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INTEGRATED SERVICES DIGITAL NETWORK (ISDN)

SERVICE CAPABILITIES – BEARER SERVICES SUPPORTED BY AN ISDN

CIRCUIT-MODE BEARER SERVICE CATEGORIES – CIRCUIT-MODE 64 kbit/s UNRESTRICTED, 8 kHz STRUCTURED BEARER SERVICE

ITU-T Recommendation I.231.1

(Extract from the *Blue Book*)

NOTES

1   ITU-T Recommendation I.231.1 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.231.1

CIRCUIT-MODE BEARER SERVICE CATEGORIES – CIRCUIT-MODE 64 kbit/s UNRESTRICTED, 8 kHz STRUCTURED BEARER SERVICE

(Melbourne, 1988)

1   I.231.1 - **Circuit-mode 64 kbit/s unrestricted, 8 kHz structured bearer service category** (Note 1)

1.1   *Definition*

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 (Note 2);

-      3.1 kHz audio (Note 2);

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

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

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

Note 1 - During an interim period some networks may only support restricted 64 kbit/s digital information transfer capability, i.e. information transfer capability solely restricted by the requirement that the all-zero octet is not allowed. For interworking the rules given in Appendix I of Recommendation I.520 should apply. The interworking functions have to be provided in the network with restricted 64 kbit/s capability. The ISDN with 64 kbit/s transfer capabilities will not be affected by this interworking other than by conveying the appropriate signalling message to and from the ISDN terminal.

Note 2 - Whilst speech and 3.1 kHz audio have been given as applications for this bearer service category, it is recognized that it is the responsibility of the customers to ensure that a compatible encoding scheme is in operation. Customers should also recognize that no network provision can be made for the control of such items as echo and loss, as the network is unaware of the application in use. Furthermore, the Quality of Service attribute value for information transfer delay will indicate the suitability of a particular version of this bearer service for speech.

1.2   *Description*

1.2.1   *General description*

This circuit-mode bearer service category allows:

-      two users (e.g. terminals, PABXs) in a point-to-point configuration to communicate via the ISDN using 64 kbit/s digital signals over the B-channel, in both directions continuously and simultaneously for the duration of call;

-      three or more users in a multipoint configuration (refer to Recommendation I.254 for the supplementary service description on Three-Party Service and Conference Calling).

1.2.2   *Specific terminology*

Retention timer: this timer specifies the amount of time that the network retains the call information of the original call upon encountering busy or being released. It is a network provider option. The value for this timer is greater than 15 seconds.

1.3   *Procedures*

1.3.1   *Provision/withdrawal*

1.3.1.1   Provision of this service will be by pre-arrangement with the Administration.

1.3.1.2   This bearer service is offered with several subscription options which apply separately to each ISDN number or group of ISDN numbers on the interface. For each subscription option, only one value can be selected. Subscription options for the interface are summarized below:

Subscription option	Value
Maximum number of information channels available at user B the interface	- m, where m is not greater than the number of information channels on the interface
Maximum number of total calls present at user B the interface	-n, where n is not greater than the number of information channels on the interface

User B can be an ISDN number or group of ISDN numbers on the interface.

Note - More than one ISDN number can be associated with the service/interface only as a part of a supplementary service such as multiple subscriber number. In the case of one ISDN number, the option given above for the number of calls can only exceed the number of information channels in association with a supplementary service (e.g. call waiting). As a network provider option, separate values may be specified for incoming and for outgoing calls for either or both of the limits.

1.3.2   *Normal procedures*

All user-network signalling is done on the D-channel.

a)   *Originating the service (call set-up)*

The call is originated by the user requesting from the network the required bearer service; the request includes a number identifying the called user. Other information, as required, for the bearer service and for use by the network in supplementary services provided to the called user (e.g. calling line identity) may also be included. This request may be given to the network either *en bloc,* containing all the required information, or not *en bloc.*

b)   Indications during call set-up

After initiating a call the calling user will receive an acknowledgement that the network is able to process the call. The called user will receive an indication of the arrival of an incoming call of this bearer service.

The calling user shall also be given an indication that the incoming call is being offered to the called user, when an indication is received by the network that the called user is being informed of this call. When the call reaches the called user and the connection is established, an indication of this is sent to the calling user.

The called user may also provide other information for use by the network in supplementary services provided to other users (e.g. connected line identity). The relationship of a connected user with the called user requires further study.

Once established, the B-channel is then available for the transmission of 64 kbit/s digital signals in both directions continuously and simultaneously, without alteration by the network. No restriction is placed by the network on the content of the digital signals (see Note 1 of § 1.1).

c)   *Terminating the call*

The call may be terminated by either or both of the users by indicating this to the network. If one user terminates the call, an appropriate indication is sent to the other user.

1.3.3   *Exceptional procedures*

    a)   *Failure situations due to user error*

        i)   A user inputting a network-identifiable, improper service request will be given an appropriate failure indication by the network and the call set-up will be ceased.

        ii)   A user inputting a non-valid network number will be given an appropriate failure indication by the network and the call set-up will be ceased.

    b)   *Failure situations due to called user state*

        i)   A calling user attempting to establish a call to a user who is identified by the network to be busy (either network-determined user busy or user-determined user busy) will be given an appropriate failure indication by the network.

        ii)   A user attempting to establish a call to a user whose terminal equipment fails to respond will be given an appropriate failure indication by the network and the call set-up will be ceased.

        iii) On a call to a user whose terminal equipment has responded that the called user is being informed of the call but has failed to answer within a defined period of time, the calling user attempting to establish the call will be given an appropriate failure indication by the network and the call set-up will be ceased.

    c)   *Failure situations due to network conditions*

    A user attempting to establish a call but meeting call failure situations due to network conditions (e.g. congestion) will be given an appropriate failure indication by the network.

    d)   *Failure situations due to called user state and/or network conditions*

    A user attempting to establish a call but meeting call failure situations due to network conditions (e.g. congestion) or called user state (e.g. busy) can have service data retained for a specified period of time, i.e. retention timer.

1.3.4   *Alternative procedures*

1.3.4.1   *Reserved service procedures*

    For further study.

1.3.4.2   *Permanent service procedures*

    For further study.

1.4   *Network capabilities for charging*

    This Recommendation does not cover charging principles. Future Recommendations in the D-Series are expected to contain that information.

1.4.1   *Demand service charging*

    It shall be possible to charge the subscriber accurately for the demand service.

1.4.2   *Reserved service charging*

    It shall be possible to charge the subscriber accurately for the reserved service.

1.4.3   *Permanent service charging*

    It shall be possible to charge the subscriber accurately for the permanent service.

1.5   *Interworking requirements*

Interworking between the ISDN and networks referred to as "digital PSTNs", pre-ISDNs, pilot ISDNs or extended IDNs as well as between the ISDN and PSTNs may be required for this bearer service category.

In advance of the provision of the ISDN, similar services supported by 64 kbit/s connectivity will be available to customers by RPOAs/network operators on what may be described as "digital PSTNS", pre ISDNs, pilot ISDNs or extended IDNs. Interworking with ISDN customers will therefore be required. To effect this, as a broad guideline, RPOAs/network operators need to ensure these networks have the necessary functionality at the interworking point to provide service connectivity with the ISDN.

A V-Series terminal connected to the ISDN via a terminal adaptor and using the 64 kbit/s unrestricted bearer service requires the use of an IWF (including a modem) in the network for calls to PSTN users. To effect the connection, a 64 kbit/s connection would need to be used to the IWF (interworking function) and a 3.1 kHz audio or equivalent connection would then need to be used to the PSTN user.

1.6   *Interaction with supplementary services*

Not applicable. Each supplementary service description identifies the applicability to this bearer service category.

1.7   *Attributes and values of attributes of the circuit-mode 64 kbit/s unrestricted, 8 kHz structured bearer service category*

Information transfer attributes

1.	Information transfer mode:	circuit
2.	Information transfer rate:	64 kbit/s
3.	Information transfer capability:	unrestricted
4.	Structure:	8 kHz integrity
5.	Establishment of communication:	demand/reserved/permanent
6.	Symmetry:	bidirectional symmetric/unidirectional
7.	Communication configuration:	point-to-point/multipoint

Access attributes

8.	Access channel:	B for user information, D for signalling (Note)
9.	Access protocol:	I-Series for D-channel

General attributes

10.	Supplementary services provided	- Refer to Recommendation I.250
11.	Quality of Service	
12.	Interworking possibilities	} for further study
13.	Operational and commercial aspects	

Note - For reserved/permanent service the operational administrative and maintenance (OAM) messages related to these services may be conveyed over the D-channel.

1.8   *Provision of individual circuit-mode 64 kbit/s unrestricted, 8 kHz structured bearer services*

　　a)   Overall provision[1] : E

　　b)   Variations of secondary attributes:

	Establishment of communication		*Symmetry*	*Communication configuration*	*Provision*[1]
I.231.1/1	demand	⎫		pt-pt	E
I.231.1/2	reserved	⎬ bidirectional		pt-pt	A
I.231.1/3	permanent	⎭		pt-pt	E
I.231.1/4	demand	⎫		pt-pt	A
I.231.1/5	reserved	⎬ unidirectional		pt-pt	A
I.231.1/6	permanent	⎭		pt-pt	A
I.231.1/7	demand	⎫		multipt	A
I.231.1/8	reserved	⎬ bidirectional		multipt	A
I.231.1/9	permanent	⎭		multipt	A
I.231.1/10	demand	⎫		multipt	A
I.231.1/11	reserved	⎬ unidirectional		multipt	A
I.231.1/12	permanent	⎭		multipt	A

　　c)   Access

Signalling and OAM (Note 1)		User information		Provision
Channel and rate	Protocols	Channel and rate	Protocols	
D(16)	I.451 (Note 2)	B(64)	User-defined	E
D(64)	I.451 (Note 2)	B(64)	User-defined	E

Note 1 - Definition of protocols for OAM is for further study.

Note 2 - Demand services only. Further study for reserved and permanent services.

1.9   *Dynamic description*

　　　　The dynamic description for this service on a demand basis is identical for a number of circuit-mode services and is therefore collectively given in Recommendation I.220.

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[1] The definition of E (essential) and A (additional) can be found in Recommendation I.230.