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Communication Diversion (CDIV) using IP Multimedia (IM) Core Network (CN) subsystem;
Protocol specification
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Contents

Foreword

This Technical Specification (TS) was been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN) and originally published as ETSI TS 183 004 [19]. It was transferred to the 3rd Generation Partnership Project (3GPP) in January 2008.

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1 Scope

The present document specifies the stage 3, Protocol Description of the Communications Diversion (CDIV) supplementary services, based on stage one and two of the ISDN Communication diversion supplementary services. It provides the protocol details in the IP Multimedia (IM) Core Network (CN) subsystem based on the Session Initiation Protocol (SIP) and the Session Description Protocol (SDP).

The present document is applicable to User Equipment (UE) and Application Servers (AS) which are intended to support the CDIV supplementary service.

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 22.173: "Multimedia Telephony Service and supplementary services".

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

[3] IETF RFC 4244: "An Extension to the Session Initiation Protocol (SIP) for Request History Information".

[4] 3GPP TS 24.623: "Extensible Markup Language (XML) Configuration Access Protocol (XCAP) over the Ut interface for Manipulating Supplementary Services".

[5] IETF RFC 4566: "SDP: Session Description Protocol".

[6] IETF RFC 3261: "SIP: Session Initiation Protocol".

[7] IETF RFC 3966: "The tel URI for Telephone Numbers".

[8] IETF RFC 3325: "Private Extensions to the Session Initiation Protocol (SIP) for Asserted Identity within Trusted Networks".

[9] 3GPP TS 24.611: "Anonymous Communication Rejection (ACR) and Communication Barring (CB); Protocol specification".

[10] Void.

[11] 3GPP TS 24.628: "Common Basic Communication procedures; Protocol specification".

[12] 3GPP TS 23.002: "Network Architecture".

[13] Void.

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

[15] IETF RFC 3265: "Session Initiation Protocol (SIP) -Specific Event Notification".

[16] 3GPP TS 24.629: "Explicit Communication Transfer (ECT); Protocol specification".

[17] IETF RFC 3515: "The Session Initiation Protocol (SIP) Refer Method".

[18] IETF RFC 4745: "Common Policy: A Document Format for Expressing Privacy Preferences".

[19] ETSI TS 183 004 V2.4.0: "Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); PSTN/ISDN simulation services: Communication Diversion (CDIV); Protocol specification".

[20] IETF RFC 5627 (October 2009): "Obtaining and Using Globally Routable User Agent URIs (GRUUs) in the Session Initiation Protocol (SIP)".

[21] OMA-TS-XDM-Core-V1_1: "XML Document Management (XDM) Specification", Version 1.1.

[22] 3GPP TS 24.238: "Session Initiation Protocol (SIP) based user configuration".

[23] Void.

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

[25] Void.

[26] IETF RFC 3023 (January 2001): "XML Media Types".

[27] IETF RFC 4288 (December 2005): "Media Type Specifications and Registration Procedures".

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TS 22.173 [1] and the following apply:

CDIV Session Identifier URI: URI created and inserted by a diverting AS that is routed through the same AS

NOTE: This is used to solve the service interaction of CDIV and ECT.

escaped character: See IETF RFC 3261 [6].

transferee: party being transferred to the transfer target

transferor: party initiating the transfer

transfer target: party that the existing communication is transferred to

NOTE: After transfer the transferee and the transfer target are in communication with each other.

3.2 Abbreviations

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

ACM	Address Complete Message
ACR	Anonymous Communication Rejection
ANM	ANswer Message
AS	Application Server
CB	Communication Barring
CD	Communication Deflection
CDIV	Communication DIVersion
CFB	Communication Forwarding Busy
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

CPG	Call ProGress message
CSCF	Call Session Control Function
ECT	Explicit Communication Transfer
HOLD	communication HOLD
IAM	Initial Address Message
IFC	Initial Filter Criteria
IMS	IP Multimedia Subsystem
IP	Internet Protocol
ISDN	Integrated Service Data Network
ISUP	Integrated Service digital network User Part
MCID	Malicious Communication IDentification
MGCF	Media Gateway Control Function
OCB	Outgoing Communication Barring
OIP	Originating Identification Presentation
OIR	Originating Identification Restriction
P-CSCF	Proxy-Call Session Control Function
PSTN	Public Switched Telephone Network
RTP	Real-Time Transport Protocol
S-CSCF	Server-Call Session Control Function
SDP	Session Description Protocol
SIP	Session Initiation Protocol
TIP	Terminating Identification Presentation
TIR	Terminating Identification Restriction
UA	User Agent
UE	User Equipment
URI	Universal Resource Identifier
XCAP	XML Configuration Access Protocol
XML	eXtensible Markup Language

4 Communications Diversion (CDIV)

4.1 Introduction

The Communications Diversion (CDIV) service enables diverting user, to divert the communications addressed to diverting user to another destination.

4.2 Description

4.2.1 General description

4.2.1.1 Service description

The service description of the following CDIVs ervices CFU, CFB, CFNR and CD is based on the PSTN/ISDN supplementary services, whereas CFNL is a CDIV service based on requirements for IP based networks and CFNRc is based on requirements for mobile networks.

Generally the following requirements are expected to be fulfilled:

- The service provides for the user or the network to identify an alternative destination for an IP multimedia session or individual media of an IP multimedia session.
- The service provides for redirection to be initiated at various stages of an IP Multimedia session. For example:
  - Prior to the set up of an IP Multimedia session.
  - During the initial request for an IP Multimedia session (CFU).
  - During the establishment of an IP Multimedia session (CD).

- The service provides redirection to be applied for all Multimedia sessions unconditionally or it can be caused by any of a set list of events or conditions. Typical causes could be:
  - Identity of the originating user.
  - Presence of the originating or destination party.
  - If the destination party is already in a session (CFB).
  - If the destination party is unreachable or unavailable in some other way (CFNL; CFNR, CFNRc).
  - If the destination party does not respond (CFNR).
  - After a specified alerting interval (CFNR).
  - User's preference on routing for specific IP Multimedia session based on the capabilities of multiple UEs sharing the same IMS service subscription.
  - The sending party, receiving party or the network on their behalf, may initiate redirection to alternative destinations.
  - The service provides for the user to subscribe to receive notifications of his/her communications diversions

The following services describe applications based on a subset of the above-mentioned requirements to provide user different possibilities to divert a communication.

It should be possible that a user has the option to restrict receiving communications that are forwarded.

4.2.1.2 Communication Forwarding Unconditional (CFU)

The CFU service enables a served user to have the network redirect to another user communications which are addressed to the served user's address. The CFU service may operate on all communications, or just those associated with specified services. The served user's ability to originate communications is unaffected by the CFU supplementary service. After the CFU service has been activated, communications are forwarded independent of the status of the served user.

As a service provider option, a subscription option can be provided to enable the served user to receive a reminder indication that the CFU service has been activated. This indication is provided when the served user originates a communication and if the CFU service has been activated for the served user's address and for the service requested for the communication.

The maximum number of diversions permitted for each communication is a service provider option. The service provider defines the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

4.2.1.3 Communication Forwarding on Busy user (CFB)

The CFB service enables a served user to have the network redirect to another user communications which are addressed to the served user's address and meet busy. The CFB service may operate on all communications, or just those associated with specified services. The served user's ability to originate communications is unaffected by the CFB supplementary service.

As a service provider option, a subscription option can be provided to enable the served user to receive a reminder indication that the CFB service has been activated. This indication is provided when the served user originates a communication and if the CFB service has been activated for the served user's address and for the service requested for the communication.

The maximum number of diversions permitted for each communication is a service provider option. The service provider defines the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

For more information on the procedures for determination of the busy condition see 3GPP TS 24.628 [11].

4.2.1.4 Communication Forwarding on no Reply (CFNR)

The CFNR service enables a served user to have the network redirect to another user communications which are addressed to the served user's address, and for which the connection is not established within a defined period of time. The CFNR service may operate on all communications, or just those associated with specified services. The served user's ability to originate communications is unaffected by the CFNR supplementary service.

The CFNR service can only be invoked by the network after the communication has been offered to the served user and an indication that the called user is being informed of the communication has been received.

As a service provider option, a subscription option can be provided to enable the served user to receive a reminder indication that the CFNR service has been activated. This indication is provided when the served user originates a communication and if the CFNR service has been activated for the served user's address and for the service requested for the communication.

The maximum number of diversions permitted for each communication is a service provider option. The service provider defines the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

4.2.1.5 Communication Forwarding on Subscriber Not Reachable (CFNRc)

The CFNRc service enables a user to have the network redirect all incoming communications, when the user is not reachable (e.g. there is no IP connectivity to the user's terminal), to another user. The CFNRc service may operate on all communications, or just those associated with specified services. The user's ability to originate communications is unaffected by the CFNRc supplementary service.

As a service provider option, a subscription option can be provided to enable the user to receive an indication that the CFNRc service has been activated. This indication is provided when the user originates a communication if the CFNRc service has been activated for the user and for the service requested for the communication.

The maximum number of diversions permitted for each communication is a service provider option. The service provider defines the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

4.2.1.6 Communication Deflection (CD)

The CD service enables the served user to respond to an incoming communication by requesting redirection of that communication to another user. The CD service can only be invoked before the connection is established by the served user, i.e. in response to the offered communication (before ringing), i.e. CD Immediate, or during the period that the served user is being informed of the communication (during ringing). The served user's ability to originate communications is unaffected by the CD supplementary service.

The maximum number of diversions permitted for each communication is a network provider option. The network provider defines the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

4.2.1.7 Communication Forwarding on Not Logged-in (CFNL)

The Communication Forwarding on Not Logged-in (CFNL) service enables a served user to redirect incoming communications which are addressed to the served user's address, to another user (forwarded-to address) in case the served user is not registered (logged-in). The CFNL service may operate on all communications, or just those associated with specified basic services.

As a service provider option, a subscription option can be provided to enable the served user to receive a reminder indication that the CFNL service has been activated. This indication is provided when the served user logs out according to procedures described in IETF RFC 3261 [6].

The maximum number of diversions permitted for each communication is a service provider option. The service provider defines the upper limit of diversions. When counting the number of diversions, all types of diversion are included.

4.2.1.8 Void

4.3 Operational requirements

4.3.1 Provision/withdrawal

The CDIV services (Communication forwarding unconditional, Communication forwarding busy, Communication forwarding no reply, Communication forwarding not logged-in, Communication deflection and Communication Diversion Notification) is provided after prior arrangement with the service provider.

The CDIV services are withdrawn at the served user's request or for administrative reasons.

The CDIV supplementary services can be offered separately with subscription options. For each subscription option, only one value can be selected. These subscription options are part of the call diversion profile for the served user. The subscription options are shown in table 4.3.1.1.

Table 4.3.1.1: Subscription options for CDIV services

Subscription options	Value	Applicability
Served user receives indication that a communication has been forwarded (indication of communication diversion to the diverting user).	No (default) Yes	CFU CFB CFNR CFNRc
Originating user receives notification that his communication has been diverted (forwarded or deflected).	No Yes (default)	CFU CFB CFNR CFNRc CFNL CD
Served user allows the presentation of diverted to URI to *originating* user in diversion notification.	No Not reveal as GRUU Yes (default)	CFU CFB CFNR CFNRc CFNL CD
Served user receives reminder indication on outgoing communication that CDIV is currently activated.	No (default) Yes	CFU CFB CFNR CFNRc CFNL
Served user allows the presentation of his/her URI to *diverted-to* user.	No Not reveal as GRUU Yes (default)	CFU CFB CFNR CFNRc CFNL CD
Served user allows the presentation of his/her URI to *originating* user in diversion notification.	No Not reveal as GRUU Yes (default)	CFU CFB CFNR CFNRc CFNL CD

The following network provider options are available for the CDIV services: