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Technical Specification

**3rd Generation Partnership Project;
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Contents

Foreword

This Technical Specification (TS) has been produced by the 3rd Generation Partnership Project (3GPP).
The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

   Version x.y.z

   where:

   x   the first digit:

        1   presented to TSG for information;

        2   presented to TSG for approval;

        3   or greater indicates TSG approved document under change control.

   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.

1   Scope

This TS defines the service requirements from users', operators'/service providers' and content providers' perspective for the support of IP multimedia applications.
IP multimedia applications are supported by IP multimedia sessions in the IM CN Subsystem. IP multimedia sessions use IP connectivity bearers (e.g. GPRS as a bearer). Examples of IP multimedia applications include speech communication, real time multimedia applications, shared online whiteboards etc.
This TS, in general, does not standardise usage of IP multimedia applications, but instead identifies the requirements to enable their support.
In order to align IP multimedia applications wherever possible with non-3GPP IP applications, the general approach is to adopt non-3GPP IP based solutions.
The existing legacy tele- and supplementary services shall not be re-standardised as IP multimedia applications, and multimedia equivalent applications may be created with toolkits.

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.

- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

2.1   Normative references

[1]   TS 22.003: " CS Teleservices supported by a PLMN".

[2]   TS 22.011: "Service Accessibility".

[3]   TS 22.060: "General Packet Radio Service (GPRS) stage 1".

[4]   TS 22.066: "Support of Mobile Number Portability (MNP)".

[5]   TS 22.101: "Service principles".

[6]   TS 22.105: "Services and Service Capabilities".

[7]   TS 22.121: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; The Virtual Home Environment"

[8]   TS 22.129: "Handover requirements between UMTS and GSM and other Radio Systems".

[9]   RFC2543: "SIP: Session Initiation Protocol"

[10]   TS 22.078: "; Customised Applications for Mobile network Enhanced Logic (CAMEL); Service definition - Stage 1"

[11]   TS 22.057: "; Mobile Execution Environment (MExE); Service description, Stage 1"

[12]   TS 22.038: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; USIM/SIM Application Toolkit (USAT/SAT); Service description; Stage 1"

[13]   TS 22.127: "3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Stage 1 Service Requirement for the Open Service Access (OSA)

3   Definitions and abbreviations

3.1   Definitions

For the purposes of this TS the following definitions apply:

IM CN subsystem: (IP Multimedia CN subsystem) comprises of all CN elements for the provision of IP multimedia applications over IP multimedia sessions

IP multimedia application: an application that handles one or more media simultaneously such as speech, audio, video and data (e.g. chat text, shared whiteboard) in a synchronised way from the user's point of view. A multimedia application may involve multiple parties, multiple connections, and the addition or deletion of resources within a single IP multimedia session. A user may invoke concurrent IP multimedia applications in an IP multimedia session.

IP multimedia service: an IP multimedia service is the user experience provided by one or more IP multimedia applications.

IP multimedia session: an IP multimedia session is a set of multimedia senders and receivers and the data streams flowing from senders to receivers. IP multimedia sessions are supported by the IP multimedia CN Subsystem and are enabled by IP connectivity bearers (e.g. GPRS as a bearer). A user may invoke concurrent IP multimedia sessions.

3.2   Abbreviations

For the purposes of this TS the following abbreviations apply;

API	Application Programming Interface
CAMEL	Customised Application for Mobile Enhanced Logic
CN	Core Network
CS	Circuit Switched
GPRS	General Packet Radio Service
IM	IP Multimedia
IP	Internet Protocol
MExE	Mobile Execution Environment
OSA	Open Service Architecture
OA&M	Operations, Administration and Maintenance
QoS	Quality of Service
SAT	SIM Application Toolkit
SIP	Session Initiation Protocol
UE	User Equipment
VHE	Virtual Home Environment
WWW	World Wide Web

4   Introduction

IP has opened up a whole range of communication applications, which may allow service providers to develop totally new value added applications as well as to enhance their existing solutions. The open architecture and platforms supported by IP and operating systems may lead to applications and new opportunities that are more difficult to replicate using a standard switched centralised solution.

A complete solution for the support of IP multimedia applications (including voice communications) shall be available. The solution consists of terminals, GERAN or UTRAN radio access networks and GPRS evolved core network. One of the main objectives for 3GPP specifications is to ensure that the availability and behaviour of these IP applications when used via the 3GPP mobile access is at least as good as when used via other mobile access types.

5   High level requirements

Support for IP multimedia sessions shall be provided in a flexible manner to allow operators to differentiate their services in the market place as well customise them to meet specific user needs. This shall be provided by the use of service capabilities in both networks and terminals, for the creation and support of IP multimedia applications.

The following high level requirements shall be supported for IP multimedia applications:-

- negotiable QoS for IP multimedia sessions both at the time of a session establishment as well as during the session by the operator and the user

- negotiable QoS for individual media components in an IP multimedia session both at the time of establishing a media component as well as when the media component is active by the operator and the user
- end to end QoS for voice at least as good as that achieved by the circuit-switched (e.g. AMR codec based) wireless systems shall be enabled
- IP multimedia sessions shall be able to support a variety of different media types. A set of media types shall be identified to ensure interoperability (e.g. default codec selection and header compression).
- within each IP multimedia session, one or more IP multimedia applications shall be supported
- the possibility for IP multimedia applications to be provided without a reduction in privacy, security, or authentication compared to corresponding GPRS and circuit switched services
- support for interworking between the packet and circuit switched services, and with PSTN, ISDN and Internet
- roaming shall be supported enabling users to access IP multimedia services provisioned by the:-
    - Home Environment
    - Serving Network
- access independence shall be supported. It is desirable that an operator should be able to offer services to their subscribers regardless of how they obtain an IP connection (e.g. GPRS, fixed lines, LAN).
- It shall be possible to support session-related internet applications that have been developed outside the 3GPP community.

6 Standardised service capability approach

IP multimedia applications shall, as a principle, not be standardised, allowing service provider specific variations. It shall be possible to enable rapid service creation and deployment using service capabilities.

It is important that commercially available IP multimedia applications are supported. In general compatibility shall be with these IP multimedia applications instead of building 3GPP-specific solutions.

The following options shall be available in the 3GPP standards to enable service delivery:
- an architectural framework shall be created that enables maximum flexibility in the end user device and network servers, similar in concept to that used in the Internet.
  This framework shall enable an operator to deploy IP multimedia applications in a network-agnostic manner without having to wait for these applications or additional enabling technology, to be standardised in 3GPP.
- service capabilities (enhanced to control IP multimedia applications), which will allow IP multimedia applications to be deployed in a vendor independent manner
  CAMEL [10], MExE [11], SAT [12] and OSA [13], which are the identified service capabilities of VHE in 22.121 [7], should be improved to support IP multimedia applications, e.g. additions to APIs, service capability features, service capability servers, user profile etc.
- registration mechanisms which allow the network to understand the limitations of the mobile and thereby take appropriate actions.
  Note: There is a concern that with a large variety of toolkits to create applications, service interworking between terminals and networks may be compromised and needs to be addressed.

7 User service requirements

IP multimedia sessions provide the ability for users to invoke IP multimedia applications to send and receive (where applicable) voice and data communications, even when roaming. This includes interworking with existing voice and data networks for both fixed (e.g. PSTN, ISDN, internet etc.) and mobile users.

7.1 Identifying IP multimedia application subscriptions

There is no requirement to support standardised subscription mechanisms for IP multimedia applications.
IP multimedia applications may require to be provisioned and configured by users and service providers. Since the source and variety of IP multimedia applications are not standardised, the specific feature codes to provision, enable and configure IP multimedia applications cannot be standardised either. Thus there are no requirements on the network capabilities to support provisioning and configuration for specific IP multimedia applications.

Note: The standardised service capabilities, personalised Internet web pages and evolving IP mechanisms may be used to allow user (self) provisioning, configuration and enabling of IP multimedia applications.

7.2   Access to the IM CN subsystem

7.2.1   Access control

The IM CN subsystem shall be able to verify at any time that the user is entitled to use the resources of the IM CN subsystem.

7.3   Capability negotiation

The IP multimedia applications shall be able to negotiate their capabilities to identify and select the available media components, QoS etc. of IP multimedia sessions. It shall be possible for the capability negotiation to take place on invocation, acceptance and during an IP multimedia session (e.g. following a change in UE capabilities, change in media types etc.). Capability negotiation may be initiated by the user, operator or an application on behalf of them. In order to support the user's preferences for IP multimedia applications, the capability negotiation shall take into account the information in the user profile whenever applicable.

7.4   Redirect

It shall be possible for the user to identify an alternative destination for IP multimedia sessions or individual media of an IP multimedia session. This may be initiated by the sending or receiving party during an IP multimedia session. Redirect may also occur prior to an IP multimedia session being established (e.g. the user's preference is that the IP multimedia session is unconditionally redirected).

7.5   Invoking an IP multimedia session

The user shall be able to invoke one or more IP multimedia sessions. The user shall also be able to activate concurrent IP multimedia applications within each IP multimedia session.

7.5.1   Identification of entities

Both telecom and internet numbering and addressing schemes shall be supported. IP multimedia communication establishment (both mobile originating and terminating) depending on originator shall be able to be based on E.164 (e.g. +1 23 456 789) or SIP URL (sip:my.name@company.org) [9].

It shall be possible for the network operator to use

- the same E.164 number for IP multimedia sessions and CS speech telephony (TS11) [1]

- a different E.164 number if desired for IP multimedia sessions

7.5.2   Negotiation at IM session invocation

It shall be possible for the capability negotiation to take place at the time of the IP multimedia session invocation. Refer to subclause 7.3 for further details on capability negotiation on IP multimedia session invocation.

7.5.3   Emergency communications

See [5] for further details.

7.6   Handling of an incoming session (by the terminating entity)

7.6.1   Presentation of session originator identity

It shall be possible to present the identity of the session originator (see 7.5.1) subject to it not being suppressed by the

session originator.

7.6.2 Negotiation of an incoming session

Interaction with the user profile shall be supported, and additionally direct interaction with the user may be required. Refer to subclause 7.3 for further details on capability negotiation on an incoming IP multimedia session.

7.6.3 Accepting or rejecting an incoming session

It shall be possible for the user to either accept or reject an incoming IP multimedia session. Further, it shall also be possible for the user to accept only a subset of the offered media, not have any of the media offered to him at all etc.

7.7 Handling of an ongoing session

7.7.1 User modification of media in an ongoing session

The user shall be able to negotiate the addition or deletion of media components of IP multimedia applications during an IP multimedia session. Refer to subclause 7.3 for further details on capability negotiation during an IP multimedia session.

7.7.2 Suspending and resuming of an ongoing session

It shall be possible for the user to suspend an IP multimedia session, and resume that IP multimedia session at a later time.

7.8 Ending a session

The user shall be able to end an IP multimedia session at any time during the session.

Annex A   Example IP multimedia application scenarios (informative)

The following example scenarios describe the personalised handling of individual media in multimedia applications (note that this list is neither complete nor exhaustive):-

1. The user is in a voice communication, and receives an incoming IP video communication. The user decides not to accept the communication, but diverts the incoming video to a messaging system. Further, the user is given an indication that there is a video message in his mail box

2. The user is in a voice communication, and receives an incoming video communication. The user decides to accept the communication but wishes to switch between the two communications.

3. The user is idle in a network and not involved in a communication. The user modifies his user profile to divert all voice communications other than those from high priority, pre-identified callers (e.g. his boss). In this scenario all emails and text messages continue to be received regardless of the sender.

4. On receiving a communication, the calling party's identity is displayed (if not restricted) and user shall be able to decide whether to accept the communication, or divert to a messaging system. The user shall be able to request media handling of the communication (e.g. media splitting to different destinations, media conversion).

5. The user is busy in a communication when receiving an incoming communication, but responds to the originating party that he will respond later. The user may request that the originating party's details (if not restricted) are stored with a reminder in user's profile.

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