INTERNATIONAL STANDARD

ISO/IEC 13869

Second edition
2003-04-01

Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Call Transfer supplementary service

Technologies de l'information — Télécommunications et échange d'information entre systèmes — Réseau privé à intégration de services — Protocole de signalisation d'interéchange — Service supplémentaire de transfert d'appel

Reference number
ISO/IEC 13869:2003(E)

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Published in Switzerland

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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. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. 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 document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC 13869 was prepared by ECMA (as ECMA-178) 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.

This second edition cancels and replaces the first edition (ISO/IEC 13869:1995), which has been technically revised.

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 Transfer supplementary service. 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 JTC 1, ITU-T, ETSI and other international and national standardization bodies. It represents a pragmatic and widely based consensus.

Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Inter-exchange signalling protocol — Call Transfer supplementary service

1 Scope

This International Standard specifies the signalling protocol for the support of the Call Transfer supplementary service (SS-CT) at the Q reference point between Private Integrated Network services eXchanges (PINXs) connected together within a Private Integrated Services Network (PISN).

SS-CT is a supplementary service which enables a User to transform two of that User's calls (at least one of which must be answered) into a new call between the two other users in the two calls.

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 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 13865.

The signalling protocol for SS-CT 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 Transfer and other supplementary services and ANFs.

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.

3 Normative references

The following referenced documents are indispensable for the application of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

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 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 11582:2002, *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 13865:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Call Transfer supplementary service*

ISO/IEC 13868:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Name identification supplementary services*

ISO/IEC 13873:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Call Diversion supplementary services*

ISO/IEC 13874:2003, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Inter-exchange signalling protocol - Path Replacement additional network feature*

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

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 document, the following terms and definitions apply.

4.1 External definitions

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

- Alerting (ISO/IEC 13865)
- Answered (ISO/IEC 13865)
- Application Protocol Data Unit (APDU) (ISO/IEC 11582)
- Basic Service (ITU-T Rec. I.210)
- Gateway PINX (ISO/IEC 11572)
- Complete Number (ISO/IEC 11571)
- Interpretation APDU (ISO/IEC 11582)
- Network Facility Extension (NFE) (ISO/IEC 11582)
- Originating PINX (ISO/IEC 11582)
- Primary Call (ISO/IEC 13865)
- Private Integrated Services Network (PISN) (ISO/IEC 11579-1)
- Private Integrated services Network eXchange (PINX) (ISO/IEC 11579-1)
- Secondary Call (ISO/IEC 13865)
- 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)
- Transfer by join (ISO/IEC 13865)
- Transfer by rerouteing (ISO/IEC 13865)
- Transit PINX (ISO/IEC 11582)
- User (ISO/IEC 11574)
- User A (ISO/IEC 13865)
- User B (ISO/IEC 13865)
- User C (ISO/IEC 13865)

4.2 Other definitions

4.2.1 End PINX

Within the context of a call, a PINX which is not acting as a Transit PINX, i.e. an Originating PINX, a Terminating PINX, or a Gateway PINX.

4.2.2 Primary PINX

The End PINX which is on the end of the Primary Call nearest to User B.

4.2.3 Redirection number

The number of a transferred User, as provided to the PINX of the other transferred User.

4.2.4 Secondary PINX

The End PINX which is on the end of the Secondary Call nearest to User C.

4.2.5 Transferring PINX

End PINX which initiates the call transfer procedures on behalf of User A.

5 Acronyms

APDU	Application Protocol Data Unit
ASN.1	Abstract Syntax Notation no. 1
ISDN	Integrated Services Digital Network
NFE	Network Facility Extension
PNP	Private Numbering Plan
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated services Network eXchange
PISN	Private Integrated Services Network
SDL	Specification and Description Language
SS-CT	Supplementary Service Call Transfer

6 Signalling protocol for the support of SS-CT

6.1 SS-CT description

Call Transfer (CT) is a supplementary service which enables a user to transform two of that user's calls (at least one of which must be answered) into a new call between the two other users in the two calls.

This supplementary service is applicable to all basic services defined in ISO/IEC 11574.

Call transfer can be achieved by using one of two methods; transfer by join and transfer by rerouteing. Support of transfer by join is mandatory. Support of transfer by rerouteing is an option, which, if not supported by all PINXs involved in the operation of call transfer, allows fall back to using transfer by join.

NOTE - When an active call has been transferred to an alerting call, the supervision during the alerting phase and the possible procedures to be followed in case the alerting call remains unanswered are outside the scope of this International Standard.

6.2 SS-CT operational requirements

6.2.1 Provision/Withdrawal

Provision and withdrawal shall be in accordance with 6.2.1 of ISO/IEC 13865.

6.2.2 Requirements on a Transferring 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 Primary 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.

6.2.4 Requirements on a Secondary 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.

6.2.5 Requirements on a Transit 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 a Transit PINX, shall apply.

For SS-CT the requirements are limited to the passing on of Facility information elements for which the destination, as indicated in the NFE, is not the Transit PINX.

6.3 SS-CT coding requirements

6.3.1 Operations

The operations defined in Abstract Syntax Notation number 1 (ASN.1) in table 1 shall apply. The notation is in accordance with ITU-T Rec. X.680 and X.690. The ITU-T Rec. X.208 and X.209 superseded version is in annex F.

Table 1 - Operations in support of SS-CT

```
Call-Transfer-Operations-asn1-97
  {iso(1)  standard(0) pss1-call-transfer(13869) call-transfer-operations-asn1-97 (1)}

DEFINITIONS EXPLICIT TAGS ::=

BEGIN


IMPORTS
            OPERATION, ERROR FROM
Remote-Operations-Information-Objects {joint-iso-itu-t(2) remote-operations(4) informationObjects(5) version1(0)}
            EXTENSION, Extension{} FROM
Manufacturer-specific-service-extension-class-asn1-97 {iso(1) standard(0) pss1-generic-procedures (11582)
msi-class-asn1-97(11)}
            Name FROM
Name-Operations-asn1-97 {iso(1) standard(0) pss1-name (13868) name-operations-asn1-97 (1)}
            supplementaryServiceInteractionNotAllowed,
            notAvailable,
            invalidCallState FROM
General-Error-List {ccitt (0) recommendation (0) q 950  general-error-list (1)}
            PresentedAddressScreened,
            PresentedNumberScreened,
            PartyNumber,
            PartySubaddress FROM
Addressing-Data-Elements-asn1-97 {iso(1) standard(0) pss1-generic-procedures (11582)
addressing-data-elements-asn1-97 (20)}
            PSS1InformationElement
FROM PSS1-generic-parameters-definition-asn1-97 { iso(1) standard (0) pss1-generic-procedures (11582)
 pss1-generic-parameters-asn1-97 (17)};

-- TYPE DEFINITIONS FOR CT OPERATIONS FOLLOW

Call-Transfer-Operations OPERATION ::= {callTransferIdentify | callTransferAbandon | callTransferInitiate |
callTransferSetup | callTransferActive | callTransferComplete | callTransferUpdate | subaddressTransfer}

callTransferIdentify      OPERATION ::= {
                          ARGUMENT    DummyArg
                          RESULT      CTIdentifyRes
                          ERRORS {
                                      notAvailable |
                                      invalidCallState |
                                      unspecified |
                                      supplementaryServiceInteractionNotAllowed}
                          CODE        local: 7}
```

Table 1 - Operations in support of SS-CT (continued)

```
callTransferAbandon     OPERATION ::= {
                        ARGUMENT              DummyArg
                        RETURN RESULT         FALSE
                        ALWAYS RESPONDS       FALSE
                        CODE                  local: 8}

callTransferInitiate    OPERATION ::= {
                        ARGUMENT      CTInitiateArg
                        RESULT        DummyRes
                        ERRORS {
                                      notAvailable |
                                      invalidCallState |
                                      invalidRerouteingNumber |
                                      unrecognizedCallIdentity |
                                      establishmentFailure |
                                      unspecified |
                                      supplementaryServiceInteractionNotAllowed }
                        CODE          local: 9}

callTransferSetup       OPERATION ::= {
                        ARGUMENT      CTSetupArg
                        RESULT        DummyRes
                        ERRORS{
                                      notAvailable |
                                      invalidCallState |
                                      invalidRerouteingNumber |
                                      unrecognizedCallIdentity |
                                      unspecified |
                                      supplementaryServiceInteractionNotAllowed }
                        CODE          local: 10}

callTransferActive      OPERATION::= {
                        ARGUMENT              CTActiveArg
                        RETURN RESULT         FALSE
                        ALWAYS RESPONDS       FALSE
                        CODE                  local: 11}

callTransferComplete    OPERATION ::= {
                        ARGUMENT              CTCompleteArg
                        RETURN RESULT         FALSE
                        ALWAYS RESPONDS       FALSE
                        CODE                  local: 12}
```

Table 1 - Operations in support of SS-CT (continued)

```
callTransferUpdate      OPERATION ::= {
                        ARGUMENT              CTUpdateArg
                        RETURN RESULT         FALSE
                        ALWAYS RESPONDS       FALSE
                        CODE                  local: 13}

subaddressTransfer      OPERATION ::= {
                        ARGUMENT              SubaddressTransferArg
                        RETURN RESULT         FALSE
                        ALWAYS RESPONDS       FALSE
                        CODE                  local: 14}

-- TYPE DEFINITIONS FOR CT DATA TYPES FOLLOW

DummyArg ::=  CHOICE {
    null          NULL,
    single        [1] IMPLICIT Extension{{CTExtSet}},
    multiple      [2] IMPLICIT SEQUENCE OF  Extension{{CTExtSet}}
    }

DummyRes ::=  CHOICE {
    null          NULL,
    single        [1] IMPLICIT Extension{{CTExtSet}},
    multiple      [2] IMPLICIT SEQUENCE OF  Extension{{CTExtSet}}
    }

CTIdentifyRes ::=  SEQUENCE {
    callIdentity                    CallIdentity,
    rerouteingNumber                PartyNumber,
    resultExtension                 CHOICE {
                single              [6] IMPLICIT Extension{{CTExtSet}},
                multiple            [7] IMPLICIT SEQUENCE OF Extension{{CTExtSet}}
                                        }    OPTIONAL
    }

CTInitiateArg ::=  SEQUENCE {
    callIdentity                    CallIdentity,
    rerouteingNumber                PartyNumber,
    argumentExtension               CHOICE {
                single              [6] IMPLICIT Extension{{CTExtSet}},
                multiple            [7] IMPLICIT SEQUENCE OF Extension{{CTExtSet}}
                                        } OPTIONAL
    }
```

Table 1 - Operations in support of SS-CT (continued)

```
CTSetupArg ::=  SEQUENCE {
    callIdentity                    CallIdentity,
    argumentExtension               CHOICE {
            single          [0] IMPLICIT Extension{{CTExtSet}},
            multiple        [1] IMPLICIT SEQUENCE OF Extension{{CTExtSet}}
                                } OPTIONAL
    }

CTActiveArg ::=  SEQUENCE{
    connectedAddress                PresentedAddressScreened,
    basicCallInfoElements           PSS1InformationElement          OPTIONAL,
                                        -- ISO/IEC 11572 information element
                                        -- Progress indicator is conveyed
    connectedName                   Name                            OPTIONAL,
    argumentExtension               CHOICE {
            single          [9] IMPLICIT Extension{{CTExtSet}},
            multiple        [10] IMPLICIT SEQUENCE OF Extension{{CTExtSet}}
                                } OPTIONAL
    }

CTCompleteArg ::=  SEQUENCE {
    endDesignation                  EndDesignation,
    redirectionNumber               PresentedNumberScreened,
    basicCallInfoElements           PSS1InformationElement          OPTIONAL,
                                        -- ISO/IEC 11572 information element
                                        -- Progress indicator is conveyed
    redirectionName                 Name                            OPTIONAL,
    callStatus                      CallStatus DEFAULT  answered,
    argumentExtension               CHOICE {
            single          [9] IMPLICIT Extension{{CTExtSet}},
            multiple        [10] IMPLICIT SEQUENCE OF Extension{{CTExtSet}}
                                } OPTIONAL
    }

CTUpdateArg ::=  SEQUENCE {
    redirectionNumber               PresentedNumberScreened,
    redirectionName                 Name                            OPTIONAL,
    basicCallInfoElements           PSS1InformationElement          OPTIONAL,
                                    -- ISO/IEC 11572 information element
                                    -- Progress indicator is conveyed
    argumentExtension               CHOICE {
            single          [9] IMPLICIT Extension{{CTExtSet}},
            multiple        [10] IMPLICIT SEQUENCE OF Extension{{CTExtSet}}
                                }OPTIONAL           }
```

Table 1 - Operations in support of SS-CT (concluded)

```
SubaddressTransferArg ::=  SEQUENCE {
    redirectionSubaddress                PartySubaddress,
    argumentExtension                    CHOICE {
                single              [0] IMPLICIT Extension{{CTExtSet}},
                multiple            [1] IMPLICIT SEQUENCE OF Extension{{CTExtSet}}
                                         } OPTIONAL
    }

CallStatus ::=  ENUMERATED{
    answered(0),
    alerting(1)
    }

CallIdentity ::=  NumericString (SIZE (1..4))

EndDesignation ::=  ENUMERATED {
    primaryEnd(0),
    secondaryEnd(1)
    }

CTExtSet EXTENSION ::= {…}

unspecified                     ERROR  ::= {
                                PARAMETER Extension {{CTExtSet}}
                                CODE local: 1008 }


invalidRerouteingNumber         ERROR ::= {    CODE local: 1004}
                                               -- used when establishment of the new
                                               -- connection fails because
                                               -- the rerouteingNumber is not a valid
                                               -- PISN address

unrecognizedCallIdentity        ERROR ::= {    CODE local: 1005}
                                               -- used when establishment of the new
                                               -- connection fails because it could not be
                                               -- associated with a SS-CT entity
                                               -- at the Secondary PINX

establishmentFailure            ERROR ::= {    CODE local: 1006}
                                               -- used when establishment of the new
                                               -- connection fails and no other error applies
                                               -- of Call-Transfer-Operations

END -- of Call-Transfer-Operations-asn1-97
```