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CCITT

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INTEGRATED SERVICES DIGITAL NETWORK (ISDN)

GENERAL STRUCTURE AND SERVICE CAPABILITIES

CALL DEFLECTION

Recommendation I.252.5

Geneva, 1992

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation I.252.5 was revised by Study Group I and was approved under the Resolution No. 2 procedure on the 4th of August 1992.

CCITT NOTES

1) In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication Administration and a recognized private operating agency.

2) A list of abbreviations used in this Recommendation can be found in Annex A.

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Recommendation I.252.5

CALL DEFLECTION

(revised 1992)

1 Definition

Call Deflection permits a served user to, in real time, request that the network redirects an incoming call addressed to the served user's ISDN number to another number. The served user's originating service is unaffected.

Note – In normal situations, the Call Deflection service is provided on a per access basis. (In these situations, there is a one-to-one relationship between ISDN number and access.) However, the network may recognize multiple numbers on a single interface; in addition, it may not understand a complete ISDN number (e.g. Direct-Dialling-In). In these cases, the Call Deflection service is offered on the basis of the part of the ISDN number which the network can recognize.

2 Description

2.1 *General description*

For a given ISDN number, Call Deflection (CD) service (including options) may be subscribed to for each basic service to which the user(s) of the number subscribes, or collectively for all the basic services to which the user(s) subscribes. Since subscription is on an ISDN number basis, the same call deflection subscriptions will apply to all terminals using this number.

Note – In this service description it is assumed that a single ISDN number is not shared across multiple interfaces. A single ISDN number may, however, be shared by multiple terminals on the same interface. Procedures permitting an ISDN number to be shared across multiple interfaces are for further study.

2.2 *Specific terminology*

Served user: User of a particular ISDN number who is requesting that the call to his number be deflected. This user may also be referred to as the deflecting user or the called user.

Deflected-to user: User, to whom the call shall be deflected.

2.3 *Qualification on the applicability to telecommunication services*

CD can be used with benefit for basic services, which require an alerting state when setting up a call, and can also be used to immediately deflect a call before alerting has commenced.

3. Procedures

3.1 *Provision/withdrawal*

CD shall be provided after prearrangement with the service provider.

The service can be offered with several subscription options. Options apply separately to each basic service subscribed to on each ISDN number. For each subscription option, only one value can be selected. Subscription options are summarized below:

Subscription options	Value
Served user releases his/her number to deflected-to us user (see Note)	No Yes
Calling user receives notification his call has been deflected	No Yes, with the deflected-to user number Yes, without the deflected-to user number

Note – Notification of diversion to the calling user A may be provided as a network provider option.

This service will be withdrawn by the service provider at the subscriber's request or for administrative reasons.

3.2 *Normal procedures*

3.2.1 *Activation/deactivation/registration*

Call deflection is active upon completion of subscription via the service order process and needs no further activation. Deactivation of CD is also achieved via service order.

3.2.2 *Invocation and operation*

If CD is subscribed to, the served user can request that the call be diverted to another number instead of answering the call. To accommodate this, the user sends the network an indication of deflection with the deflected-to address provided in that indication.

The served user may optionally include a privacy selection in that indication to release or not release his/her number to the deflected-to user. If a privacy selection is provided in the deflection request, this selection shall override the pre-determined subscription value "served user releases his/her number to deflected-to user" for that deflection.

In that indication, the served user may also specify either a transit network or a network specific facility or both to be used for that deflection. If the served user does not provide this information, the network shall use the default values.

This invocation can be either an automatic response from the terminal to the offered call (using pre-programmed information at the terminal) or the result of an action by the terminal's user.

In a point-to-multipoint configuration, the acceptance of a deflection request from a particular terminal is dependent on the reaction of other terminals to the same call. Two cases are to be distinguished:

a) a terminal requests call deflection immediately in response to a call request from the network. In this case, the network shall accept the deflection request only, if in response to the call request, no other terminal connects to the call, nor puts the call into the alerting state;

b) a terminal or terminal user requests call deflection whilst being alerted. In this case, the network shall accept the deflection request if no other terminal has been connected in the meantime.

In either case, if there are several deflection requests, the network will only accept the first request.

If the user has subscribed to the service, the network performs the call deflection towards the indicated number and clears the call to the called (served) user with a positive acknowledgement. For call deflection after alerting, the network may either:

a) retain the call to the served user until alerting commences at the deflected-to user; or

b) clear the call to the served user on acceptance of the call deflection request.

For call deflection before alerting, only case "b" is applicable.

The deflected-to user will receive an indication that the call has been deflected.

As an option he may also receive:

1) originally called number B_1;

2) cause for original diversion;

3) last deflecting number B_X;

4) cause for last deflection.

(Depending on the use of other supplementary services, the deflected-to user C may also receive information such as the calling party A number and user-to-user signalling. See the descriptions of interactions with other supplementary services.)

As a subscription option, the served user can request that the calling user be not notified that deflection has been invoked. In this case, the calling user receives no information. Also, the served user's request that no information be transferred shall override any invocation of Connected Line Identification Presentation (COLP) by the calling user.

If the served user requests that the calling user receives notification that the call has been deflected, this information may, as an additional option, include the deflected-to number.

The following notification procedures for the calling user A are a network provider option. The notification procedures for calling user A shall only operate if the served user has subscribed to the option "calling user receives notification that call has been deflected".

For the initial diversion and for any subsequent Call Forwarding No Reply (CFNR), or CD after alerting has commenced, the network will take the following actions depending on the subscription option parameter of the served user.

1) If this parameter is set to "calling user does not receive notification", no notification is given to the calling user.

2) If this parameter is set to "notify calling user, without deflected-to number", then the calling user will receive a notification that the call has been deflected without the deflected-to number providing a previous diverting user has not requested that no notification is given as under item 1) above.

3) If this parameter is set to "notify calling user, with deflected-to number", then the calling user will receive a notification that the call has been deflected, providing a previous diverting user has not requested that no notification is given as under item 1) above. In addition, if alerting takes place (e.g. at user C), notification of the current deflected-to number will be given when alerting commences if all served users in all previous diversions subscribe to "notify calling user, with deflected-to number".

Transfer of the deflected-to user's number may be subject to number notification restrictions due to invocation of other supplementary services at the deflected-to user.

3.3 *Exceptional procedures*

3.3.1 *Activation/deactivation/registration*

Not applicable.

3.3.2 *Invocation and operation*

In cases where a user may be given the address of users involved in the call [e.g. when the calling user may receive the deflected-to user's address, or when the deflected-to user may receive the deflecting user's address and originally deflecting address (multiple diversions), or when the served user may receive user's addresses] as part of that user's notification and this address information is unavailable (e.g. due to address presentation restriction or interworking), the user who would have been given the address shall get an indication on the reason why no number can be given.

Within the ISDN or tandem ISDNs the total number of all diversions for each call should be limited. The maximum number of such connections should be limited to a value between three and five. This is to prevent infinite looping.

If the system cannot accept a deflection request, the served user should receive a notification that deflection is unsuccessful. Possible causes are:

i) service not subscribed;

ii) deflected-to ISDN number invalid;

iii) use of an operator access prefix;

iv) deflected-to ISDN number telecommunications service violates subscribed constraints (e.g. group restrictions);

v) deflected-to ISDN number is of a free number within the same office;

vi) insufficient information;

vii) requested telecommunications service is not provided to the deflected-to ISDN number;

viii) deflected-to number is a special service code (e.g. police);

ix) deflected-to number is served user's number;

x) limit of tandem diverting connections reached.

However, the network is not required to validate information related to the deflected-to user.

If the deflected call cannot be completed to the deflected-to destination, then, as a network option, the network may either:

a) continue the call at the deflecting user. Note that with this option, if alerting at the deflecting user had begun, then alerting would not be interrupted; or

b) clear the call towards the calling user and send an indication that the call cannot be completed. This indication shall not explicitly reveal that the call has been forwarded. If CFNR or CD after alerting has previously occurred, then the call would be cleared back towards that served user; refer to Recommendations I.252.3 or I.252.5 respectively, for these cases.

For call deflection before alerting, only case "b" is applicable.

3.4 *Alternate procedures*

3.4.1 *Activation/deactivation/registration*

None identified.

3.4.2 *Invocation and operation*

None identified.

4 Network capabilities for charging

This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information. It shall be possible to charge the subscriber accurately for the service.

5 Interworking requirements

With diversion invoked across more than one network, e.g. from public switched telephone network (PSTN) via ISDN to another PSTN or between ISDNs of different countries, or even different continents, a decrease in Quality of Service parameters may arise. For example, the parameters that may be influenced are:

– Call Establishment Time;

– Transmission Delay;

– Bit Error Ratio;

– Attenuation of Audio Signals.

Depending on national implementations, the network may provide some precautions, e.g. limit the number of forwarding legs, limit the number of international border crossings, limit the number of satellite hops, etc.

5.1 *Interworking with non-ISDN networks*

If the deflected-to number is not within the ISDN, then an interworking situation is said to exist.

The number of times a call will be deflected once it has exited the ISDN network cannot be limited by this ISDN network.

If a deflected call meets an interworking situation, then an interworking indication should be sent to the calling party. This indication shall not explicitly reveal that the call has been deflected.

In case of interworking, appropriate tones and/or announcements should be provided.

Note – Once a call has been deflected to a non-ISDN network, then further diversions and/or notifications to the calling user are outside the scope of this Recommendation.

5.2 *Interworking with private ISDNs*

Within ISDNs (public or private) the total number of diversions for each call should be limited (see § 3.3.2).

Where a remote user is on a different network, notifications to the remote user, if applicable, shall be sent to the remote user's network for forwarding to the remote user.

If the private network detects deflection back to a destination in the public network, the private network could request that deflection is performed by the public network. This assumes cooperation between the public and private networks.

The private network may also optionally specify either a transit network or a network specific facility, or both, to be used for that deflection.

If a private ISDN employs other types of service interactions than specified under § 6, e.g. with completion of calls to busy subscribers (CCBS), the private ISDN shall supply the necessary precautions against such consequences.

6 Interaction with other supplementary services

The ways in which call deflection interacts with other supplementary services are in general identical to the ways in which Call Forwarding Unconditional interacts with other supplementary services. Thus, if the interactions are described to be "Same as Call Forwarding Unconditional (CFU)", the CFU text should be taken verbatim, except that the words "call forwarding unconditional" should be replaced with "call deflection".

6.1 *Call Waiting*

Calling user: Same as CFU (see Recommendation I.252.4).

Called user: CD can be used in response to a call waiting indication.

Deflected-to user: A deflected call can invoke call waiting.

6.2 *Call Transfer*

Same as CFU (see Recommendation I.252.4).

6.3 *Connected Line Identification Presentation*

Calling user notification of the diverted-to number is part of the diversion service and should not be considered to require an invocation of COLP by the calling user.

If the served (diverting) user selects the option that the calling user is not notified of call deflection, then the calling user will receive no deflection notification. In addition, the calling user will not receive the connected user's identity when the call is answered, unless the calling user has override capability.

If the served (diverting) user selects the option that the calling user is notified, but without the deflected-to number, then the calling user will not receive the connected user's identity when the call is answered, unless the calling user has override capability.

6.4 *Connected Line Identification Restriction*

If a deflected-to user subscribes to Connected Line Identification Restriction (COLR) "permanent mode", then the deflected-to user's number shall not be provided with the notification that the call has been deflected.

If a deflected-to user subscribes to COLR "temporary mode", the provision of the deflected-to user's number to the calling user shall not be allowed during the alerting conditions of the call. The deflected-to user's connected number may still be provided on answer, based on COLR temporary mode operation.

In each of the above situations, a calling user that subscribes to COLP and having override capability, shall not be able to receive the deflected-to user number as part of the diverting notification information, but can invoke COLP in order to receive the connected line identity when the call is answered.

6.5 *Calling Line Identification Presentation*

Same as CFU (see Recommendation I.252.4).

6.6 *Calling Line Identification Restriction*

Same as CFU (see Recommendation I.252.4).

6.7 *Closed User Group*

Closed User Group (CUG) restrictions between the calling user and the deflecting user must be met. In the case of multiple diversions, CUG restrictions between the calling user and the diverting user have to be met at each intermediate diverting point. In addition, CUG restrictions between the calling user and diverted-to user must be met end-to-end.

Called user/diverted-to user: When a call is diverted, a new check of the CUG restrictions between the calling user and diverted-to user is made at the "diverted-to" destination. The CUG information sent to the "diverted-to" destination is the same calling user CUG information that was sent from the originating network.

6.8 *Conference Calling*

Same as CFU (see Recommendation I.252.4).

6.9 *Direct-Dialling-In*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.10 *Diversion*

6.10.1 *Call Forwarding Busy*

In case of network determined user busy (NDUB) the incoming call is not offered to the called user and Call Forwarding Busy takes precedence over Call Deflection.

If a NDUB condition is not met, the incoming call is offered to the called user and invocation of either Call Forwarding Busy (CFB) or Call Deflection depends on the user's response. If both responses are received, the CD invocation is taken to be a "positive response" and the user busy response is ignored.

6.10.2 *Call Forwarding No Reply*

The incoming call is offered to the called user and invocation of either Call Deflection or Call Forwarding No Reply depends on the user's response.

6.10.3 *Call Forwarding Unconditional*

The invocation of CFU takes precedence over CD.

6.10.4 *Call Deflection*

Not applicable.

6.11 *Line Hunting*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.12 *Three-Party Service*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.13 *User-to-User Signalling*

Refer to Recommendation I.257.1, Annex B, for more details of the interaction with the User-to-User Signalling service.

Call deflection before alerting: See Call Forwarding Busy, Recommendation I.252.2 (the call shall be treated as if the user determined user busy condition exists).

Call deflection after alerting: See Call Forwarding No Reply (Recommendation I.252.3).

6.14 *Multiple Subscriber Number*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.15 *Call Hold*

No impact, i.e. neither supplementary service affects the operation of the other supplementary service.

6.16 *Advice of Charge*

Charging information at call set-up time: Not applicable.

Charging information during the call: When a call is forwarded and the deflecting user is charged for the deflected part of the call, the charging information is not given to the deflecting user.

Charging information at the end of the call: When a call is deflected and the deflection user is charged for the forwarded part of the call, the charging information may be given to the forwarding user when the call is cleared.

6.17 *Multi-level Precedence and Preemption*

The precedence level of calls is preserved during the deflection process, and the deflected-to user may be preempted.

6.18 *Priority*

Priority service is restricted to A-B connections.

6.19 *Malicious Call Identification*

The Malicious Call Identification (MCID) supplementary service can be invoked for a deflected call. In addition to the normal operation of the MCID supplementary service, the identity of the called user shall be registered and, as a network option, the last diverting user can be registered.

Once deflection has taken place, the deflecting user cannot invoke the MCID supplementary service.

6.20 *Outgoing Call Barring*

After Outgoing Call Barring (OCB) has been activated, calls can only be deflected to destinations which are within the limitations of the OCB version, that has been activated.

6.21 *Reverse Charging*

If parties A, B and C are all in different countries, reverse charging for all charges to C should not be permitted.

Where charging on diverted calls occurs on a per leg basis, reverse charging should occur only on the leg on which it is requested.

A request for Reverse Charging (REV), case B, made by the calling user should always be rejected on calls which have been diverted.

REV, case B, requested by the called user and REV, case C, can only be requested on a final leg.

With respect to REV, cases A and D, the following restrictions apply:

a) on leg A-B_1, REV will come into operation only if user B_1 subscribes to REV, case D. User A may or may not have requested REV, case A, in addition;

b) on leg B_m-B_{m+1}, REV will come into operation only if user B_{m+1} subscribes to REV, Case D. User B_m may or may not have requested REV, case A, together with a deflection request;

Note – In other cases of diversion, user B_m cannot make a request for REV on the outgoing leg.

c) on leg B_n-C, the following applies:

– if user C subscribes to REV, case D, REV will always come into operation. User B_n may or may not have requested REV, case A, together with a deflection request;

Note – In other cases of diversion, user B_n cannot make a request for REV on the outgoing leg.

– if user C does not subscribe to REV, case D, then REV will come into operation only if user B_n has requested REV, case A, together with a deflection request and user C accepts the REV request when connecting the call.

6.22 *Sub-addressing*

The sub-address associated with the original called party number is delivered to the original called party and shall not be forwarded if the call is deflected.

7 Dynamic description

Refer to the CFB dynamic description which covers CFB, CFNR, CFU and CD in Recommendation I.252.2.

ANNEX A

(to Recommendation I.252.5)

Alphabetical list of abbreviations used in this Recommendation

CCBS	Completion of calls to busy subscribers
CD	Call deflection
CFB	Call forwarding busy
CFNR	Call forwarding no reply
CFU	Call forwarding unconditional
COLP	Connected line identification presentation
COLR	Connected line identification restriction
CUG	Closed user group
ISDN	Integrated services digital network
MCID	Malicious call identification
NDUB	Network determined user busy
OCB	Outgoing calling barring
PSTN	Public switched telephone network
REV	Reverse charging