

ECMA

Standardizing Information and Communication Systems

**Broadband Private Integrated
Services Network (B-PISN) -
Inter-Exchange Signalling
Protocol -
Transit Counter
Additional Network Feature**

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(B-QSIG-TC)

Brief History

This Standard is one of a series of ECMA standards defining services and signalling protocols applicable to Broadband Private Integrated Services Networks. The series uses the B-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 Standard specifies the signalling protocol for use at the Q reference point in support of the Transit Counter additional network feature.

The 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.

This ECMA Standard is contributed to ISO/IEC JTC1 under the terms of the fast-track procedure for adoption as an ISO/IEC International Standard.

This Standard has been adopted by the ECMA General Assembly of December 1996.

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1 Scope

This Standard specifies the signalling protocol for the support of the Transit Counter additional network feature (ANF-TC) at the Q reference point between Private Integrated Services Network Exchanges (PINXs) connected together within a Broadband Private Integrated Services Network (B-PISN).

ANF-TC is a feature that limits the number of Transit PINXs that a call/connection setup request may be routed through e.g., to protect the network against indefinite looping.

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 Rec. I.130. This 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 ECMA-224.

The signalling protocol for ANF-TC operates in association with the signalling protocols for basic call/connection control (as specified in ISO/IEC DIS 13247) and call independent (connection oriented) signalling connections (as specified in ECMA-254).

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

2 Conformance

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

3 References (normative)

The following standards contain provisions which, through reference in this text, constitute provision of this Standard. All standards are subject to revision, and parties to agreements based on this Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ECMA-224	Private Integrated Services Network (PISN) - Specification, Functional Model and Information Flows - Transit Counter Additional Network Feature (1995)
ECMA-254	Broadband Private Integrated Services Network (B-PISN) - Inter-Exchange Signalling Protocol - Generic Functional Protocol (1996)
ISO/IEC 11579-1	Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Part 1: Reference configuration for PISN Exchanges (PINX) (1994)
ISO/IEC DIS 13247	Information technology - Telecommunications and information exchange between systems - Broadband Private Integrated Services Network - Inter-exchange signalling procedures and protocol - Basic Call
CCITT Rec. I.112	Vocabulary of terms for ISDNs (1988)
CCITT Rec. I.130	Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN (1988)
CCITT Rec. I.210	Principles of telecommunication services supported by an ISDN and the means to describe them (1988)

4 Definitions

For the purpose of this Standard the following definitions apply.

4.1 External definitions

This Standard uses the following terms defined in other documents:

- Basic Service (CCITT Rec. I.210)
- Call, Basic Call (ECMA-254)

- Call Independent Signalling Connection (ECMA-254)
- Incoming Gateway PINX (ISO/IEC DIS 13247)
- Incoming Side (ISO/IEC DIS 13247)
- Inter-PTNX Link (ISO/IEC DIS 13247)
- Originating PINX (ISO/IEC DIS 13247)
- Outgoing Gateway PINX (ISO/IEC DIS 13247)
- Outgoing Side (ISO/IEC DIS 13247)
- Preceding PINX (ISO/IEC DIS 13247)
- 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 DIS 13247)
- Supplementary Service (CCITT Rec. I.210)
- Terminating PINX (ISO/IEC DIS 13247)
- Transit PINX (ISO/IEC DIS 13247)

5 List of acronyms

ANF	Additional Network Feature
ANF-TC	Transit Counter Additional Network Feature
B-ISDN	Broadband Integrated Services Digital Network
B-PISN	Broadband Private Integrated Services Network
PICS	Protocol Implementation Conformance Statement
PINX	Private Integrated Services Network Exchange
PISN	Private Integrated Services Network

6 Signalling protocol for the support of ANF-TC

6.1 ANF-TC description

ANF-TC is invoked when it is desired to limit the number of Transit PINXs that a call/connection setup request may be routed through.

This additional network feature is applicable to the broadband connection oriented bearer service.

ANF-TC may be used in conjunction with either a Basic call setup request or a setup request for a call independent (connection oriented) signalling connection.

Use of ANF-TC is a network option. The criteria for determining:

- when ANF-TC should be invoked;
- the number of PINXs through which a call may be routed; and,
- the means by which the feature is activated or deactivated

are network dependant and outside the scope of this Standard.

6.2 ANF-TC operational requirements

6.2.1 Requirements on the Originating PINX

Call/connection establishment procedures for the outgoing side of an inter-PINX link and call/connection release procedures, as specified in ISO/IEC DIS 13247, shall apply.

If the PINX supports connection-oriented APDU transport, then the generic procedures for the call independent control (connection oriented) of supplementary services, as specified in ECMA-254 for an Originating PINX, shall apply.

6.2.2 Requirements on the Terminating PINX

Call/connection establishment procedures for the incoming side of an inter-PINX link and call/connection release procedures, as specified in ISO/IEC DIS 13247, shall apply.

If the PINX supports connection-oriented APDU transport, then the generic procedures for the call independent control (connection oriented) of supplementary services, as specified in ECMA-254 for a Terminating PINX, shall apply.

6.2.3 Requirements on a Transit PINX

Basic call procedures for call/connection establishment and call/connection clearing at a Transit PINX, as specified in ISO/IEC DIS 13247, shall apply.

If the PINX supports connection-oriented APDU transport, then the generic procedures for the call independent control (connection oriented) of supplementary services, as specified in ECMA-254 for a Transit PINX, shall apply.

6.3 ANF-TC coding requirements

6.3.1 Transit counter information element

ANF-TC shall be encoded as a discrete information element (called Transit counter) within codeset 4 (ISO codeset), according to the rules for the general format and coding of variable length information elements defined in 8.5.1 of ISO/IEC DIS 13247.

The Transit counter information element shall be a variable length category 1 (see 12.1.9.2 of ISO/IEC DIS 13247) information element with the format shown in figure 1 and coded as shown in table 1.

8	7	6	5	4	3	2	1	Octet
Transit counter								
0	0	1	1	0	0	0	1	1
Information element identifier								
1 ext	Coding standard		IE compatibility instr. indicator Flag Res. IE Action Ind.					2
Length of transit counter contents								3
								4
1 ext	0	0	Transit count (binary value)					5
								6

Figure 1 - Transit counter information element

Table 1 - Transit counter information element

<p><u>Transit count (octet 3)</u></p> <p>A binary value (in the range 0 - 31) that indicates the number of Transit PINXs through which the SETUP request has already passed.</p> <p>The maximum number of Transit PINXs through which a SETUP request may pass is a network dependant value.</p>
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6.3.2 Messages

If used, the Transit counter information element shall be conveyed in a SETUP message.

One of the shift information elements (see 8.5.3 and 8.5.4 of ISO/IEC DIS 13247) shall precede the Transit counter information element in the SETUP message.

6.4 ANF-TC signalling procedures

The signalling protocol for Transit counter functionality operates in association with the signalling protocols for basic call/connection control (as specified in ISO/IEC DIS 13247) and call independent (connection oriented) signalling connections (as specified in ECMA-254).

NOTE 1

The actions specified in the following subclauses are applicable to both cases.

Where a reference is made to procedures specified in ISO/IEC DIS 13247 and ECMA-254, the interpretation of such reference should be made according to whether the call concerned is a basic call or a call independent signalling connection.

6.4.1 Actions at the Originating PINX

An Originating PINX may include a Transit counter information element in the SETUP message sent across an inter-PINX link. The value of the transit count field shall be set to zero.

6.4.2 Actions at the Terminating PINX

A Terminating PINX shall ignore the Transit counter information element if it is contained in any received SETUP message.

6.4.3 Actions at a Transit PINX

6.4.3.1 Normal procedures

On receipt of a SETUP message from the Preceding PINX, the call/connection request shall be processed according to the procedures specified in ISO/IEC DIS 13247 and ECMA-254.

If the received SETUP message contains a Transit counter information element in which the transit count field has a value that is less than the acceptable (network dependent) limit, that information element shall be included in the SETUP message sent to the Subsequent PINX. The value of the transit count field in the outgoing Transit counter information element shall be set to one greater than the value received.

If the received SETUP message does not contain a Transit counter information element, the Transit PINX may include a Transit counter information element in the SETUP message sent to the Subsequent PINX. The value of the transit count field in this element shall be set to a value not less than 1.

6.4.3.2 Exceptional procedures

If the SETUP message received from the Preceding PINX contains a Transit counter information element in which the transit count field has a value that is greater than or equal to the acceptable (network dependent) limit of Transit PINX's through which the call may be routed, and the PINX is unable to become a Terminating or Outgoing Gateway PINX, the call shall be rejected. The acceptable limit shall not exceed 31.

6.4.4 At an Incoming Gateway PINX

When routing a call entering the PISN an Incoming Gateway PINX may include a Transit counter information element in the SETUP message sent across the inter-PINX link. The value of the transit count field shall be set to an initial value. This initial value shall be zero unless knowledge of the history of the call enables a higher value to be chosen.

6.4.5 At an Outgoing Gateway PINX

An Outgoing Gateway PINX shall ignore the Transit counter information element if it is contained in any received SETUP message.

Annex A

(normative)

Protocol Implementation Conformance Statement (PICS) proforma

A.1 Introduction

The supplier of a protocol implementation which is claimed to conform to this Standard shall complete the following Protocol Implementation Conformance Statement (PICS) proforma.

A completed PICS proforma is the PICS for the implementation in question. The PICS is a statement of which capabilities and options of the protocol have been implemented. The PICS can have a number of uses, including use:

- by the protocol implementor, as a check list to reduce the risk of failure to conform to the Standard through oversight;
- by the supplier and acquirer, or potential acquirer, of the implementation, as a detailed indication of the capabilities of the implementation, stated relative to the common basis for understanding provided by the Standard's PICS proforma;
- by the user or potential user of the implementation, as a basis for initially checking the possibility of interworking with another implementation - while interworking can never be guaranteed, failure to inter-work can often be predicted from incompatible PICSs;
- by a protocol tester, as the basis for selecting appropriate tests against which to assess the claim for conformance of the implementation.

A.2 Instructions for completing the PICS proforma

A.2.1 General structure of the PICS proforma

The PICS proforma is a fixed format questionnaire divided into sub-clauses each containing a group of individual items. Each item is identified by an item number, the name of the item (question to be answered), and the reference(s) to the clause(s) that specifies (specify) the item(s) in the main body of this Standard.

The "Status" column indicates whether an item is applicable and if so whether support is mandatory or optional. The following terms are used:

m	mandatory (the capability is required for conformance to the protocol);
o	optional (the capability is not required for conformance to the protocol, but if the capability is implemented it is required to conform to the protocol specifications);
o.<n>	optional, but support of at least one of the group of options labelled by the same numeral <n> is required;
x	prohibited;
c.<cond>	conditional requirement, depending on support for the item or items listed in condition <cond>;
<item>:m	simple conditional requirement, the capability being mandatory if item number <item> is supported, otherwise not applicable;
<item>:o	simple conditional requirement, the capability being optional if item number <item> is supported, otherwise not applicable.

Answers to the questionnaire items are to be provided either in the "Support" column, by simply marking an answer to indicate a restricted choice (Yes or No), or in the "Not Applicable" column (N/A).

A.2.2 Additional Information

Items of Additional Information allow a supplier to provide further information intended to assist the interpretation of the PICS. It is not intended or expected that a large quantity will be supplied, and a PICS can be considered complete without any such information. Examples might be an outline of the ways in which a (single) implementation can be set up to operate in a variety of environments and configurations.

References to items of Additional Information may be entered next to any answer in the questionnaire, and may be included in items of Exception information.

A.2.3 Exception Information

It may occasionally happen that a supplier will wish to answer an item with mandatory or prohibited status (after any conditions have been applied) in a way that conflicts with the indicated requirement. No pre-printed answer will be found in the Support column for this. Instead, the supplier is required to write into the support column an x.<i> reference to an item of Exception Information, and to provide the appropriate rationale in the Exception item itself.

An implementation for which an Exception item is required in this way does not conform to this Standard. A possible reason for the situation described above is that a defect in the Standard has been reported, a correction for which is expected to change the requirement not met by the implementation.

A.3 PICS Proforma

A.3.1 Implementation identification

Supplier	
Contact point for queries about the PICS	
Implementation name(s) and version(s)	
Other information necessary for full identification, e.g. name(s) and version(s) for machines and/or operating systems; system name(s)	

Only the first three items are required for all implementations; other information may be completed as appropriate in meeting the requirement for full identification.

The terms Name and Version should be interpreted appropriately to correspond with a suppliers terminology (e.g. Type, Series, Model).

A.3.2 Protocol summary

Protocol version	1.0
Addenda implemented (if applicable)	
Amendments implemented	
Have any exception items been required (see A.2.3)?	No [] Yes [] (The answer Yes means that the implementation does not conform to this Standard)
Date of statement	

A.3.3 General

Item	Question/feature	Reference	Status	N/A	Support
A1	Behaviour as an Originating PINX for ANF-TC in association with basic circuit switched call control (ISO/IEC DIS 13247)	6.2.1, 6.4.1	o.1		Yes [] No []
A2	Behaviour as an Originating PINX for ANF-TC in association with call independent signalling connections (ECMA-254)	6.2.1, 6.4.1	o.1		Yes [] No []
A3	Behaviour as a Terminating PINX for ANF-TC in association with basic circuit switched call control (ISO/IEC DIS 13247)	6.2.2, 6.4.2	o.1		Yes [] No []
A4	Behaviour as a Terminating PINX for ANF-TC in association with call independent signalling connections (ECMA-254)	6.2.2, 6.4.2	o.1		Yes [] No []
A5	Behaviour as a Transit PINX for ANF-TC in association with basic circuit switched call control (ISO/IEC DIS 13247)	6.2.3, 6.4.3	o.1		Yes [] No []
A6	Behaviour as a Transit PINX for ANF-TC in association with call independent signalling connections (ECMA-254)	6.2.3, 6.4.3	o.1		Yes [] No []
A7	Behaviour as an Incoming Gateway PINX for ANF-TC in association with basic circuit switched call control (ISO/IEC DIS 13247)	6.4.4	o.1		Yes [] No []
A8	Behaviour as an Incoming Gateway PINX for ANF-TC in association with call independent signalling connections (ECMA-254)	6.4.4	o.1		Yes [] No []
A9	Behaviour as an Outgoing Gateway PINX for ANF-TC in association with basic circuit switched call control (ISO/IEC DIS 13247)	6.4.5	o.1		Yes [] No []
A10	Behaviour as an Outgoing Gateway PINX for ANF-TC in association with call independent signalling connections (ECMA-254)	6.4.5	o.1		Yes [] No []

Printed copies can be ordered from:

ECMA

114 Rue du Rhône
CH-1204 Geneva
Switzerland

Fax: +41 22 849.60.01

Internet: helpdesk@ecma.ch

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**114 Rue du Rhône
CH-1204 Geneva
Switzerland**

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