

# INTERNATIONAL STANDARD

**ISO/IEC**  
**15053**

First edition  
1997-05-15

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## **Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Call interception additional network feature**

*Technologies de l'information — Télécommunications et échange  
d'information entre systèmes — Réseau privé à intégration de services —  
Spécification, modèle fonctionnel et flux d'informations — Facilité de réseau  
additionnelle d'interception d'appel*



Reference number  
ISO/IEC 15053:1997  
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## Contents

|                                                                     |    |
|---------------------------------------------------------------------|----|
| Foreword                                                            | iv |
| Introduction                                                        | v  |
| 1 Scope                                                             | 1  |
| 2 Conformance                                                       | 1  |
| 3 Normative references                                              | 1  |
| 4 Definitions                                                       | 2  |
| 4.1 External definitions                                            | 2  |
| 4.2 Other definitions                                               | 2  |
| 5 List of acronyms                                                  | 3  |
| 6 ANF-CINT stage 1 specification                                    | 3  |
| 6.1 Description                                                     | 3  |
| 6.1.1 General description                                           | 3  |
| 6.1.2 Qualifications on applicability to telecommunication services | 3  |
| 6.2 Procedures                                                      | 3  |
| 6.2.1 Provision/withdrawal                                          | 3  |
| 6.2.2 Normal procedures                                             | 4  |
| 6.2.3 Exceptional procedures                                        | 5  |
| 6.3 Interactions with other supplementary services and ANFs         | 5  |
| 6.3.1 Calling Line Identification Presentation (CLIP)               | 5  |
| 6.3.2 Connected Line Identification Presentation (COLP)             | 5  |
| 6.3.3 Calling/Connected Line Identification Restriction (CLIR)      | 5  |
| 6.3.4 Calling Name Identification Presentation (CNIP)               | 5  |
| 6.3.5 Connected Name Identification Presentation (CONP)             | 5  |
| 6.3.6 Calling/Connected Name Identification Restriction (CNIR)      | 5  |
| 6.3.7 Call Diversion (CFU, CFB, CFNR, CD)                           | 5  |
| 6.3.8 Do Not Disturb (DND)                                          | 5  |
| 6.3.9 Do Not Disturb Override (DNDO)                                | 5  |
| 6.3.10 Call Completion to Busy Subscriber (CCBS)                    | 6  |
| 6.3.11 Call Completion on No Reply (CCNR)                           | 6  |
| 6.3.12 Call Offer (CO)                                              | 6  |
| 6.3.13 Call Intrusion (CI)                                          | 6  |
| 6.3.14 Call Transfer (CT)                                           | 6  |
| 6.3.15 Path Replacement (PR)                                        | 6  |
| 6.3.16 Advice Of Charge (AOC/S/D/E)                                 | 6  |
| 6.3.17 Recall (RE)                                                  | 6  |

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Printed in Switzerland

|                                                                                |           |
|--------------------------------------------------------------------------------|-----------|
| <b>6.4 Interworking considerations</b>                                         | <b>6</b>  |
| <b>6.5 Overall SDL</b>                                                         | <b>6</b>  |
| <b>7 ANF-CINT stage 2 specification</b>                                        | <b>11</b> |
| <b>7.1 Functional model</b>                                                    | <b>11</b> |
| <b>7.1.1 Functional model description</b>                                      | <b>11</b> |
| <b>7.1.2 Description of functional entities</b>                                | <b>11</b> |
| <b>7.1.3 Relationship of functional model to basic call functional model</b>   | <b>12</b> |
| <b>7.2 Information flows</b>                                                   | <b>12</b> |
| <b>7.2.1 Definition of information flows</b>                                   | <b>12</b> |
| <b>7.2.2 Relationship of information flows to basic call information flows</b> | <b>18</b> |
| <b>7.2.3 Information flow sequences</b>                                        | <b>19</b> |
| <b>7.3 Functional entity actions</b>                                           | <b>26</b> |
| <b>7.3.1 Functional entity actions of FE1</b>                                  | <b>26</b> |
| <b>7.3.2 Functional entity actions of FE2</b>                                  | <b>26</b> |
| <b>7.3.3 Functional entity actions of FE3</b>                                  | <b>26</b> |
| <b>7.3.4 Functional entity actions of FE4</b>                                  | <b>27</b> |
| <b>7.3.5 Functional entity actions of FE5</b>                                  | <b>27</b> |
| <b>7.3.6 Functional entity actions of FE6</b>                                  | <b>27</b> |
| <b>7.4 Functional entity behaviour</b>                                         | <b>27</b> |
| <b>7.4.1 Behaviour of FE1</b>                                                  | <b>27</b> |
| <b>7.4.2 Behaviour of FE2</b>                                                  | <b>28</b> |
| <b>7.4.3 Behaviour of FE3</b>                                                  | <b>29</b> |
| <b>7.4.4 Behaviour of FE4</b>                                                  | <b>31</b> |
| <b>7.4.5 Behaviour of FE5</b>                                                  | <b>32</b> |
| <b>7.4.6 Behaviour of FE6</b>                                                  | <b>34</b> |
| <b>7.5 Allocation of functional entities to physical equipment</b>             | <b>35</b> |
| <b>7.6 Interworking considerations</b>                                         | <b>36</b> |

## Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 15053 was prepared by ECMA (as ECMA-220) and was adopted, under a special “fast-track procedure”, by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in parallel with its approval by national bodies of ISO and IEC.

## Introduction

This International Standard is one of a series of standards defining services and signalling protocols applicable to Private Integrated Services Networks. The series uses the ISDN concepts as developed by ITU-T (formerly CCITT) and is also within the framework of standards for open systems interconnection as defined by ISO.

This International Standard specifies the Call Interception additional network feature.

The International Standard is based upon the practical experience of ECMA member companies and the results of their active and continuous participation in the work of ISO/IEC JTC 1, ITU-T, ETSI and other international and national standardization bodies. It represents a pragmatic and widely based consensus.

There is currently no equivalent service specified by ITU-T or ETSI for public ISDNs.

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# Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call interception additional network feature

## 1 Scope

This International Standard specifies Additional Network Feature Call Interception (ANF-CINT), which is applicable to various basic services supported by Private Integrated Services Networks (PISN). Basic services are specified in ISO/IEC 11574.

ANF-CINT is an additional network feature which enables calls that cannot be completed due to certain conditions to be redirected to a pre-defined intercepted-to user.

ANF specifications are produced in three stages, according to the method described in CCITT Rec. I.130. This International Standard contains the stage 1 and stage 2 specifications of ANF-CINT. The stage 1 specification (clause 6) specifies the feature as seen by users of PISNs. The stage 2 specification (clause 7) identifies the functional entities involved in the feature and the information flows between them.

## 2 Conformance

In order to conform to this International Standard, a stage 3 standard shall specify signalling protocols and equipment behaviour that are capable of being used in a PISN which supports the feature specified in this International Standard. This means that, to claim conformance, a stage 3 standard is required to be adequate for the support of those aspects of clause 6 (stage 1) and clause 7 (stage 2) which are relevant to the interface or equipment to which the stage 3 standard applies.

## 3 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below. Members of IEC and ISO maintain registers of currently valid International Standards.

- |                        |                                                                                                                                                                                                                                                  |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISO/IEC 11571:1994,    | <i>Information technology - Telecommunications and information exchange between systems - Numbering and sub-addressing in private integrated services networks.</i>                                                                              |
| ISO/IEC 11574:1994,    | <i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit-mode 64 kbit/s bearer services - Service description, functional capabilities and information flows.</i> |
| ISO/IEC 11579-1:1994,  | <i>Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Part 1: Reference configuration for PISN Exchanges (PINX).</i>                                                   |
| CCITT Rec. I.112:1988, | <i>Vocabulary of terms for ISDNs.</i>                                                                                                                                                                                                            |
| CCITT Rec. I.130:1988, | <i>Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN.</i>                                                                                                                   |
| CCITT Rec. I.210:1988, | <i>Principles of telecommunication services supported by an ISDN and the means to describe them.</i>                                                                                                                                             |
| CCITT Rec. I.221:1988, | <i>Common specific characteristics of services.</i>                                                                                                                                                                                              |
| CCITT Rec. Z.100:1988, | <i>Specification and description language.</i>                                                                                                                                                                                                   |

## 4 Definitions

For the purposes of this International Standard, the following definitions apply.

### 4.1 External definitions

This International Standard uses the following terms defined in other documents:

|                                                       |                    |
|-------------------------------------------------------|--------------------|
| – Basic Service                                       | (CCITT Rec. I.210) |
| – Connection                                          | (CCITT Rec. I.112) |
| – Network Determined User Busy                        | (CCITT Rec. I.221) |
| – Private Integrated Services Network (PISN)          | (ISO/IEC 11579-1)  |
| – Private Integrated Services Network Exchange (PINX) | (ISO/IEC 11579-1)  |
| – PISN Number                                         | (ISO/IEC 11571)    |
| – Service                                             | (CCITT Rec. I.112) |
| – Signalling                                          | (CCITT Rec. I.112) |
| – Supplementary Service                               | (CCITT Rec. I.210) |
| – User Determined User Busy                           | (CCITT Rec. I.221) |
| – User (except in the context of ANF-CINT user)       | (ISO/IEC 11574)    |

This International Standard refers to the following basic call functional entities (FEs) defined in ISO/IEC 11574:

- Call Control (CC)
- Call Control Agent (CCA).

This International Standard refers to the following basic call inter-FE relationships defined in ISO/IEC 11574:

- r1
- r2
- r3

This International Standard refers to the following basic call information flows defined in ISO/IEC 11574:

- Disconnect request/indication
- Setup request/indication
- Setup response/confirmation
- Report request/indication
- Release request/indication

### 4.2 Other definitions

**Additional Network Feature** : A capability, over and above that of a basic service, provided by a PISN, but not directly to a PISN user.

**ANF-CINT user** : An entity, within a PISN, that requests ANF-CINT.

**busy** : A property of a user for whom either a Network Determined User Busy or a User Determined User Busy condition exists.

**call, basic call** : An instance of the use of a basic service.

**called user** : The user to which a call is directed prior to invocation of ANF-CINT.

**intercepted-to user** : The user to which the intercepted call is directed.

**interception cause** : A condition that can lead to call interception.

**interception delayed** : The redirection of a call to an alternative destination as a result of remaining too long in an alerting or waiting on busy state.

**interception immediate** : The redirection of a call to an alternative destination as a result of detecting a condition that prevents the call reaching an alerting or waiting on busy state.

**waiting on busy** : A call state in which a call is awaiting answer at a user that is busy on another call.

Note - This can arise, for example, as a result of the use of supplementary service Call Offer (SS-CO) during call establishment. A call that is waiting on busy can be transferred.

## 5 List of acronyms

|          |                                                     |
|----------|-----------------------------------------------------|
| ANF      | Additional Network Feature                          |
| ANF-CINT | Additional Network Feature Call Interception        |
| CC       | Call Control (functional entity)                    |
| CCA      | Call Control Agent (functional entity)              |
| CD       | Call Deflection                                     |
| CFB      | Supplementary Service Call Forwarding Busy          |
| CFNR     | Supplementary Service Call Forwarding No Reply      |
| CFU      | Supplementary Service Call Forwarding Unconditional |
| CLIR     | Calling/Connected Line Identification Restriction   |
| CNIP     | Calling Name Identification Presentation            |
| CNIR     | Calling/Connected Name Identification Restriction   |
| FE       | Functional Entity                                   |
| ISDN     | Integrated Services Digital Network                 |
| PINX     | Private Integrated Services Network Exchange        |
| PISN     | Private Integrated Services Network                 |
| SDL      | Specification and Description Language              |
| SS       | Supplementary Service                               |
| TE       | Terminal Equipment                                  |

## 6 ANF-CINT stage 1 specification

### 6.1 Description

#### 6.1.1 General description

ANF-CINT is invoked by an ANF-CINT user for an unanswered or unsuccessful call, allowing the call to be routed to a special destination in the PISN. The special destination may be dependent on the interception cause.

The conditions leading to invocation of ANF-CINT are considered as implementation options. Examples of factors that can be taken in account are:

- the source of the call (e.g., the geographic location of the calling user, the network from which the call has entered the PISN);
- the particular interception cause;
- the type of connection (e.g. the originating user is an attendant);
- the call destination;
- time of the day.

#### 6.1.2 Qualifications on applicability to telecommunication services

Call Interception is applicable to all basic services defined in ISO/IEC 11574.

### 6.2 Procedures

#### 6.2.1 Provision/withdrawal

ANF-CINT shall be PISN instigated. The conditions under which interception is invoked shall be an implementation matter. Also, parameters and values offered by a PISN shall be an implementation matter. A PISN may offer more or less parameters than the one specified below.

Parameters may apply separately to each different condition for which interception is to be invoked.

| Parameter                    | Value         |
|------------------------------|---------------|
| Intercepted-to number (Note) | - PISN number |

Note - This parameter is not needed for conditions where the intercepted-to number is determined on a call by call basis e.g. the number of the user that transferred the call.

## 6.2.2 Normal procedures

### 6.2.2.1 Activation/deactivation/registration/interrogation

The feature shall be permanently activated.

Registration and interrogation shall not apply.

### 6.2.2.2 Invocation and operation

ANF-CINT shall be invoked for a call if a certain condition, determined by the PISN implementation, is met. Also the parameters with the invocation request shall be determined by the PISN implementation. Examples of interception causes include:

- timeout in waiting on busy condition
- busy user
- closed user group rejection
- do not disturb activated
- incoming barred destination
- invalid number
- no compatible user at destination
- network congestion
- no reply (i.e. timeout during alerting)
- called user access out of service
- route restriction (i.e. calling user not authorized for the route)
- timeout in waiting on busy condition after transfer
- no reply after transfer (i.e. timeout during alerting after transfer)
- upper limit of number of diversions reached
- upper limit of transit counter reached
- mobile user location not known
- mobile user no longer registered
- mobile terminal not responding
- invalid call diversion destination
- timeout after call hold.

On acceptance of invocation of ANF-CINT, the PISN shall perform redirection towards the intercepted-to user. If interception is invoked because of detecting a condition that prevents the call reaching an alerting or waiting on busy state (interception immediate) the PISN shall complete the release of the call towards the called user immediately. If interception is invoked as a result of remaining too long in an alerting or waiting on busy state (interception delayed) the PISN shall not release the call towards the called user until the call to the intercepted-to user enters an alerting or waiting on busy state. The called user can accept the call during this period.

As an implementation option for interception delayed, the PISN may retain the call towards the called user until the intercepted-to user answers the call. Further procedures in this case are outside the scope of this International Standard.

#### 6.2.2.2.1 Intercepted-to user notification

The intercepted-to user shall be given a notification that the call has been intercepted. This notification shall include:

- the interception cause,
- the called user number/name if available.

#### 6.2.2.2.2 Calling user notifications

The calling user shall be given the notification that the call has been intercepted with the appropriate interception cause. In case of multiple call interceptions, the calling user shall be notified of the first interception and of any subsequent interceptions from intercepted-to users at which an alerting or waiting on busy state has been reached.

For single interception, the intercepted-to user's number and, if available, the intercepted-to user's name shall be sent to the calling user if CLIR/CNIR is not invoked by the intercepted-to user.

For multiple interception, the number and, if available, name of the final intercepted-to user shall be sent to the calling user if CLIR and CNIR respectively has not been invoked by the final intercepted-to user. In addition, if an alerting or waiting on busy

state is reached at an intermediate intercepted-to user the number and, if available, name of that intercepted-to user may be sent to the calling user if there is no possibility of CLIR and CNIR respectively being invoked by that intercepted-to user.

### **6.2.3 Exceptional procedures**

#### **6.2.3.1 Activation/deactivation/registration/interrogation**

Not applicable.

#### **6.2.3.2 Invocation and operation**

If the number of the intercepted-to user is unavailable (e.g. due to number presentation restriction or interworking), the user who would have been given the number shall receive an indication of the reason why no number is given.

In the case of interception delayed, if the intercepted call cannot be completed to the intercepted-to user, then the PISN shall clear the intercepted-to leg of the call and continue to alert or wait on busy at the called user. In this case the calling user shall not be given any notification.

In the case of interception immediate, if the intercepted call cannot be completed to the intercepted-to user, then the PISN shall clear the call, unless it is able to redirect the call to a new intercepted-to user. If the call is cleared, the calling user shall be sent an indication that the call has been intercepted.

### **6.3 Interactions with other supplementary services and ANFs**

Interactions with other supplementary services and ANFs for which PISN standards were available at the time of publication of this International Standard are specified below.

#### **6.3.1 Calling Line Identification Presentation (CLIP)**

No interaction.

#### **6.3.2 Connected Line Identification Presentation (COLP)**

No interaction.

#### **6.3.3 Calling/Connected Line Identification Restriction (CLIR)**

An intercepted-to user which has invoked CLIR shall not have its number presented to the calling user, as part of a notification of interception, unless the calling user has an override service profile. An intercepted-to user which is provided with CLIR 'temporary mode' shall not have its identity revealed to the calling user as part of a notification of interception until the intercepted-to user has responded and it is known that restriction is not to be invoked, unless the calling user has an override service profile.

#### **6.3.4 Calling Name Identification Presentation (CNIP)**

No interaction.

#### **6.3.5 Connected Name Identification Presentation (CONP)**

No interaction.

#### **6.3.6 Calling/Connected Name Identification Restriction (CNIR)**

An intercepted-to user which has invoked CNIR shall not have its name presented to the calling user, as part of a notification of interception, unless the calling user has an override service profile. An intercepted-to user which is provided with CNIR 'temporary mode' shall not have its name revealed to the calling user as part of a notification of interception until the intercepted-to user has responded and it is known that restriction is not to be invoked, unless the calling user has an override service profile.

#### **6.3.7 Call Diversion (CFU, CFB, CFNR, CD)**

If the call has been diverted before invocation of interception, the diversion indication and the number and name of the original called user, if available and not restricted, shall also be presented to the intercepted-to user.

If the call is diverted after it has been intercepted, the intercepted-to user notification shall be presented to the diverted-to user.

#### **6.3.8 Do Not Disturb (DND)**

No interaction.

#### **6.3.9 Do Not Disturb Override (DNDO)**

No interaction.

### 6.3.10 Call Completion to Busy Subscriber (CCBS)

If a call is intercepted and the final intercepted-to user is busy, then a SS-CCBS request made by the calling user shall be applied to the intercepted-to user.

Interception immediate shall not apply to a call resulting from the use of SS-CCBS.

### 6.3.11 Call Completion on No Reply (CCNR)

If a call is intercepted, and the final intercepted-to user does not answer, then a SS-CCNR request from the calling user shall be applied to the intercepted-to user.

Interception immediate shall not apply to a call resulting from the use of SS-CCNR.

### 6.3.12 Call Offer (CO)

**CO against the called user:** If the PISN invokes SS-CO automatically because of the service profile of the calling user or the calling user invokes SS-CO as part of initial call set up, then call interception on busy user shall not apply. In all other cases call interception on a busy user can apply, in which case SS-CO shall not apply.

**CO against the intercepted-to user:** If a call is intercepted and the intercepted-to user is busy, then if a SS-CO request is received it shall apply to the intercepted-to user.

Interception with cause "waiting on busy not answered" can occur after successful invocation of SS-CO.

### 6.3.13 Call Intrusion (CI)

**CI against the called user:** If the calling user invokes SS-CI as part of initial call set up, then call interception on busy user shall not apply. In all other cases call interception on a busy user can apply, in which case call intrusion SS-CI shall not apply.

**CI against the intercepted-to user:** If a call is intercepted and the intercepted-to user is busy then, if an SS-CI request is received, it shall be applied to the intercepted-to user.

### 6.3.14 Call Transfer (CT)

A call resulting from transfer can be subject to interception if it continues to alert or wait on busy at the called user without reply.

### 6.3.15 Path Replacement (PR)

No interaction.

### 6.3.16 Advice Of Charge (AOC/S/D/E)

If a call is subject to interception, then the intercepted call can be a charged call.

The invocation of SS-AOC-S/D/E at the time of call establishment by or on behalf of the calling user shall apply to the intercepted call.

### 6.3.17 Recall (RE)

A call redirected as a result of SS-RE may be subject to interception.

Note - ANF-CINT can be used instead of SS-RE, e.g. in case of transfer by rerouting.

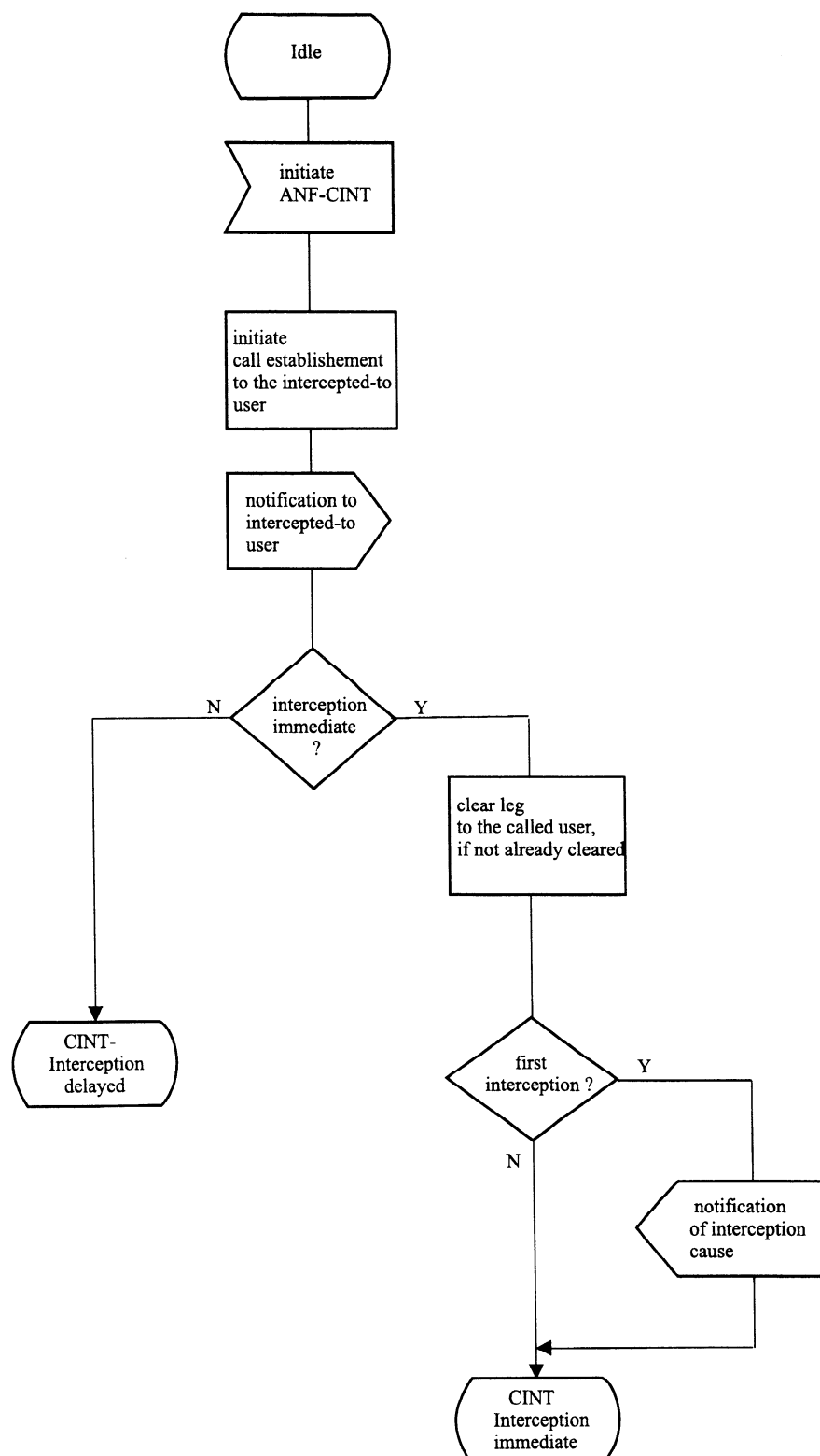
## 6.4 Interworking considerations

When interworking with another network which supports an equivalent feature, it may be possible to cooperate with the other network in order to provide ANF-CINT.

## 6.5 Overall SDL

Figure 1 contains the dynamic description of ANF-CINT using the Specification and Description Language (SDL) defined in CCITT Rec. Z.100 (1988). The SDL process represents the behaviour of the network in providing ANF-CINT. The relationship of this process to the basic call process is indicated in the annotations.

Output signals to the left represent primitives to the calling user. Output signals to the right represent primitives to the intercepted-to user. Input signals from the left represent internal stimuli and primitives from the ANF-CINT user.



96-0132-A

Figure 1 - ANF-CINT, overall SDL (part 1)

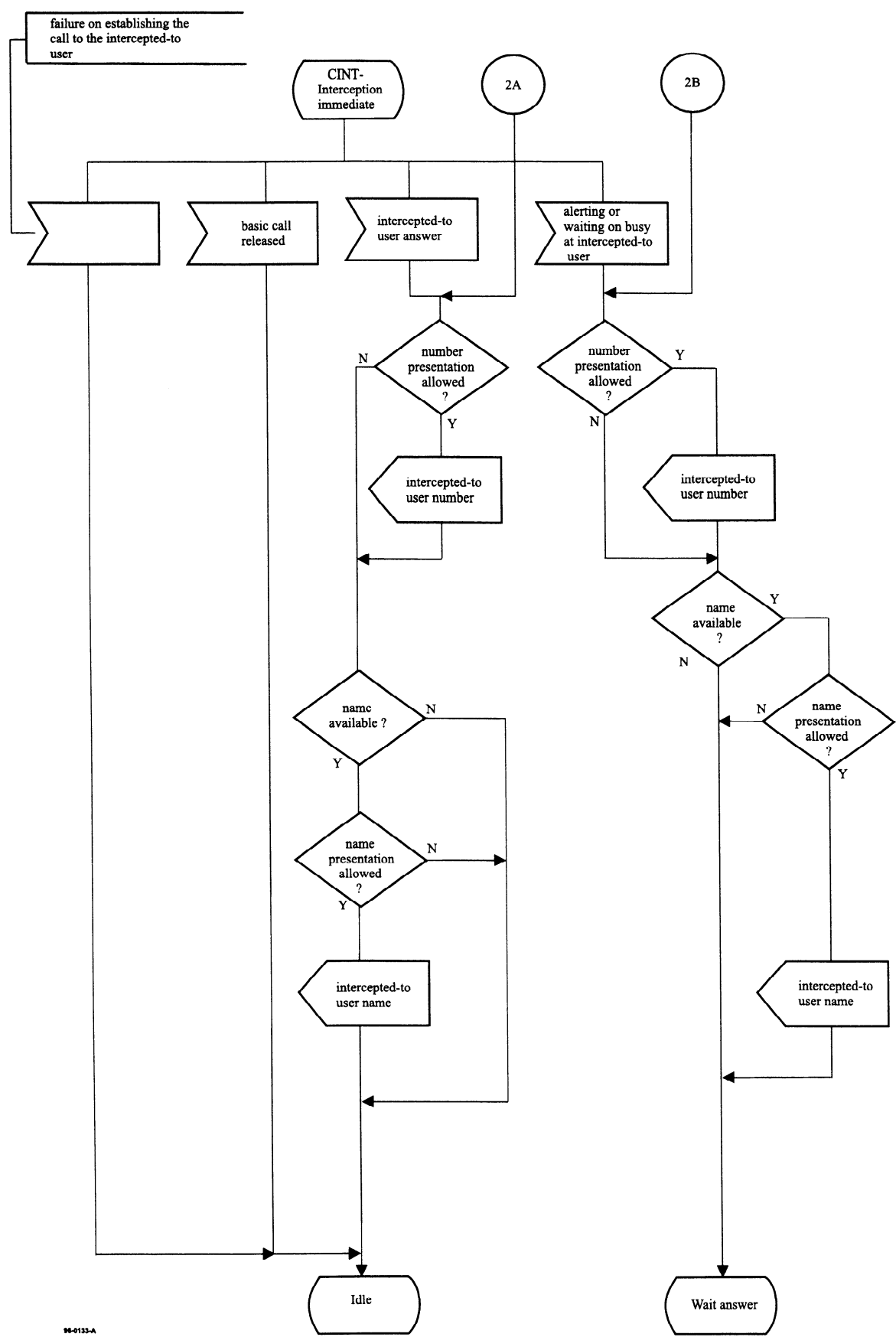


Figure 1 - ANF-CINT, overall SDL (part 2)