INTERNATIONAL TELECOMMUNICATION UNION

ITU-T I.241.1

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

INTEGRATED SERVICES DIGITAL NETWORK (ISDN)
SERVICE CAPABILITIES

TELESERVICES SUPPORTED BY AN ISDN: TELEPHONY

ITU-T Recommendation I.241.1

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation I.241.1 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.241.1

TELESERVICES SUPPORTED BY AN ISDN: TELEPHONY

(Melbourne, 1988)

1 Telephony

1.1 *Definition*

The "telephony service" provides users with the ability for real-time two-way speech conversation via the network.

1.2 *Description*

1.2.1 *General description*

The "telephony service" provides speech transmission at an audio bandwidth of 3.1 kHz. The communication is bidirectional, with both directions continuously and simultaneously active during the speech phase. The network may use processing techniques appropriate for speech such as analogue transmission, echo cancellation and low bit-rate encoding.

The digital signal at the S/T reference point follows the encoding laws for speech (according to Recommendation G.711), A-law or μ-law and the network may use digital signal processing techniques. It may also be necessary to use echo cancellation techniques in particular when interworking with other networks such as the PSTN. User information is provided over a B-channel, signalling is provided over the D-channel. Tones and announcements are provided by the network, encoded according to Recommendation G.711, although terminals can generate tones or other indications based on the messages received.

1.2.2 *Specific terminology*

a) *Voice quality* – The required acoustic performance is described in terms of loudness ratings, frequency response, quantizing distortion, etc. Overall requirements are given in the Recommendations of the P-Series.

b) *Transmission delay* – The maximum delay is that specified for the general telephone network (cf. Recommendation G.114). The permissible variation of the actual delay is for further study.

c) *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 The teleservice 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	– *m*, where *m* is not greater than the number of information channels on the interface
Maximum number of total calls present at user B	– *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*

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 appropriate indications as to the state of the call.

i) A service selection is required on a multi-service terminal.

ii) Terminating customer selection is selecting the required termination (user/network interface) by an appropriate means [for example, the use of direct-dialling-in (DDI), or multiple subscriber number].

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. It shall be possible to have audible indications which may 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 awaiting answer indication). The acceptance of the call by the terminating user, i.e. answer, causes the indications to be removed and bidirectional communication paths to be provided. The call is now termed in the “speech phase”.

c) *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.

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 Recommendations I.451 and I.220);

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

e) *Failure indications due to terminating termination state*

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

Note - In support of some supplementary services (e.g. call waiting, line hunting), it may optionally be necessary for the subscriber to register some additional parameters (e.g. destination number used to distinguish PSTN telephony calls) with the network to allow the network to know when a channel is busy with telephony.

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 Recommendations I.451 and I.220).

f) *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 a suitable indication.

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.

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

1.5 *Interworking requirements*

1.5.1 Interworking is required between the ISDN and PSTN.

1.6 *Interaction with supplementary services*

Not applicable. Each supplementary service description identifies the applicability with this teleservice.

1.7 *Attributes and values of attributes of the telephony service*

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:	on demand
6.	Symmetry:	bidirectional symmetric
7.	Communication configuration	point-to-point

Access attributes

8.	Access channel (and rate):	B(64) for user information, D for signalling (Note)
9.	Access protocol	
9.1	Signalling access protocol layer 1:	I.430/I.431
9.2	Information access protocol layer 2:	I.440/I.441
9.3	Signalling access protocol layer 3:	I.450/I.451
9.4	Information access protocol layer 1:	I.430/I.431; G.711
9.5	Signalling access protocol layer 2:	not applicable
9.6	Information access protocol layer 3:	not applicable

b) *HIGH LAYER ATTRIBUTES*

10.	Type of user information:	speech
11.	Layer 4 protocol functions:	not applicable
12.	Layer 5 protocol functions:	not applicable
13.	Layer 6 protocol functions:	Recommendation G.711
14.	Layer 7 protocol functions:	not applicable

c) *GENERAL ATTRIBUTES*

15.	Supplementary services provided:	further study
16.	Quality of Service:	further study
17.	Interworking possibilities:	to and from PSTN
18.	Operational and commercial:	further study

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

1.8 *Recommended support of telephony by an ISDN*

a) Overall support[1]: E/A

Note - It is anticipated that ISDNs will offer telephony as a basic telecommunication service. Some networks will offer this as a teleservice. However, due to national regulation policies, some networks will offer telephony as a bearer service rather than as a teleservice.

b) Variations of non-dominant attributes :

1) Information transfer mode

– Circuit : E

2)

Establishment of communication	*Symmetry*	*Communication configuration*	*Support*[1]
demand		pt-pt	E
reserved	bidirectional	pt-pt	FS
permanent	symmetric	pt-pt	A
demand		multipt	A
reserved	bidirectional	pt-pt	FS
permanent	symmetric	multipt	A

3) Access

Signalling and OAM (Note 1)		User information		Support
Channel and rate	Protocols	Channel and rate	Protocols	
D(16)	I.430, I.440, I.441, I.450, I.451 (Note 2)	B(64)	I.430, G.711	E
D(64)	I.431, I.440, I.441, I.450, I.451 (Note 2)	B(64)	I.431, G.711	E

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

Note 2 - Demand services only. Others are for further study.

1.9 *Dynamic description*

The circuit-mode dynamic description appears in Recommendation I.220.

[1] The definition of E (essential) and A (additional) can be found in Recommendation I.240.