ATIS-1000614.1991(R2012)

Integrated Services Digital Network (ISDN) – Packet Mode Bearer Service Category Description

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Integrated Services Digital Network (ISDN) – Packet Mode Bearer Service Category Description

Secretariat

Exchange Carriers Standards Association

Approved April 8, 1991

American National Standards Institute, Inc.

Abstract

This standard defines a recommended set of packet mode bearer service categories, describes individual packet mode bearer services, and recommends their provision as ISDN-based services in North America. The definitions and descriptions in this standard form the basis for defining the network capabilities required for the support of ISDN-based packet mode bearer services. Bearer service categories are described by prose definitions and descriptions, by attributes and their values, and by dynamic descriptions. The packet mode bearer service categories that are currently identified are the virtual call and permanent virtual circuit bearer service category; the connectionless bearer service category; the user signaling bearer service category; and the frame mode bearer service category. Only the virtual call and permanent virtual circuit bearer service category is included in this issue.

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Foreword (This foreword is not part of American National Standard T1.614-1991.)

This standard defines a recommended set of packet mode bearer service categories, describes individual packet mode bearer services, and recommends their provision as ISDN-based services in North America. The definitions and descriptions in this standard form the basis for defining the network capabilities required for the support of ISDN-based packet mode bearer services. Bearer service categories are described by prose definitions and descriptions, by attributes and their values, and by dynamic descriptions. The packet mode bearer service categories that are currently identified are the virtual call and permanent virtual circuit bearer service category; the connectionless bearer service category; the user signaling bearer service category; and the frame mode bearer service category. Only the virtual call and permanent virtual circuit bearer service category is included in this issue.

Manufacturers of ISDN user terminals and manufacturers of ISDN switching equipment can apply this standard to the design and development of their products.

This standard was developed by Working Group T1S1.1 of Accredited Standards Committee T1, Telecommunications. Many of T1S1.1's participants are also active participants in similar activities of the CCITT. Therefore, this standard is consistent with CCITT Recommendation I.232 (1988).

This standard contains one bibliographic annex. This annex is for information only and is not considered part of the standard.

Suggestions for improvement of this standard will be welcome. They should be sent to the Exchange Carriers Standards Association, T1 Secretariat; 5430 Grosvenor Lane; Bethesda, Maryland 20814-2122.

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American National Standard for Telecommunications –

Integrated Services Digital Network (ISDN) – Packet Mode Bearer Service Category Description

1 Scope, purpose and application

The International Telegraph and Telephone Consultative Committee (CCITT) Recommendation I.210 describes the principles for defining Integrated Services Digital Network (ISDN)-based telecommunication services including the concept of bearer services, teleservices and supplementary services. It also provides the means for the definition and description of such services.

The purpose of this standard is to define a recommended set of packet mode bearer services categories, to describe individual packet mode bearer services and to recommend their provision as ISDN-based services in North America. The definitions and descriptions form the basis to define the network capabilities required for the support of ISDN-based packet mode bearer services. Individual packet mode bearer services, from any category, are bursty in character and may, in combination, create congestion on the D channel. The issues of congestion and of mechanisms for dealing with it are not addressed in this standard. Contention between information on SAPI 0 and SAPI 16 is not covered in this standard nor is it explicitly dealt with in ANSI T1.602. In particular, the mechanism for handling non-SAPI 0 information when SAPI 0 information is in contention with it on a D channel needs to be defined.

Bearer service categories are described by prose definitions and descriptions, by attributes and their values and by dynamic descriptions following the description method given in CCITT Recommendation I.130. The application of the attribute method and the definitions of these attributes and attribute values is given in CCITT Recommendation I.140.

The following set of packet mode bearer services categories is currently identified and more may be identified in the future:

a) virtual call and permanent virtual circuit bearer service category;

b) connectionless bearer service category;

c) user signaling bearer service category;

d) frame mode bearer service category.

Only the virtual call and permanent virtual circuit bearer service category is included in this issue.

NOTE – Frame Mode Bearer Services may also provide services similar to virtual call and permanent virtual circuit. The other categories are for further study.

This standard is based on CCITT Recommendation I.232. The only technical differences between this standard and CCITT Recommendation I.232 are that this standard mentions D channel congestion (see clause 1, paragraph 2) and this standard mentions permanent virtual circuits on the D channel (see 3.1.3.1.2).

2 Normative references

The following standards and publications contain provisions which, through reference in this text, constitute provisions of this American National Standard. At the time of

publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this American National Standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

ANSI T1.601-1988, *Telecommunications–Integrated services digital network (ISDN)–Basic access interface for use on metallic loops for application at the network side of the NT–Layer 1 specification*

ANSI T1.602-1989, *Telecommunications–Integrated services digital network (ISDN)–Data link layer signalling specification for application at the user-network interface–Layer 2 specification*

ANSI T1.605-1989, *Integrated services digital network (ISDN)–Basic access interface for S and T reference points–Layer 1 specification*

ANSI T1.607-1990, *Digital subscriber signalling system No. 1 (DSS1)–Layer 3 signalling specification for circuit switched bearer service*

ANSI T1.608-1990, *Digital subscriber signalling system No. 1 (DSS1)–Layer 3 signalling specification for X.25 packet switched bearer service*

CCITT Recommendation I.232, *Packet mode bearer services categories* [1),2)]

CCITT Recommendation I.431, *Primary rate user-network interface–Layer 1 specification* [1),2)]

CCITT Recommendation X.2, *International data transmission services and optional user facilities in public data networks and ISDNs* [1),2)]

CCITT Recommendation X.25, *Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuit* [1),2)]

CCITT Recommendation X.300, *General principles for interworking between public networks, and between public networks and other networks for the provision of data transmission services* [1),2)]

3 Virtual call and permanent virtual circuit bearer service category

3.1 Prose description

3.1.1 Definition

This bearer service category provides the unrestricted transfer (without alteration) of user information in a packetized manner over a virtual circuit within a B or D channel at the S,T, or U reference point. Signaling information for a virtual call is transferred via a p B or D channel as described in ANSI T1.608.

3.1.2 General description

This packet mode bearer service category allows users (e.g., terminals) in a point-to-point communication configuration to communicate via ISDN technology using X.25 encoding, by means of ANSI T1.608 procedures over either B or D channels, in both directions continuously and simultaneously for the duration of a call.

3.1.3 Procedures

Detailed procedures for virtual calls appear in ANSI T1.608 Case B. This description is a synopsis of those procedures. For actual, complete procedures, refer to ANSI T1.608.

3.1.3.1 Normal procedures for invocation and operation

3.1.3.1.1 Virtual call procedures

a) Call establishment

For virtual calls, X.25 will be used on an active channel (B or D) to the packet handler. In order to establish that channel or to negotiate the type of channel to be used, out-of-band signaling procedures may be used. Once connected to the packet handler, remaining call information, including called user address, are signaled in the X.25 call request.

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1) Available from American National Standards Institute, 11 West 42nd Street, New York, NY 10036.
2) All CCITT Recommendations referenced in this standard were published in the 1988 CCITT Blue Books.

b) Data transfer phase

Once established, the virtual circuit is then available for X.25 data transfer in both directions continuously and simultaneously. During the data transfer phase, information exchange occurs with the following characteristics, among others:

- packetized;
- flow control;
- delivery confirmation (optional);
- reset/interrupt.

c) Clearing the call

The call may be cleared by either or both of the users by indicating this to the network. In either case, an appropriate indication is sent to the other user. The active channel may be released after the last virtual call on that channel has been cleared.

3.1.3.1.2 Permanent virtual circuit procedures

For permanent virtual circuits on B or D channels, there is no call set up or clearing. For permanent virtual circuits using B channel access, a semi-permanent connection of the channel to the packet handler must be in place. For permanent virtual circuits using D channel access, a semi-permanent logical link to the packet handler must be in place; such access may be provided using procedures from ANSI T1.602 and Case B of ANSI T1.608. The procedures for the control of packets between user terminal equipment and network are covered by X.25 data transfer phase.

3.1.3.2 Exceptional procedures for invocation and operation

3.1.3.2.1 Virtual call

In case of failure situations due to calling/called user error, user state, or network conditions, appropriate failure indications shall be signaled from the network and the call set-up or established call may be terminated. For detailed procedures, see ANSI T1.608.

3.1.3.2.2 Permanent virtual circuit

In case of failure situations due to user error, user state, or network conditions, appropriate failure indications shall be signaled from the network. For detailed procedures, see ANSI T1.608.

3.1.4 Interworking

General interworking arrangements for this bearer service category are defined in CCITT Recommendation X.300. Specific interworking procedures are in ANSI T1.608.

3.2 Attributes

The attribute values for this bearer service category are as contained in table 1.

3.3 Dynamic description

Dynamic descriptions for the ANSI T1.608 procedures in the virtual call and permanent virtual circuit bearer service category are not included. State transition diagrams for layer 3 of CCITT Recommendation X.25 (Annex B) apply for virtual call and permanent virtual circuit.

3.4 Provision of individual bearer services

The overall provision of the virtual call and permanent virtual circuit bearer services is essential.

The variations of the secondary attributes are shown in table 2.

The provision of the access attributes for signaling, OAM, and user information are shown in table 3.

3.5 Network capabilities for charging

It shall be possible for the network provider to charge accurately for this service.

Table 1 – Attributes/values

Information transfer attributes		
1)	Information transfer mode	packet
2)	Information transfer rate	maximum throughput of a given virtual circuit is less than or equal to the maximum bit rate of the user information access channel and the throughput class of the virtual circuit. The exact values of information transfer rates for the virtual call and permanent virtual circuit are for further study.
3)	Information transfer capability	unrestricted
4)	Structure	service data unit integrity
5)	Establishment of communication	demand (virtual call)/permanent (permanent virtual circuit)
6)	Symmetry	bidirectional symmetric
7)	Communication configuration	point-to-point
Access attributes		
8)	Access channel	user information over virtual circuit within B or D channel. When D channel is used, maximum packet size and quality of service may be restricted. Channel control signaling will be in the D channel. Virtual call signaling will be via either the D or B channel.
9)	Access protocol	as specified in ANSI T1.602, ANSI T1.607, ANSI T1.608, and CCITT Recommendation X.25 (layers 2 and 3)
General attributes		
10)	Supplementary services provided	as listed in CCITT Recommendation X.2. Others are for further study.
11)	Quality of service	for further study
12)	Interworking possibilities	for further study
13)	Operational and commercial aspects	for further study

Table 2 – Provision of secondary attributes

Establishment of communication	Symmetry	Communication configuration	Provision
demand	bidirectional	pt-pt symmetric	essential
permanent	bidirectional	pt-pt symmetric	essential

Table 3 – Provision of access attributes

Access channel control signaling and OAM [1),2)]		Virtual call control signaling and OAM [3),4)]		User information [4)]		Provision
Channel and rate (kb/s)	Protocols	Channel and rate (kb/s)	Protocols	Channel and rate (kb/s)	Protocols	
D(16)	ANSI T1.608 ANSI T1.602 ANSI T1.601 ANSI T1.605	B(64)	X.25 layer 3, X.25 layer 2, ANSI T1.601 ANSI T1.605	B(64)	X.25 layer 3, X.25 layer 2, ANSI T1.601 ANSI T1.605	additional
D(64)	ANSI T1.608 ANSI T1.602 I.431	B(64) (Note 4)	X.25 layer 3, X.25 layer 2, I.431	B(64)	X.25 layer 3, X.25 layer 2, I.431	additional
D(16)	ANSI T1.608 ANSI T1.602 ANSI T1.601 ANSI T1.605	D(16)	X.25 layer 3, ANSI T1.602 ANSI T1.601 ANSI T1.605	D(16)	X.25 layer 3, ANSI T1.602 ANSI T1.601 ANSI T1.605	additional
D(64)	ANSI T1.608 ANSI T1.602 I.431	D(64)	X.25, layer 3, ANSI T1.602 I.431	D(64)	X.25, layer 3, ANSI T1.602 I.431	additional

NOTES

1) The definition of other protocols for OAM is for further study.

2) The protocols listed in this column are for establishing communications with the packet handling function using out-of-band call control signals. This procedure does not apply in certain cases (for example, semi-permanent D channel connection).

3) The protocols listed in this column are for the establishment of a virtual circuit using X.25 procedures. These procedures do not apply to permanent virtual circuits.

4) Other channels and rates are for further study.

Annex A
(informative)

Bibliography

CCITT Recommendation I.130, *Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN* [1),2)]

CCITT Recommendation I.140, *Attribute technique for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN* [1),2)]

CCITT Recommendation I.210, *Principles of telecommunication services supported by an ISDN and the means to describe them* [1),2)]