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THE INTERNATIONAL
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CONSULTATIVE COMMITTEE

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INTEGRATED SERVICES DIGITAL NETWORK (ISDN)

GENERAL STRUCTURE AND SERVICE CAPABILITIES

CIRCUIT-MODE MULTIPLE-RATE UNRESTRICTED 8 kHz STRUCTURED BEARER SERVICE CATEGORY

Recommendation I.231.10

Geneva, 1992

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

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Recommendation I.231.10 was prepared by Study Group I and was approved under the Resolution No. 2 procedure on the 4th of August 1992.

CCITT NOTE

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

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(1992)

1 Definition of the service

The **multiple-rate circuit-mode bearer service for an ISDN interface** allows users to request from the ISDN on a demand basis the establishment and release of circuit-mode connections supporting unrestricted information transfer rates at integer multiples of 64 kbit/s up to the maximum rate of the interface.

The multiple-rate circuit-mode bearer service in a sense extends the circuit-mode bearer service based on 64 kbit/s by supporting higher information transfer rates.

2 Description

2.1 *General description*

This circuit-mode bearer service category allows:

– two users [e.g. terminals, private automatic branch exchanges (PABXs)] in a point-to-point configuration to communicate via the integrated services digital network (ISDN) using digital signals over multiple 64 kbit/s channels, in both directions continuously and simultaneously for the duration of the call;

– three or more users in a multipoint configuration (refer respectively to Recommendations I.254.2 and I.254.1 for the supplementary service description on Three-Party Service and Conference Calling).

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 s.

– *Contiguous time slot assignment:* The time slots for the call are adjacent.

– *Non-contiguous time slot assignment:* The time slots are not necessarily adjacent.

3 Procedures

3.1 *Provision/withdrawal*

Provision of this service will be by pre-arrangement with the service provider. This service can be offered with several options. Examples are:

Subscriber 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
Assignment of time-slots (see Note)	Contiguous Non-contiguous

Note – This subscription option is not necessary for basic access.

Withdrawal of the service is made by the service provider upon request by the subscriber or for service provider reasons.

3.2 *Normal procedures*

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

The call is originated by the user requesting this service. With the request, the originating user supplies the called party number identifying the destination, the information transfer rate needed (e.g. 128, 192, . . .) which will remain the same for the whole duration of the call. 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*.

The assignment of multiple 64 kbit/s channels at one access has a local meaning only. In particular, their contiguous assignment at one interface does not mean that they will be assigned contiguously within the network or at the terminating interface. The 64 kbit/s channels selected will belong to a single interface and will not span several interfaces.

3.2.2 *Indications during call set-up*

After initiating a call, the calling user will receive an indication that the network is processing the request; an indication when the called user has been informed of the call and an indication when the connection has been established.

The called user will receive an indication of the arrival of a call for this bearer service, including the information transfer rate, and will inform the network of the acceptance or rejection of the call.

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 the connection is established between the calling and called users, the allocated time slot(s)/channel(s) is/are available for the transmission in both directions continuously and simultaneously at the information transfer rate specified at call set-up until the call is terminated.

3.2.3 *Terminating the call*

A call may be terminated by either or both users indicating this to the network. If one user or both users terminate the call, the network will send an appropriate indication to the other user.

3.3 *Exceptional procedures*

The exceptional procedures handle the following conditions:

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 fail indication by the network and the call set-up will be ceased.

iv) On a call to a user whose access cannot support the specified information transfer rate (i.e. it exceeds the subscription option for the maximum number of information channels available at user B), 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

i) 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.

ii) The inability of the network to guarantee time-slot sequence integrity will result in a 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.

e) Exceptional procedures for dealing with the situation in which the network or the user cannot continue to support the information transfer rate requested at call set-up, are for further study.

3.4 *Alternative procedures*

Permanent and reserved service procedures are for further study.

4 Network capabilities for charging

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

5 Interworking requirements

Interworking is required between the ISDN and a non-ISDN network offering this service. This service will interwork with the following bearer services:

Multiple-rate bearer service	Bearer service
128 kbit/s (n = 2)	2 × 64 kbit/s unrestricted – see Recommendation I.231.5 (Note)
384 kbit/s (n = 6)	384 kbit/s unrestricted – see Recommendation I.231.6
1536 kbit/s (n = 24)	1536 kbit/s unrestricted – see Recommendation I.231.7
1920 kbit/s (n = 30)	1920 kbit/s unrestricted – see Recommendation I.231.8

This interworking may require mapping of the (non) contiguous channels used for the multiple-rate bearer service category onto contiguous information channels in order to offer the call to the destination user.

Note – Interworking in this case is allowable only in the direction from the multiple-rate bearer service to the 2×64 kbit/s bearer service due to differential time delay requirements.

6 Interactions with supplementary services

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

7 Attributes and attributes values of the service

The following list defines the bearer attributes of the service:

7.1 *Information transfer attributes*

1) information transfer mode: circuit;
2) information transfer rate: 128, 192, . . ., 1920 kbit/s;
3) information transfer capability: unrestricted digital information;
4) structure: 8 kHz with time slot sequence integrity;
5) establishment of communication: demand (other methods are for further study);
6) symmetry: bidirectional symmetric (other types of symmetry are for further study);
7) communication configuration: point-to-point (other configurations are for further study).

7.2 *Access attributes*

1) access channel and rate: multiple B-channels (other channels are for further study);
2) access protocol: I-Series for D-channel.

7.3 *General attributes* (for further study)

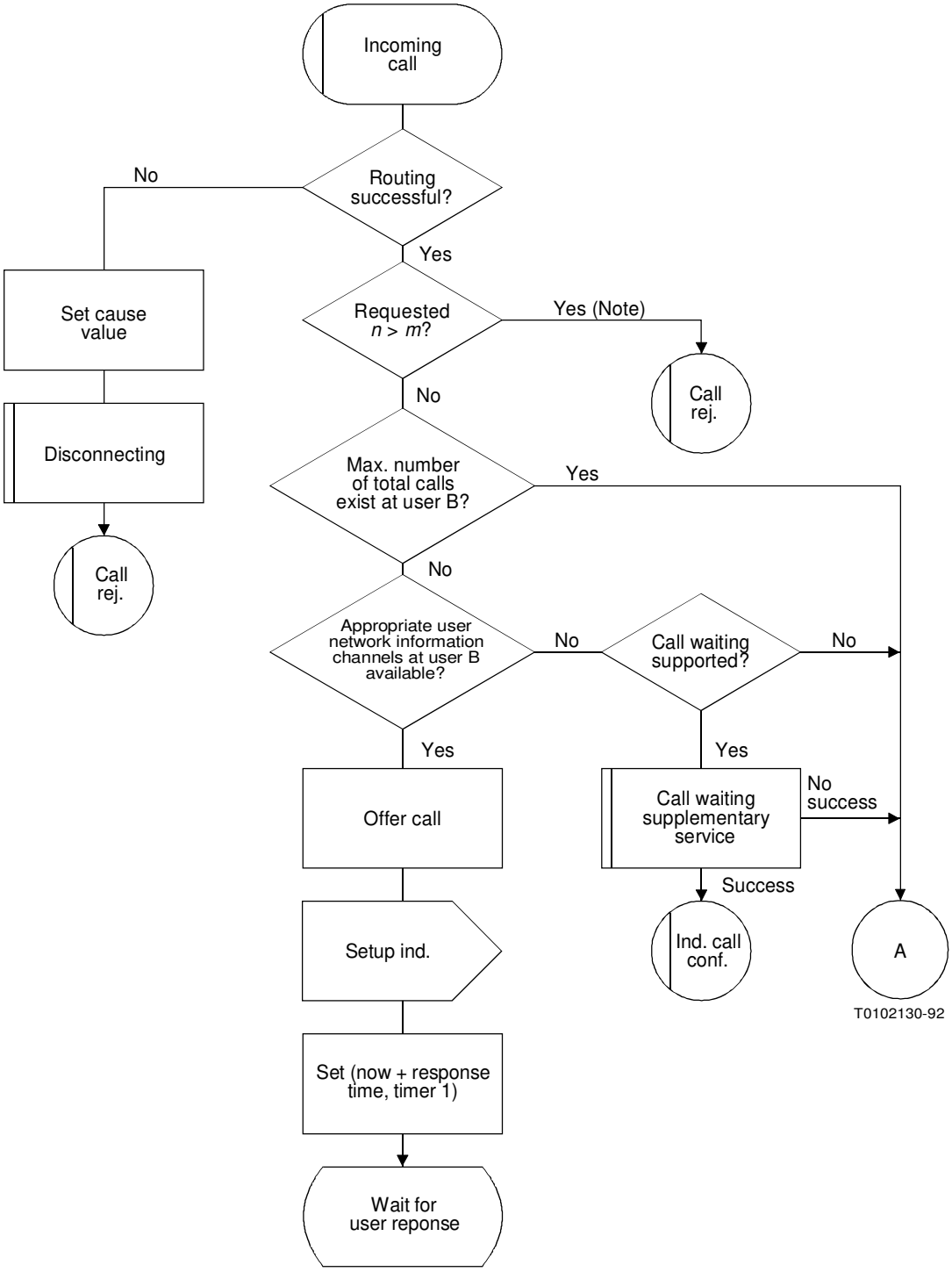
1) supplementary services provided;
2) Quality of Service;
3) interworking possibilities;
4) operational and commercial.

8 Provision of individual multirate circuit-mode bearer services

For further study.

9 Dynamic description

The dynamic description of this service on a demand basis is given in Recommendation I.220 with Figure 1/I.231.10 replacing sheet 1 of Figure 4/I.220.



Note – The requested value of*n* is greater than the value of user B's subscription option for the maximum number of information channels available at user B.

FIGURE 1/I.231.10 (replaces Figure 4/I.220 (sheet 1))

Basic call process; macro definition: incoming call