

## STANDARDS AUSTRALIA/STANDARDS NEW ZEALAND

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**Amendment No. 1**  
**to**  
**AS/NZS 4328:1997**  
**Information technology—Telecommunications and information exchange between**  
**systems—Private integrated services network—Inter-exchange signalling**  
**protocol—Path replacement additional network feature**

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**REVISED TEXT**

The 1997 edition of AS/NZS 4328 is amended as follows; the amendments should be inserted in the appropriate places.

**SUMMARY:** This Amendment is reproduced from and is identical with ISO/IEC 13874:1995 Technical Corrigendum 1 1996 and applies to subclause 6.9.5.2.1 and subclause A.3.3 of Annex A.

Published on 5 September 1997.

Approved for publication in New Zealand on behalf of the Standards Council of New Zealand on 5 July 1997.

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**TECHNICAL CORRIGENDUM 1**

*Page 16*

**Subclause 6.9.5.2.1**

Delete the following text from the first paragraph: ", except that if the old path is released as a result of successful ANF-PR, signalling shall continue using the new path".

Delete NOTE 26.

Add the following to the end of the subclause:

"As an exceptional procedure, if after receipt of a callTransferComplete, callTransferIdentify or callTransferInitiate invoke APDU while acting as an ANF-PR cooperating PINX in ANF-PR state PR-Coop-Establishment or PR-Coop-Retain, the old path is released as a result of successful ANF-PR before SS-CT signalling is complete, SS-CT shall be allowed to proceed normally using the new path for further signalling.

NOTE 26 The requesting PINX will normally abandon ANF-PR by sending back a pathReplaceSetup return error APDU because SS-CT has been invoked. Therefore switch over to a new path will not normally occur."

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**Subclause A.3.3**

Add the following questions to the end of the table, immediately after question A6:

|    |                                                                                                                                            |  |   |  |                                                                                                                                                                                                              |
|----|--------------------------------------------------------------------------------------------------------------------------------------------|--|---|--|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A7 | Are methods of avoiding «loss of user information» (as described in Annex B of ISO/IEC 13863) supported at the Requesting PINX?            |  | o |  | <p>Yes [ ] No [ ]</p> <p>Please provide information regarding which methods are supported and for which basic services these methods are applicable.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> |
| A8 | Are methods of avoiding «loss of user information» (as described in Annex B of ISO/IEC 13863) supported at the Cooperating/Branching PINX? |  | o |  | <p>Yes [ ] No [ ]</p> <p>Please provide information regarding which methods are supported and for which basic services these methods are applicable.</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> |

**AS/NZS 4328:1997**  
ISO/IEC 13874:1995

**Australian/New Zealand Standard<sup>®</sup>**

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**Information technology—  
Telecommunications and  
information exchange between  
systems—Private integrated  
services network—Inter-exchange  
signalling protocol—Path  
replacement additional network  
feature**

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**AS/NZS 4328:1997**

This Joint Australian/New Zealand Standard was prepared by Joint Technical Committee IT/16, Private Telecommunications Networking. It was approved on behalf of the Council of Standards Australia on 24 December 1996 and on behalf of the Council of Standards New Zealand on 3 December 1996. It was published on 5 March 1997.

The following interests are represented on Committee IT/16:

Airline interests, New Zealand  
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 Australia Post  
 Australian Electrical and Electronic Manufacturers Association  
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 New Zealand Standards Committee SC 605 WG1  
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AS/NZS 4328:1997

## Australian/New Zealand Standard<sup>®</sup>

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### **Information technology— Telecommunications and information exchange between systems—Private integrated services network—Inter-exchange signalling protocol—Path replacement additional network feature**

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## PREFACE

This Standard was prepared by the Joint Standards Australia/Standards New Zealand Committee IT/16, Private Telecommunication Networking, to supersede AS/NZS 4328(Int):1995.

This Standard is identical with, and has been reproduced from, ISO/IEC 13874:1995, *Information technology—Telecommunications and information exchange between systems—Private Integrated Services Network—Inter-exchange signalling protocol—Path replacement additional network feature*.

The objective of this Standard is to provide private integrated services network (PISN) designers and users with the specification for the signalling protocol for use at the Q reference point in order to allow calls between PISN exchanges to be replaced by a new connection worldwide.

The Standard is one of a series of ISO/IEC Standards applicable to private integrated services networking. The series uses the ISDN concepts as developed by ITU-T and is also within the framework of Standards for Open Systems Interconnection (OSI) as defined by ISO/IEC JTC 1.

Statements expressed in mandatory terms in notes to tables, figures or clauses are deemed to be requirements of this Standard.

Users of this Standard are advised by Standards Australia and Standards New Zealand, under arrangements made with ISO and IEC, as well as certain other Standards organizations, that the number of this Standard is not reproduced on each page; its identity is shown only on the cover, inside front cover and title pages.

The terms 'normative' and 'informative' have been used in this Standard to define the application of the annex to which they apply. A 'normative' annex is an integral part of a Standard, whereas an 'informative' annex is only for information and guidance.

For the purpose of this Joint Standard, the ISO/IEC text should be modified as follows:

- (a) *Terminology* The words 'this Australian/New Zealand Standard' should replace the words 'this International Standard' wherever they appear.
- (b) *References* The references to international Standards should be replaced by references, where appropriate, to the following Australian or Joint Australian/New Zealand Standards:

| <i>Reference to International Standard<br/>or other Publication</i> |                                                                                                                                                                                                                          | <i>Australian/New Zealand Standard</i> |                                                                                                                                                                                                                          |
|---------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ISO/IEC                                                             |                                                                                                                                                                                                                          | AS/NZS                                 |                                                                                                                                                                                                                          |
| 11571                                                               | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Numbering and<br>sub-addressing in Private Integrated<br>Services Networks                                                  | 4134                                   | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Numbering and<br>sub-addressing in private integrated<br>services networks                                                  |
| 11572                                                               | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private Integrated<br>Services Network—Circuit mode<br>bearer services—Inter-exchange<br>signalling procedures and protocol | 4137                                   | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private integrated<br>services network—Circuit mode<br>bearer services—Inter-exchange<br>signalling procedures and protocol |

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| ISO/IEC       |                                                                                                                                                                                                                                                                          | AS/NZS |                                                                                                                                                                                                                                                                          |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 11574         | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private Integrated<br>Services Network—Circuit-mode<br>64 kbit/s bearer services—Service<br>description, functional capabilities<br>and information flows                   | 4135   | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private integrated<br>services network—Circuit-mode<br>64 kbit/s bearer services—Service<br>description, functional capabilities<br>and information flows                   |
| 11579         | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private integrated<br>services network                                                                                                                                      | 4136   | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private integrated<br>services network                                                                                                                                      |
| 11579-1       | Part 1: Reference configuration for<br>PISN Exchanges (PINX)                                                                                                                                                                                                             | 4136.1 | Part 1: Reference configuration for<br>PISN exchanges (PINX)                                                                                                                                                                                                             |
| 11582         | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private Integrated<br>Services Network—Generic<br>functional protocol for the support<br>of supplementary services—<br>Inter-exchange signalling procedures<br>and protocol | 4239   | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private integrated<br>services network—Generic<br>functional protocol for the support<br>of supplementary services—<br>Inter-exchange signalling<br>procedures and protocol |
| 13863         | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private Integrated<br>Services Network—Specification,<br>functional model and information<br>flows—Path replacement additional<br>network feature                           | 4335   | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private integrated<br>services network—Specification,<br>functional model and information<br>flows—Path replacement additional<br>network feature                           |
| 13869         | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private Integrated<br>Services Network—Inter-exchange<br>signalling protocol—Call transfer<br>supplementary services                                                        | 4339   | Information technology—<br>Telecommunications and<br>information exchange between<br>systems—Private integrated<br>services network—Inter-exchange<br>signalling protocol—Call transfer<br>supplementary services                                                        |
| CCITT (ITU-T) |                                                                                                                                                                                                                                                                          |        |                                                                                                                                                                                                                                                                          |
| Rec.I.112     | Vocabulary of terms for ISDNs<br>(Blue Book)                                                                                                                                                                                                                             | —      |                                                                                                                                                                                                                                                                          |
| Rec.I.130     | Method for the characterization of<br>telecommunication services<br>supported by an ISDN and network<br>capabilities of an ISDN (Blue Book)                                                                                                                              | —      |                                                                                                                                                                                                                                                                          |
| Rec.I.210     | Principles of Telecommunication<br>services supported by an ISDN and<br>the means to describe them                                                                                                                                                                       | —      |                                                                                                                                                                                                                                                                          |

|                                                                                                                                         |        |
|-----------------------------------------------------------------------------------------------------------------------------------------|--------|
| CCITT (ITU-T)                                                                                                                           | AS/NZS |
| Rec Z.100 Specification and Description<br>Language (Blue Book)                                                                         | —      |
| ITU-T                                                                                                                                   |        |
| Rec.Q.950 Digital Subscriber Signalling<br>System No.1 (DSS1)—<br>Supplementary services protocols,<br>structure and general principles | —      |

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## AUSTRALIAN/NEW ZEALAND STANDARD

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

## 1 Scope

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

ANF-PR is a feature which applies to an established call, allowing that call's connection between PINXs to be replaced by a new connection.

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 L.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 13863.

The signalling protocol for ANF-PR 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-PR 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 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, *Information technology - Telecommunications and information exchange between systems - Numbering and sub-addressing in Private Integrated Services Networks*.

ISO/IEC 11572:1994, *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 13863:1995, *Information technology - Telecommunications and information exchange between systems - Private Integrated Services Network - Specification, functional model and information flows - Path replacement additional network feature.*

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

CCITT Rec. I.112(1988), *Vocabulary of terms for ISDNs (Blue Book).*

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

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

CCITT Rec. Z.100(1988), *Specification and Description Language (Blue Book).*

ITU-T Rec. Q.950(1993), *Digital Subscriber Signalling System No. 1 (DSS1) - Supplementary services protocols, structure and general principles.*

## 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:

|                                                       |                    |
|-------------------------------------------------------|--------------------|
| – ANF-PR user                                         | (ISO/IEC 13863)    |
| – Application Protocol Data Unit (APDU)               | (ISO/IEC 11582)    |
| – Basic Service                                       | (CCITT Rec. I.210) |
| – Call, Basic Call                                    | (ISO/IEC 11582)    |
| – Connection                                          | (ISO/IEC 13863)    |
| – Incoming Gateway PINX                               | (ISO/IEC 11572)    |
| – Interpretation APDU                                 | (ISO/IEC 11582)    |
| – Network Facility Extension (NFE)                    | (ISO/IEC 11582)    |
| – New Connection                                      | (ISO/IEC 13863)    |
| – Old Connection                                      | (ISO/IEC 13863)    |
| – Originating PINX                                    | (ISO/IEC 11572)    |
| – Outgoing Gateway 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) |
| – Supplementary Service                               | (CCITT Rec. I.210) |
| – Supplementary Services Control Entity               | (ISO/IEC 11582)    |
| – Terminating PINX                                    | (ISO/IEC 11572)    |
| – Transit PINX                                        | (ISO/IEC 11572)    |
| – Trombone Connection                                 | (ISO/IEC 13863)    |

## 4.2 Other definitions

**4.2.1 branching PINX:** The Transit PINX at which the retained connection finishes and the new connection starts.

**4.2.2 cooperating PINX:** The end PINX which initiates the establishment of the new connection towards other end PINX involved in the call.

**4.2.3 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, an Incoming Gateway PINX or an Outgoing Gateway PINX.

**4.2.4 preceding PINX:** The adjacent PINX in the direction of the cooperating PINX, relative to a particular PINX involved in the old connection.

NOTE 1 — This can be the cooperating PINX itself or a Transit PINX.

**4.2.5 replaced connection:** That part of the old connection which is not retained and is replaced by the new connection.

**4.2.6 requesting PINX:** The end PINX which invokes ANF-PR and towards which the new connection is routed.

**4.2.7 retained connection:** That part of the old connection which is retained and not replaced by the new connection.

**4.2.8 subsequent PINX:** The adjacent PINX in the direction of the requesting PINX, relative to a particular PINX involved in the old connection.

NOTE 2 — This can be the requesting PINX itself or a Transit PINX.

## 5 List of acronyms

|        |                                               |
|--------|-----------------------------------------------|
| ANF    | Additional Network Feature                    |
| ANF-PR | Path Replacement additional network feature   |
| APDU   | Application Protocol Data Unit                |
| ASN.1  | Abstract Syntax Notation no. 1                |
| 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-CT  | Call Transfer supplementary service           |

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

### 6.1 ANF-PR description

ANF-PR is invoked by an ANF-PR user for an established call, allowing that call's connection through the PISN to be replaced by a new connection. If the new connection is required to satisfy certain criteria, ANF-PR should be used in conjunction with other supplementary services and/or ANFs. In the absence of specific criteria, the new connection should be established using the routing rules which apply to basic call establishment.

NOTE 3 — Annex A of ISO/IEC 13863 gives examples of the circumstances under which ANF-PR can be used and criteria which can govern the selection of the new connection.

The requesting PINX shall request the cooperating PINX to attempt the establishment of a new connection from the cooperating PINX to the requesting PINX. If successful, the new connection shall replace the old connection.

NOTE 4 — The requesting PINX can be either end PINX involved in a call, i.e., the Originating PINX or the Terminating PINX or, in the case of interworking with another network, the Incoming Gateway PINX or Outgoing Gateway PINX.

Optional procedures and coding are specified for allowing the retention of one or more elements of the old connection, starting from the cooperating PINX and continuing as far as a Transit PINX, subject to any given criteria being achievable in that way. A new connection is established from the Transit PINX to the requesting PINX instead of from the cooperating PINX to the requesting PINX.

## **6.2 ANF-PR operational requirements**

### **6.2.1 Requirements on the cooperating PINX**

ANF-PR shall be applicable to a call whose protocol control state, as defined in ISO/IEC 11572, is Active.

NOTE 5 — State Active will have been reached as a result of ISO/IEC 11572 call establishment procedures, possibly in conjunction with supplementary service and/or ANF procedures.

ISO/IEC 11572 protocol control procedures for call establishment at the outgoing side of an inter-PINX link shall apply to the establishment of the new connection. ISO/IEC 11572 protocol control procedures for call clearing shall apply to the release of the old connection in the event of successful switch over to the new connection.

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 the requesting PINX**

ANF-PR shall be applicable to a call whose protocol control state, as defined in ISO/IEC 11572, is Active.

NOTE 6 — State Active will have been reached as a result of ISO/IEC 11572 call establishment procedures, possibly in conjunction with supplementary service and/or ANF procedures.

ISO/IEC 11572 protocol control procedures for call establishment at the incoming side of an inter-PINX link shall apply to the establishment of the new connection. ISO/IEC 11572 protocol control procedures for call clearing shall apply to the release of the old connection in the event of successful switch over to the new connection.

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 Transit PINX**

#### **6.2.3.1 Transit PINX involved in the replaced connection**

ANF-PR shall be applicable to a call whose protocol control state, as defined in ISO/IEC 11572, on each of the two links (incoming and outgoing) is Active and whose call control state, as defined in ISO/IEC 11572 is TCC\_Call\_Active.

NOTE 7 — State Active will have been reached as a result of ISO/IEC 11572 call establishment procedures, possibly in conjunction with supplementary service and/or ANF procedures.

ISO/IEC 11572 protocol control and call control procedures for call clearing at a Transit PINX shall apply to the release of the old connection in the event of successful switch over to the new connection.

Generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for a Transit PINX, shall apply. For ANF-PR the requirements are limited to the passing on of Facility information elements for which the destination, as indicated in the Network Facility Extension (NFE), is not the Transit PINX.

#### **6.2.3.2 Transit PINX involved in the new connection**

ISO/IEC 11572 protocol control and call control procedures for call establishment at a Transit PINX shall apply to the establishment of the new connection.

ISO/IEC 11572 protocol control and call control procedures for call clearing at a Transit PINX shall apply to the release of the new connection in the event of failure to complete ANF-PR successfully.

Generic procedures for the call-related control of supplementary services, as specified in ISO/IEC 11582 for a Transit PINX, shall apply. For ANF-PR the requirements are limited to the passing on of Facility information elements for which the destination, as indicated in the Network Facility Extension (NFE), is not the Transit PINX.

#### **6.2.3.3 Transit PINX involved in the retained connection**

The procedures below are applicable only if the optional procedures for retention of part of the old connection (6.6) are

ANF-PR shall be applicable to a call whose protocol control state, as defined in ISO/IEC 11572, on each of the two links (incoming and outgoing) is Active and whose call control state, as defined in ISO/IEC 11572 is TCC\_Call\_Active.

NOTE 8 — State Active will have been reached as a result of ISO/IEC 11572 call establishment procedures, possibly in conjunction with supplementary service and/or ANF procedures.

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

#### **6.2.3.4 Branching PINX**

The procedures below are applicable only if the optional procedures for retention of part of the old connection (6.6) are supported.

ANF-PR shall be applicable to a call whose protocol control state, as defined in ISO/IEC 11572, on each of the two links (incoming and outgoing) is Active and whose call control state, as defined in ISO/IEC 11572 is TCC\_Call\_Active.

NOTE 9 — State Active will have been reached as a result of ISO/IEC 11572 call establishment procedures, possibly in conjunction with supplementary service and/or ANF procedures.

ISO/IEC 11572 protocol control procedures for call establishment at the outgoing side of an inter-PINX link shall apply to the establishment of the new connection. ISO/IEC 11572 protocol control procedures for call clearing shall apply to the release of the replaced connection in the event of successful switch over to the new connection.

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-PR coding requirements**

#### **6.3.1 Operations**

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