
**Information technology —
Telecommunications and information
exchange between systems — Broadband
Private Integrated Services Network —
Inter-exchange signalling protocol —
Basic call/connection control**

*Technologies de l'information — Télécommunications et échange
d'information entre systèmes — Réseau privé à large bande à intégration
de services — Protocole de signalisation d'échange — Appel de
base/contrôle de connexion*

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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. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 13247 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 6, *Telecommunications and information exchange between systems*.

Annexes A and B form an integral part of this International Standard. Annexes C to L are for information only.

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Introduction

This International Standard is one of a series of International Standards defining services and signalling protocols applicable to Broadband Private Integrated Services Networks (B-PISNs). The series uses B-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 particular International Standard specifies the signalling protocol for use at the Q reference point for basic call/connection control (B-QSIG-BC).

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Information technology — Telecommunications and information exchange between systems — Broadband Private Integrated Services Network — Inter-exchange signalling protocol — Basic call/connection control

1 Scope

This International Standard defines the signalling protocol for the purpose of basic call/connection control at the Q reference point between Private Integrated Services Network Exchanges (PINXs) connected together within a Broadband Private Integrated Services Network (B-PISN) employing Asynchronous Transfer Mode (ATM). This International Standard is part of the B-QSIG signalling system.

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

This International Standard is an application of the signalling protocol that forms part of the ATM Forum's PNNI 1.0 specification, which in turn is based on ITU-T Recommendation Q.2931, including the provisions for symmetrical operation described in annex H of recommendation Q.2931. Technical differences compared with the signalling protocol specified in PNNI 1.0 are summarized in annex J. Guidelines for interworking between a network employing the signalling protocol specified in this International Standard and a network employing the ATM Forum's PNNI 1.0 specification are given in annex L.

This International Standard is applicable to PINXs which interconnect to form a B-PISN using static hop-by-hop routing. It therefore complements the ATM Forum's PNNI 1.0 specification, which is applicable to networks that employ dynamic source routing.

The basic capabilities supported by the protocol specified in this International Standard are listed below and described in more detail in annex F:

- demand (switched) virtual channel and virtual path connections;
- point-to-point switched virtual channel and virtual path connections;
- point-to-multipoint virtual channel connections;
- connections with symmetric or asymmetric bandwidth requirements;
- single-connection (point-to-point) calls;
- basic signalling functions via protocol messages, information elements, and procedures;
- CBR, VBR (realtime and non-realtime), UBR and ABR service categories;
- negotiation of certain signalling parameters;
- inter-PINX virtual channel identifier (IPVCI) negotiation;
- out-of-band signalling for all signalling messages;
- error recovery;
- B-PISN addressing formats;
- end-to-end compatibility parameter identification;
- signalling interworking with N-PISN and provision of N-PISN services;
- forward compatibility;
- call/connection handling at different types of PINX, including Transit PINX, Originating PINX, Terminating PINX, Incoming Gateway PINX, Outgoing Gateway PINX and Interworking PINX;
- Signalling of individual QoS parameters
- ATM anycast addresses
- Negotiation of ATM traffic descriptors

- Soft PVPC and PVCC support
- Generic Identifier Transport

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

3.1 References from ISO, IEC or ITU-T

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 8348:1996, *Information technology — Open Systems Interconnection — Network Service Definition*.

ISO/IEC 9646-1:1994, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 1: General concepts*.

ISO/IEC 9646-7:1995, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 7: Implementation Conformance Statements*.

ISO/IEC 11571:1994, *Information technology — Telecommunications and information exchange between systems — Numbering and sub-addressing in private integrated services networks*.

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

ISO/IEC 11574:1994, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Circuit-mode 64 kbit/s bearer services — Service description, functional capabilities and information flows*.

ISO/IEC 11584:1996, *Information technology — Telecommunications and information exchange between systems — Private Integrated Services Network — Circuit-mode multi-rate 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 13246:1997, *Information technology — Telecommunications and information exchange between systems — Broadband Private Integrated Services Network — Inter-exchange signalling protocol — Signalling ATM adaptation layer*.

CCITT Rec. E.164:1991, *Numbering plan for the ISDN era*.

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

CCITT Rec. I.330:1988, *ISDN numbering and addressing principles (Blue Book)*.

CCITT Rec. Q.9:1988, *Vocabulary of switching and signalling terms (Blue Book)*.

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

ITU-T Rec. I.321:1991, *B-ISDN protocol reference model and its application*.

ITU-T Rec. I.363:1996, *B-ISDN ATM adaptation layer (AAL) specification*.

ITU-T Rec. I.371:1996, *Traffic control and congestion control in B-ISDN*.

ITU-T Rec. I.610:1994, *B-ISDN operation and maintenance principles and functions*.

ITU-T Rec. Q.2931:1995, *Broadband Integrated Services Digital Network (B-ISDN) — Digital Subscriber Signalling System No. 2 (DSS2) — User-Network Interface (UNI) layer 3 specification for basic call/connection control*.

ITU-T Rec. Q.2971:1996, *Broadband Integrated Services Digital Network (B-ISDN) — Digital Subscriber Signalling System No. 2 (DSS2) — User-Network Interface (UNI) layer 3 specification for point-to-multipoint call/connection control*.

3.2 References from other sources

All references in this subclause were correct at the time of approval of this International Standard. The provisions of the referenced specifications, as identified in this subclause, are valid within the context of this IS. The reference to a specification within this IS does not give it any further status within ISO/IEC; in particular, it does not give the referenced specification the status of an International Standard.

ATM Forum PNNI 1.0: 1996, *Private Network-Network Interface Specification Version 1.0 (af-pnni-0055.000)*.

ATM Forum UNI 4.0: 1996, *User-Network Interface (UNI) Signalling Specification Version 4.0 (af-sig-0061.000)*

4 Definitions

For the purposes of this International Standard, the following definitions apply.

4.1 Definitions in PNNI 1.0

References contained in sections 2.2 and 6.1 of PNNI 1.0 are applicable with the exception of the definitions applicable to the routing sections of PNNI 1.0 and with the exception of terms for which there are replacement definitions in 4.2 and 4.3 of this International Standard.

Where text of PNNI 1.0 is referenced from this International Standard, terms used within the referenced text shall be interpreted as shown in Table 1.

Table 1 — Interpretation of PNNI terms

Term used in PNNI referenced text	Interpretation for the purposes of this International Standard
network node	PINX
call	call/connection
logical link	inter-PINX link (IPL)
physical link	inter-PINX link (IPL)
virtual channel identifier (VCI)	inter-PINX virtual channel identifier (IPVCI)
virtual path identifier (VPI)	inter-PINX virtual path identifier (IPVPI)
PNNI interface	inter-PINX link (IPL)
PNNI link	inter-PINX link (IPL)

4.2 Other external definitions

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

- ATM transfer capability (ATC) (ITU-T Rec. I.371)
- connection (CCITT Rec. Q.9)
- F5 (ITU-T Rec. I.610)
- private integrated services network (PISN) (ISO/IEC 11579-1)
- private integrated services network exchange (PINX) (ISO/IEC 11579-1)
- signalling (CCITT Rec. I.112)
- user plane (CCITT Rec. I.321)

4.3 Other definitions

4.3.1 ATM endsystem address: the address of a point of attachment to an ATM network.

4.3.2 broadband private integrated services network (B-PISN): a PISN that offers ATM services to its users and

employs ATM transmission between PINXs and ATM switching.

4.3.3 call: an association between two or more users for the use or attempted use of a telecommunication service.

4.3.4 call/connection: a call combined with a single connection in the user plane for the transfer of user information.

4.3.5 en bloc: a method of signalling the called party number information in which all called party number digits are sent in the first message.

4.3.6 gateway PINX: within the context of a call/connection, a PINX which performs interworking between B-QSIG and another signalling system.

4.3.7 incoming call/connection: a call/connection using an IPL from the point of view of the succeeding side of that IPL.

4.3.8 incoming gateway PINX: a Gateway PINX that routes a call/connection from a route employing another signalling system on to an IPL employing B-QSIG signalling. (See Figure 1.)

4.3.9 information element: a component of a message.

4.3.10 information element with invalid contents: an information element that is recognized, but whose contents cannot be interpreted as valid using the rules specified in clause 8 of this International Standard, or that contains field values that are marked as «reserved» in clause 8 of this International Standard.

4.3.11 inter-PINX link (IPL): a link between the Q reference points of two PINXs, the link comprising a signalling IPVC together with one or more user information IPVCs under the control of that signalling IPVC.

4.3.12 inter-PINX virtual channel (IPVC): one of a number of bi-directional transfers of digital information, multiplexed at the ATM layer, between two PINXs.

NOTE 1. An IPVC can be a single virtual channel or a concatenation of virtual channels.

4.3.13 inter-PINX virtual channel identifier (IPVCI): an integer that identifies an IPVC within the context of an IPVP.

4.3.14 inter-PINX virtual path (IPVP): a grouping of one or more IPVCs within a single IPL.

4.3.15 inter-PINX virtual path identifier (IPVPI): an integer that identifies an IPVP within the context of an IPL.

4.3.16 interworking PINX: within the context of a call/connection, a PINX that performs interworking between a B-PISN and a N-PISN.

NOTE 2. An interworking PINX will also be either an Originating PINX, a Terminating PINX or a Gateway PINX.

4.3.17 narrow-band private integrated services network (N-PISN): a PISN that offers only 64 kbit/s-based services to its users.

4.3.18 originating PINX: within the context of a call/connection, the PINX to which the calling user is attached. (See Figure 1.)

4.3.19 outgoing call/connection: a call/connection using an IPL from the point of view of the preceding side of that IPL.

4.3.20 outgoing gateway PINX: a Gateway PINX that routes an incoming call/connection from an IPL employing B-QSIG signalling on to a route employing another signalling system. (See Figure 1.)

4.3.21 overlap: a method of signalling the called party number information in which not all called party number information is sent in the same message.

4.3.22 preceding PINX: within the context of a call/connection using an IPL, the PINX to which the preceding side of the IPL belongs, from the point of view of the PINX to which the succeeding side of the IPL belongs.

4.3.23 preceding side: in the context of a call/connection using an IPL, the side that initiates call/connection establishment over that IPL. (See Figure 1.)

4.3.24 public broadband ISDN (public B-ISDN): a public ISDN that offers ATM services to its users and employs ATM transmission and switching.

4.3.25 public integrated services digital network (public ISDN): a network that provides to the general public a range of different telecommunication services using digital connections.

4.3.26 public narrow-band ISDN (public N-ISDN): a public ISDN that offers to the general public only 64 kbit/s-based services.

- 4.3.27 side:** the Protocol Control entity in a PINX at one end of an IPL.
 - 4.3.28 signalling AAL (SAAL):** the AAL used for the bi-directional transfer of layer 3 signalling information.
 - 4.3.29 succeeding PINX:** within the context of a call/connection using an IPL, the PINX to which the succeeding side of the IPL belongs, from the point of view of the PINX to which the preceding side of the IPL belongs.
 - 4.3.30 succeeding side:** in the context of a call/connection using an IPL, the opposite side from the side that initiates call/connection establishment over that IPL. (See Figure 1.)
 - 4.3.31 terminating PINX:** within the context of a call/connection, the PINX to which the called user is attached. (See Figure 1.)
 - 4.3.32 transit PINX:** within the context of a call/connection, any PINX through which the call/connection passes, excluding any Originating PINX, Terminating PINX, Incoming Gateway PINX or Outgoing Gateway PINX. (See Figure 1.)
 - 4.3.33 unexpected message:** within the context of a particular Protocol Control state, a message that is recognized, but for which no procedures are defined in 9.6 of this International Standard (or in any other Standard relating to B-QSIG to which the PINX claims conformance) for receipt in that Protocol Control state.
 - 4.3.34 unrecognized information element:** an information element received in a particular message which is not specified as part of that message in clause 7 of this International Standard or in any other Standard relating to B-QSIG to which the PINX claims conformance (e.g., a Standard specifying generic procedures for supplementary services).
- NOTE 3. The handling of national/private information elements is outside the scope of this International Standard (see annex H).
- 4.3.35 unrecognized message:** a message that is not specified in clause 7 of this International Standard or in any other Standard relating to B-QSIG to which the PINX claims conformance (e.g., a Standard specifying generic procedures for supplementary services).
- NOTE 4. The handling of national/private messages is outside the scope of this International Standard (see annex H).
- 4.3.36 unspecified bit rate (UBR):** an ATM service category for which no traffic-related service guarantees are specified.
 - 4.3.37 virtual channel:** one of a number of multiplexed, bi-directional transfers of digital data provided by the ATM layer across an interface between two ATM switching points.
 - 4.3.38 virtual channel connection:** a concatenation of virtual channels that extends between two points where the ATM adaptation layer is accessed.

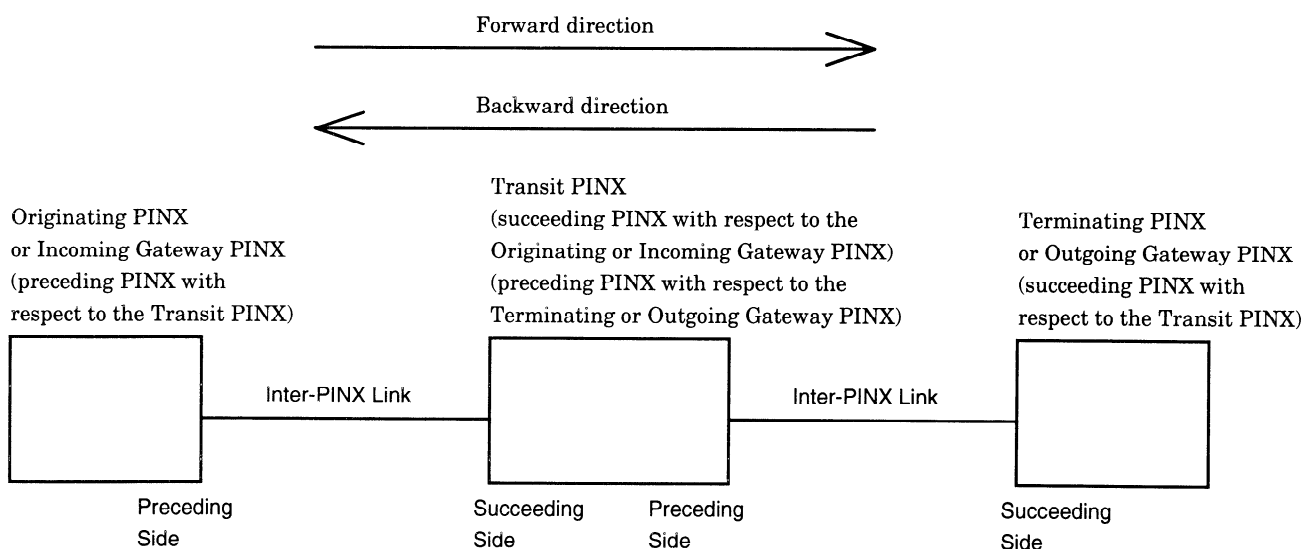


Figure 1 — Illustration of terminology through example of a call/connection routed over two inter-PINX links

5 List of acronyms

Abbreviations contained in section 2.1 of ATM Forum's PNNI 1.0 are applicable with the following additions and/or