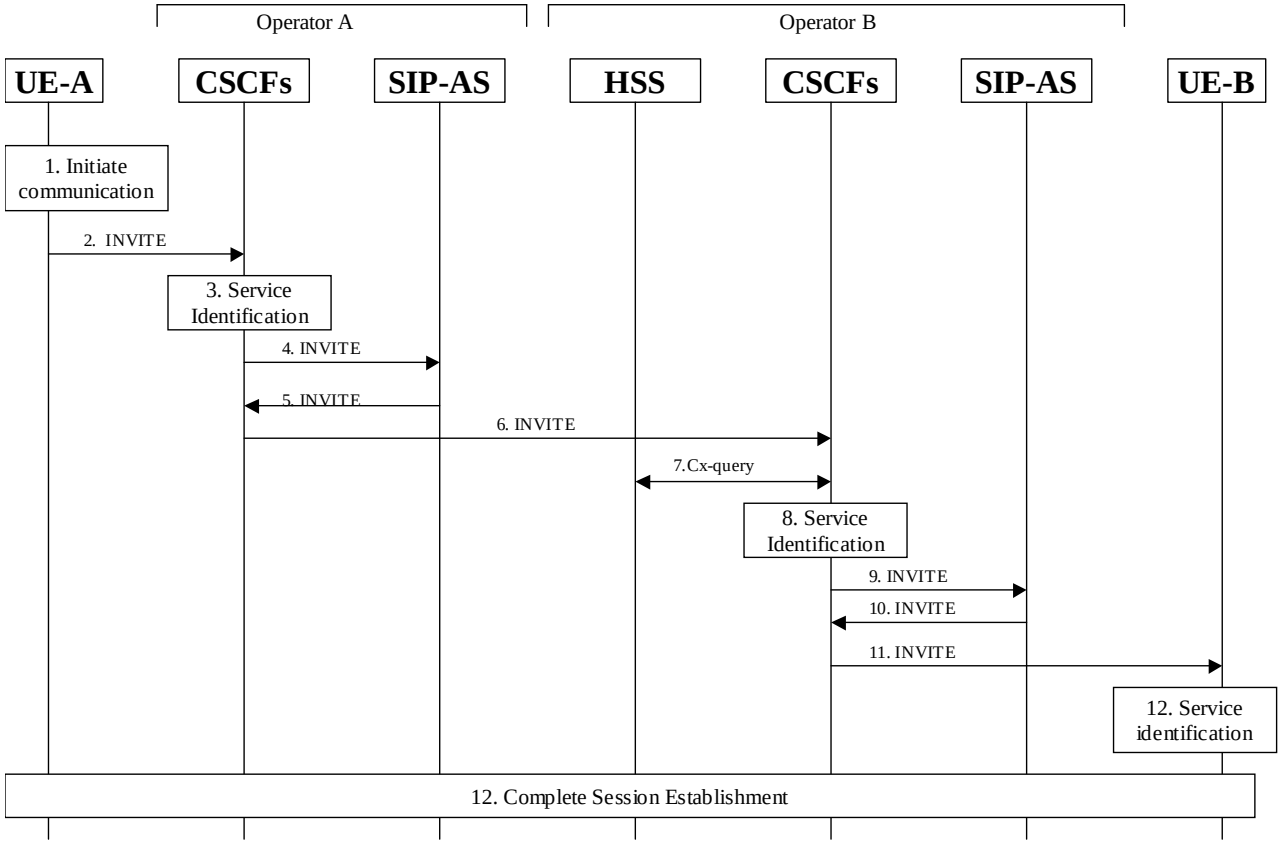

Figure 4-2: Communication establishment to other peer user

Figure 4-2 illustrates a high level flow of a communication establishment towards a peer user. The communication service identifier is included in the INVITE (steps 2,4,5,6,9,10,11). Of significance to the identification of services is steps 3 and 8, where the S-CSCF identifies the service using the initial filter criteria. This assumes that with the communication service identifier the IFC has sufficient information to uniquely identify the communication service being requested. Step 12 shows the UE identifying the requested communication service and invoking the correct UE IMS application.

Without a means to identify the requested communication service either the SIP-AS required for the service is not invoked or all AS for the subscriber will have to be invoked. This is not practical as, in addition to the load created by invoking additional SIP-ASs, if there is no means for the S-CSCF to identify the communication service to be invoked, then the SIP-ASs themselves cannot determine the context that a SIP session is intended for. The media descriptions in SDP may not identify the communication service since as the same media components can be part of several communication services. Video could, for instance, be used in 3GPP multimedia, OMA PoC and an operator-specific communication service.

If different supplementary services are to be provided for these media types (e.g. unconditional forwarding of video to a mail system for 3GPP multimedia calls but not for OMA PoC), it is crucial to uniquely identify the communication service and not only the requested media.

4.10.2 Operator B policy is set to restrict a particular communication service towards User B

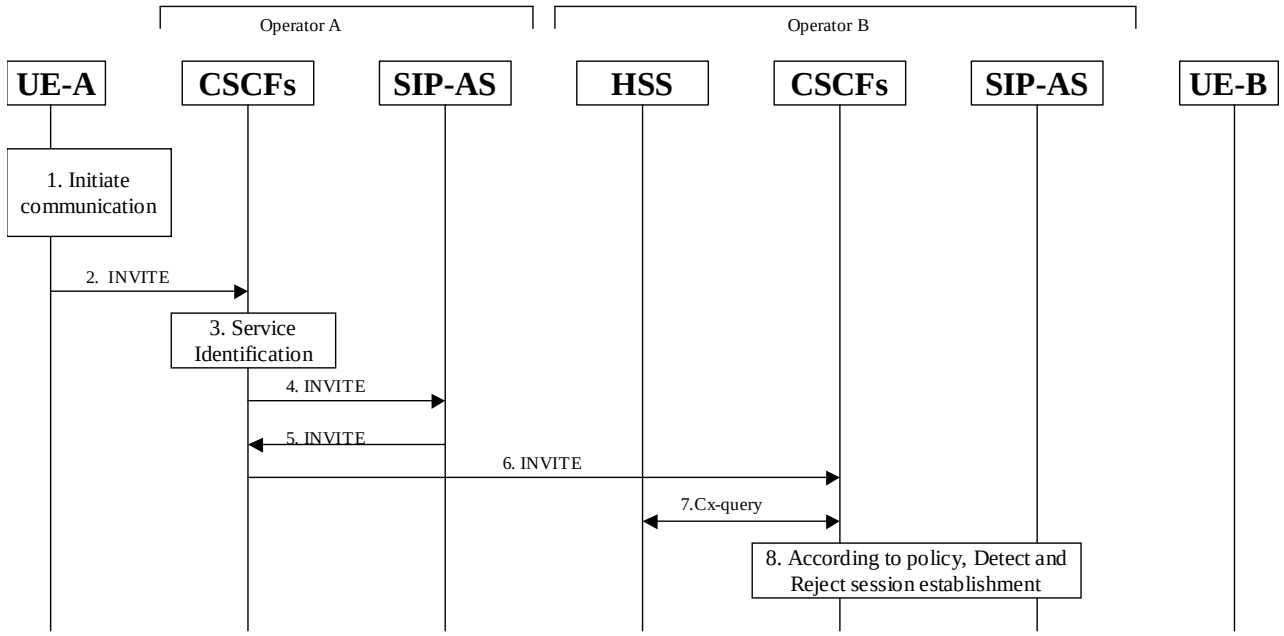

Figure 4-3: Communication establishment rejected due to operator policy

Figure 4-3 above, illustrates an example of a flow where the operator B's policy is set to not allow the requested communication service (examples of such policy may include lack of business agreement to receive the requested communication). The network of Operator B should be capable to detect the requested service and, if user B is not authorised to receive the requested service, reject the session request. Without an indication of the identified service, the session would be delivered to the terminal - this may lead to undesirable or unpredictable results.

NOTE: For communication to a service addressing another end-user, a PSI is not applicable on the terminating side as the session initiation request will be addressed to the end-user, not an application server.

4.10.3 Communication establishment to a service indicated by a PSI

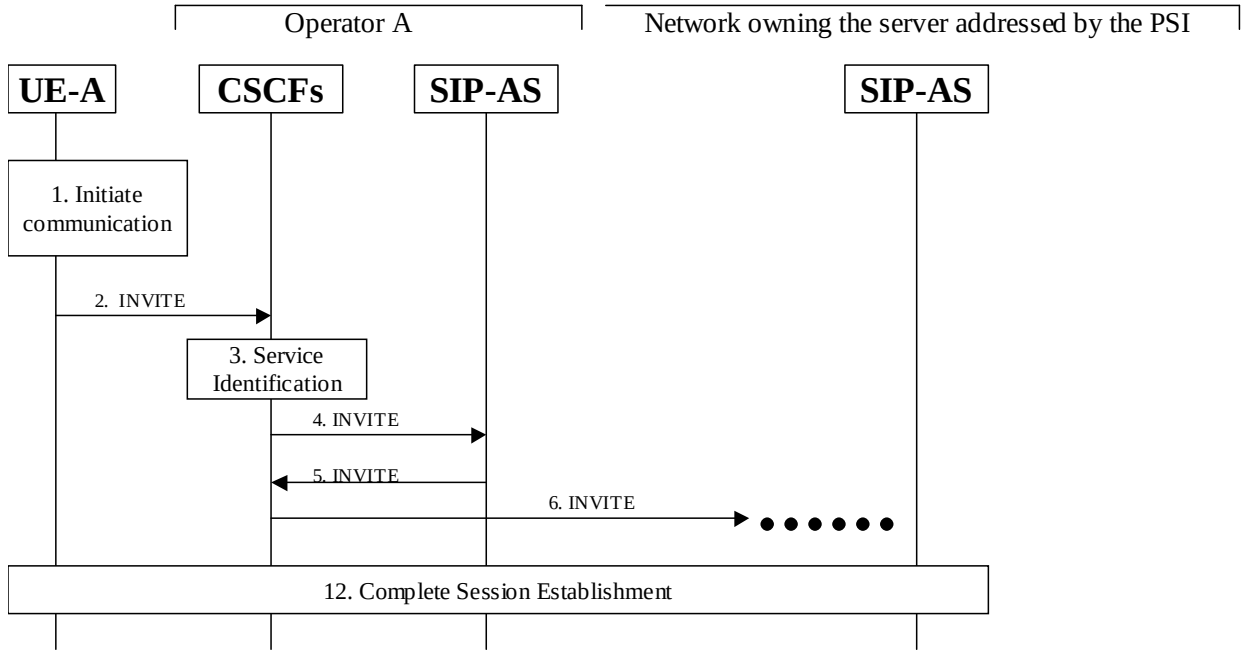

Figure 4-4: Communication establishment to a service indicated by a PSI

Figure 4-4 illustrates a call to a service addressed by a PSI, where the PSI represents a service on the terminating side. The PSI may be reached by more than one communication service (e.g. PoC or multimedia telephony). In such a case a particular communication service identifier is chosen to communicate with the service addressed by the PSI. It must also be possible to invoke services provided by an applications server on the originating side that relate to the particular communication service, and not to the service provided by the application server addressed by the PSI. Application servers on the originating side will be invoked over ISC when the S-CSCF examines the communication service identifier.

5 The IMS communication service Identifier

5.1 Requirements on the IMS communication service identifier

A communication service identifier provides a framework for the identification of communication services utilising the IMS enablers. A communication service is provided via the use of the IMS enablers. At terminals, the use of a communication service identifier is similar to the use of the port concept in TCP/IP, in that it allows applications in a terminal and the network that use SIP for communication purposes to be identified. In the terminal this means dispatching a SIP message to the correct application, and in the network it means selection of the correct application server over ISC. Examples of IMS based applications and communication services provided by these are 3GPP multimedia telephony and OMA PoC.

The communication service is an aggregation of one or several media components and the service logic managing the aggregation, represented in the protocols used. Its behaviour and characteristics may be standardized as for the two examples above, or proprietary and specific for e.g. an operator or an enterprise.

A service description specifies this behaviour and states e.g. the allowed media combinations and state transitions as a consequence of signalling and use of IMS enablers in the network and terminals.

The need of applying a service identifier is a discussion to be taken within the specification of each individual service.

The communication service identifier identifies IMS communication services and shall be included in the relevant SIP methods.

The IMS communication service identifier shall fulfil the following requirements:

1. It shall be possible for the UE and an Application Server (AS) to set the IMS communication service identifier in a SIP request, e.g. in the REGISTER and INVITE request.

2. Based on operator policy the S-CSCF or an AS shall be able to validate an IMS communication service identifier in a SIP request. This includes e.g. to check the syntactical correctness of a service identifier, and policing the usage of a communication service identifier.

3. It shall be possible, e.g. for the UE, S-CSCF and AS, to identify an IMS service uniquely by the IMS communication service identifier.

4. It shall be possible for the S-CSCF to invoke appropriate service logic based on the IMS communication service identifier contained in a SIP request, e.g. route a SIP request containing a service identifier based on initial filter criteria to the correct AS.

5. It shall be possible for the UE to invoke appropriate applications based on the IMS communication service identifier contained in a received SIP request.

6. It shall be possible for the UE to indicate its service capabilities to the network, e.g. during registration, using the IMS communication service identifier.

7. Format and structure of the IMS communication service identifier shall be compatible to the already defined PoC (Push-to-Talk over Cellular) service identifier, i.e. the PoC feature tag. As a consequence it shall be possible to interpret the PoC feature tag as an IMS communication service identifier.

8. The structure of the IMS communication service identifier shall be as simple as possible, i.e. the IMS communication service identifier shall be limited to identify a service.

9. Based on operator policy S-CSCF and AS shall consider the IMS communication service identifier for online and offline charging, e.g. put appropriate data into call detailed records.

10. The communication service identifier shall be capable of being an input into the PCC rules.

11. Based on operator policy, the communication service identifier shall be able to be used as a means to authorise whether a subscriber is allowed to initiate or receive requests for a communication service.

12 The communication service identifier shall be taken into account when selecting the correct UE(s), if multiple UEs are registered for the same Public User Identity(s)

13. The usage of communication service identifiers shall not adversely affect interoperability between IMS networks and interoperability with external SIP networks and CS networks. The behaviour of a network receiving the IMS requests without an IMS communication service identifier is a matter of operator policy. Usage of communication service identifiers shall not decrease the level of interoperability with networks and UEs that are unaware of the communication service identifier.

    Editor's note: The impacts of using IMS communication service identifiers for interoperability with SIP-based networks and CS networks is FFS.

14. It shall be possible for the IMS network and UE to support communications that do not use a communication service identifier. In the case that an IMS communication service identifier is not present then the network may assume a particular IMS communication service.

15. The usage of communication service identifiers shall not restrict the inherent capabilities of SIP.

16. The usage of communication service identifiers shall not require additional user interaction, i.e. the communication service identifier is assumed to be "added" by the UE that initiates the communication.

The network and the terminal shall be able to continue operation as defined in 3GPP Release 5 and 3GPP Release 6.

The communication service identifier shall be available at least in the following interfaces:

- ISC; Gm; Mi, Mj, Mk, Mw; Mg; Mr;
- Cx; Dx (e.g as part of the iFC);
- Rx;
- Rf, Ro.

NOTE 1: Depending on the stage 3 solution, the inclusion of the communication service identifier may not have protocol impacts.

NOTE 2: The communication service identifier does not replace the public service identity (PSI). The communication service identifier would be used to indicate the communication service used to access the service addressed via a PSI, and is required to identify the communication service even when SIP requests are sent towards another entity without using a PSI.

5.2 Applications

An IMS application is an application that uses an IMS communication service(s) in order to provide a specific service to the end-user. The IMS application uses specific IMS Communication Service(s) and provides the end user service through the reuse of the SIP communication part of service. The IMS application does not extend the definition of the IMS communication service. The IMS application reference identifies the application utilising the IMS communication service.

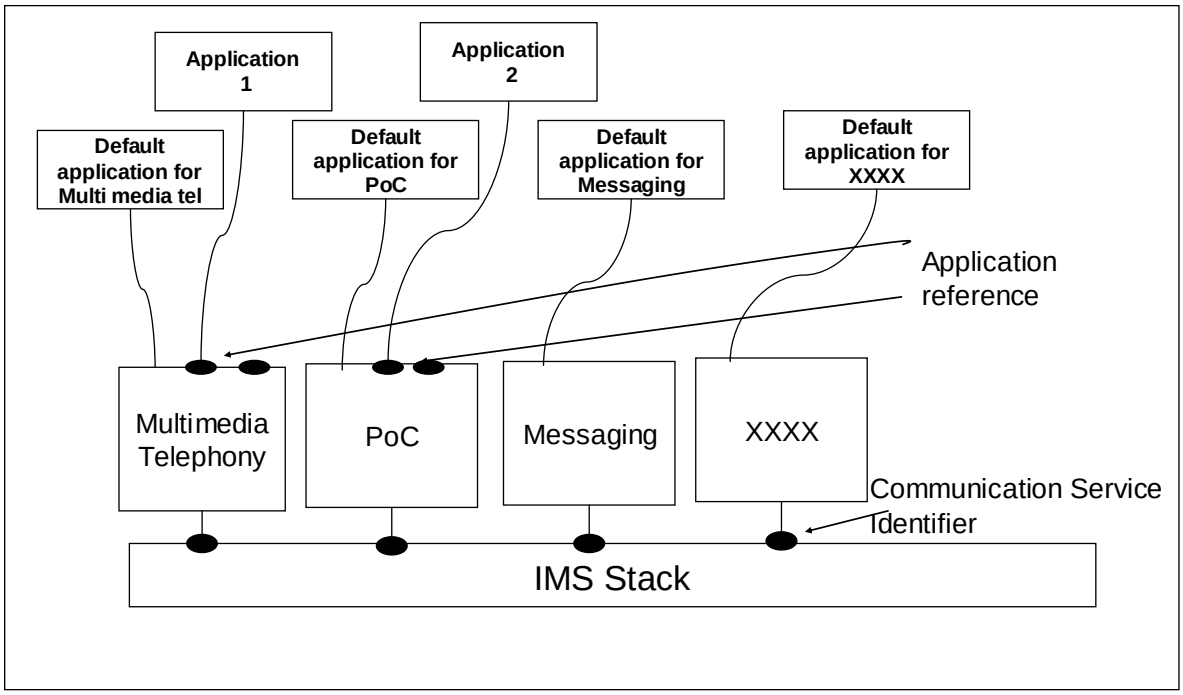

Figure 5-1: IMS application s utilising an IMS communication service

The IMS application reference is used to identify the IMS applications other than the default for the IMS communication service. The IMS application reference has significance at the UE and the SIP AS behaving as SIP endpoints. The means to transport the IMS application reference is defined within the IMS communication services. When used, the IMS application reference shall be possible transported on the following interfaces:

- ISC; Gm; Mi, Mj, Mk, Mw; Mg; Mr;
- Rx;
- Rf, Ro.

NOTE: Depending on the stage 3 solution chosen by the IMS communication service, the means to transport the IMS application reference may not have protocol impacts.

5.3 IMS communication service identifier format

The format of the IMS communication service identifier could comply to the 3.1.2 Global tree according to RFC 2506 [2].

6 Administrative procedures for the IMS communication service identifier

6.1 Requirements on the administrative procedures for the IMS communication service identifier

In order to support the industry to use the IMS in a suitable manner, an efficient means to administer a communication service identifier is required. This section outlines some of the requirements on the administration of a communication service identifier.

The requirements on the administration of a communication service identifier are:

- The communication service identifier shall be globally unique.
- Organisations producing specifications or recommendations utilising the IMS shall be able to obtain a communication service identifier for a communication service they define.
- When a standardisation organisation is allocated a communication service identifier, the reference to the specifications describing communication service shall be recorded.
- For IMS communication services that have related presence attributes the description containing the IMS communication service identifier shall contain a reference to the related presence attributes and specification.

Editors Note: The requirements on the administration of propitiatory communication service identifiers is FFS.

6.2 Administrative procedures for the IMS communication service identifier

The final details for the administration of the IMS communication service identifier is a stage 3 issue. This section describes a few of the possible approaches that could be adopted.

The means to administer an IMS communication service identifier is also dependant upon the final stage 3 solution. If a stage 3 solution re-uses and existing IETF SIP mechanism or parameter such as the feature tag, then 3GPP should consider to take out a range and administer the IMS communication service identifiers from within that range.

For the values that 3GPP is to administer, then the following non-exhaustive list of approaches have been identified:

- Include an annex in an existing specification (such as TS 24.229 or TS 23.003) where the agreed IMS communication service identifiers can be listed. It would be preferable that the additions and deletions to this list were agreed at the CT plenary meeting.
- Establish a web page where the agreed values are taken. This approach would require to create a set of criteria to that must be fulfilled in order to have an IMS communication service identifier allocated, and would require e.g. MCC support for this approach. This approach seems to remove the possibility for discussing the validity of a request for an IMS communication service identifier.

Alternatively, an additional approach is that the administrative procedure for the IMS communication service identifier utilizes RFC2506 [2], where a well defined registration with Internet Assigned Number Authority (IANA) is documented to ensure globally unique of the IMS communication service identifier.

NOTE: There maybe IMS communication service identifiers that are not administered by the above means.

7 Alternative means to identify IMS communication services

No alternative means to identify IMS communication services were identified.

8 Conclusion

This feasibility study contains the results of an investigation into the IMS communication service identifiers. The study concludes the following:

- IMS communication services may be identified by an IMS communication service identifier. In the case that an IMS communication service identifier is not present the network will identify a particular IMS communication service by other means.

- IMS applications, which utilise IMS communication services, are identified by an application reference. The absence of the application reference may imply that a default application for the specified IMS communication service is invoked.

- The exact means to administer the IMS communication service identifiers are a stage 3 issue, but a few possibilities exist and are described in this document.

The main stage 2 change requests required to incorporate changes into the specifications have been created.

Annex A:
Change history

Change history							
Date	**TSG #**	**TSG Doc.**	**CR**	**Rev**	**Subject/Comment**	**Old**	**New**
2005-11	SA#30	SP-050677	-	-	Editorial update by MCC for presentation to TSG SA for information	0.3.1	1.0.0
2006-03	SA#31	SP-060150	-	-	Editorial update by MCC for presentation to TSG SA for approval	1.1.0	2.0.0
2006-03	-	-	-	-	Publication after TSG SA Approval	2.0.0	7.0.0