
**Information technology —
Telecommunications and information
exchange between systems — Private
Integrated Services Network — Inter-
exchange signalling protocol — Call
Identification and Call Linkage Additional
Network Feature**

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*Technologies de l'information — Télécommunications et échange
d'information entre systèmes — Réseau privé à intégration de services —
Protocole de signalisation d'échange — Identification d'appel et
caractéristique de réseau additionnelle de liaison d'appel*

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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.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 3.

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.

Attention is drawn to the possibility that some of the elements of this International Standard may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

International Standard ISO/IEC 21889 was prepared by ECMA (as ECMA-314) 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 a normative part of this International Standard. Annexes B, C, D and E are for information only.

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Introduction

This International Standard is one of a series of Standards defining services and signalling protocols applicable to Private Integrated Services Networks (PISNs). The series uses ISDN concepts as developed by ITU-T and conforms to the framework of International Standards for Open Systems Interconnection as defined by ISO/IEC.

This International Standard specifies the signalling protocol for use at the Q reference point in support of the Call Identification and Call Linkage Additional Network Feature. The protocol defined in this International Standard forms part of the PSS1 protocol (informally known as QSIG).

This 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 JTC1, ITU-T, ETSI and other international and national standardization bodies. It represents a pragmatic and widely based consensus.

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Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Call Identification and Call Linkage Additional Network Feature

1 Scope

This International Standard specifies the signalling protocol for the support of the Call Identification and Call Linkage Additional Network Feature (ANF-CIDL) at the Q reference point between Private Integrated Network Services Exchanges (PINXs) connected together within a Private Integrated Services Network (PISN).

ANF-CIDL is an additional network feature which allows the assignment of a Global Call Identification (GID) to identify a call end-to-end over the call route (i.e. between the two end PINXs). As an option, a Thread Identification (TID) may be assigned to different calls which are logically linked together due to the operation of other supplementary services and/or ANFs. Additionally a Leg Identification (LID) may be assigned, to identify the different legs of a call.

NOTE 1 - This ANF has been developed to support the use of CSTA (ISO/IEC 18051) in a networked environment, i.e. in a PISN. Use of this ANF for other applications is not precluded.

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

Supplementary Service specifications are produced in three stages and according to the method specified in ETS 300 387. 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 21888.

The signalling protocol for ANF-CIDL 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 Call Identification and Call Linkage and other supplementary services and ANFs.

This International Standard is applicable to PINXs which can be interconnected 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-CIDL 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 normative documents contain provisions which, through reference in this text, constitute provisions of this International Standard. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 11571:1998, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Networks — Addressing*

ISO/IEC 11572:2000, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Circuit mode bearer services — Inter-exchange signalling procedures and protocol*

ISO/IEC 21889:2001(E)

ISO/IEC 11574:2000, *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 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 13874:1999, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Path replacement additional network feature*

ISO/IEC 14843:1996, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Call offer supplementary service*

ISO/IEC 14844:1996, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Do not disturb and do not disturb override supplementary services*

ISO/IEC 14846:1996, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Call intrusion supplementary service*

ISO/IEC 15054:1997, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Call interception additional network feature*

ISO/IEC 15429:1999, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Wireless Terminal Location Registration supplementary service and Wireless Terminal Information exchange additional network feature*

ISO/IEC 15431:1999, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Wireless terminal call handling additional network features*

ISO/IEC 15433:1999, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Wireless Terminal Authentication supplementary services*

ISO/IEC 15992:1998, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Call priority interruption and call priority interruption protection supplementary services*

ISO/IEC 17876:2000, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Private User Mobility (PUM) — Registration supplementary service*

ISO/IEC 17878:2000, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Private User Mobility (PUM) — Call handling additional network features*

ISO/IEC 18051:2000, *Information technology — Telecommunications and information exchange between systems — Services for Computer Supported Telecommunications Applications (CSTA) Phase III*

ISO/IEC 19460:2001, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Single Step Call Transfer Supplementary Service*

ISO/IEC 21888:2001, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Specification, functional model and information flows — Call Identification and Call Linkage Additional Network Feature*

ETS 300 387:1994, *Private Telecommunication Network (PTN); Method for the specification of basic and supplementary services*

ITU-T Rec. H.225:2000, *Call signalling protocols and media stream packetization for packet-based multimedia communication systems*

ITU-T Rec. I.112:1993, *Vocabulary of terms for ISDNs*

ITU-T Rec. I.210:1993, *Principles of telecommunication services supported by an ISDN and the means to describe them*

ITU-T Rec. Q.950:2000, *Supplementary services protocols, structure and general principles*

ITU-T Rec. Z.100:1999, *Specification and description language (SDL)*

4 Terms and definitions

For the purposes of this International Standard, the following terms and 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)
— ANF-CIDL user	(ISO/IEC 21888)
— Basic Call	(ISO/IEC 11572)
— Basic Service	(ITU-T Rec. I.210)
— Call Identification Data, CIDL data	(ISO/IEC 21888)
— Call Independent Signalling Connection	(ISO/IEC 11582)
— Complete Number	(ISO/IEC 11571)
— Gateway PINX	(ISO/IEC 11572)
— Global Call Identification, Global Call ID, GID	(ISO/IEC 21888)
— Global Thread Identification, Thread ID, TID	(ISO/IEC 21888)
— Interpretation APDU	(ISO/IEC 11582)
— Leg Identification	(ISO/IEC 21888)
— Network Facility Extension (NFE)	(ISO/IEC 11582)
— Originating PINX	(ISO/IEC 11582)
— Private Integrated Services Network (PISN)	(ISO/IEC 11579-1)
— Private Integrated Services Network Exchange (PINX)	(ISO/IEC 11579-1)
— Signalling	(ITU-T Rec. I.112)
— Supplementary Service	(ITU-T Rec. I.210)
— Supplementary Service Control Entity	(ISO/IEC 11582)
— Terminating PINX	(ISO/IEC 11582)
— Transit PINX	(ISO/IEC 11582)
— User	(ISO/IEC 11574)

4.2 Other definitions

4.2.1 CIDL PINX : The PINX receiving initial Global Call ID and optionally Thread ID and Leg ID values from the Originating PINX of a call. Upon supplementary / ANF interactions (e.g. after call transfer), the CIDL PINX may generate a new Global Call ID for the resulting call and may correlate two or more logically linked calls together by updating the Thread ID values of these calls.

NOTE 2 - The CIDL PINX may be the Originating or the Terminating PINX of a call, as well as any other PINX invoking Supplementary Services / ANFs for this call, e.g. the SS-CT Transferring PINX.

4.2.2 CIDL Transit PINX : A Transit PINX on the call route between the Originating PINX and a CIDL PINX or between two CIDL PINXs, which informs the local ANF-CIDL user about incoming CIDL Data and passes the data on unchanged to the subsequent PINX.

5 Acronyms

ANF-CIDL	Additional Network Feature Call Identification and Call Linkage
APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation no. 1
CIDL	Call Identification and Call Linkage
GID	Global Call Identification
ID	Identification
ISDN	Integrated Services Digital Network
LID	Leg Identification
NFE	Network Facility Extension
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated Services Network Exchange
PISN	Private Integrated Services Network
PNP	Private Numbering Plan
SDL	Specification and Description Language
TID	Thread Identification

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6 Signalling protocol for the support of ANF-CIDL

6.1 ANF-CIDL description

ISO/IEC 21889:2001

NOTE 3 - If not otherwise stated, the term call is used in the sense of a Basic Call or a Call Independent Signalling Connection.

ANF-CIDL is an additional network feature which allows the assignment of a Global Call Identification (GID) to identify a call end-to-end over the call route (i.e. between the two end PINXs). As an option, a Thread Identification (TID) may be assigned to different calls which are logically linked together due to the operation of other supplementary services and/or ANFs. Additionally a Leg Identification (LID) may be assigned, to identify the different legs of a call.

This additional network feature is applicable to all basic services defined in ISO/IEC 11574.

6.2 ANF-CIDL operational requirements

6.2.1 Provision/Withdrawal

Provision and withdrawal shall be in accordance with 6.2.1 of ISO/IEC 21888.

6.2.2 Requirements on an Originating PINX

The basic call procedures specified in ISO/IEC 11572 shall be supported.

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 a CIDL PINX

The basic call procedures specified in ISO/IEC 11572 shall be supported.

Generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for an End PINX, shall apply. Additionally generic procedures for the call independent control (connection oriented) of supplementary services, as specified in ISO/IEC 11582 for an Originating PINX and a Terminating PINX shall apply.

6.2.4 Requirements on a CIDL Transit PINX

The basic call procedures specified in ISO/IEC 11572 shall be supported.

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

6.3 ANF-CIDL coding requirements

6.3.1 Operations

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

Table 1 - Operations in support of ANF-CIDL

```

Call-Identification-and-Call-Linkage-Operations-asn1-97
    {iso(1) standard (0) pss1-call-identification-and-call-linkage (21889)
    call-identification-and-call-linkage-operations-asn1-97 (1)}

DEFINITIONS EXPLICIT TAGS ::=
BEGIN
IMPORTS
    OPERATION
    FROM Remote-Operations-Information-Objects
    {joint-iso-itu-t remote-operations(4) informationObjects(5) version1(0)}

    EXTENSION, Extension{}
    FROM Manufacturer-specific-service-extension-class-asn1-97
    { iso standard pss1-generic-procedures (11582) msi-class-asn1-97 (11)};

CallIdentification-Operations OPERATION ::= { callIdentificationAssign | callIdentificationUpdate }

callIdentificationAssign OPERATION ::= {
    ARGUMENT          CallIdentificationAssignArg
    RETURN RESULT     FALSE
    ALWAYS RESPONDS   FALSE
    CODE              local: 105
}

callIdentificationUpdate OPERATION ::= {
    ARGUMENT          CallIdentificationUpdateArg
    RETURN RESULT     FALSE
    ALWAYS RESPONDS   FALSE
    CODE              local: 106
}

CallIdentificationAssignArg ::= SEQUENCE {
    globalCallID [0] CallIdentificationData,
    threadID     [1] CallIdentificationData OPTIONAL,
    legID        [2] CallIdentificationData OPTIONAL,
    extension    ExtensionType          OPTIONAL
}

CallIdentificationUpdateArg ::= SEQUENCE {
    globalCallID [0] CallIdentificationData OPTIONAL,
    threadID     [1] CallIdentificationData OPTIONAL,
    legID        [2] CallIdentificationData OPTIONAL,
    extension    ExtensionType          OPTIONAL
}

```

```

CallIdentificationData ::= SEQUENCE {
-- this structure is according to ISO/IEC 18051, 12.2.5 (see annex D)
    switchingSubDomainName [0] IMPLICIT SwitchingSubDomainName OPTIONAL,
    linkageID CHOICE {
        subDomainID [1] IMPLICIT SubDomainID,
        globallyUniqueID [2] IMPLICIT GloballyUniqueID},
    timeStamp [3] IMPLICIT TimeStamp OPTIONAL
    }

SwitchingSubDomainName ::= IA5String (SIZE(1..64))

GloballyUniqueID ::= OCTET STRING (SIZE(1..16))
-- the GloballyUniqueID shall be coded according to ITU-T Recommendation H.225, section 7.6 (see annex D)

ExtensionType ::= CHOICE {
    extension [3] Extension{{ExampleExtSet}},
    sequenceOfExt [4] IMPLICIT SEQUENCE OF Extension{{ExampleExtSet}}
    }

ExampleExtSet EXTENSION ::= {...}

SubDomainID ::= OCTET STRING (SIZE(1..8))

TimeStamp ::= GeneralizedTime (SIZE(16..19))

```

END -- of Call-Identification-and-Call-Linkage-Operations-asn1-9701

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6.3.2 Information elements

6.3.2.1 Facility information element

APDUs of the operations defined in 6.3.1 shall be coded in the Facility information element in accordance with ISO/IEC 11582.

When conveying the invoke APDUs of the operations defined in 6.3.1, the destinationEntity data element of the NFE shall contain value anyTypeOfPINX, the Interpretation APDU shall contain value discardAnyUnrecognisedInvokePdu.

6.3.2.2 Other information elements

Information elements used during the establishment of the new connection shall be coded as specified in ISO/IEC 11572.

6.3.3 Messages

Except for cases where a basic call message is to be conveyed at the same time, the Facility information element shall be conveyed in a FACILITY message as specified in ISO/IEC 11582.

6.4 ANF-CIDL state definitions

6.4.1 States at a Originating PINX

The procedures at the Originating PINX are written in terms of the following conceptual states existing within the ANF-CIDL control entity in that PINX in association with a particular call.

6.4.1.1 CIDL-Idle

ANF-CIDL is not operating.

6.4.1.2 CIDL-Simultaneous-Assignment-Supervision

A callIdentificationAssign invoke APDU has been sent and Timer T1 has been started.

6.4.2 States at a CIDL PINX

The procedures at the CIDL PINX are written in terms of the following conceptual states existing within the ANF-CIDL control entity in that PINX.

6.4.2.1 CIDL-Idle

ANF-CIDL is not operating.

6.4.2.2 CIDL-Simultaneous-Assignment-Supervision

A callIdentificationUpdate invoke APDU has been sent or a callIdentificationAssign or a callIdentificationUpdate invoke APDU has been received and Timer T1 has been started.

6.4.3 States at a CIDL Transit PINX

The procedures at the CIDL Transit PINX are written in terms of the following conceptual states existing within the ANF-CIDL control entity in that PINX.

6.4.3.1 CIDL-Idle

ANF-CIDL is not operating.

6.5 ANF-CIDL signalling procedures

References in this clause to protocol control states refer to basic call protocol control states defined in ISO/IEC 11572.

NOTE 4 - The specification in this sub-clause is based on each of the End PINXs being a different PINX, but this sub-clause is also applicable to scenarios where two or more of the described PINXs are the same. In those scenarios some of the signalling procedures and message flows described in this sub-clause are internal to the PINX implementation and therefore outside the scope of this International Standard.

Annex B contains some examples of message sequences.

6.5.1 Actions at a Originating PINX

The SDL representation of procedures at a Originating PINX is shown in C.1 of annex C.

6.5.1.1 Normal procedures

Upon a request for a new call, the Originating PINX

1. shall generate the value of element globalCallID within the CallIdentificationAssignArg anew or, due to supplementary service / ANF interactions, as described in the procedures in 6.8. The content of element globalCallID shall be generated according to ISO/IEC 18051, 12.2.5 (see annex D) in a way that its value is unique within the PISN.
2. may additionally generate the value of element threadID within the CallIdentificationAssignArg anew or, due to supplementary service / ANF interactions, as described in the procedures in 6.8. The content of element threadID shall be generated according to ISO/IEC 18051, 12.2.5 (see annex D) in a way that its value is unique within the PISN.
3. may additionally generate the element legID within the CallIdentificationAssignArg. The content of element legID shall be generated as described for the globalCallData in ISO/IEC 18051, 12.2.5 (see annex D) in a way that its value is unique within the PISN.
4. store the generated values, correlate them to the call and inform the ANF-CIDL user about the generated values.
5. shall send one callIdentificationAssign invoke APDU which shall include all generated elements in the SETUP message of the new call, start timer T1 and enter state CIDL-Simultaneous-Assignment-Supervision.

After entering stage CIDL-Simultaneous-Assignment-Supervision, the Originating PINX shall act as a CIDL PINX for the rest of the call, i.e. it shall perform the actions as described in 6.5.2.

6.5.1.2 Exceptional procedures

Not applicable.

6.5.2 Procedures at the CIDL PINX

The SDL representation of procedures at a CIDL PINX is shown in C.2 of annex C.

6.5.2.1 Normal procedures

In state CIDL-Idle, upon receipt of a callIdentificationAssign invoke APDU in a SETUP message for a call for which no Call Identification Data has been stored, the CIDL PINX.

1. shall store the values received within the elements globalCallID, threadID and legID, correlate them to the call and inform the ANF-CIDL user about the received values.