Recommendation T/SF 31-02 (Cannes 1983, revised in Odense 1986)

BEARER SERVICES AND TELESERVICES TO BE PROVIDED BY INTEGRATED SERVICES DIGITAL NETWORK (ISDN)

Content

1. GENERAL

This Recommendation details the Bearer and Teleservices to be provided by an ISDN.

Bearer Services and Teleservices are described by a definition and a set of attribute values which fully described the service from a user's viewpoint.

2. LIST OF STANDARDIZED TELESERVICES FOR THE ISDN

The following is an initial list of standardized Teleservices that should be available in the ISDN:
Telephony
Teletex
Facsimile
Videotex
Message Handling Services
Video Telephony
Video Telephone Conference/Video Conferencing
Surveillance
Picture Mail
Film Retrieval
Audio Retrieval.

This will be completed and requirements for each standardized entry will be specified separately.

Note: The ISDN should be capable of providing access to a dedicated Telex Network. The Telex users can be accessed through the Teletex service. The interworking of Telex and Teletex has been included as a function of Teletex.

Note: The following Teleservices have been identified for further study; others may be added:
Telephony 7 kHz
Videophone
Videotransmission – slow motion
                – still picture.

3. LIST OF BEARER SERVICES

A list of Bearer Services that the ISDN should provide, together with an indication of their priority for introduction is shown below.

	Bearer Service	Priority
1.	Circuit Mode (8 kHz structured)	
1.1.	64 kbit/s unrestricted	
1.1.1.	Demand (previous No. 1)	E
1.1.2.	Permanent (previous No. 4)	E
1.2.	64 kbit/s usable for speech information transfer	
1.2.1.	Demand (previous No. 2)	E
1.2.2.	Permanent (previous No. 5)	A

	Bearer Service	Priority
1.3.	64 kbit/s usable for 3.1 kHz audio information transfer	
1.3.1.	Demand (previous No. 3)	E
1.3.2.	Permanent (previous No. 6)	E
1.4.	Alternate speech/64 kbit/s non-speech	
1.4.1.	Demand	A
1.5.	Alternate speech/3.1 kHz audio	
1.5.1.	Demand	A
1.6.	384 kbit/s unrestricted (previous No. 7)	
1.6.1.	Permanent	A
1.7.	1,920 kbit/s	
1.7.1.	Demand	A
1.7.2.	Permanent	E
1.8.	32 kbit/s for speech information transfer	
1.8.1.	Demand	A
1.8.2.	Permanent	A
2.	Packet Mode	
2.1.	Virtual call and permanent virtual circuit	
2.1.1.	B Channel (previous No. 9)	E
2.1.2.	D Channel (previous No. 10)	A
2.2.	Connectionless packet Bearer Service on a D-Channel (previous No. 11)	E

Priority Markings: E = Essential.   A = Additional.

Note: Other Bearer Services than those listed above are for further study. This includes the Reserved Category of Bearer Services.

4. EXISTING SERVICES TO BE SUPPORTED ON AN ISDN

A list of services that are currently provided by use of existing networks is shown below.

The support of these services on the ISDN and in the interim period before a full capability is available requires further study.

It is also necessary to determine the relationship between these services and the definitions of Bearer Services, Teleservices and Supplementary Services.

The services so far identified are:
— Switched telephony access to public radiophone.
— Access to public radiopaging.
— Data by telephone.
— Facsimile by telephone.
— Videotex by telephone.

5. DESCRIPTION OF BEARER SERVICES TO BE PROVIDED BY ISDNs

Descriptions of the Bearer Services to be provided by an ISDN are contained in Annex 1. (The contents are not yet complete.)

6. DESCRIPTION OF TELESERVICES TO BE PROVIDED BY ISDNs

Descriptions of the Teleservices to be provided by an ISDN are shown in Annex 2. (The contents are not yet complete.)

Annex 1

BEARER SERVICES

Circuit-mode 64 kbit/s unrestricted (8 kHz structured) Bearer service category

Definition and Description   NUMBER

An unrestricted service provides information transfer without alteration between S/T reference points. It may, therefore, be used to support various user applications. Examples include:

1) speech;

2) multiple sub-rate information streams multiplexed into 64 kbit/s by the user;

3) transparent access to a X.25 public network (CCITT Recommendation I.462).

User information is transferred to a B channel; signalling is provided over a D channel.

Description

This circuit switched bearer service allows two users (e.g. terminals, PABXs, etc.) 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 an established call.

Normal Procedure with Successful Outcome
(a) Originating a call (call set-up). The call is originated by:
    — the user selecting the required bearer service and
    — indicating the address of the called user and
    — if necessary providing the desired routing requirements.
(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;
    — an indication to the called user of the arrival of the call;
    — when the call reaches the called user and the connection is established, an indication of this is sent to the calling user.
(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.

Exceptional Procedures/Unsuccessful Outcome
(a) Failure situations due to user error:
    — user inputting an improper service request to the network will be given a failure indication;
    — user inputting a non-valid network address will be given a failure indication.
(b) Failure situations due to called user state:
    — calling user attempting to establish a call to a user who is determined by the network to be busy, will be given a failure indication;
    — user attempting to establish a call to a user whose terminal equipment is unavailable will be given an appropriate failure indication;
    — user attempting to set up a call where the call is not accepted will, after a defined period, be given an appropriate failure indication by the network.
(c) Failure situations due to network conditions:
    — user attempting to set up a call but meeting problems in the network (e.g. congestion) will be given an appropriate indication.

Open Issues
    — User attempting to establish a call to a user who is incompatible or unable to communicate with the calling user will be given an appropriate failure indication.
    Note. It has to be clarified what "user incompatible" means.
    Is the network facility part of the basic service or a supplementary service?

	Charging Requirements It shall be possible to charge accurately for the service on a per call basis, based on the duration of the call, the number of the called party and the time of day. Other options for charging may also be available.
1.	**INFORMATION TRANSFER MODE** [X] Circuit [ ] Packet
2.	**INFORMATION TRANSFER** BIT RATE BANDWIDTH THRU' PUT [X] [ ] [ ] Options For Further Study Options For Further Study 64 384 1,920 kbit/s
3.	**INFORMATION TRANSFER CAPABILITY** [X] Unrestricted digital [ ] Speech [ ] 3.1. kHz audio [ ] 7 kHz audio [ ] 15 kHz audio [ ] Video [ ] Others For further Study
4.	**STRUCTURE** [X] 8 kHz Integrity [ ] Service Data Unit Integrity [ ] Unstructured
5.	**ESTABLISHMENT OF COMMUNICATION** [X] Demand [X] Reserved [X] Permanent
6.	**COMMUNICATION CONFIGURATION** [X] Point-to-Point [X] Point to Multi-Point [ ] Broadcast

	Title of Bearer Service Circuit Mode (8 kHz structured) 64 kbit/s unrestricted							NUMBER

7.	SYMMETRY

[X] Unidirectional	[X] Bi-directional Symmetric	[ ] Bi-directional Asymmetric

8.	ACCESS CHANNEL AND RATE

[X] D(16)	[ ] D(64)	[ ] E	[ ] B
[ ] HO	[ ] H12	[ ] Others For further Study	

9.1.	SIGNALLING ACCESS PROTOCOL

[X] I.440/441 plus	[X] I.450/451	[ ] CCITT No. 7	[ ] Others for further Study

9.2.	INFORMATION ACCESS PROTOCOL

[ ] G.711	[ ] G.721	[ ] I.460
[ ] I.451	[ ] X.25	[ ] Others for further Study

10.	SUPPLEMENTARY SERVICES
	The relevance of Supplementary Services to Bearer Services is defined in Recommendation T/SF 31-06.

11.	QUALITY OF SERVICE
	Quality of Service is defined in Recommendation T/SF 31-03.

12.	INTERWORKING POSSIBILITIES
	Intercommunication with services in PSTN, PSPDN and CSPDN is required. Changes to the capabilities as a result of intercommunication are for further study.

13.	OPERATIONAL COMMERCIAL
	For Further Study.

Notes: 1) For Definition of Attributes, see CCITT Recommendation I.130.

2) Where CCITT Recommendations are quoted, European Versions may be subsequently substituted.

Annex 2

TELESERVICE TELEPHONY

1. **DEFINITION**

   The telecommunication service "Telephony" provides users with the possibility of a real time two-way speech conversation via the network.

2. **DESCRIPTION**

   The service telephony permits users to interchange sounds with speech quality via the network. The communication is bidirectional and both directions are continuously and simultaneously active during a session.

2.1. **Telephony supported by the ISDN**

   This service provides speech communication. The digital signal at the S/T reference point follows the international agreed encoding laws for speech and the network may use digital signal processing techniques. It may also be necessary to use echo cancellation techniques when interworking with other networks such as the PSTN. User information is provided over a B-channel, signalling is provided over the D-channel.

3. **OPERATIONAL REQUIREMENTS**

   a) Originating the Service (Call Set Up)

   The service is originated by the originating user activating the terminal, performing service selection, if applicable, for the originating terminal and terminating customer selection. During this process the originating user is given the appropriate indications as to the state of the call.

   i) Service selection is required on multi-service terminals and consists of directly selecting the service "Telephony".

   ii) Terminating customer selection is selecting the required termination (user/network interface) by means of the appropriate network address. In association with Telephony a specific terminal on that address may be selected by the use of e.g. DDI or sub-addressing.

   iii) Indications during call origination may include an indication that the network is ready to receive the network address information (proceed indication) and an indication that the call is progressing through the network. These shall be audible indications but may also be accompanied by other indications.

   b) Call Acceptance (Answer)

   Selection of the terminating customer is indicated to each user by appropriate indications (call arrival indication and waiting answer indication). The acceptance of the call by the terminating user (answer), causes the indications to be removed and bidirectional communication paths to be provided. The call is now termed in the "speech phase".

   c) Terminating the Service (Call Release)

   A request to terminate the service may be generated by either user. If one user terminates the service the other user is given an appropriate indication as to the state of the call, provided the call has entered the "speech phase".

   d) Failure Situations Due to User Error

   The following failure situations may occur due to user error:

   i) User taking too long to input the network address information will be given a failure indication, e.g. during overlap sending (see CCITT Recommendation I.451.).

   ii) User inputting a non-valid network address, e.g. an unallocated address, will be given a failure indication.

   e) Failure Situations Due to Terminating Termination State

   i) User attempting to set up a call to termination where no free B-channels are available will receive a Busy indication unless call waiting or another supplementary service is in operation.

   ii) User attempting to set up a call to a termination where the call is not accepted, i.e. no response indicating call acceptance is received, will after a defined period be given a call failure indication. (See CCITT Recommendation I.451.)

   f) Failure Situations Due to Network Conditions

   i) User attempting to set up a call but meeting problems in the network (e.g. congestion) will be given a suitable indication.

4. QUALITY REQUIREMENTS

a) Sound Quality

The accepted distortion of a spoken message is described in terms of a maximum percentage of misunderstood elements from a list of short words.

b) Sound Delay

The accepted delay is described in two parameters:
 i) the allowed delay (for further study)
 ii) the stability of this delay (for further study)

c) Error Rates

The accepted number of aborted sessions, unsuccessful calls, misroutings, etc. is described in terms of a proportion of the total number of calls. (For further study.)

5. CHARGING REQUIREMENTS

It should be possible to charge for the service on a per-call basis, based on the duration of the call, the address of the called party and the time of day. Other options may also be available.

6. ATTRIBUTES/VALUES

A) *Low layer attributes*

Information transfer attributes

1.	Information transfer mode:	Circuit
2.	Information transfer rate:	64 kbit/s
3.	Information transfer capability:	Speech
4.	Structure:	8 kHz integrity
5.	Establishment of communication:	Demand/reserved/permanent
6.	Communication configuration:	Point-to-point/multipoint
7.	Symmetry:	Bidirectional symmetric

Access attributes

8.	Access channel (and rate):	B (64) for user information D for signalling *(Note)*
9.1.	Signalling access protocol layer 1:	I.430/I.431
9.2.	Information access protocol layer 1:	I.430/I.431; G.711
9.3.	Signalling access protocol layer 2:	I.440/I.441
9.4.	Information access protocol layer 2:	—
9.5.	Signalling access protocol layer 3:	I.450/I.451
9.6.	Information access protocol layer 3:	—

Note: For reserved/permanent service the operational, administrative and maintenance messages related to these services may be conveyed over the D channel.

B) *High layer attributes*

10.	Type of user information:	Speech (see CCITT Recommendation I.130)
11.	Layer 4 protocol functions:	—
12.	Layer 5 protocol functions:	—
13.	Layer 6 protocol functions:	G.711
14.	Layer 7 protocol functions:	—

C) *General attributes*

15. Supplementary low layer and high layer attributes (supplementary services): details are given in Recommendation T/SF 31.
16. User-oriented quality of service: — to and from PSTN.
17. Interworking possibilities: ⎫ FS
18. Operational and commercial aspects: ⎭

Note: — = Not applicable
 FS = For Further Study