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TECHNICAL SPECIFICATION

Universal Mobile Telecommunications System (UMTS);
LTE;
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Charging management;
Announcement service
(3GPP TS 32.281 version 16.1.0 Release 16)

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Foreword

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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.

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1 Scope

During any phase of a voice or video call, the Online Charging System (OCS) may need to deliver billing/charging in-session notifications to the end user via announcements as part of the rating, balance management and billing process. For example, the OCS may need to inform the user about usage states, threshold crossings, offer statuses, reason for call rejection, alerts about low balances, etc.

In Circuit Switched (CS) domain, online charging of a voice session is performed using Customised Applications for Mobile network Enhanced Logic (CAMEL) mechanisms. In order to deliver in-session notifications or to interact with the end user, OCS can use CAMEL messages such as: Play Announcement, Prompt and Collect, Connect to Resource, Establish Temporary Connection. Such notifications can be delivered pre-, mid- or post-call. However, in IMS and MMTel charging defined in TS 32.260 [20] and TS 32.275 [35] as well as in Diameter Credit-Control Application (DCCA) defined in RFC 4006 [402], announcement capabilities, available at the OCS level, are limited to redirection of a session to a given SIP URI at completion of the session. When redirected the session may be connected to a resource that delivers an announcement.

The Announcement service in this specification provides announcement capabilities for use in a Diameter based online charging session. The OCS is able to specify that a given announcement be played to a call party in order to deliver charging/billing related notifications.

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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 TS 32.240: "Telecommunication management; Charging management; Charging Architecture and Principles".

[2] – [9] Void

[10] 3GPP TS 32.250: "Telecommunication management; Charging management; Circuit Switched (CS) domain charging".

[11] – [19] Void

[20] 3GPP TS 32.260: "Telecommunication management; Charging management; IP Multimedia Subsystem (IMS) charging".

[21] – [29] void

[30] 3GPP TS 32.270: "Telecommunication management; Charging management; Multimedia Messaging Service (MMS) charging".

[31] - [34] void

[35] 3GPP TS 32.275: "Telecommunication management; Charging management; MultiMedia Telephony (MMTel) charging".

[36] - [49] Void

[50] 3GPP TS 32.299: "Telecommunication management; Charging management; Diameter charging application".

[51] - [99] Void

[100] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[101] 3GPP TS 22.115: "Service aspects; Charging and billing".

[102] - [200] Void.

[201] -[203] Void.

[204] 3GPP TS 24.229: "IP multimedia call control protocol based on Session Initiation Protocol (SIP) and Session Description Protocol (SDP); Stage 3".

[205] - [243] Void.

[244] 3GPP TS 24.628: "Common Basic Communication procedures using IP Multimedia (IM) Core Network (CN) subsystem; Protocol specification".

[245] - [299] Void.

[300] - [401] Void.

[402] IETF RFC 4006 (2005): "Diameter Credit-Control Application".

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3 Definitions, symbols and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [100] 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 [100].

CAMEL: network feature that provides the mechanisms to support operator specific services even when roaming outside HPLMN.

circuit switched domain: domain within GSM / UMTS in which information is transferred in circuit switched mode.

Credit-Control: mechanism which directly interacts in real-time with an account and controls or monitors the charges, related to the service usage. Credit-Control is a process of: checking if credit is available, credit reservation, deduction of credit from the end user account when service is completed and refunding of reserved credit not used.

online charging: charging mechanism where charging information can affect, in real-time, the service rendered and therefore a direct interaction of the charging mechanism with bearer/session/service control is required.

Online Charging System: the entity that performs real-time Credit-Control. Its functionality includes transaction handling, rating, online correlation and management of subscriber accounts/balances.

3.2 Symbols

For the purposes of the present document, the following symbols apply:

Symbol format

Cr	Reference Point between an AS and an MRFC for media control.
ISC	Reference Point between a CSCF and an Application Server and between a CSCF and an MRB.
Mp	Reference Point between an MRFC and an MRFP.
Mr	Reference Point between an CSCF and an MRFC.
Mr′	Reference Point between an AS and an MRFC for session control.
Ro	Online Charging Reference Point between an AS, MRFC or the IMS-GWF and the OCS

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3.3 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [100] and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [100].

AS	Application Server
CAMEL	Customised Applications for Mobile network Enhanced Logic
CCA	Credit-Control-Answer
CCR	Credit-Control-Request
CS	Circuit Switched
CSCF	Call Session Control Function (I-Interrogating; P-Proxy; and S-Serving)
DCCA	Diameter Credit-Control Application
IMS-GWF	IMS Gateway Function
ISC	IMS Service Control
MMTel	MultiMedia Telephony
MRB	Media Resource Broker
MRFC	Media Resource Function Controller
MRFP	Multimedia Resource Function Processor
OCS	Online Charging System
SIP	Session Initiation Protocol

UE User Equipment

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4 Architecture considerations

4.1 High level Announcement aspects

Each technology to which the Announcement service is applied will utilize a technology-specific special resource function to play announcement media. Each of the architectures described in this clause utilizes the common Announcement service specified in this document.

4.2 Announcement in IP Multimedia Subsystem (IMS) architecture

The MRFC/MRFP are resources of the IMS that provide support for bearer related services such as announcements. Collectively, the MRFC/MRFP is known as the Media Resource Function. The architecture of MRF is shown in figure 4.2.1.

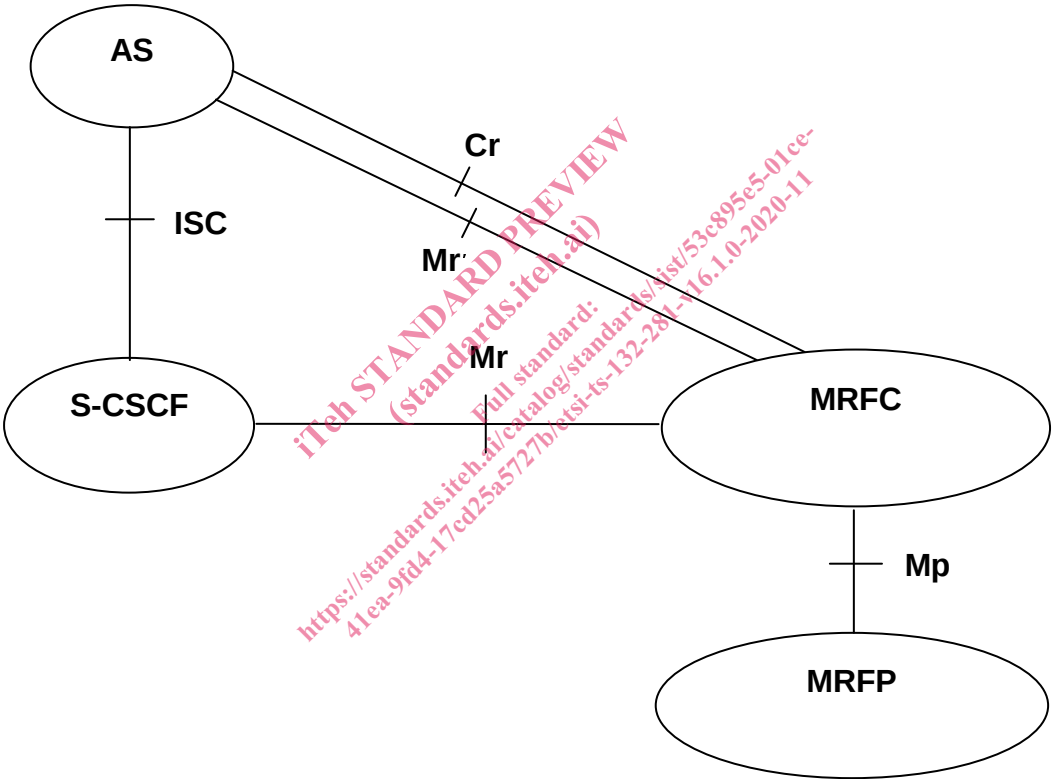

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Figure 4.2.1: Architecture of Media Resource Function in IMS

In the IMS online and converged charging architecture specified in TS 32.260 [20], both the AS and the IMS-GWF interfaces the CHF/OCS. Either the AS or the IMS-GWF may utilize the Announcement service specified in this document.

5 Announcement principles and flows

5.1 Common announcement principles

The CHF/OCS may provide information in charging messages that describe announcements to be played to a subscriber. When receiving announcement information provided by the CHF/OCS, the receiving node shall use the procedures defined for the specific technology in use. The clauses that follow identify the principles and message flows applicable to each specific technology to which the common Announcement service is applied.

5.2 Announcement in IMS

5.2.1 Basic principles and definitions

The CHF/OCS may provide information in charging messages that describe video or audio announcements which can be rendered to a subscriber involved in an IMS session at different stages of interactions with CHF/OCS.

When receiving announcement information provided by CHF/OCS, the AS or the IMS-GWF shall use the procedures defined in clause 10.2.2 of TS 24.229 [204] and TS 24.628 [244] in order to deliver the required announcement in accordance with the provided announcement information.

CHF/OCS can provide announcement information upon interaction with the AS or the IMS-GWF, during different phases of an IMS session:

- At IMS session initiation, before the IMS session is allowed to continue and no quota is granted, or before the IMS session is allowed to continue and use granted quota;
- During an ongoing established IMS session, with media components between the parties of the session, on quota allocation control process;
- At an IMS session termination due to final quota consumption.

Announcements provided by CHF/OCS are driven by quota allocation during the IMS session, and controlled by an indication on when they shall be played:

- Pre-quota announcement shall be played prior to any quota consumption (i.e. immediately);
- Mid-quota announcements shall be played at a specified duration before granted quota is exhausted, which ranges from non-zero value smaller than the granted quota.
- Post-quota announcements shall be played upon granted quota exhaustion

CHF/OCS can provide information for one or more announcements in the same charging message.

A CHF/OCS-provided announcement is delivered to a single party of an IMS session. CHF/OCS indicates to which party the announcement shall be played. This can be the served party or the remote party. When the privacy indicator for the announcement is set to "private", the announcement shall be played only to the requested party. The handling toward the other party during announcement playback is determined by the AS or the IMS-GWF internal logic.

The AS or the IMS-GWF shall control delivery of the announcements based on the announcement content information provided by the CHF/OCS. The AS or the IMS-GWF shall use the procedures in TS 24.628 [244] for announcement delivery. When the AS or the IMS-GWF are separate from the MRFC, the AS or the IMS-GWF shall support one or more of the control methods for announcement referenced in clause 10.2.2 of TS 24.229 [204], regardless of the announcement content information provided by the CHF/OCS. The AS or the IMS-GWF is responsible for determining the MRF handling the announcement.

Announcement information indicates whether any of the granted quota shall be used by the AS or the IMS-GWF during the time the announcement is connected. If not explicitly indicated in the announcement information by the CHF/OCS, it is up to the service logic implemented in the AS or the IMS-GWF to use or not the granted quota.

For announcements delivered by the AS or the IMS-GWF during an IMS established session, the existing media shall be suspended while the announcement media is played.

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