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CALL OFFERING SUPPLEMENTARY SERVICES

(Melbourne, 1988)

The purpose of this Recommendation is to provide the stage 1 description of the method defined in Recommendation I.130 using the means given in Recommendation I.210.

Supplementary services are described by a prose definition and description (step 1.1) and by a dynamic description (step 1.3). The application of the attribute technique (step 1.2), as defined in Recommendation I.140, for supplementary services is for further study.

Recommendation I.252

This Recommendation describes the following Call Offering supplementary services:

I.252.1 Call Transfer (CT)

I.252.2 Call Forwarding Busy (CFB)

I.252.3 Call Forwarding No Reply (CFNR)

I.252.4 Call Forwarding Unconditional (CFU)

I.252.5 Call Deflection (CD) (Note)

I.252.6 Line Hunting (LH)

Note — This service having been identified now requires further study; its description is not yet included.

1 I.252.1 — Call Transfer

1.1 *Definition*

The Call Transfer supplementary service enables a user to transfer an established (i.e. active) call to a third party. For the original call, the ''served user'' (see § 1.2.2) may have been either the calling or called party (i.e. the call may have been either incoming or outgoing). This service differs from the Call Diversion (i.e. Call Forwarding) supplementary services in that the latter deal only with incoming calls that have not yet reached the ''fully-established'' state, whereas in the case of Call Transfer an established end-to-end connection exists.

1.2 *Description*

1.2.1 *General description*

Three methods of Call Transfer are identified. One, called ‘‘Normal’’ Call Transfer, is described in § 1.3.2 below. The two others are described in § 1.3.4. Although the invocation of these various methods differ, the essential operation of Call Transfer is to transform the served user’s established call into a new call between the other party on the established call and a third party. It should be noted that, in a Three-Party Service call, there are several stages at which the served user can effectively transfer the call. These are described in the Three-Party Service description.

1.2.2 *Specific terminology*

1.2.2.1 *Served user, other parties*

During the invocation and active phases, the service is under the control of the ‘‘served user’’, i.e. the one for whom the service was subscribed. This user is also referred to as ‘‘user A’’. Other parties associated with this service are defined as follows:

— user B is the other party in the original call (A← B);

— user C is the ‘‘third party’’ - the other party in the subsequent call (A | (raC).

1.2.3 *Qualifications on the applicability to telecommunication services*

This supplementary service is considered meaningful when applied to the Telephony teleservice and the speech and 3.1 kHz audio bearer service. Furthermore, it may also be meaningful when applied to other services.

1.3 *Procedures*

1.3.1 *Provision/withdrawal*

The Call Transfer supplementary service is subscribed to by prior arrangements with the service provider. Subscription can be made for ‘‘Normal Call Transfer’’ and/or for either of the alternate procedures (i.e. ‘‘Single-Step Call Transfer’’ or ‘‘Explicit Call Transfer’’) offered by the service provider.

Withdrawal of the service is made by the service provider upon request by the subscriber or for service provider reasons.

1.3.2 *Normal procedures*

1.3.2.1 *Activation/deactivation/registration*

None identified.

1.3.2.2 *Invocation and operation*

The served user, user A, can transform an established call with user B into (effectively) a call from user B to a third party, user C. When the served user (user A) asks the service provider to begin the ‘‘Normal’’ Call Transfer, the service provider puts the already established call (with user B) on hold. User A then proceeds to establish the second call (to user C). Upon request from user A to complete the Call Transfer, the service provider would connect users B and C together while removing the connections between user A and the other two users. (The extent to which the service provider re-uses the resources from the A← B and A | (raC calls to form the B | (raC call is a service provider option.)

Note — In the resulting call B | (raC, user C will have all the relevant characteristics of the called party, but user B will not necessarily have all the characteristics of the calling party, depending on whether user B called user A and also depending on which service or supplementary service is under consideration.

In some networks, user A can request completion of the Call Transfer either during or after the establishment of the connection to user C.

The service provider will optionally notify users B and C of the transfer and, depending on interworking conditions and the supplementary services subscribed to by users B and C, will indicate to user B the number of user C and will indicate to user C the number of user B.

1.3.3 *Exceptional procedures*

1.3.3.1 *Activation/deactivation/registration*

None identified.

1.3.3.2 *Invocation and operation*

The service request would be rejected if the user invoking the service has not subscribed to the Call Transfer service (or the requested service option). The user would be notified of the cause for rejection and the original call A← B would remain in the state it was in before the transfer request was received.

If user A's attempt to establish a connection to user C is unsuccessful, (e.g. user C is busy), user A will be so informed and will be able either to retrieve the original call A← B or to attempt a new connection (e.g. to C or to another party) (see Figure 2/I.252).

The transfer request would be rejected if the network is unsuccessful in connecting users B and C (e.g. when user C is busy, when there is network congestion, or when transfer restrictions are violated). The user would be notified of the cause for rejection and the two calls would remain in the states they were in before the request was received.

1.3.4 *Alternative procedures*

1.3.4.1 *Activation/deactivation/registration*

None identified.

1.3.4.2 *Invocation and operation*

1.3.4.2.1 *Single-Step Call Transfer*

In this procedure, the served user can transfer an established call (with user B) to another user (user C) without first establishing a call to user C. When invoking a Single-Step Call Transfer, the served user would indicate to the service provider the address of user C. The service provider would then establish a connection between users B and C, and disconnect the served user, user A, from the original call with user B. It should be noted that the service provider is not required to reinstate the call A← B if a Single-Step Call Transfer to user C fails. It is also necessary to notify user B of the progress of the establishment of the call to user C, particularly if the call A← B cannot be reinstated.

1.3.4.2.2 *Explicit Call Transfer*

In this procedure, the served user A puts the already established call (with user B) on hold and then proceeds to establish another call (to user C) or to accept an incoming call (from user C). If user A's attempt to establish a connection to user C is unsuccessful (e.g. user C is busy), user A will be so informed and will be able either to retrieve the original call A← B or to attempt a new connection (e.g. to user C or to another party) (see Figure 4/I.252).

User A then explicitly requests that the call with user B be transferred to user C. (By contrast, in the Normal Call Transfer procedure, the service provider ‘‘knows’’ that the two calls [A← B and A | (raC] are related; requesting completion of Normal Call Transfer for call A | (raC implicitly means identical to Normal Call Transfer (with the possible exception of the failure procedures.)

1.4 *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.

1.5 *Interworking requirements*

User B and user C may not be able to receive each other’s address if one (or both) of the calls exits from the ISDN network. The different scenarios are shown in the following tables. The tables assume that B is the originator of the call to A. The network may not be able to recognize user identification if one or both of the calls requires interworking with non-ISDN network(s).

For illustrative purposes, assume that user B originates a call to user A, and user A initiates the call transfer service to connect user B to user C. The different scenarios are shown in the following tables:

H.T. [T1.252]

i) Users A, B and C are in ISDN

{ Address information available to }	Address of A	Address of B	Address of C
User A	—	YES	YES
User B	YES	—	YES
User C	YES	YES	—

Tableau i) [T1.252], p. 1

H.T. [T2.252]

ii) Users A and B are in ISDN. User C is in another network

{ Address information available to }	Address of A	Address of B	Address of C
User A	—	YES	YES
User B	YES	—	YES
User C	NO	NO	—

Tableau ii) [T2.252], p. 2

H.T. [T3.252]

iii) Users A and C are in ISDN. User B is in another network

{ Address information available to }	Address of A	Address of B	Address of C
User A	—	NO	YES
User B	YES	—	NO
User C	YES	NO	—

Tableau iii) [T3.252], p. 3

H.T. [T4.252]

iv) User A is in ISDN. Users B and C are in another network

{ Address information available to }	Address of A	Address of B	Address of C
User A	—	NO	YES
User B	YES	—	NO
User C	NO	NO	—

Tableau iv) [T4.252], p. 4

1.6 *Interaction with other supplementary services*

1.6.1 *Call Waiting*

Assume served user A has an established call with user B and wishes to transfer user B to user C, and users A, B and C all have subscribed to the Call Waiting Service. If a call from user D is received while:

i) user A is invoking Normal Call Transfer

— If user D calls user A at any time before A requests the completion of the transfer of user B to user C, then user A shall receive a call waiting indication. When user B is transferred to user C, a B-channel would normally become idle, enabling user A to accept the waiting call.

— If user D calls user B, then user B can use normal call waiting procedures to accept the waiting call (preferably once the transfer to user C is completed). If user B had a call waiting indication while the call was established with user A, the call waiting indication shall not be affected by the transfer of user B to user C.

— If user D calls user C during the transfer process (i.e. while user C is engaged on an active call with user A), the call waiting indication shall be presented to user C. User C could then use Normal Call Waiting procedures to accept the waiting call (preferably once the call transfer is completed).

ii) user A is invoking Single-Step Call Transfer

— User A may receive a call waiting indication any time before or during the transfer invocation. Once the Single-Step Call Transfer is invoked, then user A is disconnected from user B, thus, causing a B-channel to normally become idle, enabling user A to accept the waiting call.

— User B may receive a call waiting indication any time before or during the transfer invocation. User B could then use Normal Call Waiting procedures to accept the waiting call (preferably once the transfer is completed). If the transfer is not successful (e.g. user C is busy), then user B would normally release the call, causing a B-channel to become idle and enabling user B to accept the waiting call.

— If the call from user D arrives at user C's serving office after the call from A, user C would receive a call waiting indication. The call waiting indication shall not be affected by the transfer of user B to user C. User C could then use Normal Call Waiting procedures to accept the waiting call (preferably once the transfer is completed). If the call from user D arrives before the call from user A, the call from user A will receive call waiting treatment.

iii) user A is invoking Explicit Call Transfer

— The interaction for users A, B, or C with call waiting are the same as for i) above.

1.6.2 *Call Transfer*

It shall be possible for both users (user A and user B) in a normal call, who have each subscribed to the Call Transfer Service, to simultaneously transfer the call. That is, if user A and user B are active in an established call, user A could transfer the call to a user C and user B could transfer the call to a user D. Call progress signals and other notifications will be delivered to the appropriate party at the time the signal is received. See Figure 1/I.252.

Figure 1/I.252, (N), p.

1.6.3 *Connected Line Identification Presentation (COLP)*

Assume that user A has an established call with user B and wishes to transfer this call with user B to user C. Except in the case where user C prohibits the presentation of his/her number, user C's number shall be presented:

— to user B upon the successful completion of the transfer to user C (independent of the type of transfer procedure invoked by user A) provided that user B has subscribed to COLP;

— to user A when user A is using the Normal or Explicit Call Transfer procedures and has subscribed to COLP. The reached party's number will not be presented to user A if user A invokes the Single-Step Call Transfer procedure.

Note — Number presentation may not be possible if interworking with a non-ISDN network is involved in the call transfer.

1.6.4 *Connected Line Identification Restriction (COLR)*

Assume that a user A has an established call with a user B and wishes to transfer this call with user B to a user C.

If user C has subscribed to COLR, then user A shall not receive user C's number when user A invokes any Call Transfer procedure and user B shall not receive user C's number during the transfer of user B to user C.

1.6.5 *Calling Line Identification Presentation (CLIP)*

For Normal and Explicit Call Transfers, user A shall have his number presented to user C and user B shall have his number presented to user C unless:

1) user A or B has number presentation restrictions; or

2) the call transfer process requires interworking with a non-ISDN network.

For Single-Step Call Transfer, if user C has subscribed to CLIP he shall receive the number of user B unless:

1) User B has address presentation restrictions; or

2) the call transfer process requires interworking with a non-ISDN network.

User C may also receive user A's address as a ‘‘ redirecting party ´LP 1) User A has address presentation restrictions; or

2) the call transfer process requires interworking with a non-ISDN network.

1.6.6 *Calling Line Identification Restriction (CLIR)*

Assume that a user A has an established call with a user B and wishes to transfer this call with user B to a user C.

If user A has subscribed to CLIR, then user C shall not receive a calling number when user A invokes any Call Transfer procedure. If user B has subscribed to CLIR, then user C shall not receive a calling number during the transfer of user B to user C.

1.6.7 *Closed User Group (CUG)*

The intention of CUG is to allow some connections and prohibit others; call transfer must not compromise this intention.

Assume that a user A has an established call with user B and wishes to transfer this call with user B to a user C. When considering CUG requirements and restrictions, the transfer process (all three procedures) should be considered as three separate call processings:

1) when users A and B established their original connection, if user A and/or user B was a member of a CUG, then CUG requirements must have been met before the two parties were connected;

2) when user A invokes a transfer procedure, both user A and user C must meet CUG requirements before the call can be completed, if either user A or user C is a member of a CUG;

3) finally, the transfer connection of user B to user C must first meet all CUG requirements (if either user B and/or user C is a member of a CUG) before the two parties can establish communications.

The above requirements insure that CUG security is not violated. They prevent, for example, a user A who meets CUG requirements with user C from transferring a user B who does not meet CUG requirements with user C.

1.6.8 *Conference Calling*

Refer to Recommendation I.254, § 1.6.2, ineraction with Call Transfer.

1.6.9 *Direct-Dialling-In*

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

1.6.10 *Call Divertion (i.e. Call Forwarding Services)*

In general, if the served user attempts to establish a call to a party that is forwarding calls, the forwarded-to party will be alerted and may be transferred to. Specific procedures are described below.

The count for the number of forwarding ‘‘hops’’ should be cleared each time a call transfer occurs.

Assume that a user A has an established call with a user B and wishes to transfer this call with user B to a user C:

1.6.10.1 *Call Forwarding Busy (CFB)*

User C, which has subscribed to CFB, may be busy on another call when user A’s call is received. The call from user A would then be routed to another user D. For Normal and Explicit Call Transfers, user A would, in general, be aware of the forwarding and could make a decision as to whether or not the transfer of user B should be completed to the forwarded-to user D. For Single-Step Call transfer, user B would be connected to the forwarded-to user D.

1.6.10.2 *Call Forwarding No Reply (CFNR)*

User C, who has subscribed to CFNR, may have a free access but does not answer user A's call. Upon expiration of the CFNR timer, user A's call would be routed to another user D. For Normal and Explicit Call Transfers, user A would, in general, be aware of the forwarding and could make a decision as to whether or not the transfer of user B should be completed to the forwarded-to user D. For Single-Step Call Transfer, user B would be connected to the forwarded-to user D.

1.6.10.3 *Call Forwarding Unconditional (CFU)*

If user C has subscribed to CFU, then user A's call will be routed to another user D. For Normal and Explicit Call Transfers, user A would, in general, be aware of the forwarding and could make a decision as to whether or not the transfer of user B should be completed to the forwarded-to user D. For Single-Step Call Transfer, user B would be connected to the forwarded-to user D.

1.6.11 *Line Hunting*

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

1.6.12 *Three-Party Service*

The forms of call transfer given in Table 1/I.252 are applicable to the indicated states of Three-Party Service.

H.T. [T5.252]

TABLE 1/I.252

{	Call transfer Normal	Single-step	Explicit
Active/held YES | fB↑**a**↑**)** }	{ NA	YES	
Three-way conversation NA a) See Figure 4/I.254, three-party service dynamic description. }	YES | ua)	NA	{

Table 1/I.252 [T5.252], p.

1.6.13 *User-to-User Signalling (UUS)*

Prior to transfer: Prior to beginning a transfer user A can employ UUS services 1, 2 and 3 normally.

During transfer: UUS services 1, 2 and 3 are only allowable between user A and user B and/or between user A and user C. User-to-user information (UUI) sent by user B will be delivered to user A, not user C. UUI cannot be transferred between users B and C during this time. The delivery of service 3 UUI cannot be guaranteed during transfer.

After completion of transfer: Only if user B and user A both request service(s) 1, 2 and/or 3, is that service(s) available for use between users B and C after the transfer is completed. If user A did not request a given service in the set-up to user C, user B will be informed that he can no longer employ that service on this call. If user A requested a particular service in the set-up to user C, but the service was not requested by user B in the initial set-up message to user A, user C will be informed at the completion of the transfer that he can no longer employ the service.

Note 1 — The procedures to be followed if transfer of charge is permitted are for further study.

Note 2 — The procedures to be followed if the number of allowable messages has been reached by any party are for further study.

1.6.14 *Multiple Subscriber Number*

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

1.6.15 *Call Hold*

Parties held by users A, B and C, before invoking a transfer process will continue to be held by the parties after the transfer process. For example, if user B places his call to user A on hold during user A's transfer of the call to user C, the resulting call from user B to user C shall remain held by user B until it is retrieved by user B. The only exception to this is the Explicit Call Transfer procedure when user A transfers user B to user C. In this case, user B will no longer be held by user A after the transfer is completed.

Special case: Assume users A and B were in an active call and user A places user B on hold, and user B places user A on hold. If user A transfers user B to user C by invoking the Explicit Call Transfer procedure, then the transfer shall take effect with the resulting call between users B and C remaining held by user B and the held call between user A to user B shall be discarded (i.e. user B cannot retrieve user A after the transfer).

1.6.16 *Advice of Charge*

Refer to Recommendation I.256, §§ 2.1.6.2, 2.2.6.2, 2.3.6.2, Interaction with Call Transfer.

1.7 *Dynamic description*

The dynamic description of this service is shown in Figure 2/I.252.

2 I.252.2 — **Call Forwarding Busy**

2.1 *Definition*

Call Forwarding Busy (CFB) permits a ‘‘served user’’ (see § 2.2.2) to have the network send to another number all incoming calls for the served user's ISDN number (or just those associated with a specified basic service) which meet busy at the served user's ISDN number. The served user's originating service is unaffected.

Note — In normal situations, the CFB 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 undertstand a complete ISDN number (e.g. DDI). In these cases, the CFB service is offered on the basis of the part of the ISDN number which the network can recognize.

2.2 *Description*

2.2.1 *General description*

For a given ISDN number, this 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 Forwarding 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. For multiple access installations, it may be possible for the user to specify, on activation, if the service is applicable to a specific access or all accesses associated with that installation.

The served user can request a different forwarded-to number for each basic service subscription parameter value to which he has subscribed.

An indication that the CFB service is activated on a number may, as an option, be given to the user who has forwarding activated, each time an outgoing call is made. This may take the form of a special indication in the proceed response.

Figure 2/I.252, (N), p. 7

Figure 3/I.252, (N), p. 8

Figure 4/I.252, (N), p. 9

2.2.2 *Specific terminology*

A *served user* is a user of a particular ISDN number who is requesting that calls to his number be forwarded. This user may also be referred to as the forwarding user or the called user.

A *forwarded-to user* is a user to whom the call shall be forwarded.

2.2.3 *Qualifications on the applicability to telecommunications services*

No restrictions identified.

2.3 *Procedures*

2.3.1 *Provision/withdrawal*

CFB shall be provided after pre-arrangement with the service provider.

The service can be offered with three 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 receives notification that call has been forwarded — No — Yes, with call offering information (see § 2.3.2.2) Calling user receives notification that his call has been forwarded — No — Yes, with or without forwarded-to user number Served user receives notification that CFB is currently activated — No — Yes

2.3.2 *Normal procedures*

2.3.2.1 *Activation/deactivation/registration*

Same as for Call Forwarding Unconditional (CFU), see § 4.

2.3.2.2 *Invocation and operation*

The following illustration clarifies the CFB procedures. Assume that A calls B1, who forwards the call to B2, . | | , Bm, . | | , Bx. The final receiver of the call is C.

Figure, (N), p.

2.3.2.2.1 *Served user Bm's perspective*

If CFB is active and the served user is Network Determined User Busy (NDUB) or User Determined User Busy (UDUB), then an incoming call to the served user will be forwarded. In case of NDUB, the call is not offered to the served user.

In the case of UDUB, the call will have been offered to the served user. Normal call set-up information will already have been provided to the served user. When the forwarding attempt is started, the served user will receive notification that a call has been forwarded. No further notification is given.

When an incoming call is forwarded without being offered to the served user (i.e. NDUB condition), the served user, as a subscription option, may receive notification of the call forwarding (but will not be able to answer the incoming call). This notification is given as soon as the forwarding attempt is started.

This notification includes the following information (on the call that has been forwarded):

1) indication that a call has been forwarded;

2) telecommunications service information (e.g. bearer capability, higher layer compatibility);

3) user-to-user information;

4) Bm's number;

5) calling party number A (if CLIP applicable).

If multiple forwardings have occurred and the served user is authorized to receive additional information, he may also receive:

6) originally called number B1;

7) cause for original forwarding;

8) last forwarding number B | m — 1);

9) cause for last forwarding.

2.3.2.2.2 *Forwarded-to user C's perspective:*

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

As an option he may also receive:

1) originally called number B1;

2) cause for original forwarding;

3) last forwarding number Bx;

4) cause for last forwarding.

(Depending on the use of other supplementary services, the forwarded-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.)

2.3.2.2.3 *Calling user A's perpective* :

As a subscription option, the served user Bm can request that the calling user receive a notification that the call has been forwarded and, as an additional subscription option, that notification can include the forwarded- to number B(m+1). Transfer of the forwarded-to user number will not take place if number restrictions at the forwarded-to user exist.

2.3.3 *Exceptional procedures*

2.3.3.1 *Activation/deactivation/registration*

Same as CFU (see § 4).

2.3.3.2 *Invocation and operation*

Call forwarding applies only to subscribed basic services. Calls to an ISDN number requesting a basic service which is not subscribed to, will never be forwarded.

Within an ISDN, or tandem ISDNs, the total number of all forwardings for each call should be limited. The maximum number of such connections should be limited to a value between 3 and 5 for each call. This is to prevent infinite looping.

If the limit is reached and an attempt is made to forward the call an additional time, then the forwarded call shall be treated as follows:

If the forwarded call cannot be completed to the forwarded-to destination, then the network will clear the forwarded leg of the call. Specifically, if CFB has been invoked, and CNFR has not occurred, then the call would be cleared back towards the calling user, and the calling user would be sent a cause to indicate that the call has been forwarded but not completed (i.e. because of network congestion, invalid number, facility not available, etc.). If the forwarded call cannot be completed and if CFNR has occurred, then the call should only be cleared back as far as the CFNR exchange and the calling user will, in the case of a telephony call, continue to receive inband ringing tone.

2.3.4 *Alternative procedures*

2.3.4.1 *Activation/deactivation/registration*

None identified.

2.3.4.2 *Invocation and operation*

None identified.

2.4 *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.

2.5 *Interworking requirements*

Same as CFU (see § 4).

2.6 *Interaction with other supplementary services*

The ways in which Call Forwarding Busy 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 CFU’’, the CFU text should be taken verbatim, except that the expression ‘‘Call Forwarding Unconditional’’ should be replaced by ‘‘Call Forwarding Busy’’.

2.6.1 *Call Waiting*

Calling user: same as CFU (see § 4).

Called user: No interaction. That is, if the user is not NDUB, Call Waiting will take place. If the user is NDUB, Call Forwarding Busy will take place.

Forwarded-to user: A forwarded call can invoke Call Waiting.

2.6.2 *Call Transfer*

Same as CFU (see § 4).

2.6.3 *Connected Line Identification Presentation*

Same as CFU (see § 4).

2.6.4 *Connected Line Identification Restriction*

Same as CFU.

2.6.5 *Calling Line Identification Presentation*

Same as CFU (see § 4).

2.6.6 *Connected Line Identification Restriction*

Same as CFU (see § 4).

2.6.7 *Closed User Group*

Same as CFU (see § 4).

2.6.8 *Conference Calling*

Same as CFU (see § 4).

2.6.9 *Direct-Dialling-In*

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

2.6.10 *Call Diversion (i.e. Call Forwarding) services*

2.6.10.1 *Call Forwarding Busy*

Not applicable.

2.6.10.2 *Call Forwarding No Reply*

The invocation of CFB takes precedence over CFNR.

2.6.10.3 *Call Forwarding Unconditional*

The invocation of CFU takes precedence over CFB.

2.6.11 *Line Hunting*

In general, Line Hunting takes precedence over CFB. Thus, CFB only occurs if all members of the hunt group are busy.

2.6.12 *Three-Party Service*

Refer to Recommendation I.254, § 2.6.10, interaction with CFB.

2.6.13 *User-to-User Signalling*

Same as CFU (§ 4), except that service 2 of UUS cannot be guaranteed prior to completion of the Call Forwarding Busy in case of a user-determined-busy.

2.6.14 *Multiple Subscriber Number*

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

2.6.15 *Call Hold*

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

2.6.16 *Advice of Charge*

Refer to Recommendation I.256, §§ 2.1.6.10, 2.2.6.10, 2.3.6.10, interaction with CFB.

2.7 *Dynamic description*

The dynamic description given in Figure 5/I.252 contains the descriptions of the three Call Forwarding services (CFU, CFB, and CFNR).

Figure 5/I.252 (feuillet 1 sur 5), (N), p. 11

Figure 5/I.252 (feuillet 2 sur 5), (N), p. 12

Figure 5/I.252 (feuillet 3 sur 5), (N), p. 13

Figure 5/I.252 (feuillet 4 sur 5), (N), p. 14

Figure 5/I.252 (feuillet 5 sur 5), (N), p. 15

3 I.252.3 — **Call Forwarding No Reply**

3.1 *Definition*

Call Forwarding No Reply (CFNR) permits a ‘‘served user’’ (see § 3.2.2) to have the network send to another number all incoming calls for the served user’s ISDN number which meet no reply, or just those associated with a specific basic service which meet no reply. The served user’s originating service is unaffected.

Note — In normal situations, the CFNR 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. DDI). In these cases, the CFNR service is offered on the basis of the part of the ISDN number which the network can recognize.

3.2 *Definition*

3.2.1 *General description*

For a given ISDN number, this 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 Forwarding subscriptions will apply to all terminals using this number.

Two conditions of CFNR are possible as follows:

1) the call is offered and no indication of a compatible terminal is received; or

2) the call is offered and an indication of a compatible terminal is received.

Only case 2) is considered here. Case 1) is for further study.

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. For multiple access installations, it may be possible for the user to specify, on activation, if the service is applicable to a specific access or all accesses associated with that installation.

The served user can request a different forwarded-to number for each basic service subscription parameter value to which he has subscribed.

An indication that the CFNR service is activated on a number may, as an option, be given to the user who has forwarding activated, each time an outgoing call is made. This may take the form of a special indication in the proceed response.

3.2.2 *Specific terminology*

A *served user* | is a user of particular ISDN number who is requesting that calls to his number be forwarded. This user may also be referred to as the forwarding user or the called user.

A forwarded-to user | is a user to whom the call shall be forwarded.

3.2.3 *Qualifications on the applicability to telecommunication services*

No restrictions identified.

3.3 *Procedures*

3.3.1 *Provision/withdrawal*

CFNR shall be provided after pre-arrangement with the service provider.

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

Subscription options Value Served user receives notification that call has been forwarded — No — Yes, with call offering information (see § 3.3.2.2) Calling user receives notification that his call has been forwarded — No — Yes, with or without forwarded-to user number

No reply condition timer — 5-60 seconds, in steps of 5 seconds Served user received notification that CFNR is currently activated — No — Yes

3.3.2 *Normal procedures*

3.3.2.1 *Activation/deactivation/registration*

Same as CFU (see § 4).

3.3.2.2 *Invocation and operation*

The following illustration clarifies the CFNR procedures. Assume that A calls B1, who forwards the call to B2, . | | , Bm, . | | , Bx. The final receiver of the call is C.

Figure, (N), p.

3.3.2.2.1 *Served user Bm's perspective*

When CFNR is active, incoming calls will be offered to the served user. Normal call offering information is provided to the served user. If the served user does not reply within a subscribed time interval, the call will be forwarded. The served user, as a subscription option, may receive notification that a call has been forwarded. This notification is given as soon as the forwarding attempt is started. No further notification is given.

3.3.2.2.2 *Forwarded-to user C's perspective*

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

As an option he may also receive:

1) originally called number B1;

2) cause for original forwarding;

3) last forwarding number Bx;

4) cause for last forwarding.

(Depending on the use or other supplementary services, the forwarded-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.)

3.3.2.2.3 *Calling user A's perspective*

As a subscription option, the served user Bm can request that the calling user receive a notification that the call has been forwarded and, as an additional subscription option, that notification can include the forwarded-to number B(m + 1). Transfer of the fowarded-to user number will not take place if number restrictions at the forwarded-to user exist.

3.3.3 *Exceptional procedures*

3.3.3.1 *Activation/deactivation/registration*

Same as CFU (see § 4).

3.3.3.2 *Invocation and operation*

Call forwarding applies only to subscribed basic services. Calls to an ISDN number requesting a basic service which is not subscribed to will never be forwarded.

Within an ISDN, or tandem ISDNs, the total number of all forwardings for each call should be limited. The maximum number of such connections should be limited to a value between 3 and 5 for each call. This is to prevent infinite looping.

If the limit is reached and an attempt is made to forward the call an additional time, the forwarded call shall be treated as follows:

If the forwarded call cannot be completed to the forwarded-to destination, then the network will clear the forwarded leg of the call and the calling user will, in the case of a telephony call, continue to receive inband ringing tone. The ''no reply timer'' will not be restarted by the network. (Note that during the activation of CFNR, the calling user shall continue to alert the forwarding user until alerting commences at the forwarded-to user.)

3.3.4 *Alternative procedures*

3.3.4.1 *Activation/deactivation/registration*

None identified.

3.3.4.2 *Invocation and operation*

None identified.

3.4 *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.

3.5 *Interworking requirements*

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

If a forwarded call meets an interworking situation, then an interworking indication should be sent to the calling party. Also, if the network cannot determine that the forwarded call cannot be completed (i.e. the progress of the call is provided in-band), the network shall cease alerting at the diverting termination and connect the calling user to the diverted call in order to receive these inband supervisory indications.

Note — The number of times a call has been forwarded once it has exited the Common Channel Signalling (CCS) network cannot be limited by this CCS network.

3.6 *Interaction with other supplementary services*

The ways in which Call Forwarding No Reply 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 CFU’’, the CFU text should be taken verbatim, except that the expression ‘‘Call Forwarding Unconditional’’ should be replaced by ‘‘Call Forwarding Busy’’.

3.6.1 *Call Waiting*

Refer to Recommendation I.253, § 1.6.10, interaction with CFNR.

3.6.2 *Call Transfer*

Same as CFU (see § 4).

3.6.3 *Connected Line Identification Presentation*

Same as CFU (see § 4).

3.6.4 *Connected Line Identification Restriction*

Same as CFU (see § 4).

3.6.5 *Calling Line Identification Presentation*

Same as CFU (see § 4).

3.6.6 *Calling Line Identification Restriction*

Same as CFU (see § 4).

3.6.7 *Closed User Group*

Same as CFU (see § 4).

3.6.8 *Conference Calling*

Same as CFU (see § 4).

3.6.9 *Direct-Dialling-In*

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

3.6.10 *Call Diversion (i.e. Call Forwarding) services*

3.6.10.1 *Call Forwarding Busy*

The invocation of CFB takes precedence over CFNR.

3.6.10.2 *Call Forwarding No Reply*

Not applicable.

3.6.10.3 *Call Forwarding Unconditional*

The invocation of CFB takes precedence over CFNR.

3.6.11 *Line Hunting*

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

3.6.12 *Three-Party Service*

Refer to Recommendation I.254, § 2.6.10, interaction with CFNR.

3.6.13 *User-to-User Signalling*

Service 1: A CFNR subscriber who has CFNR activated should not respond by accepting or rejecting a User-to-User Service 1 request until the call is answered. If a call for which User-to-User Service 1 was requested undergoes CFNR, User-to-User Service 1 will not be extended to the forwarded-to user.

Service 2: An outgoing call which meets a called party with CFNR activated cannot use User-to-User Service 2 Service 2 will not be extended to the forwarded-to user.

Service 3: A CFNR subscriber who has CFNR activated should not respond by accepting or rejecting a User-to-User Service 3 request until the call is answered. If a call which User-to-User Service 3 was requested undergoes CFNR, User-to-User Service 3 may be extended to the forwarded-to user if the forwarding party allows it.

3.6.14 *Multiple Subscriber Number*

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

3.6.15 *Call Hold*

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

3.6.16 *Advice of Charge*

Refer to Recommendation I.256, §§ 2.1.6.10, 2.2.6.10, 2.3.6.10, interaction with CFNR.

3.7 *Dynamic description*

Refer to the CFB dynamic description (which covers CFU, CFB, and CFNR) in § 2.

4 I.252.4 — **Call Forwarding Unconditional**

4.1 *Definition*

Call Forwarding Unconditional (CFU) permits a ''served user'' (see § 4.2.2) to have the network send to another number all incoming calls for the served user's ISDN number (or just those associated with a specified basic service). The served user's originating service is unaffected. If this service is activated, calls are forwarded no matter what the condition of the termination. Other Call Forwarding services provide for call forwarding based on condition e.g. Call Forwarding Busy (CFB) and Call Forwarding No Reply (CFNR).

Note — In normal situations, the CFU 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. DDI). In these cases, the CFU service is offered on the basis of the part of the ISDN number which the network can recognize.

4.2 *Description*

4.2.1 *General description*

For a given ISDN number, this 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 Forwarding 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. For multiple access installations, it may be possible for the user to specify, on activation, if the service is applicable to a specific access or all accesses associated with that installation.

The served user can request a different forwarded-to number for each basic service subscription parameter value to which he has subscribed.

An indication that the CFU service is activated on a number may, as an option, be given to the user who has Forwarding activated, each time an outgoing call is made. This may take the form of a special indication in the proceed response.

4.2.2 *Specific terminology*

A *served user* is a user of a particular ISDN number who is requesting that calls to his number be forwarded. This user may also be referred to as the forwarding user or the called user.

A *forwarded-to user* is a user to whom the call shall be forwarded.

4.2.3 *Qualifications on the applicability to telecommunication services*

No restrictions identified.

4.3 *Procedures*

4.3.1 *Provision/withdrawal*

CFU shall be provided after pre-arrangement with the service provider.

The service can be offered with three 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 receives notification that call has been forwarded — No — Yes, with call offering information (see § 4.3.2.2) Calling user receives notification that his call has been forwarded — No — Yes, with or without forwarded-to user number Served user receives notification that CFU is currently activated — No — Yes .bp

4.3.2 *Normal procedures*

4..3.2.1 *ActivationB/FdeactivationB/Fregistration*

If the served user has subscribed to CFU, the served user will use the activation procedure.

To activate CFU, the served user must supply:

1) the forwarded-to number;

2) information as to whether all calls or all calls of a specified basic service should be forwarded;

3) possibly the ISDN number for which CFU should apply.

As a network option, verification of the forwarded-to number should be accomplished, if possible, before accepting the call forwarding request.

When the served user so activates CFU, the service provider will return notification of acceptance or rejection of the request (see Exceptional procedures, § 4.3.3, for a list of possible causes for rejection).

This notification will include the number of the forwarded-to user to whom the call forwarding is active. If a single number can be used by more than one terminal, activation of CFU will be possible from any terminal which uses this number. As a service option, activation/deactivation may be restricted to selected terminals (users) (e.g. by use of a password).

CFU can be deactivated in either of two ways. The user can specifically deactivate the CFU activation. The user can activate CFU for the specified basic service to another number, thus causing the previous invocation of CFU to be overridden.

4.3.2.2 *Invocation and opertion*

The following illustration clarifies the CFU procedures. Assume that A calls B1, who forwards the call to B2, . | | , Bm, . | | , Bx. The final receiver of the call is C.

Figure, (N), p.

4.3.2.2.1 *Served user Bm's perspective*

When CFU is active, all incoming calls will be forwarded without being offered to the served user Bm. When an incoming call is forwarded without being offered to the served user, the served user, as a subscription option, may receive notification of the call forwarding (but will not be able to answer the incoming call). This notification is given as soon as the forwarding attempt is started.

This notification includes the following information (on the call that has been forwarded):

1) indication that a call has been forwarded;

2) telecommunication service information (e.g. bearer capability, higher layer compatibility);

3) user-to-user information;

4) Bm's number;

5) calling party's number A (if CLIP applicable).

If multiple forwardings have occurred and the served user is authorized to receive additional information, he may also receive:

6) originally called number B1;

7) cause for original forwarding;

8) last forwarding number B(m — 1);

9) cause for last forwarding.

4.3.2.2.2 *Forwarded-to user C's perspective*

The forwarded-to User C will receive an indication that call has been forwarded.

As an option he may also receive:

1) originally called number B1;

2) cause for original forwarding;

3) last forwarding number Bx;

4) cause for last forwarding.

(Depending on the use of other supplementary services, the forwarded-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.)

4.3.2.2.3 *Calling user A's perspective*

As a subscription option, the served user Bm can request that the calling user receive a notification that the call has been forwarded and, as an additional subscription option, that notification can include the forwarded-to number B(m+1). Transfer of the forwarded-to user number will not take place if number restrictions at the forwarded-to user exist.

4.3.3 *Exceptional procedures*

4.3.3.1 *Activation/deactivation/registration*

4.3.3.1.1 Call Forwarding Unconditional for all basic services and Call Forwarding of particular basic services cannot be activated simultaneously.

If the system cannot accept an activation request, the served user should receive a notification that Call Forwarding activation was unsuccessful. Possible causes are:

i) service not subscribed;

ii) forwarded-to invalid ISDN number;

iii) use of an operator access prefix;

iv) forwarded-to ISDN number's telecommunication services violate subscribed constraints (e.g. group restrictions);

v) forwarded-to ISDN number is of a free number within the same office (i.e. a number to which no call is chargeable);

vi) insufficient information;

vii) requested telecommunication service is not provided to the forwarded-to ISDN number;

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

ix) forwarded-to number is served user's number.

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

4.3.3.1.2 *Deactivation*

If the user does not specify completely which CFU request is to be deactivated (e.g. the basic service and/or the originator's number), the network will reject the deactivation request with appropriate cause.

If the network cannot accept a user’s request for deactivation, the cause will be returned to the user, e.g. incorrect origination ISDN number used.

If the network deactivates CFU without the served user having requested deactivation (e.g. when an exceptional condition occurs), the served user will receive notification along with the cause.

4.3.3.2 *Invocation and operation*

Call forwarding applies only to subscribed basic services. Calls to an ISDN number requesting a basic service which is not subscribed to, will never be forwarded.

Within an ISDN, or tandem ISDNs, the total number of all forwardings for each call should be limited. The maximum number of such connections should be limited to a value between 3 and 5 for each call. This is to prevent infinite looping.

If the limit is reached and an attempt is made to forward the call an additional time, then the forwarded call shall be treated as follows:

If the forwarded call cannot be completed to the forwarded-to destination, then the network will clear the forwarded leg of the call. Specifically, if CFU has been invoked, then the call would be cleared back towards the calling user. If the call has not previously undergone CFNR, the call will be cleared all the way back to the calling user and the calling user will be informed that no user is responding. If the call has previously undergone CFNR the call will only be cleared back as far as the CFNR exchange and the calling user will, in case of a telephony call, continue to receive inband ringing tone.

4.3.4 *Alternative procedures*

4.3.4.1 *Activation/deactivation/registration*

None identified.

4.3.4.2 *Invocation and operation*

None identified.

4.4 *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.

4.5 *Interworking requirements*

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

If a forwarded call meets an interworking situation, then an interworking indication should be sent to the calling party.

Note — The number of times a call has been forwarded once it has exited the Common Channel Signalling (CCS) network, cannot be limited by the CCS network.

4.6 *Interaction with other supplementary services*

4.6.1 *Call Waiting*

Calling user: No impact i.e. neither supplementary service affects the operation of the other supplementary service.

Called user: If a called user has activated CFU, then execution of that forwarding condition takes precedence over Call Waiting. CFU can be activated while a call is waiting without changing the state of the waiting call.

Forwarded-to user: A forwarded call can invoke Call Waiting.

4.6.2 *Call Transfer*

4.6.2.1 *Transfer of a Forwarded Call*

Calling user: A call which has been forwarded can be transferred by the calling user.

Called user: No impact i.e. neither supplementary service affects the operation of the other supplementary service.

Forwarded-to user: A call that has been transferred will be forwarded if the transferred-to user has CFU active and the appropriate forwarding conditions are met. A call which has been forwarded can by transferred by the forwarded-to user.

4.6.2.2 *Forwarding of a Call During Transfer*

A call which is being transferred can be forwarded by the party to whom the call is being transferred.

4.6.3 *Connected Line Identification Presentation*

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

4.6.4 *Connected Line Identification Restriction*

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

4.6.5 *Calling Line Identification Presentation*

Called user: If subscribed to, the called user can receive the Calling Line Identification of all calls which have been forwarded.

Forwarded-to user: Forwarded-to users having subscribed to CLIP may receive the calling user's number. If subscribed to by the called user, the forwarded-to user may receive the called user's number when a call has been forwarded.

Forwarded-to users who have subscribed to CLIP may receive the calling user's number if the calling user has not subscribed/invoked CLIR. In addition, forwarded-to users subscribing to CLIP may also receive the original called user's number and the last forwarding user's number if neither has subscribed/invoked CLIR (e.g. if A calls B1 who forwards A to B2 who forwards A to B3 who forwards A to C, then C will receive A, B1 and B3's number, unless A, B1 and B3 have restricted delivery).

4.6.6 *Calling Line Identification Restriction*

Calling user: When the CLIR is applicable and activated, the Calling Line Identification will not be presented to the forwarded-to user unless both the forwarding and forwarded-to users are in the override category. In addition, if the forwarding user is in an override category, the calling party's number will be provided in the call offering information. The latter is a national option.

4.6.7 *Closed User Group*

CUG restrictions must be met on each leg of the call. In addition, CUG restrictions must be met end-to-end. In the case of multiple forwarding, CUG restrictions have to be met in addition at each intermediate forwarding point.

Called user/forwarded-to user: When a call is forwarded, a new check of the CUG restrictions is made at the ‘‘forwarded-to’’ destination. The CUG information sent to the ‘‘forwarded to’’ destination is the same CUG information that was sent from the originating network.

Forwarding (i.e. called) user: Call forwarding can only be activated if CUG restrictions between the forwarding user and the forwarded-to user are met.

4.6.8 *Conference Calling*

Calling user: If a conference controller attempts to establish a conference call and calls a user with call forwarding active, the forwarded-to user will be alerted and can be added to the conference.

Called user: No impact i.e. neither supplementary service affects the operation of the other supplementary service.

Forwarded-to user: A forwarded-to user can establish a conference using an existing forwarded call as one of the conference connections.

A call, which has been forwarded, can be added to an existing conference by the forwarded-to user.

4.6.9 *Direct-Dialling-In*

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

4.6.10 *Call Diversion (i.e. Call Forwarding) services*

4.6.10.1 *Call Forwarding Busy*

The invocation of CFU takes precedence over CFB.

4.6.10.2 *Call Forwarding No Reply*

The invocation of CFU takes precedence over CFNR.

4.6.10.3 *Call Forwarding Unconditional*

Not applicable.

4.6.11 *Line Hunting*

Calling user: No impact i.e. neither supplementary service affects the operation of the other supplementary service.

Called user: Call Forwarding may be assignable to all or part of the hunting group. When forwarding is only required on part of the hunting group the forwarding customer must specify, at activation, which access the service is to be invoked from. Procedures for the operation of this service in association with part of a hunt group need to be completed. In general, CFU takes precedence over Line Hunting.

Forwarded-to user: Forwarded calls will be treated as normal calls when completing to a multi-line group user.

4.6.12 *Three-Party Service*

Refer to Recommendation I.254, § 2.6.10, interaction with CFU.

4.6.13 *User-to-User Signalling (UUS)*

Call originated by a user with CFU activated: Since CFU does not affect the forwarding user's ability to make outgoing calls, a user with CFU activated can send and receive user-to-user information (UUI) in association with an ongoing call or at the set-up of a new call.

Call incoming to a user with CFU activated:

During forwarding: Any UUI which accompanies the set-up of the call will be forwarded along with the forwarded call if both the calling and forwarding (i.e. called) parties have subscribed to service 1.

After forwarding: If the calling party has requested UUS service(s) 1, 2 and/or 3 in his initial call set-up, and if the fowarding (i.e. called) party has subscribed to the same service(s), then that service (those services) will automatically be extended so that they are available for use between the calling party and the forwarded-to party. If the forwarding party does not subscribe to the same service (set of services), the calling party will be informed that he can no longer employ the service(s) on this call.

4.6.14 *Multiple Subscriber Number*

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

4.6.15 *Call Hold*

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

4.6.16 *Advice of Charge*

Refer to Recommendation I.256, §§ 2.1.6.10, 2.2.6.10, 2.3.6.10.

4.7 *Dynamic description*

Refer to CFB dynamic description (which covers CFB, CFNR and CFU) in § 2.

5 I.252.5 — **Call Deflection**

This service, having been identified, now requires further study; its description is not yet included.

6 I.252.6 — **Line Hunting**

6.1 *Definition*

Line Hunting is a supplementary service which enables incoming calls to a specific ISDN number to be distributed over a group of interfaces.

Note — Development of Line Hunting to cover the case of hunting on available ISDN numbers, or addresses, rather than on interfaces is a possible extension of the service.

6.2 *Description*

6.2.1 *General description*

The interfaces selected for Line Hunting may be contained within one node, or may encompass more than one node.

It is the responsibility of the user to provide terminals to his interfaces for effective operation of the service. The problem of terminal compatibility in the Line Hunting supplementary service is also the responsibility of the user of the service.

6.2.2 *Specific terminology*

The following specific terminology is used to describe the possible selection method:

Sequential hunting — A sequential search is conducted over the members of the group in a fixed pre-specified order

Uniform distribution — An equal distribution of calls is provided to idle members of the group

The actual algorithm for each hunting method is a network provider option.

Note — The status of an individual channel may be included in the selection criteria above.

The selection of an interface is based on the availability of information channels rather than on the NDUB status. As part of each applicable bearer service or teleservice, there is already an option specifying the maximum number of information channels which can be used on the interface for each ISDN number, all ISDN numbers or subsets of ISDN numbers.

6.2.3 *Qualifications on the applicability to telecommunication services*

This supplementary service is considered meaningful when applied to the speech and 3.1 kHz audio bearer services and to the Telephony teleservice. Furthermore, it may also be meaningful when applied to other services.

6.3 *Procedures*

6.3.1 *Provision/withdrawal*

Line Hunting is offered, with possible subscription options, as a service to the called party and applied to an ISDN number. For each subscription the following are specified:

Subscription options	*Values*
Selected Method	— Sequential — Uniform
Members	— List of 2 or more interfaces

6.3.2 *Normal procedures*

6.3.2.1 *Activation/deactivation/registration*

Line Hunting is activated on provision and deactivated on withdrawal.

6.3.2.2 *Invocation and operation*

An incoming call to an ISDN number on which Line Hunting is in operation will be offered to a specific available interface in a pre-defined manner. The selection of the specified interface may provide for a uniform distribution of calls or sequential distribution of calls.

The method of selecting the interface may be either Sequential Hunting or Uniform Distribution. The selection algorithm may include reference to the channel status.

Once an interface has been selected, normal call set-up procedures apply and Line Hunting procedures are considered complete.

Outgoing calls from a Line Hunting Group are unaffected by this service.

6.3.3 *Exceptional procedures*

6.3.3.1 *Activation/deactivation/registration*

None identified.

6.3.3.2 *Invocation and operation*

If no interface is available, the Line Hunting service is unsuccessful and a busy indication is returned to the calling subscriber.

If no compatible terminal on a selected interface responds, no further line hunting action is provided and the call is released in the normal manner.

If the offered call is rejected at an interface, the call is released with normal procedures. No further hunting is provided.

6.3.4 *Alternative procedures*

6.3.4.1 *Activation/deactivation/registration*

None identified.

6.3.4.2 *Invocation and operation*

None identified.

6.4 *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.

6.5 *Interworking requirements*

The possibility of a line hunting group including both ISDN and non-ISDN interfaces for a particular Line Hunting service should be considered. This is for futher study.

6.6 *Interaction with other supplementary services*

6.6.1 *Call Waiting*

The Call Waiting service should not be provided to a line in a hunt group.

6.6.2 *Call Transfer*

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

6.6.3 *Connected Line Identification Presentation*

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

6.6.4 *Connected Line Identification Restriction*

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

6.6.5 *Calling Line Identification Presentation*

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

6.6.6 *Calling Line Identification Restriction*

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

6.6.7 *Closed User Group*

When a free line of a Line Hunting Group has been found, any CUG restrictions must be met before the connection will be established.

6.6.8 *Conference Calling*

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

6.6.9 *Direct-Dialling-In*

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

6.6.10 *Call Diversion (i.e. Call Forwarding) services*

6.6.10.1 *Call Forwarding Busy (CFB)*

If the outcome of the Line Hunting supplementary service is unsuccessful (see § 6.3.3.2 above), CFB may be invoked.

6.6.10.2 *Call Forwarding No Reply*

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

6.6.10.3 *Call Forwarding Unconditional*

When the CUF and Line Hunting supplementary services are both subscribed to on the same ISDN number, the CFU supplementary service takes priority. Further information is contained in the CUF definition in § 4.

6.6.11 *Line Hunting*

Not relevant.

6.6.12 *Three-Party Service*

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

6.6.13 *User-to-User Signalling*

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

6.6.14 *Multiple Subscriber Number*

For further study.

6.6.15 *Call Hold*

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

6.6.16 *Advice of Charge*

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

6.7 *Dynamic description*

The dynamic description of this service is contained in Figure 6/I.252.

Figure 6/I.252, (N), p.