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ITU-T

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TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

**INTEGRATED SERVICES DIGITAL
NETWORK (ISDN)
GENERAL STRUCTURE**

**METHOD FOR THE CHARACTERIZATION
OF TELECOMMUNICATION SERVICES
SUPPORTED BY AN ISDN AND
NETWORK CAPABILITIES OF AN ISDN**

ITU-T Recommendation I.130

(Extract from the *Blue Book*)

NOTES

1 ITU-T Recommendation I.130 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.

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Recommendation I.130

METHOD FOR THE CHARACTERIZATION OF TELECOMMUNICATION SERVICES SUPPORTED BY AN ISDN AND NETWORK CAPABILITIES OF AN ISDN

(Melbourne, 1988)

1 General considerations

The concept and the principles of ISDNs are described in Recommendation I.120. The purpose of this Recommendation is to provide a method for the characterization of telecommunication services (including supplementary services) and a definition of the needed network capabilities in an ISDN, in order to support the identified services.

The main objectives are:

- a) to give a common framework and tools to be adopted for service description;
- b) to show how, starting from the service definition, it is possible to define protocols and network resources for providing such services;
- c) to make reference to those Recommendations which are relevant to the above two points.

2 Structure and application of the overall method

The method is divided into three main stages of activity: service aspects (stage 1), functional network aspects (stage 2) and network implementation aspects (stage 3).

Within each stage a number of steps have been identified, as shown in Figure 1/I.130. In principle, the application of the method is sequential, stage 1 given the service description from the user point of view, stage 2 offering an intermediate view of what happens at the user-network interface and inside the network between different exchanges, and stage 3 giving the actual switching and service nodes descriptions, as well as protocols and format to be adopted.

In order to classify and relate the various Recommendations relevant to the method, a three level structure is used where each level applies to the three above-mentioned stages.

Level 1 is a description of the overall method, and is contained in this Recommendation.

Level 2 identifies and defines the tools for the work within each stage. Examples of these tools are frameworks for service prose descriptions, libraries of pre-defined functions, graphical conventions, etc. All these tools are covered by Recommendations.

Level 3 is the actual application of the method to each individual service and is contained in various Recommendations.

The application of the method for stage 1 results in a description of the service. Stage 2 results in one or more implementation independent scenarios, and stage 3 results in a set of protocol and switching Recommendations needed to realize the service for each scenario.

Figure 2/I.130 illustrates the concept of levels in relation to various Recommendations relevant to the method.

3 Description of the method

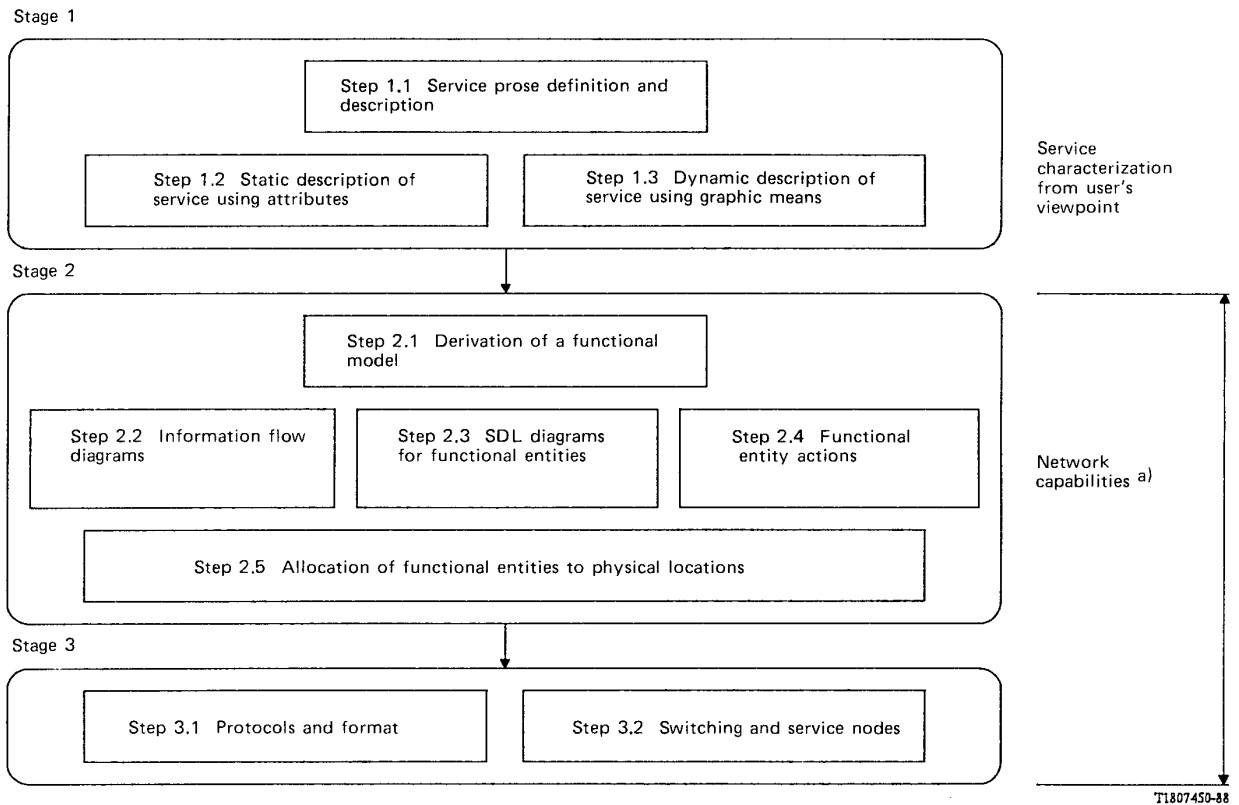
As referred to in § 2 above, there are three stages of the method as follows:

Stage 1 is an overall service description from the user's standpoint.

Stage 2 is an overall description of the organization of the network functions to map service requirements into network capabilities.

Stage 3 is the definition of switching and signalling capabilities needed to support services defined in stage 1.

Each stage consists of several steps.

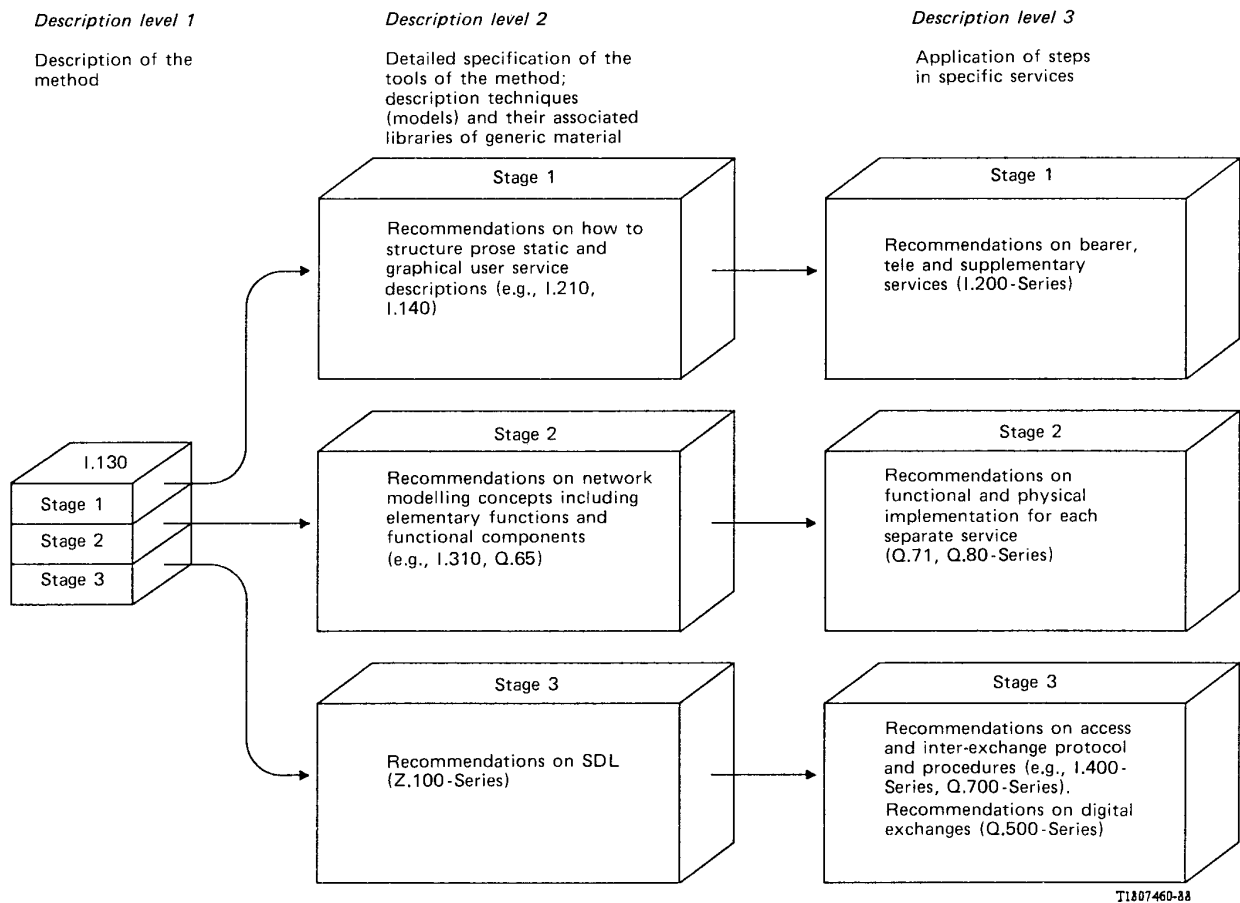


a) This term, in this context, could include some capability in the user equipment.

FIGURE 1/I.130

Graphical representation of the overall method for development of ISDN service Recommendations

d01



Note — In the application of stages 1, 2 and 3 there may not be separate Recommendations for each service. A Recommendation may describe provisions for basic service and multiple supplementary services in an integrated way.

FIGURE 2/I.130

d02

3.1 *Stage 1*

Stage 1 is an overall service description from the user's point of view, but does not deal with the details of the human interface itself. The stage 1 service description is independent of the amount of functionality in the user's terminal, other than that required to provide the human interface. For example the conference calling service description is designed to be independent of whether the conference bridge is in the terminal, in the serving exchange or elsewhere.

The steps in stage 1 are:

Step 1.1 – Service prose definition and description

This step describes the service in terms of the perceptions of the user receiving the service and any other users involved in the service. It describes events in a generic term which does not constrain terminal or network design. It is intended to allow an understanding of the service without regard to implementation. The description should include operational, control, interworking and administrative aspects as well as interactions with other services. A detailed format and list of definitions for terms used for service prose definition and description is contained in Recommendation I.210.

Step 1.2 – Static description of the service using attributes

The static, that is, time-independent, aspects of a service can, in some cases, be efficiently described by attributes. An attribute is a characteristic or functional description which is common to several services and therefore needs to be described in detail only once. Subsequently, it can be referred to by a name or other designation. Within the scope of an attribute definition there may be multiple parameters or identified functional variations which are called attribute values.

The attribute technique is described more fully in Recommendation I.140. It contains an outline of the technique and definitions of attributes and attributes values, valid for both services and connection types. The attributes and attribute values identified for services can be found in Rec. I.210 (Annexes B and C) for bearer services and for teleservices. The use of the attribute technique in the description of supplementary services is for further study.

Step 1.3 – Dynamic description of the service using graphic means

The dynamic description of a service contains all the information that is sent and received by the user from activation invocation of the service to completion of the service. The information is presented in the form of an overall Specification and Description Language (SDL) diagram. An overall SDL diagram is a flow chart which 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 within the network are considered. The method of using the overall SDL diagrams for service description is given in Recommendation I.210, Annex D.

3.2 *Stage 2*

Stage 2 identifies the functional capabilities and the information flows needed to support the service as described in stage 1. The stage 2 description will also include user operations not directly associated with a call (e.g. user change of call forwarding parameters via his service interface) as described in stage 1. Furthermore, it identifies various possible physical locations for the functional capabilities. The output of stage 2 which is signalling system independent is used as an input to the design of signalling system and exchange switching Recommendations.

The steps in stage 2 are:

Step 2.1 – Derivation of a functional model

A functional model is derived for each basic and for each supplementary service. The functions required to provide the service are grouped into functional entities. The functional model is the aggregate of the functional entities and their relationships. The concept of a functional entity is contained in the ISDN functional principles Recommendation (I.310). In the case of supplementary services the relationship between the supplementary service and the basic service is shown by a composite functional model.

Step 2.2 – Information flow diagrams

The distribution of the functions needed to provide a service as defined by the functional model requires that interactions be defined between functional entities. Such an interaction is referred to as an “information flow” and has a name descriptive of the intent of the information flow. Information flow diagrams are created for successful operation and may be created as appropriate for other cases. The semantic meaning and information content of each information flow is determined.

Step 2.3 – SDL diagrams for functional entities

The functions performed within a functional entity are identified and represented in the form of a Specification and Description Language (SDL) diagram. The inputs and outputs of the SDL diagram are to and from the users as described in stage 1 and are information flows to and from other functional entities.

SDL diagrams are defined for each functional entity based on the information flows defined for the successful operation of the service. The SDL diagram also covers the unsuccessful cases.

Step 2.4 – Functional entity actions

The actions performed within a functional entity are represented as a list, or sequence, of functional entity actions (FEAs) in prose form. These form the basis for understanding the meaning of the information flows and provide a basis for the stage 3 switching Recommendations.

Note – The relationship between the FEAs and the elementary functions (EFs), as listed in Recommendation I.310 is for further study.

Step 2.5 – Allocation of functional entities to physical locations

In this step, the functional entities and information flows identified in previous steps are allocated to specific types of physical locations, e.g. a PABX or an exchange. Each allocation is called a scenario. The relationship supported between two functional entities located in different physical locations must be realized within protocol(s) supported between those locations.

The detailed procedures and formats used and the concepts needed for the stage 2 description can be found in Recommendations Q.65 and I.310.

3.3 *Stage 3*

In stage 3 the information flow and SDL diagrams from the stage 2 output form the basis for producing the signalling system protocol Recommendations and the switching Recommendations.

The steps in stage 3 will need to be repeated for each service where, because of different allocations of functional entities to physical locations, different protocols and procedures are needed.

The steps in stage 3 are:

Step 3.1 – Protocols and formats

The messages needed to support the information flows and the modifications to existing information flows between the nodes are identified and the detailed message elements and procedures are designed into the relevant signalling systems.

Step 3.2 – Switching and service nodes

The requirements identified for switching functions (functional entity actions) are incorporated into the switching Recommendations (Q.500-Series).

