INTERNATIONAL STANDARD

# ISO/IEC 15054

First edition
1997-05-15

# Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Call interception additional network feature



*Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseau privé à intégration de services — Protocole de signalisation d'interéchange — Facilité de réseau additionnelle d'interception d'appel*



Reference number
ISO/IEC 15054:1997(E)

## Contents

## 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 15054 was prepared by ECMA (as ECMA-221) 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.



Annex A forms an integral part of this International Standard. Annexes B, C and D are for information only.

## 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 signalling protocol for use at the Q reference point in support of 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 has been produced under ETSI work item DE/ECMA-00103. It represents a pragmatic and widely based consensus.

This page intentionally left blank

# Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call interception additional network feature

## 1 Scope

This International Standard specifies the signalling protocol for the support of the additional network feature Call Interception (ANF-CINT) at the Q reference point between Private Integrated Services Network Exchanges (PINX) connected together within a Private Integrated Services Network (PISN).

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

The Q reference point is defined in ISO/IEC 11579-1.

Service specifications are produced in three stages and according to the method specified in CCITT Recommendation I.130. This International Standard contains the stage 3 specification for the Q reference point and satisfies the requirements identified by the stage 1 and stage 2 specifications in ISO/IEC 15053.

The signalling protocol for ANF-CINT operates on top of the signalling protocol for basic circuit switched call control, as specified in ISO/IEC 11572, and uses certain aspects of the generic procedures for the control of supplementary services specified in ISO/IEC 11582.

This International Standard also specifies additional signalling protocol requirements for the support of interactions at the Q reference point between ANF-CINT and other supplementary services and ANFs.



Note - Additional interactions that have no impact on the signalling protocol at the Q reference point can be found in the relevant stage 1 specifications.

This International Standard is applicable to PINXs which can interconnect to form a PISN.



## 2 Conformance

In order to conform to this International Standard, a PINX shall satisfy the requirements identified in the Protocol Implementation Conformance Statement (PICS) proforma in annex A.

Conformance to this International Standard includes conforming to those clauses that specify protocol interactions between ANF-CINT and other supplementary services and ANFs for which signalling protocols at the Q reference point are supported in accordance with the stage 3 standards concerned.

## 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 11572:1997, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Circuit mode bearer services - Inter-exchange signalling procedures and protocol.*

ISO/IEC 11574:1994, *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.*

ISO/IEC 11579-1:1994, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Part 1: Reference configuration for PISN Exchanges (PINX).*

ISO/IEC 11582:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Generic functional protocol for the support of supplementary services - Inter-exchange signalling procedures and protocol.*

ISO/IEC 13868:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Name identification supplementary services.*

ISO/IEC 13869:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call transfer supplementary service.*

ISO/IEC 13870:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call completion supplementary services.*

ISO/IEC 13873:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call diversion supplementary services.*

ISO/IEC 15050:1997, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Advice of charge supplementary services.*

ISO/IEC 15052:1997, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Recall supplementary service.*

CCITT Rec. I.112:1988, *Vocabulary of terms for ISDNs.*

CCITT Rec. I.130:1988, *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN.*

CCITT Rec. I.210:1988, *Principles of telecommunication services supported by an ISDN and the means to describe them.*

CCITT Rec. Z.100:1988, *Specification and description language.*



## 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:

- Application Protocol Data Unit (APDU) (ISO/IEC 11582)
- Basic Service (CCITT Rec. I.210)
- Call, Basic Call (ISO/IEC 11582)
- End PINX (ISO/IEC 11582)
- Incoming Gateway PINX (ISO/IEC 11572)
- Outgoing Gateway PINX (ISO/IEC 11572)
- Originating PINX (ISO/IEC 11572)
- Preceding PINX (ISO/IEC 11572)
- Private Integrated Services Network (PISN) (ISO/IEC 11579-1)
- Private Integrated Services Network Exchange (PINX) (ISO/IEC 11579-1)
- Signalling (CCITT Rec. I.112)
- Subsequent PINX (ISO/IEC 11572)
- Supplementary Service (CCITT Rec. I.210)
- Supplementary Service Control Entity (ISO/IEC 11582)
- Terminating PINX (ISO/IEC 11572)
- Transit PINX (ISO/IEC 11572)
- User (ISO/IEC 11574)

### 4.2 Other definitions

**forward switching** : Network routeing algorithm which performs the interception by joining together the first connection from the calling user to the Intercepting PINX and the new connection from the Intercepting PINX to the intercepted-to user.

**Intercepting PINX** : The PINX where the interception is invoked.

**Intercepted-to PINX** : The PINX serving the intercepted-to user.

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

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

**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.

**call failure** : In the context of a particular PINX, the inability to route a call or, having routed a call, the receipt of a call clearing message from the Subsequent PINX without the call having reached 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 |
| APDU | Application Protocol Data Unit |
| ASN.1 | Abstract Syntax Notation no. 1 |
| CINT | Call Interception |
| ISDN | Integrated Services Digital Network |
| NFE | Network Facility Extension |
| PICS | Protocol Implementation Conformance Statement |
| PINX | Private Integrated Services Network Exchange |
| PISN | Private Integrated Services Network |
| SDL | Specification and Description Language |
| SS | Supplementary Services |



## 6 Signalling protocol for the support of ANF-CINT

### 6.1 ANF-CINT description

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

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

### 6.2 ANF-CINT operational requirements

#### 6.2.1 Requirements on an Originating PINX

Call establishment procedures for the outgoing side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply.

#### 6.2.2 Requirements on a Terminating PINX

Call establishment procedures for the incoming side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply.

### 6.2.3 Requirements on an Intercepted-to PINX

Call establishment procedures for the incoming side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply.

### 6.2.4 Requirements on a Transit PINX

Basic call procedures for call establishment and call clearing at a Transit PINX, as specified in ISO/IEC 11572, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for a Transit PINX, shall apply.

### 6.2.5 Requirements on an Intercepting PINX

Call establishment procedures for the outgoing side of an inter-PINX link and call release procedures, as specified in ISO/IEC 11572, shall apply.

Generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply.

Where, as a result of invocation of ANF-CINT, an Intercepting PINX can become a Transit PINX, generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for a Transit PINX, shall apply.

### 6.3 ANF-CINT coding requirements

#### 6.3.1 Operations

The operations defined in Abstract Syntax Notation number 1 (ASN.1) in table 1 shall apply.

In addition the operation divertingLegInformation3, as defined in ISO/IEC 13873, shall apply.

**Table 1 - Operations in Support of ANF-CINT**

```
Call-Interception-Operations {iso (1) standard (0) pss1-cint (15054) cint-operations (0) }

DEFINITIONS     EXPLICIT TAGS ::=

BEGIN

IMPORTS                 OPERATION, ERROR  FROM  Remote-Operation-Notation
                        {joint-iso-ccitt (2) remote-operations (4) notation (0)}

                        Extension  FROM Manufacturer-specific-service-extension-definition
                        {iso (1) standard (0) pss1-generic-procedures (11582) msi-definition (0)}

                        PartyNumber, PresentedNumberUnscreened, PresentationAllowedIndicator
                        FROM Addressing-Data-Elements
                        {iso (1) standard (0) pss1-generic procedures (11582)
                        addressing-data-elements (9)}

                        Name FROM Name-Operations
                        {iso (1) standard (0) pss1-name (13868) name-operations (0)};


CintLegInformation1::=  OPERATION
                        -- Sent from the Intercepting PINX to the Originating PINX --

                        ARGUMENT    CintInformation1Arg

CintLegInformation2::=  OPERATION
                        -- Sent from the  Intercepting PINX to the Intercepted-to PINX --

                        ARGUMENT    CintInformation2Arg


CintCondition::=        OPERATION
                        -- Sent to a preceding PINX to indicate a condition for possible --
                        -- interception --

                        ARGUMENT    CintCondArg
```

**Table 1 - Operations in Support of ANF-CINT (continued)**

```
CintDisable ::= OPERATION
                -- Sent to a Preceding PINX to disable interception delayed --

                ARGUMENT    CintExtension

CintEnable ::= OPERATION
               -- Sent to a Preceding PINX to reenable interception --

               ARGUMENT    CintExtension

CintInformation1Arg ::= SEQUENCE
                        {
                        interceptionCause       CintCause,
                        interceptedToNumber     PartyNumber,
                        extension               CintExtension OPTIONAL
                        }

CintInformation2Arg ::= SEQUENCE
                        {
                        interceptionCause       CintCause,
                        calledNumber            [1]PresentedNumberUnscreened OPTIONAL,
                        originalCalledNumber    [2]PresentedNumberUnscreened OPTIONAL,
                        calledName              [3]Name OPTIONAL,
                        originalCalledName      [4]Name OPTIONAL,
                        extension               CintExtension OPTIONAL
                        }

CintCondArg ::= SEQUENCE
                {
                interceptionCause       Condition,
                originalCalledNumber    [1]PresentedNumberUnscreened OPTIONAL,
                calledName              [2]Name OPTIONAL,
                originalCalledName      [3]Name OPTIONAL,
                extension               CintExtension OPTIONAL
                }

CintExtension ::= CHOICE
                  {
                  none          NULL,
                  single        [5] IMPLICIT Extension,
                  multiple      [6] IMPLICIT SEQUENCE OF Extension
                  }
```

**Table 1 - Operations in Support of ANF-CINT (concluded)**

```
CintCause       ::=     INTEGER  {
                        unknown         (0),
                        cintBnan        (1),    -- timeout in waiting on busy condition
                        cintBus         (2),    -- busy user
                        cintCug         (3),    -- closed user group rejection
                        cintDnd         (4),    -- do not disturb activated
                        cintIbd         (5),    -- incoming barred destination
                        cintInn         (6),    -- invalid number
                        cintMob1        (7),    -- mobile user location not known
                        cintMob2        (8),    -- mobile user no longer registered
                        cintMob3        (9),    -- mobile terminal not responding
                        cintNcmp        (10),   -- no compatible destination
                        cintNcong       (11),   -- network congestion
                        cintNre         (12),   -- no reply (i.e. timeout during alerting)
                        cintOos         (13),   -- called user out of service
                        cintRrs         (14),   -- route restriction (calling user not authorized for
                                                -- the route)
                        cintTbnan       (15),   -- timeout in wait on busy condition after transfer
                        cintTnre        (16),   -- no reply after transfer (i.e. timeout during alerting
                                                -- after transfer
                        cintTrans       (17),   -- upper limit of transit counter reached
                        cintUpl         (18)    -- upper limit of number of diversions reached
                        cintInvDiv      (19)    -- invalid call diversion destination
                        cintHold        (20)    -- timeout after call hold
                        } (0..127)

Condition       ::=     INTEGER  {
                        unknown         (0),
                        cintBus         (2),    -- busy user
                        cintCug         (3),    -- closed user group rejection
                        cintDnd         (4),    -- do not disturb activated
                        cintIbd         (5),    -- incoming barred destination
                        cintInn         (6),    -- invalid number
                        cintMob1        (7),    -- mobile user location not known
                        cintMob2        (8),    -- mobile user no longer registered
                        cintMob3        (9),    -- mobile terminal not responding
                        cintNcmp        (10),   -- no compatible destination
                        cintNcong       (11),   -- network congestion
                        cintOos         (13),   -- called user out of service
                        cintRrs         (14),   -- route restriction (calling user not authorized for
                                                -- the route
                        cintTrans       (17),   -- upper limit of transit counter reached
                        cintUpl         (18)    -- upper limit of number of diversions
                                                -- reached
                        cintInvDiv      (19)    -- invalid call diversion destination
                        } (0..127)

cintLegInformation1             CintLegInformation1     ::=     66
cintLegInformation2             CintLegInformation2     ::=     67

cintCondition                   CintCondition           ::=     68
cintDisable                     CintDisable             ::=     69
cintEnable                      CintEnable              ::=     70

END     -- of Call-Interception-Operations
```