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SERIES Q: SWITCHING AND SIGNALLING

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services

Communication diversion protocol specification as an NGN supplementary service

Recommendation ITU-T Q.3616



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Recommendation ITU-T Q.3616

Communication diversion protocol specification as an NGN supplementary service

Summary

Recommendation ITU-T Q.3616 describes the protocol specification of the communication diversion (CDIV) protocol specification in NGN supplementary services. This Recommendation includes operational requirements, coding requirements, signalling requirements, interaction with other services and parameter values (timers).

This Recommendation is aligned with ETSI TS 124 604.

History

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Recommendation ITU-T Q.3616

Communication diversion protocol specification as an NGN supplementary service

1 Scope

This Recommendation describes the protocol specification of the communication diversion (CDIV) protocol specification in NGN supplementary services.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

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- [ITU-T Q.763] Recommendation ITU-T Q.763 (1999), *Signalling System No. 7 – ISDN User Part formats and codes*.
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3 Definitions and abbreviations

3.1 Definitions

None.

3.2 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ACM	Address Complete Message
ACR	Anonymous Communication Rejection
ANM	Answer Message
AS	Application Server
CB	Communication Barring
CCBS	Completion of Communications to Busy Subscriber
CD	Communication Deflection
CDIV	Communication DIVersion
CDIVN	Communication Diversion Notification

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
CN	Core Network
CONF	Conference
CPG	Call Progress message
CSCF	Call Session Control Function
CW	Communication Waiting
ECT	Explicit Communication Transfer
GRUU	Globally Routable User agent URI
HOLD	communication HOLD
IAM	Initial Address Message
IFC	Initial Filter Criteria
IM	IP Multimedia
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
NDUB	Network Determined User Busy
NNI	Network-to-Network Interface
OCB	Outgoing Communication Barring
ODB	Operator Determined Barring
OIP	Originating Identification Presentation
OIR	Originating Identification Restriction
P-CSCF	Proxy-Call Session Control Function
PSTN	Public Switched Telephone Network
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
UDUB	User Determined User Busy
XCAP	XML Configuration Access Protocol
XML	extensible Markup Language

4 Communication diversion (CDIV)

4.1 Introduction

The communication diversion (CDIV) service could enable communications addressed to a user to be diverted to another destination.

The description and document structure of this Recommendation are based on [ETSI TS 124 604].

Procedures for the CDIV application server (AS) regarding operator determined barring (ODB) are defined in [ETSI TS 124 315].

4.2 Description

4.2.1 General description

4.2.1.1 Service description

The service description of the following CDIV services: communication forwarding unconditional (CFU), communication forwarding busy (CFB), communication forwarding no reply (CFNR) and communication deflection (CD), is based on that of public switched telephone network (PSTN)/integrated service data network (ISDN) supplementary services. The communication forwarding on not logged-in (CFNL) service is a CDIV service based on requirements for IP based networks and the communication forwarding on subscriber not reachable (CFNRc) service is based on requirements for mobile networks.

In addition, communication diversion notification (CDIVN) is a CDIV service providing the user with the capability to receive notifications about all diverted communications (CFU, CFB, CFNR, CD, CFNRc and CFNL).

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 setting 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 redirection 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);
 - the user's preference on routing for specific IP multimedia session based on the capabilities of multiple user equipments (UEs) sharing the same IP multimedia subsystem (IMS) service subscription;
 - the sending party, the 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 as dictated by the above requirements. The user will also be able to control:
- if he/she wants to be notified of all or of a particular subset of his/her communication diversions;
 - the amount of information he/she wishes to see as a part of the notifications of his/her CDIV services;
 - the time interval or availability instance when he/she wants to be notified of his/her communication diversions.

The services described hereafter are applications based on a subset of the above-mentioned requirements to provide the user with 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 the communication to another user, when the served user is in communication and in a busy state. 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.

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 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 the case where the served user is not registered (logged-in). The CFNL service may operate on all communications, or just on those associated with specified basic services.

As a service provider option, a subscription option can be provided to enable the served user to receive an 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].

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 Communication diversion notification (CDIVN)

The CDIVN service enables a served user to receive notification about the diversion of any of his/her incoming communications, which were addressed to the served user's address.

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

In the case where the user is not available to receive CDIVN, for example if the user is logged out or not reachable, the notification will be provided to the user following the user's registration, in the case of CFNL when the user's CDIVN activation is still valid and if the time to buffer the notification (CDIVN buffer timer) in the application server (AS) has not expired.

NOTE – In the cases of CFNL and CRNRc, CDIVN activation continues to be valid after user registration in the case where the user employs the same user's address employed before having the status of no connectivity and as long as the SUBSCRIBE dialogue has not expired in the AS.

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) are 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. The notification service CDIVN is offered together with at least one CDIV supplementary service. 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
The served user receives an indication that a communication has been forwarded (indication of communication diversion to the diverting user).	No (default)	CFU
	Yes	CFB CFNR CFNRc
The originating user receives notification that his communication has been diverted (forwarded or deflected).	No	CFU
	Yes (default)	CFB CFNR CFNRc CFNL CD

Table 4.3.1.1 – Subscription options for CDIV services

Subscription options	Value	Applicability
The served user allows the presentation of his/her diverted-to universal resource identifier (URI) to the originating user in the diversion notification.	No _____ Not reveal as globally routable user agent URI (GRUU) _____ Yes (default)	CFU CFB CFNR CFNRc CFNL CD
The served user receives a reminder indication on outgoing communication that CDIV is currently activated.	No (default) _____ Yes	CFU CFB CFNR CFNRc CFNL CDIVN
The served user allows the presentation of his/her URI to the diverted-to user.	No _____ Not reveal as GRUU _____ Yes (default)	CFU CFB CFNR CFNRc CFNL CD
The served user allows the presentation of his/her URI to the originating user in the diversion notification.	No _____ Not reveal as GRUU _____ Yes (default)	CFU CFB CFNR CFNRc CFNL CD

Network provider options available for the CDIV services are shown in Table 4.3.1.2.

Table 4.3.1.2 – Network provider options for CDIV services

Network provider option	Value	Applicability
Served user communication retention on invocation of diversion (forwarding or deflection).	Retain communication to the served user until alerting begins at the diverted-to user _____ Clear communication to the served user on invocation of call diversion	CFNR CD
Served user communication retention when diverting is rejected at diverted-to user.	Continue to alert the diverting user (see Note 1) _____ No action at the diverting user (see Note 2)	CFNR CD
The subscription option is provided for "served user receives reminder indication on outgoing communication that CDIV is currently activated".	No _____ Yes	CFU CFB CFNR CFNRc CFNL CDIVN

Table 4.3.1.2 – Network provider options for CDIV services

Network provider option	Value	Applicability
Served user communication retention on invocation of diversion (forwarding or deflection).	Retain communication to the served user until alerting begins at the diverted-to user Clear communication to the served user on invocation of call diversion	CFNR CD
Total number of all diversions for each communication.	Maximum number of diverted connections (upper limit is based on operator policy)	CFU CFB CFNR CFNRc CFNL CD
AS behaviour when the maximum number of diversions for a communication is reached.	Reject the communication (default) Deliver the communication to the latest diverting party	CFU CFB CFNR CFNRc CFNL CD
CDIV Indication Timer.	Timer duration is a service provider option	CFU CFB CFNR CFNRc CFNL CD
Communication forwarding on no reply timer.	Timer default duration is a service provider option (see Note 3)	CFNR
CDIVN Buffer Timer; Timer value for AS to store CDIVN, if it cannot be delivered as per CDIVN configuration.	Timer duration set by the service provider. Default value is 1 day	CFNL, CFNRc in case of CDIVN
NOTE 1 – This applies to the retention of the communication at invocation of communication diverting. NOTE 2 – This applies to the clearing communication option on invocation of communication diverting. NOTE 3 – As a network provider option, it shall be possible for the served user to change the timer duration.		

4.3.2 Requirements on the originating network side

No specific requirements are needed in the network.

4.3.3 Requirements in the network

No specific requirements are needed in the network.

Based on the initial filter criteria (IFC) rules, indicating that the served user is subscribed to the CDIV supplementary services, the communication is be forwarded to an AS.

4.4 Coding requirements

The messages and parameters for this supplementary service are defined in [ETSI TS 124 229]. In order to fulfil the requirements messages and parameters are used to support the communication diversion service.