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# PART II

## I.200-Series Recommendations

## SERVICE CAPABILITIES

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**MONTAGE: PAGE 102 = PAGE BLANCHE**

**Recommendation I.200**

## GUIDANCE TO THE I.200-SERIES OF RECOMMENDATIONS

*(Melbourne, 1988)*

### 1 General

The Recommendations in the I.200-Series cover the aspects of the telecommunications services supported by ISDNs. They contain the definitions, descriptions and details on the provision of bearer services, teleservices and their associated supplementary services.

In the layout of the I.200-Series of Recommendations the following objectives have been taken into account:

— to achieve a systematic structure which is open to future enhancement;

— to facilitate the requirements of different readers by separating, in specific Recommendations, general service concepts and definitions from Recommendations covering detailed characteristics of individual services;

— to use systematically the service description method given in Recommendation I.130 where, the stage 1, telecommunication services are described in three steps:

1) prose definition and description;

2) static description using attributes;

3) dynamic description using graphic means.

### 2 Structure of the I.200-Series of Recommendations

Section 2.1 gives the layout and Figure 1/I.200 illustrates the structure of the I.200-Series of Recommendations.

The general service concepts and principles are given in Recommendation I.210. Annexes to Recommendation I.210 describe the application of the service description method to the three service families: bearer services, teleservices and supplementary services.

A separate section of the I.200-Series is allocated to each service family. Within each of these sections the first Recommendation gives an overview of the services within each family and the subsequent Recommendations specify in detail individual services. The reader interested in an overview of service concepts and principles, as well as the method to describe services, will find them in Recommendations I.210, I.230, I.240 and I.250.

The reader interested in the detailed characteristics of individual services will find them in Recommendations I.231, I.232, I.241 and I.251-I.257. Detailed items of common significance are defined and described in the I.220-Series of Recommendations.

*Note* — In the CCITT Red Book (1984) all ISDN service requirements were contained in three Recommendations, numbered I.210, I.211 and I.212. References have been made widely to these three Recommendations in other Recommendations and elsewhere, and to facilitate a translation to the new CCITT Blue Book (1988) version of the I.200 Recommendations Appendix I shows the mapping between the Red Book and Blue Book versions of the I.200-Series of Recommendations.

2.1 *Layout of the I.200-Series of Recommendations*

I.200 Guidance to the I.200-Series of Recommendations

SECTION 1 — *General aspects of services in an ISDN*

I.210 Principles of telecommunication services supported by an ISDN and the means to describe them

SECTION 2 — *Common aspects of services in an ISDN*

I.220 Common dynamic description of basic telecommunication services

I.221 Common specific characteristics of services

SECTION 3 — *Bearer services supported by an ISDN*

I.230 Definition of bearer services categories

I.231 Circuit mode bearer services categories

I.232 Packet mode bearer services categories

SECTION 4 — *Teleservices supported by an ISDN*

I.240 Definition of teleservices

I.241 Teleservices supported by an ISDN

SECTION 5 — *Supplementary services in an ISDN*

I.250 Definition of supplementary services

I.251 Number identification supplementary services

I.252 Call offering supplementary services

I.253 Call completion supplementary services

I.254 Multi-party supplementary services

I.255 ‘‘Community of Interest’’ supplementary services

I.256 Charging supplementary services

I.257 Additional information transfer supplementary services

**Figure 1/I.200, p.**

APPENDIX I
(to Recommendation I.200)

**Mapping between the Red Book and Blue Book**

**I.200-Series of Recommendations**

| *Red Book Recommendations* | *Blue Book Recommendations* |
|---|---|
| Rec. I.210 § 1-6 | Rec. I.211 § 1 |
| 2 | 2.1 |
| 2.1.1 | 2.1.2 |
| 2.1.3 | 2.1.4 |
| 2.1.5 | 2.1.6 |
| 2.1.7 | 2.1.8 |
| 2.2 | 2.2.1 |
| 2.2.2 | 3 |
| 3.1.1 | 3.1.2 |
| 3.1.3 | 3.1.4 |
| 3.1.5 | 3.1.6 |
| 3.1.7 | 3.1.8 |
| 3.2.1 | 3.2.2 |
| Rec. I.210 Annex B | I.230 § 2 |
| 2.1 | I.231 § 1 |
| 2 | 3 |
| 4 | Deleted |
| I.231 § 6 | 7 |
| 8 | I.230 § 2.2 |
| I.232 § 1 | 2 |
| I.230 § 3 | I.231 § 1.7.2 |
| 2.7.2 | 3.7.2 |
| 4.7.2 | Deleted |
| I.231 § 6.7.2 | 7.7.2 |
| 8.7.2 | I.232 § 1 |
| 2 | Rec. I.212 § 1 |
| 2 | Rec. I.210 § C.1 |
| C.2 | |

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SECTION 1

## GENERAL ASPECTS OF SERVICES IN ISDN

### Recommendation I.210

### PRINCIPLES OF TELECOMMUNICATION SERVICES SUPPORTED BY AN ISDN

### AND THE MEANS TO DESCRIBE THEM

*(Malaga-Torremolinos, 1984; amended at Melbourne, 1988)*

## 1 General

An ISDN will support a wide range of services as described generally in Recommendation I.120. The purpose of this Recommendation is to provide a classification of such services, the means for the description of such services based on the description method as defined in Recommendation I.130, and to give a basis for the definition of the network capabilities required by an ISDN. These network capabilities are defined in the I.300-Series of Recommendations.

Using the service concepts and the means for the description of services as given in this Recommendation, recommended bearer services are defined and described in the I.230-Series of Recommendations, recommended teleservices are defined and described in the I.240-Series of Recommendations and recommended supplementary services are defined and described in the I.250-Series of Recommendations.

## 2 Service concepts

2.1 Services supported by an ISDN are the communication capabilities made available to customers by telecommunication service providers. An ISDN will provide a set of network capabilities which are defined by standardized protocols and functions and enable telecommunication services to be offered to customers.

A service provision by a telecommunication service provider to a customer connected to an ISDN may cover the whole or only part of the means required to fully support the service. The operational and commercial features associated with provision of the service are included in the service concept.

The service classification and descriptions which follow are independent of different possible arrangements for ownership and provision to the customer of the means required to support a service. The customer may therefore be offered, by the Administration, services or service support.

2.2 The method used for the characterization of telecommunication services is described in Recommendation I.130 ‘‘Method for the characterization of telecommunication services supported by an ISDN and network capabilities of an ISDN’’. Within this method the first stage is an overall service description from the user’s point of view. In stage 1 there are three steps:

Step 1.1 Prose service definition and description

Step 1.2 Static description of the service using attributes

Step 1.3 Dynamic description of the service using graphic means

Together these three steps define the service characteristics as they apply at a given reference point where the customer accesses the service.

Annexes A to D of this Recommendation give the format of stage 1 service descriptions as follows:

Annex A: Structure for prose service definition and description

Annex B: List of attributes and their possible values for describing bearer services

Annex C: List of attributes and their possible values for describing teleservices

Annex D: Dynamic description of the service using graphic means

*Note 1* — Recommendation I.140 describes the use of attributes for this purpose.

*Note 2* — The use of attributes for describing supplementary services is for further study.

This format allows the information contained within stage 1 to be structured in a consistent, comprehensive and logical manner. Only one overall format is recommended but it is recognized that certain sections of this format are only applicable to certain types of services.

2.3 Telecommunication services are classified using their static characteristics described by attributes. Therefore this Recommendation (except Annexes A and D) deals mainly with step 1.2 of the description method.

A telecommunication service is, from the static point of view, composed of:

— technical attributes as seen by the customer; and

— other attributes associated with the service provision, e.g. operational and commercial attributes.

Realization of the technical attributes of a telecommunication service requires a combination of network and terminal capabilities and other service providing systems.

2.4 Telecommunication services are divided in two broad families, i.e.

— bearer services , and

— teleservices

A supplementary service modifies or supplements a basic telecommunication service

as a stand alone service. It must be offered together with or in association with a basic telecommunication service. The same supplementary service may be common to a number of telecommunication services.

*Note* — The concept of supplementary services corresponds to the concept of optional user facilities in the X-Series of Recommendations.

The concepts introduced here are illustrated in Table 1/I.210 and are defined in more detail in § 5.

**H.T. [T1.210]**

TABLE 1/I.210

**Classification of telecommunication services**

lw(48p) | lw(66p) | lw(48p) | lw(66p) .

**Table [T1.210], p.**

## 3 Customer access to telecommunication services supported by an ISDN

3.1 Considering the reference configurations defined in Recommendation I.411, customers can access various telecommunication services at different access points. Figure 1B/FI.210 shows these access points.

This figure takes into account that the network provider may offer to a customer connected to an ISDN the whole or only part of the means to fully support the service.

**Figure 1/I.210, p.**

3.2 The definitions of the access points introduced in Figure 1/I.210 are as follows:

i) access points 1 (reference point T) and 2 (reference point S) are the access points for bearer services supported by an ISDN. The choice between access point 1 (T) and 2 (S) depends on the ownership and form of provision (to the customer) of the communications equipment at the customer premises. The service classification and descriptions in the following are independent of different possible arrangements for such provision;

ii) at access point 4 (reference point R), depending on the type of terminal adaptors provided, other CCITT standardized services may be accessed, e.g. according to the X- and V-Series of Recommendations;

iii) at access points 3 and 5 (user-to-terminal interface), teleservices are accessed — the teleservice concept includes the terminal capabilities.

3.3 The following customer entities may be connected at access points 1 and 2:

— customer terminals;

— customer systems, e.g. PABXs, LANs, service vendor systems;

— private networks.

*Note* — Customer terminals and systems may be private or provided by Administrations.

All customer equipment connected to an ISDN interface at one of these access points should meet the specifications of the protocols at that interface for all the layers that are included in the definition of the telecommunication service used.

For some telecommunication services the service definition also covers some terminal functions and characteristics in addition to those specified by the protocols at the interface. This relates in particular to teleservices, and also to supplementary services (see Recommendation I.250).

3.4 From the user's point of view the telecommunication services as defined in the I.200-Series of Recommendations will be used for some applications. For example, the telephony teleservice will be typically used for a human conversation (application). Likewise bearer services will be used for applications. The area of applications is outside the scope of the I-Series of Recommendations. The user's application of services is the responsibility of the user and not of the network. The network can have no knowledge of what application is being used at any given time.

3.5 The telecommunication service, as described in this Recommendation, is time-independent, that is to say that the description is valid for all the time the service is available. Whenever a demand or reserved service is invoked by a user, then the particular instance of the service is referred to as a *call* . Similarly, the instance also applies to the application as described in § 3.4. The instance of an application is referred to as a *communication* .

## 4 Capabilities to support a telecommunication service

4.1 The capabilities required to fully support a telecommunication service for a customer connected to an ISDN include:

— network capabilities;

— terminal capabilities, when required;

— other services providing capabilities, when required;

— operational and commercial features associated with the service provision (i.e. sales or marketing aspects).

4.2 Network capabilities are described in detail in Recommendation I.310. Two different levels of ISDN network capabilities are introduced in that Recommendation:

— low layer capabilities which relate to bearer services;

— high layer capabilities which together with low layer capabilities relate to teleservices.

The low layer capabilities are defined as a set of Low Layer Functions (LLF) (relating to layers 1-3 in Recommendation X.200) which provide the capability for the carriage of user information over an ISDN connection. These functions include:

— Basic Low Layer Functions (BLLF) supporting the necessary layer 1-3 requirements;

— Additional Low Layer Functions (ALLF) supporting, in addition to BLLFs, lower layer requirements of supplementary services.

High layer capabilities are defined as a set of High Layer Functions (HLF) generally associated with layers 4-7 in Recommendation X.200.

High Layer Functions are sub-divided into Basic High Layer Functions (BHLF) and Additional High Layer Functions (AHLF).

*Note* — Depending on national regulations, ALLF, BHLF, and AHLF may be provided by Administrations, or other suppliers.

4.3 The concept of describing network capabilities in terms of low layer capabilities and high layer capabilities can equally be applied to describe terminal capabilities. In the description of teleservices the HLF and LLF are included in the service definition. In the case of bearer service definition the terminal capabilities are not included but the terminal must conform to the LLF of the bearer service.

*Note* — The relationships between service categories, network/terminal capabilities and functions are illustrated in Table 2/I.210.

**H.T. [T2.210]**

TABLE 2/I.210

**Relationship between service categories, network/terminal capabilities and functions**

lw(36p) | lw(21p) | lw(21p) | lw(21p) | lw(15p) | lw(21p) | lw(21p) | lw(21p) | lw(15p) | lw(36p) .

**Table [T2.210], p.**

4.4 The operational service capabilities associated with a service offering may include capabilities for maintenance, charging, user control of service features, etc.

The use of such capabilities may involve terminal-network communication and may therefore be viewed as specific applications.

A more precise description of these capabilities and the relationship to Recommendation X.200 needs further study.

## 5 Telecommunication service classification

5.1 The static characteristics of a telecommunication service supported by an ISDN are described by service attributes. They are given in Annexes B and C.

There are two groups of service attributes applicable to user information flow:

— low layer attributes;

— high layer attributes.

Bearer services are defined as including only low layer attributes. Teleservices are defined as including both low layer attributes and high layer attributes.

The relationship between telecommunication service attributes and low/high layer functions is illustrated in Figure 2/I.210.

**Figure 2/I.210, p.**

## 5.2 *Bearer services supported by an ISDN*

5.2.1 Bearer services supported by an ISDN provide the capability for information transfer between ISDN access points 1 or 2 and involve only low layer functions.

The customer may choose any set of high layer (at least 4-7) protocols for his communication, and the ISDN does not ascertain compatibility at these layers between customers. An example of a bearer service is a demand circuit-mode, 64 kbitB/Fs unrestricted, 8 kHz structured bearer service.

5.2.2 Bearer services are characterized from a static point of view by a set of low layer attributes given in Annex B. These attributes are classified into three categories:

— information transfer attributes ;

— access attributes ; and

— general attributes , including operational and commercial attributes

The bearer capability defines the technical features of a bearer service as they appear to the user at the appropriate access point (1 or 2).

The bearer capability is characterized by information transfer and access attributes. A bearer capability is associated with every bearer service.

*Note* — It is likely that some Quality of Service parameters — such as error rate or call set-up delay — should be extracted in order to form a new attribute allocated to the information transfer category. Identification and definition of such parameters require further consideration.

Individual bearer services categories are defined and described in the I.230-Series of Recommendations.

5.2.3 A bearer service provides the user with the possibility of gaining access to various forms of communication, covering for example:

— information transfer between users employing the same access points (1 or 2) and access attributes (see Figure 3*a* /I.210);

— information transfer between users employing different access attributes at the access points (1 or 2) involved (see Figure 3*b* /I.210); and

— information transfer between a user and a separate resource providing high layer functions (see Figure 3*c* /I.210).

## 5.3 *Teleservices supported by an ISDN*

5.3.1 Teleservices provide the full capacity for communication by means of terminal and network functions and possibly functions provided by dedicated centres.

A teleservice supported by an ISDN should use only one (or a small number of) bearer capability(ies) recommended by the CCITT. It should be noted that in the case where more than one of the recommended bearer capabilities is used for a given teleservice, network interworking functions may be required under the responsi bility of the teleservice provider. However, a user operating a specific application is not prevented from using a terminal compatible with a given teleservice in association with a bearer capability not recommended for this teleservice. Examples of teleservices are telephony, Teletex and Videotex.

5.3.2 Teleservices are described from a static point of view by a set of low layer and high layer attributes, and operational and commercial attributes, as given in Annex C of this Recommendation.

Low layer attributes are those used to characterize the bearer capability (see § 5.2.2). High layer attributes are used in Recommendation I.241 to describe message-related (i.e. message on layer 7) characteristics of a service (basic high layer attributes) or

of a supplementary service (supplementary high layer attributes). They refer to the functions and protocols of layers 4-7 in the Recommendation X.200 framework which are concerned with the transfer, storage and processing of user messages (provided by a subscriber's terminal, a retrieval centre, or a network service centre).

Therefore, not all these attributes can be applied directly at the user-to-terminal interface (access points 3 or 5) as they represent two kinds of features, the bearer capability and the terminal features, that are not directly perceived by the user.

The definition of appropriate attributes and the specifications of teleservices at this access point from the user point of view (man-machine interface) is for further study and the subject of E-and F-Series Recommendations.

Individual teleservices are defined and described in the I.240-Series of Recommendations.

**Figure 3/I.210, p.**

5.3.3 A teleservice provides the user with the possibility of gaining access to various forms of applications (or teleservice applications) covering, for example:

— teleservice application involving two terminals providing the same teleservice attributes at both access points (3 or 5) — (see Figure 4*a* /I.210);

— teleservice application involving a terminal at one access point (3 or 5) and HLF functions located within the ISDN — (see Figure 4*b* /I.210);

— teleservice application involving terminals based on different teleservice attributes at each access point — in this case, the use of HLF functions in the ISDN is necessary (interworking situation) — (see Figure 4*c* /I.210);

— teleservice application involving a terminal at one access point (3 or 5) and a system providing HLF functions (see Figure 4*d* /I.210);

— teleservice application involving two terminals at both access points (3 or 5) and an intervening system providing HLF functions (see Figure 4*e* /I.210). In this case, teleservice attributes can be different at each terminal access point.

**Figure 4/I.210, p.**

5.4 *Supplementary services supported by an ISDN*

Supplementary services supported by an ISDN provide additional capabilities to be used with bearer services and teleservices. They cannot be offered to a customer as a stand alone service.

Supplementary services are characterized by a prose definition and description following the layout given in Annex A and a dynamic description applying the means given in Annex D.

The use of the attribute technique for supplementary services is for further study. The individual supplementary services are described in the I.250-Series of Recommendations.

## 6 Provision of telecommunication services

6.1 A telecommunication service is provided by an Administration, andB/For other service providers. Customer terminals and systems may be privately owned or provided by Administrations. Depending on the nature of customer ownership within the customer premises (TE or TE and NT2), a telecommunication service is provided at different access points.

6.2 The provision of telecommunication services implies:

— subscription ensuring the basic service and possibly subscription to supplementary services;

— registration into a service directory in the case where demand services are used;

— compatibility between terminals;

— interworking capabilities (this point needs further study).

6.3 The provision of individual bearer services is given in the I.230-Series, the provision of individual teleservices is given in the I.240-Series and the association of supplementary services to bearer services and teleservices is given in Recommendation I.250.

ANNEX A
(to Recommendation I.210)

**Structure for prose service definition and description — Step 1.1 of description method (Recommendation I.130)**

A.1 *Structure of prose service definition and description*

Prose service definition and description is the first step (1.1) of the stage 1 overall service description from the user's point of view (Recommendation I.130). The prose definition of a telecommunication service will be structured as follows:

1 *Definition*

2 *Description*

2.1 General description

2.2 Specific terminology

2.3 Qualifications

3 *Procedures*

3.1 ProvisionB/Fwithdrawal

3.2 Normal procedures

3.2.1 ActivationB/FdeactivationB/Fregistration

3.2.2 Invocation and operation

(3.2.3 InterrogationB/Fediting)

3.3 Exceptional procedures

3.3.1 ActivationB/FdeactivationB/Fregistration

3.3.2 Invocation and operation

(3.3.3 InterrogationB/Fediting)

3.4 Alternative procedures

3.4.1 Activation/deactivation/registration

3.4.2 Invocation and operation

(3.5 Verification)

4 *Network capabilities for charging*

5 *Interworking requirements*

6 *Interaction with other supplementary services*

*Note 1* — Where a particular section would not be appropriate for a particular service (basic or supplementary) ‘‘not applicable’’ appears in that section for that service. Some such items have been identified by paragraph numbering in parenthesis.

*Note 2* — Where information contained under one item (e.g. 3.2.1) for a particular service is extensive, then this item may be further sub-divided under sub-headings as necessary.

*Note 3* — In a Recommendation containing prose definitions and descriptions, an additional digit is prefixed to the above numbering structure to make the section numbering conform to the presentation rules laid out in Recommendation A.15.

## A.2 *Explanation of the terms and content of the items in the service prose definition and description*

### 1 *Definition*

This section provides a short description of the service in terms of the perceptions of the user receiving the service and any other users involved in the service.

### 2 *Description*

This section expands on the definition and summarizes the operation of the service in a generic form which does not constrain terminal or network design. It is intended to allow an understanding of the service without regard to implementation. It also includes any specific terminology used within the prose definition and description, and any qualifications. For basic services this section details the applications which could utilize the service whilst for supplementary services this section details their applicability to particular telecommunication services.

### 3 *Procedures*

The overall operation of the service in its various states is described in this section 3. These procedures relate to all actions between the user(s) and the network during the period that the service is available.

#### 3.1 *Provision/withdrawal*

This section describes the means by which the service is made available by the service provider, e.g. it may be generally available to all customers, or only be available to those customers who have made a prior arrangement.

#### 3.2 *Normal procedures*

The paragraphs under this heading describe the normal procedures for activation, deactivation, registration, invocation and operation for the service as appropriate. This section describes only the successful outcome of each procedure, and the procedures which are executed as a result of such successful outcomes. The procedures are described in a time-based sequence of events. They describe the interactions of the users involved in the service with the service provider and with each other which lead to, and are elements of, the successful operation of the service.

##### 3.2.1 *Activation/deactivation/registration*

The procedures for activation, which is the operation of bringing the service into the ‘‘ready for invocation’’ state, and deactivation, which is the complementary action, are described in this section. For some services there may be a specific user procedure to allow activation and deactivation as necessary, whilst for others the service is permanently activated on provision and thus no procedure is provided.

Registration describes the procedures by which any specific information, necessary for the successful operation of the supplementary service, is given to the network. The need to register information with the network, e.g. a forwarding number, only applies to certain supplementary services.

##### 3.2.2 *Invocation and operation*

This section describes the procedures for invocation, which is the action and conditions under which the service

is brought into operation; in the case of a supplementary service this may only be on a particular call. It should be noted that although a supplementary service may be activated, it may not necessarily be invoked on all calls. (Invocation takes place either subsequent to or simultaneously with activation.)

In the case of basic services this section describes the events, perceived at the service access point, during the establishment, information transfer and clearing phases.

Operation is the procedure which occurs once a service has been invoked. In the case of a supplementary service this is described in terms of the way in which the supplementary service modifies/enhances the network's treatment of a call. This description gives details of the significant actions of the network, treated in principle as a single entity, and the perception of the users involved on the call. It includes details of the information exchanged between the network and relevant users and the indications given to each user, by the network, concerning the states of the call.

3.2.3 *Interrogation/editing*

Interrogation is the facility which enables a served user to determine, from the service provider, the current status of a particular service. Whether this facility is provided for the service being described, and if so, the procedures that accompany it, are detailed in this section.

Editing describes the process whereby any registered information (see section 3.2.1 under this § A.2) specific to a service may be erased or modified by the served user.

3.3 *Exceptional procedures*

The paragraphs under this heading describe, for each of the items shown under section 3.2 of this § A.2, the exceptional procedures which result in an unsuccessful outcome of the call. Included within this description are the details for such situations as invalid user action and the handling of certain network and interface conditions. For the case of basic services this includes the handling of such network conditions as congestion.

3.4 *Alternative procedures*

The paragraphs under this heading describe any alternative procedures, where available, for each of the items shown under section 3.2 of this § A.2. These either allow an alternative way of activating or invoking the service, or detail a possible alternative treatment of the call by the network.

3.5 *Verification*

This section describes the facilities that are provided by the network to enable the subscriber to verify the operation of the service once it has been activated. Not all services allow provision for verification of the operation of the service.

4 *Networking capabilities for charging*

This section details only those charging aspects specific to the service in question and includes, where necessary, both static (subscription) and dynamic (call related) aspects.

5 *Interworking requirements*

This section describes special aspects of the individual service, if the service is used in a connection which exists partly inside and partly outside a given ISDN, or which, for certain operational aspects, routes through more than one ISDN.

6 *Interaction with other supplementary services*

This section only applies in the case of supplementary services and describes all interactions of the supplementary service being described with other supplementary services as far as they have been identified and which are relevant for standardization.

For example, for some supplementary service pairs there is no interaction as the two supplementary services are not permitted to be both in operation at the same time. For other pairs, one or both supplementary services may be modified whilst the pair of services are in operation simultaneously.

It is recognized that although the layout, and the detailed work to date, has only dealt with the interactions between two supplementary services, further work is necessary on combinations of more than two supplementary services.

ANNEX B

(to Recommendation I.210)

## List of attributes and their possible values for describing bearer services — Step 1.2 of description method (Recommendation I.130)

B.1 *Framework for the static description of bearer services supported by an ISDN*

Static description of the service using attributes is the second step (1.2) of the stage 1 overall service description from the user's point of view (Recommendation I.130). These attributes are described and defined in Recommendation I.140. Attributes to describe bearer services are intended to be independent and are grouped into three categories:

i) *information transfer attributes* | hich characterize the network capabilities for transferring information from one S/T reference point to one (or more) other S/T reference point(s), corresponding to access points 2 and 1 as defined in Recommendation I.210;

ii) *access attributes* | hich describe the means for accessing network functions or facilities as seen at one S/T reference point; and

iii) *general attributes* | hich deal with the service in general.

Figure B-1/I.210 shows the relation between the groups of attributes and their fields of applicability. § B.2 gives the list of the attributes. For the definitions and possible values of these attributes, see Recommendation I.140.

**Figure B-1/I.210, p.**

B.2 *List of bearer service attributes*

*Information transfer attributes*

1. Information transfer mode
2. Information transfer rate
3. Information transfer capability
4. Structure
5. Establishment of communication
6. Symmetry
7. Communication configuration

*Access attributes* | Note)

8. Access channel and rate
9. Access protocol

*General attributes*

10. Supplementary services provided
11. Quality of Service
12. Interworking possibilities
13. Operational and commercial

*Note* — Different access attributes may apply at each of the (two or more) network interfaces involved in the use of a bearer service.

Table B-1/I.210 presents a list of possible values for each attribute. Where options exist for a given attribute, the selection is subject to agreement between the customer and the Administration.

According to Recommendation I.210 the bearer capability defines the technical features of a bearer service as they appear to the user at the S/T reference point. The bearer capability is characterized by information transfer and access attributes. A bearer capability is associated with every bearer service.

**H.T. [1T3.210]**

TABLE B-1/I.210

**Values for each bearer service attribute**

| Attributes | ua) | Possible values of attributes | |
|---|---|---|---|
| { *Information transfer attributes* } 1. Information transfer mode } | { | | |
| Circuit | Packet | | |

| | | | | |
|---|---|---|---|---|
| {<br>3.<br>Information transfer capability<br>} | | | | |
| {<br>Unrestricted digital information<br>} | Speech | 3.1 kHz audio | 7 kHz audio | |
| 4. Structure | 8 kHz integrity | {<br>Service data<br>unit integrity \| ub) | | |
| } | Unstructured | TSSI \| uc) | RDTD \| ud) | |
| {<br>5.<br>Establishment of communication \| ue) | | | | |
| } | Demand | Reserved | Permanent | |
| 6. Symmetry | Unidirectional | Bidirectional symmetric | Bidirectional asymmetric | |
| {<br>7.<br>Communication configuration | | | | |
| } | Point-to-point | Multipoint | Broadcast \| uf) | |
| {<br>*Access attributes*<br>8.<br>Access channel and rate | | | | |
| } | D \| 16) | D \| 64) | B | |
| {<br>9.1<br>Signalling access<br>protocol layer 1 | | | | |
| } | Rec. \| .430/ Rec. I.431 | Rec. I.461 | Rec. I.462 | |
| {<br>9.2<br>Signalling access<br>protocol layer 2 | | | | |
| } | Rec. I.440/ Rec. I.441 | Rec. I.462 | Rec. X.25 | Oth |
| {<br>9.3<br>Signalling access<br>protocol layer 3 | | | | |
| } | Rec. I.450/ Rec. I.451 | Rec. I.461 | Rec. I.462 | |
| {<br>9.4<br>Information access<br>protocol layer 1 | | | | |
| } | Rec. \| .430/ Rec. I.431 | Rec. I.460 \| ug) | Rec. I.461 | |
| {<br>9.5<br>Information access protocol layer 2 | | | | |
| } | HDLC LAPB | I.440/ I.441 | Rec. X.25 | |
| {<br>9.6<br>Information access protocol layer 3 \| uh) | | | | |
| } | T.70-3 | Rec. X.25 | Rec. I.462 | Oth |
| {<br>*General attributes*<br>10.<br>Supplementary services provided<br>11.<br>Quality of service<br>12.<br>Interworking possibilities | | | | |

| | |
|---|---|
| 13.<br>Operational and commercial aspects<br>} | Under study |

**Table B-1 [1T3.210], p.**

**H.T. [2T3.210]**

*Notes to Table B-1/I.210*

a) The attributes are intended to be independent of each other.

b) The need for a ‘‘data sequence integrity’’ attribute is for further study.

c) Time slot sequence integrity (TSSI).

d) Restricted differential time delay (RDTD).

e) A definition of the establishment of communication is given in Recommendation I.140.

f) The characterization of the information transfer configuration attribute ‘‘broadcast’’ is for further study.

g) The inclusion of Recommendation I.460 implies the support of non-ISDN CCITT standardized services (e.g., at X.1 rate). The necessary user-network signalling is provided in Recommendation I.451.

h) The use of Recommendation I.451 as an information access protocol is for further study.

**H.T. [1T4.210]**

TABLE C-1/I.210

**Possible values for each teleservice attribute**

| Attributes \| ua) | Possible values of attributes | | |
|---|---|---|---|
| { *Information transfer attributes* } 1. Information transfer mode | { | | |
| } Circuit | Packet | | |
| | | | |

| | | | | |
|---|---|---|---|---|
| { 3. Information transfer capability } Unrestricted digital information } | { Speech | 3.1 kHz audio | 7 kHz audio | Others for further study |
| 4. Structure | 8 kHz integrity | Service data unit integrity | Unstructured | Others for further study |
| { 5. Establishment of communication \| ub) } | Demand | Reserved | Permanent | |
| 6. Symmetry | Unidirectional | Bidirectional symmetric | Bidirectional asymmetric | |
| { 7. Communication configuration } | Point-to-point | Multipoint | Broadcast \| uc) | |
| { *Access attributes* 8. Access channel and rate } | D \| 16) | D \| 64) | B | Others for further study |
| { 9.1 Signalling access protocol layer 1 } | Rec. \| .430/ Rec. I.431 | Rec. I.461 | Rec. I.462 | Rec. I.463 |
| { 9.2 Signalling access protocol layer 2 } | Rec. I.440/ Rec. I.441 | Rec. I.462 | Rec. X.25 | Others for further study |
| { 9.3 Signalling access protocol layer 3 } | Rec. I.450/ Rec. I.451 | Rec. I.461 | Rec. I.462 | Rec. X.25 |

| | | | | | |
|---|---|---|---|---|---|
| { 9.4 Information access protocol layer 1 } | Rec. \| .430/ Rec. I.431 | Rec. I.460 | Rec. I.461 (Rec. \| .30) | Rec. I.462 (Rec. \| .31) | Rec. I.46 |
| { 9.5 Information access protocol layer 2 } | HDLC LAPB | Rec. \| .440/ Rec. I.441 | Rec. X.75 SLP | Rec. X.25 LAPB | Others fo |
| { 9.6 Information access protocol layer 3 } ISO 8208 \| ud) (Rec. X.25 PLP) } | { Rec. X.25 PLP | Others for further study | | | |

**Tableau B-1/I.210 [2T3.210], p. 10**

ANNEX C
(to Recommendation I.210)

**List of attributes and their possible values for describing**

**teleservices — Step 1.2 of description method**
**(Recommendation I.130)**

C.1 *Framework for the static description of teleservices supported by an ISDN*

A static description of the service using attributes is the second step (step 1.2) of the stage 1 overall service description from the user's point of view (Recommendation I.130). These attributes are described and defined in Recommendation I.140.

Attributes to describe teleservices supported by an ISDN are intended to be largely independent. They are grouped into three categories:

a) low layer attributes

— information transfer attributes,

— access attributes;

b) high layer attributes;

c) general attributes.

*Note* — Teleservices generally make use of underlying lower layer capabilities of bearer services specified in the I.230-Series of Recommendations. However, where teleservices are provided by a single administration, RPOAs or other service providers, the combination of values of lower layer attributes applicable to specific teleservices may not necessarily be identical to any of those identified for the bearer services appearing in the I.230-Series of Recommendations.

Figure C-1/I.210 shows the relationship between the different categories of service attributes and their scope within a teleservice.

**Figure C-1/I.210, p.**

C.2 *List of the teleservice attributes*

*Low layer attributes*

*Information transfer attributes*

1. Information transfer mode
2. Information transfer rate
3. Information transfer capability
4. Structure
5. Establishment of communication
6. Symmetry
7. Communication configuration

*Access attributes*

8. Access channel and rate
9. Access protocol

9.1 Signalling access protocol layer 1

9.2 Signalling access protocol layer 2

9.3 Signalling access protocol layer 3

9.4 Information access protocol layer 1

9.5 Information access protocol layer 2

9.6 Information access protocol layer 3

*High layer attributes*

10. Type of user information

11. Layer 4 protocol functions

12. Layer 5 protocol functions

13. Layer 6 protocol functions

— Resolution ?04 — Graphic mode ?05 if applicable 〕

14. Layer 7 protocol functions

— TE-to-TE protocol functions ?04 — TE-to-HLF protocol functions ?05 if applicable (Note) 〕

*General attributes*

15. Supplementary services provided

16. Quality of Service

17. Interworking possibilities

18. Operational and commercial

*Note* — These attribute values are shown in order to give an example of a description of a teleservice appliction involving terminals at both access points (3 or 5) and an intervening system providing HLF functions (see Figure 3*c* /I.210 and Figure 3*e* /I.210). A specific teleservice attribute description for this case is for further study.

Table C-1/I.210 presents a list of possible values for each service attribute. Where optional values of given attributes are offered, their selection is subject to agreement between the customer and service provider.

**H.T. [1T4.210]**

TABLE C-1/I.210

**Possible values for each teleservice attribute**

| Attributes \| ua) | Possible values of attributes | | | |
|---|---|---|---|---|
| { *Information transfer attributes* } 1. Information transfer mode | { | | | |
| } Circuit | Packet | | | |
| | | | | |
| { 3. Information transfer capability } Unrestricted digital information | { | | | |
| } | Speech | 3.1 kHz audio | 7 kHz audio | Others for further study |
| 4. Structure | 8 kHz integrity | Service data unit integrity | Unstructured | Others for further study |
| { 5. Establishment of communication \| ub) } | Demand | Reserved | Permanent | |
| 6. Symmetry | Unidirectional | Bidirectional symmetric | Bidirectional asymmetric | |
| { 7. Communication configuration } | Point-to-point | Multipoint | Broadcast \| uc) | |
| { *Access attributes* 8. Access channel and rate } | D \| 16) | D \| 64) | B | Others for further study |
| { 9.1 Signalling access protocol layer 1 } | Rec. \| .430/ Rec. I.431 | Rec. I.461 | Rec. I.462 | Rec. I.463 |
| { 9.2 Signalling access protocol layer 2 } | Rec. I.440/ Rec. I.441 | Rec. I.462 | Rec. X.25 | Others for further study |
| { 9.3 Signalling access protocol layer 3 } | Rec. I.450/ Rec. I.451 | Rec. I.461 | Rec. I.462 | Rec. X.25 |

| | | | | | |
|---|---|---|---|---|---|
| {<br>9.4<br>Information access protocol layer 1<br>} | Rec. \| .430/ Rec. I.431 | Rec. I.460 | Rec. I.461 (Rec. \| .30) | Rec. I.462 (Rec. \| .31) | Rec. I.463 (Rec. V.11 |

| | | | | | |
|---|---|---|---|---|---|
| {<br>9.5<br>Information access protocol layer 2<br>} | HDLC LAPB | Rec. \| .440/ Rec. I.441 | Rec. X.75 SLP | Rec. X.25 LAPB | Others for further study |
| {<br>9.6<br>Information access protocol layer 3<br>}<br>ISO 8208 \| ud)<br>(Rec. X.25 PLP)<br>} | {<br>Rec. X.25 PLP | Others for further study | | | |

**Table C-1 [1T4.210], p.**

**H.T. [2T4.210]**

TABLE C-1/I.210 | fI(cont.)

**Possible values for each teleservice attribute**

| Attributes | ua) | Possible values of attributes | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 10. Type of user information | Speech (telephony) | Sound | Text (Teletex) | Facsimile (Telefax | ) | { | | | |
| Text-facsimile (Mixed mode) } | Videotex | Video | Text interactive (Telex) | Other | | | | | |
| 11. Layer 4 protocol | Rec. X.224 | Rec. T.70 | Others for further study | | | | | | |
| 12. Layer 5 protocol | Rec. X.225 | Rec. T.62 | Others for further study | | | | | | |
| 13. Layer 6 protocol | T.400-Series | Rec. G.711 | Rec. T.61 | Rec. T.6 | Others fo | | | | |
| { Resolution | ue) f) } | 200 ppi | 240 ppi | 300 ppi | 400 ppi | Others fo | | | |
| Graphic mode | uf) | Alpha-mosaic | Geometric | Photographic | Others for further study | | | | |
| 14. Layer 7 protocol | Rec. T.60 | T.500-Series | Others for further study | | | | | | |
| *General attributes* | Under study | | | | | | | | |

SLP Single link protocol

PLP Packet layer protocol

ppi Picture elements per inch

a) The attributes are intented to be independent of each other.

b) A definition of the establishment of communication is given in Recommendation I.140.

c) The characterization of the information transfer configuration attribute ‘‘broadcast’’ is for further study.

d) For those teleservices that use circuit mode bearer capability X.25 PLP description is as per ISO 8208.

e) These attribute values are mentioned in order to give an example of a specific presentation description of characteristics such as coding of the user information, resolution, and graphic mode. Attribute values for other presentation characteristics are for further study.

f) If applicable.

**Tableau C-1/I.210 [2T4.210], p. 13**

ANNEX D
(to Recommendation I.210)

**Dynamic description of the service using graphic means —**

**Step 1.3 of description method**
**(Recommendation I.130)**

D.1 *Introduction*

Dynamic description of the service using graphic means is the third step (1.3) of the stage 1 overall service description from the user’s point of view (Recommendation I.130).

The dynamic description of a service contains all the information that is sent and received by the user from activationB/Finvocation of the service to completion of the service. The information is presented in the form of an Overall Specification and Description Language (SDL) diagram or state transition diagrams.

*Note* — Currently, state transition diagrams are not used for the dynamic descriptions of services.

An overall SDL diagram shows the flow of events and states within the service, in a time-sequenced format, and identifies all possible actions relevant to the service as perceived by the user. It treats the network as a single entity, that is, no information flows between nodes within the network are considered.

SDL diagrams , drawn according to the principles laid down in Recommendation Z.100, are included in step 1.3 in order to help to clarify and support the processing and information flows necessary for each service.

## D.2 *Overall specifications and description language (OSDL) diagrams*

In this third step of stage 1 each service state is shown in conjunction with all the external or internal actions which cause state changes. The actions may be inputs from users or the outcome of an internal process. Ideally all situations are included in a single diagram although the diagram may have to be distributed over more than one document because of its complexity.

The symbols used in OSDL diagrams and their meanings are as follows:

**Diagramme T1806920-88, p. 14**

**Diagramme T1806930-88, p. 15**

**MONTAGE : PAGE 126 = PAGE BLANCHE**

SECTION 2

## COMMON ASPECTS OF SERVICES IN THE ISDN

**Recommendation I.220**

## COMMON DYNAMIC DESCRIPTION OF BASIC TELECOMMUNICATION SERVICES

*(Melbourne, 1988)*

### 1 Introduction

This Recommendation provides the dynamic description of basic telecommunication services. The dynamic description for basic telecommunication services using the circuit-mode means of service establishment/dis establishment is provided in § 2. The packet-mode description is for further study.

The dynamic description shows the flow of events, and states within

the service, in a time-sequenced format and identifies all possible actions relevant to the service as perceived by end-users.

Although the service is described from the end-user perspective it does not concern details of the human-to-machine interface itself. In addition, the service description considers the network as a single entity. For example, information flows between nodes within the network are not shown.

End-user perceptions of the service are shown in terms of ‘‘user/network’’ interactions whenever they are or can be perceived by an end-user during the operation of the service, and as required by SDL drawing rules.

The terminology and the meaning of the ‘‘user/network’’ interactions are provided in Annex A. The means for developing dynamic descriptions, e.g. the SDL symbols and their usage, is further elaborated in Recommendation I.210.

*Note* — In the development of the circuit-mode dynamic description, the bearer services (speech, 3.1 kHz audio, unrestricted) and the teleservices (telephony, Teletex, Telefax 4, mixed-mode and Videotex) were considered. Others are for further study.

### 2 Circuit-mode dynamic description of basic bearer services and teleservices

See Annex A for terminology used in Figures 1/I.220 to 6/I.220.

In Figures 1/I.220 to 6/I.220, the following notes are common:

*Note 1* — This is an event which may occur at the S/T reference point and can be reflected at the user interface.

*Note 2* — This is an event which may occur at the S/T reference point but is not reflected at the user interface.

*Note 3* — In some networks this decision is optional, that is, multipoint operation is assumed.

**Figure 1/I.220, p. 16**

**Figure 2/I.220, p. 17**

**Figure 3/I.220, p. 18**

**Figure 4/I.220 (feuillet 1 sur 4), p. 19**

**Figure 4/I.220 (feuillet 2 sur 4), p. 20**

**Figure 4/I.220 (feuillet 3 sur 4), p. 21**

**Figure 4/I.220 (feuillet 4 sur 4), p. 22**

**Figure 5/I.220, p. 23**

**Figure 6/I.220, p. 24**

ANNEX A
(to Recommendation I.220)

**Terminology for ‘‘user/network’’ interactions**

SETUP Interaction across the ‘‘user/network’’ interface regarding a service request.

REPORT Interaction across the ‘‘user/network’’ interface regarding alerting of the user’s terminal function, interworking whih a non-ISDN network, or routing progress.

CONNECT Interaction across the ‘‘user/network’’ interface regarding completion of circuit cut-through.

DISCONNECT Interaction across the ‘‘user/network’’ interface regarding a user who has disconnected, or regarding a user A who cannot be connected (e.g. busy) to a user B.

RELEASE Interaction across the ‘‘user/network’’ interface regarding freeing of resources associated with the call/connection, such as call references and channels.

NDUB Network determined user busy.

UDUB User determined user busy.

**Recommendation I.221**

## COMMON SPECIFIC CHARACTERISTICS OF SERVICES

*(Melbourne, 1988)*

### 1 Introduction

The principles of telecommunication services supported by an ISDN and the means to describe them are given in Recommendation I.210.

The attribute technique and values of attributes, which form part of the standardized description method, (see Recommendation I.130) for services, are given in Recommendation I.140.

This Recommendation refers to and details the common specific characteristics of services for both basic services and supplementary services.

### 2 Scope and content of the Recommendation

This Recommendation identifies and describes those common specific characteristics of services which are a common feature of each of the individual services and which help to form a relationship between services.

These characteristics are used in a consistent manner throughout the ISDN services and are intended to be service independent. They are used, for instance, to help to identify the situations under which certain supplementary services are invoked during the operation of basic services.

### 3 Common specific characteristics

#### 3.1 *Definition of ‘‘busy’’ in an ISDN*

##### 3.1.1 *Scope*

This section describes the conditions under which a given ISDN destination is considered ‘‘busy’’. In general, this occurs whenever the resources associated with that destination (and needed to successfully complete the call) exist but are not available for the call. In existing networks, such as the PSTN, this is indicated to the calling subscriber by ‘‘busy tone’’.

In addition, the operation of certain ISDN supplementary services occurs when certain of these resources are busy. Therefore, these ‘‘resource busy’’ conditions are also described herein.

This section does not cover the cases where network resources not associated with a given destination are unavailable, or when such resources are out-of-service or otherwise non-funtional.

##### 3.1.2 *Resources*

Two main categories of resources may become involved in the determination of ‘‘busy’’: interface resources and customer resources.

*Interface resources* | nclude the signalling channel (D-channel), other physical channels (B- and H-channels), logical channels (for packet-mode services) and maximum number of calls supported. It is noted that with the ongoing activities on ‘‘calls versus

connections'' other interface resources may become important in the future.

For the purposes of this Recommendation, the signalling channel is considered to be always available and with sufficient capacity to handle signalling for new calls. Situations where this is not true are considered to be ''failure conditions'' and are not covered here. For the other interface resources, descriptions are given below of what is meant when they are considered busy.

*Subscriber resources* | nclude the terminal(s) themselves and the persons or processes using them. For the purposes of this Recommendation, it is not considered significant which of the subscriber resources are busy, or why. An indication from the subscriber that (some, necessary) subscriber resources are busy is sufficient.

3.1.3 *Resource busy conditions*

Three resource busy conditions have been found necessary to refer to and are defined below:

1) channels busy: this condition occurs when there is no appropriate information channel (physical or logical) available for the network to use for the call.

2) maximum number of total calls reached: this condition occurs when the maximum number of total calls supported at the given subscriber's interface(s) has been reached.

3) subscriber busy: this condition is indicated by the subscriber's terminal equipment, e.g. by having all compatible terminals which could respond to the call request indicate ''user busy'' either when they are offered a call, or in response to an enquiry from the network.

3.1.4 *Procedural aspects*

The resource busy conditions described above significantly influence the call offering procedures, both for the basic ISDN calls and for calls that may involve ISDN supplementary services. The procedural aspects of call offering are outlined below and shown in Figure 1/I.221.

1) Assume that a call of a telecommunications service subscribed to by the called subscriber is about to be offered.

2) If all of the appropriate user-network interface information channels are busy (i.e. channels busy) and either the network does not support the offering of additional calls beyond the number of appropriate channels, or the maximum number of such additional calls has been reached, the network will clear the call [see also item 7, below] and indicate ''network determined user busy'' back towards the calling subscriber.

3) Similarly, if the maximum number of total calls supported at the given subscriber's interface(s) has been reached, the network will clear the call (see also item 7 below) and indicate ''network determined user busy'' back towards the calling subscriber.

4) Otherwise, the network offers the call to the subscriber.

5) If any compatible terminal responds ''positively'' to the call offering, i.e. gives some indication that the call may progress towards successful completion, the normal call offering procedure should continue.

6) If no compatible terminal responds ''positively'' but one or more compatible terminal responds ''user busy'', then when the response-to-call-offering timeout occurs, the network will clear the call with the indication ''user determined user busy''.

7) It is recognized that for the determination of a ''network determined user busy'' condition, the network does not assume any knowledge of whether or not a compatible terminal exists at the called interface. This may mask the determination of a ''no compatible terminal available'' condition, i.e. a NDUB condition may be returned when, in fact, no compatible terminal is connected. The use of an explicit compatibility check to prevent this from occuring is a service provider option and is for further study.

3.1.5 *Definition of* **busy**

An ISDN destination is considered to be busy if either a ''network determined user busy'' or a ''user determined user busy'' condition occurs, as described above.

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**Figure 1/I.221, p. 25**