ITU

INTERNATIONAL TELECOMMUNICATION UNION

ITU-T   **I.230**

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

INTEGRATED SERVICES DIGITAL NETWORK (ISDN)

SERVICE CAPABILITIES

DEFINITION OF BEARER SERVICE CATEGORIES

ITU-T Recommendation I.230

(Extract from the *Blue Book*)

NOTES

1   ITU-T Recommendation I.230 was published in Fascicle III.7 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2   In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Recommendation I.230

DEFINITION OF BEARER SERVICE CATEGORIES

(Melbourne, 1988)

1   General

Recommendation I.210 describes the principles for defining telecommunication services supported by an ISDN, including the concept of bearer services, bearer capabilities and teleservices. It also provides the tools for the definition and description of such services.

The purpose of this Recommendation is to define a recommended set of bearer service categories that may be supported by an ISDN together with their overall provision. These definitions form the basis for detailed descriptions of circuit mode bearer services as given in Recommendation I.231 and packet-mode bearer services as given in Recommendation I.232 and their associated bearer capabilities, which are used to define the network capabilities required.

Bearer services are fully described by prose definitions and descriptions, by attributes and by dynamic descriptions, which altogether define the service characteristics as they apply at a given reference point where the customer accesses the service. Recommendation I.140 and Recommendation I.210, Annex B describe the use of attributes for this purpose.

2   Definition of bearer services

This section identifies several bearer services accessed via the standard network access provided by an ISDN. The identification of possible additional services such as subrate services is left for further study.

These possible additional services would not lead to any additional requirements to those already identified for physical characteristics of interfaces to be applied at reference points S and/or T (see Recommendation I.411).

The definition of bearer services is based upon the list of attributes as given in Table B-1/I.210. The information transfer attributes Nos. 1-4 are called "dominant attributes". They are used to identify a particular bearer service category. Information transfer attributes Nos. 5-7 are called "secondary attributes". They are used to identify individual bearer services within one category. "Access attributes" as well as "general attributes" are used to further specify an individual bearer service. They are called "qualifying attributes". The principles of categorizing bearer services is presented in Figure 1/I.230.

2.1   *Circuit-mode bearer service categories*

These bearer service categories are typically characterized by the provision of user information over one type of channel and signalling over another type of channel.

The use of the channel which conveys signalling information also to provide user-to-user information transfer is described in the user-to-user signalling supplementary service as given in Recommendation I.257.

Information transfer attributes	
1. Information transfer mode 2. Information transfer rate 3. Information transfer capability 4. Structure	⎫ ⎬ Dominant attributes → Bearer service categories ⎭
5. Establishment of communication 6. Symmetry 7. Communication configuration	⎫ ⎬ Secondary attributes → Individual bearer service ⎭ (in the category)
Access attributes 8. Access channel and rate 9. Access protocol 9.1 Signalling access protocols 9.2 Information access protocols *General attributes* 10. Supplementary services provided 11. Quality of Service 12. Interworking possibilities 13. Operational and commercial	Qualifying attributes → Further specifies the individual bearer service

FIGURE 1/I.230

Categories of attributes

The following circuit-mode bearer service categories have been identified so far:

I.231.1   64 kbit/s unrestricted, 8 kHz structured

I.231.2   64 kbit/s, 8 kHz structured, usable for speech information transfer

I.231.3   64 kbit/s, 8 kHz structured, usable for 3.1 kHz audio information transfer

I.231.4   Alternate speech / 64 kbit/s unrestricted, 8 kHz structured

I.231.5   2 × 64 kbit/s unrestricted, 8 kHz structured

I.231.6   384 kbit/s unrestricted, 8 kHz structured

I.231.7   1536 kbit/s unrestricted, 8 kHz structured

I.231.8   1920 kbit/s unrestricted, 8 kHz structured

The prose descriptions (step 1.1) and static descriptions (step 1.2) of these services are given in Recommendation I.231. A common dynamic description (step 1.3) for I.231.1, I.231.2, and I.231.3 is given in Recommendation I.220 for demand services only.

2.2   *Packet-mode bearer service categories*

These bearer services involve packet handling functions.

The following packet-mode bearer service categories have been identified so far and are described in Recommendation I.232:

I.232.1   Virtual call and permanent virtual circuit

I.232.2   Connectionless (Note)

I.232.3   User signalling (Note)

Note - These services require further study and their descriptions are not yet included.

3   Recommended provision of bearer services

In order to facilitate the development of compatible ISDNs and related user equipment, Recommendations I.231 and I.232 outline the recommended provision of bearer services defined in this Recommendation. This consists of three parts:

a)   description of the service category by the dominant attributes, i.e., information transfer mode, information transfer rate, type of information transfer capability and structure attributes. The recommended provision of services of the overall bearer service category is described as:

E   an essential bearer service category to be made available internationally

A   an additional bearer service category which may be available in some ISDNs and which may also be available internationally

FS   the recommended provision of this bearer service category is for further study.

b)   within each bearer service category, a description of the agreed secondary attributes, i.e. establishment of communication, symmetry and information transfer configuration attributes. If an ISDN supports the bearer service category, the recommended provision of these secondary attribute combinations within this category are described as:

E   an essential combination of attributes to be made available internationally (when an ISDN supports the particular overall bearer service category).

A   an additional combination of attributes which may be available in some ISDNs and which may also be available internationally (when an ISDN supports the particular overall bearer service category).

FS   the recommended provision of this combination of attributes is for further study.

c)   within each bearer service category a description of the agreed qualifying attributes, e.g. channel/rate and protocol access attributes for user information and for signalling OAM information. If an ISDN supports the bearer service category, the recommended provision of these qualifying attributes within this category are described as:

E   an essential access arrangement to be made available (when an ISDN supports the particular overall bearer service category)

A   an additional access arrangement which may be available in some ISDNs (when an ISDN supports the particular overall bearer service category)

FS   the recommended provision of this access arrangement is for further study.

Note 1 - During an evolutionary period, not all items marked "E" will be provided in all networks.

Note 2 - Attributes 10-13 are for further study.

The recommended overall provision of bearer service categories, as given in Recommendations I.231 and I.232, is summarized in Table 1/I.230.

4   Prose definitions of bearer service categories

In order to give an overview of the bearer service categories identified, their definitions as given in Recommendations I.231 and I.232 are reproduced in this section.

4.1   *Circuit-mode bearer service categories*

I.231.1   **Circuit-mode, 64 kbit/s unrestricted, 8 kHz structured bearer service category**

This bearer service category provides unrestricted information transfer between S/T reference points. It may, therefore, be used to support various user applications. Examples include:

- speech;

- 3.1 kHz audio;

- multiple subrate information streams multiplexed into 64 kbit/s by the user;

- transparent access to an X.25 public network [I.462 case a)].

User information is transferred over a B-channel, signalling is provided over a D-channel.

TABLE 1/I.230

Recommended overall provision of bearer service categories

Circuit-mode bearer service categories			
1)	64 kbit/s unrestricted		E
2)	Speech		E
3)	3.1 kHz audio		E
4)	Alternate speech / 64 kbit/s unrestricted		A
5)	2 × 64 kbit/s unrestricted		A
6)	384 kbit/s unrestricted		A
7)	1536 kbit/s unrestricted	A	
8)	1920 kbit/s unrestricted	A	
Packet-mode bearer service categories			
1)	Virtual call and permanent virtual circuit		E
2)	Connectionless		FS
3)	User signalling		FS

I.231.2 Circuit-mode 64 kbit/s, 8 kHz structured bearer service category usable for speech information transfer

This bearer service category is intended to support speech.

The digital signal at the S/T reference point shall conform to Recommendation G.711 (A-law or μ-law). The network may use processing techniques appropriate for speech such as analogue transmission, echo cancellation and low-bit rate voice encoding. Hence, bit integrity is not assured. This bearer service category is not intended to support modem derived voice-band data.

All Recommendations for the transfer of speech information in the network apply to this bearer service category.

I.231.3 Circuit-mode 64 kbit/s, 8 kHz structured bearer service category usable for 3.1 kHz audio information transfer

This bearer service category corresponds to the service which is currently offered in the PSTN. This bearer service category provides for the transfer of speech and of 3.1 kHz bandwidth audio information such as voice-band data via modems and facsimile group 1, 2 and 3 information. The digital signal at the S/T reference point shall conform to Recommendation G.711 (A-law or μ-law).

Connections provided for these services should offer the transfer capability for the information indicated above. (This means that the network may include speech processing techniques provided they are appropriately modified or functionally removed prior to non-speech information transfer.) The control of echo control devices, speech processing devices, etc., is only made by use of disabling tones (see Recommendation V.25). Bit integrity is not assured. The network may use analogue transmission.

All Recommendations for the transfer of speech information in the network apply to this bearer service category.

I.231.4 Circuit-mode, alternate speech/64 kbit/s unrestricted, 8 kHz structured bearer service category

This bearer service category provides the alternate transfer of either speech or 64 kbit/s unrestricted digital information within the same call.

The request for this alternate capability and the initial mode desired by the user must be identified at call set-up time.

This bearer service category is provided for the support of multiple capability terminals or single capability terminals.

For the speech mode of this bearer service, the same applies as for the speech bearer service category. For the unrestricted mode of this bearer service category, the same applies as for the unrestricted bearer service category.

I.231.5 Circuit-mode 2×64 kbit/s unrestricted, 8 kHz structured bearer service category

This bearer service category provides the unrestricted transfer of two 64 kbit/s user information flows over two B-channels at the user network interface.

I.231.6 Circuit-mode 384 kbit/s unrestricted, 8 kHz structured bearer service category

This bearer service category provides the unrestricted transfer of 384 kbit/s user information over a H_0 channel at the S/T reference point. The transfer of OAM information for reserved and permanent services may be provided over a D-channel in the same or in another interface structure.

I.231.7 Circuit-mode 1536 kbit/s unrestricted, 8 kHz structured bearer service category

This bearer service category provides the unrestricted transfer of 1536 kbit/s user information over a H_{11}, channel at the *S/T* reference point. The transfer of OAM information for reserved and permanent services may be provided via a D-channel in another interface structure.

I.231.8 Circuit-mode 1920 kbit/s unrestricted, 8 kHz structured bearer service category

This bearer service category provides the unrestricted transfer of 1920 kbit/s user information over a H_{12} channel at the S/T reference point. The transfer of OAM information for reserved and permanent services may be provided over a D-channel.

4.2 *Packet mode bearer service categories*

I.232.1 Virtual call and permanent virtual circuit bearer service category

This bearer service category provides the unrestricted transfer of user information in a packetized manner over a virtual circuit within a B- or D-channel at the S/T reference point. Signalling information for virtual call and/or possibly OAM information for permanent virtual circuit services are transferred via a D- or B-channel as described in Recommendation I.462 (X.31).

I.232.2 Connectionless packet-hearer service category

The definition of services in this bearer service category is for further study.

I.232.3 User signalling bearer service category

The definition of services in this bearer service category is for further study.