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EUROPEAN COMPUTER MANUFACTURERS ASSOCIATION

STANDARD ECMA-134

METHOD FOR THE SPECIFICATION OF BASIC AND SUPPLEMENTARY SERVICES OF PRIVATE TELECOMMUNICATION NETWORKS

April 1989

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**METHOD FOR THE SPECIFICATION OF
BASIC AND SUPPLEMENTARY SERVICES
OF PRIVATE TELECOMMUNICATION
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BRIEF HISTORY

This ECMA Standard is based on, and complements, corresponding CCITT and CEPT Recommendations applicable to public telecommunication networks.

The specification given herein relates to a series of standards applicable to private telecommunication networks, especially to private switching networks. It is intended to ensure that such standards be prepared on, and reflect, the common understanding of their overall context.

This Standard fits into the framework of the standardization activities in the field of information technology and telecommunications as sponsored by the Commission of the European Communities for the establishment of a harmonized common market in Europe. It is contributed to CENELEC for further processing as a European pre-Norm (ENV), according to the Common Declaration of Cooperation in the Field of Telecommunications in Private Networks, agreed upon between CENELEC and ECMA.

Adopted as an ECMA Standard by the General Assembly on 25th April 1989.

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1. SCOPE

This Standard specifies the method for specification of basic and supplementary services provided by a Private Telecommunication Network (PTN). It applies to any other PTN-related standard, such as:

- stage 1 and stage 2 specifications of basic and supplementary services;
- specifications of basic and supplementary service signalling protocols, at any relevant PTN reference point, in the context of any scenarios for the interconnection of PTN exchanges (PTNXs), and in the context of interworking with other networks.

2. FIELD OF APPLICATION

This Standard applies primarily to Private Telecommunication Networks (PTNs).

3. CONFORMANCE

In general, a PTN-related specification is in conformance with this Standard if it adheres to the method specified in this Standard.

In particular:

- stage 2 specifications of a basic service, or of supplementary services, are in conformance with this Standard if they adhere to the method specified in this Standard and, in addition, satisfy the requirements of the corresponding stage 1 specifications;
- stage 3 specifications of a basic service or of supplementary services are in conformance with this Standard if they adhere to the method specified in this Standard and, in addition, satisfy the requirements of the corresponding stage 1 and stage 2 specifications.

4. REFERENCES

In this Standard all references to CCITT Recommendations are references to the Recommendations as agreed by the CCITT Plenary Assembly in Melbourne in November 1988 and published in the Blue Book.

CCITT Rec. I.130 Method for the Characterization of Telecommunication Services supported by an ISDN and Network Capabilities of an ISDN

CCITT Rec. I.140 Attribute Technique for the Characterization of Telecommunication Services supported by an ISDN and Network Capabilities of an ISDN

CCITT Rec. I.210 Principles of Telecommunication Services and the Means to Describe them

CCITT Rec. I.220 Common Dynamic Description of Basic Telecommunication Services

CCITT Rec. I.230	Definition of Bearer Services
CCITT Rec. I.240	Definition of Tele-Services
CCITT Rec. Q.65	Stage 2 of the Method for the Characterization of Services Supported by an ISDN
CCITT Rec. Q.71	ISDN 64 kbit/s Circuit Mode Switched Bearer Services
ENV-xxxxxx	Terminology in Private Telecommunication Networks (a preliminary title for the Standard being prepared by CENELEC)

5. DEFINITIONS

5.1 Private Telecommunication Network Exchange (PTNX)

A nodal entity which provides autonomous (i.e. independently of the public ISDN) and automatic switching and call handling functions used for the provision of telecommunication services which are based on the definitions of the public ISDN services.

Note 1 :

If applicable, a PTNX provides :

- telecommunication services within its own area, and/or
- telecommunication services from the public ISDN, and/or
- telecommunication services from other public or private networks, and/or
- within the context of a private telecommunication network, telecommunication services from other PTNXs

to users of the same and/or another PTNX.

A PTNX may be represented by an ISPBX, or by equipment which is physically part of the equipment of, for example, an ISDN local exchange.

5.2 Private Telecommunication Network (PTN)

A private network comprising one or more interconnected PTNXs. The PTN provides services to its extension users which are based on those provided by its PTNXs. A PTN may spread over more than one user premises. In this case, inter-PTNX connections between the PTNXs serving the individual premises are required. These interconnections are considered part of the PTN.

6. GENERAL PRINCIPLES AND REQUIREMENTS

6.1 Classification of Services

The services offered to the extension user of a PTNX comprise basic and supplementary services.

Basic services are divided into basic bearer services and basic tele-services.

Supplementary services can apply to both basic bearer services and basic tele-services.

This classification of services is the same as for an ISDN, see CCITT Rec. I.210.

The attributes for the characterization of basic services are described in CCITT Rec. I.140.

6.2 Basic Call

The basic call is an instance of the use of a basic service. The basic call shall be established when use of a basic service is requested, it shall be maintained throughout the use of that service and it shall be released when the use of that service is no longer required.

Additions to the basic call shall provide the means for initiating, maintaining (if applicable) and terminating the use of supplementary services.

The following are examples of basic services :

- circuit mode bearer services,
- bearer services for the support of packetized information transfer,
- bearer services for the support of management applications (including bearer services providing fast select or datagram capabilities),
- tele-services,

as specified in CCITT Recs. I.220, I.230 and I.240.

7. THE THREE-STAGE SPECIFICATION METHOD

Service specifications shall follow the three-stage method specified below, which is based on the method specified for public ISDNs by CCITT Rec. I.130.

The three-stage method implies that the stage 2 specification satisfies the requirements of the stage 1 specification, and that the stage 3 specification satisfies the requirements of the stage 1 and of the stage 2 specifications.

7.1 Stage 1 of the Method

This stage shall specify how basic or supplementary services present themselves to the extension user.

Stage 1 specifications of basic services shall make use of a basic call stage 1 specification covering common aspects of all basic services and specific aspects which are service-dependent.

The basic call stage 1 specification shall define the establishment and release of a basic call, as they appear to the extension user. It shall also define the nature of extension user information transfer during the established phase of the basic call.

Stage 1 specifications of supplementary services shall define additions to the basic call, as they appear to the extension user.

The stage 1 specifications for basic and supplementary services shall also define the impact of interworking with a public ISDN, as perceived by the extension user, e.g. possible restrictions and modifications of the services.

7.2 Stage 2 of the Method

This stage shall specify how a basic call or supplementary service is handled by the various functional entities which cooperate in order to provide the service. These specifications shall fulfill the requirements of the relevant stage 1 specifications.

7.2.1 Functional Entities

A functional entity (FE) is a set of functions which are located in the same unit of equipment, e.g. a TE or a PTNX. Functions which may need to reside in different units of equipment shall be assigned to different FEs.

For basic calls, the FEs are defined in 7.2.5 below. The FEs supporting a supplementary service shall be identified in the appropriate stage 2 specification.

7.2.2 Functional Model

The functional model shows the FEs involved in the provision of a service and those pairs of FEs between which there is a direct interchange of information. Some types of FE may occur more than once in the model. The model for the basic call is defined in 7.2.5 below. The model to support supplementary services shall be shown in the appropriate stage 2 specification.

7.2.3 Information Flows

A collection of items of information to be sent from one FE to another FE at a particular instant is called an information flow. Stage 2 shall show examples of information flows, with their contents specified in an abstract way.

7.2.4 Sequences of Information Flows

Examples of typical sequences of information flows necessary for the FEs to cooperate in the provision of a service shall be shown.

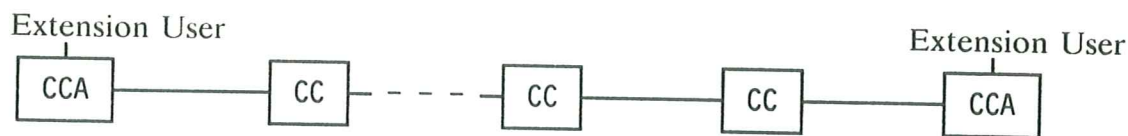
7.2.5 Functional Entities involved in a Basic Call

Figure 1 shows the functional model for the basic call, which is based on CCITT Rec. Q.71.

Two generic types of FEs are used, the Call Control Agent FE (CCA) and the Call Control FE (CC).

The CCA acts on behalf of the extension user and calls upon the CC(s) for the provision of the basic service requested by the extension user. Specific forms of CCA exist for the originating and the terminating extension user.

CCAs are located within the TEs involved in the basic call, i.e. the TE of the extension user who requests the service (calling TE) and the TE of the destination extension user (called TE).



CC : Call Control generic functional entity
CCA : Call Control Agent generic functional entity

Note 2 : The number of CCs can vary from one upwards

Figure 1 : Generic Functional Entities involved in a PTN Basic Call

The CCs cooperate in the provision of the basic service requested by the CCAs.

Specific forms of CC exist at the exchanges through which the call is routed, including the exchange serving the calling TE (originating exchange), the exchange serving the called TE (terminating exchange) and any intermediate exchanges (transit exchanges).

This model is independent of the network or networks involved in the basic call, i.e. it also applies to interworking situations between a PTN and other networks such as public ISDNs.

For calls entirely within a PTN, the CCs are located at PTNXs and the CCAs are located at TEs attached to PTNXs.

For calls which interwork with other networks, specific forms of CC exist at exchanges of the other networks, e.g. public ISDN local exchanges, and one of the CCAs is located in a TE attached to another network. Examples are given in Appendix A.

In keeping with requirements for terminal portability, the information flows between a CCA and a CC located in a PTNX shall be compatible with the information flows between a CCA and a CC located in a public ISDN local exchange.

7.2.6 Relationship between Supplementary Service and Basic Call Functional Entities

The relationship between the FEs identified for the provision of supplementary services and the various CCs and CCAs of the basic call shall be specified in the appropriate stage 2 specification. For some supplementary services, there may be a number of different possibilities for the location of supplementary service FEs. In interworking situations some supplementary service FEs may be located within other networks.

The signalling protocols specified at stage 3 shall be able to support all of the possibilities identified at stage 2.

7.3 Stage 3 of the Method

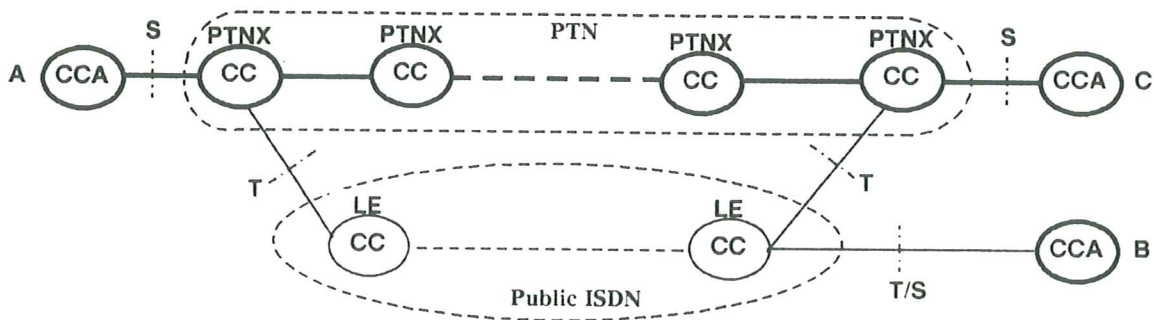
This stage shall specify the signalling protocols at each relevant reference point and/or interface for basic call and supplementary services, and other aspects of equipment behaviour which are necessary for cooperation in the provision of network services. These specifications shall fulfill the requirements of both the relevant stage 1 and the relevant stage 2 specifications.

Stage 3 conformance test specifications shall use the relevant stage 1 and stage 2 specifications to ensure that the equipment under test is capable of cooperating in the provision of network services based on those specified at stages 1 and 2.

APPENDIX A
(Informative)

Examples of Interworking for Basic Calls and
Supplementary Services between PTN and Public ISDN

Figure A-1 shows an example of the application of the model to a mixed PTN to public ISDN interworking situation.



- CC : Call Control generic functional entity
- CCA : Call Control Agent generic functional entity
- LE : Local Exchange

Figure A-1 : Example of a PTN to Public ISDN Interworking Situation

A call between CCAs A and C can either be routed entirely through CCs of the PTN, or through a CC of the PTN, CCs of the public ISDN, and a further CC of the PTN.

A call between CCAs A and B can be routed through a CC of the PTN and CCs of the public ISDN, or through a series of CCs of the PTN and a CC of the public ISDN.

It can be seen that a CC in a public ISDN local exchange (LE) is in communication with a CCA when a TE is attached at coincident S and T reference points, whereas a CC in a public ISDN LE is in communication with another CC when a PTNX is attached at the T reference point. This implies different information flows across coincident S and T reference points compared with those across a single T reference point, and different behaviour of the CC in the public ISDN LE, depending on whether a TE or a PTNX is attached. It may also have impact on the signalling protocol at the public ISDN user-network interface, as specified at stage 3.

The above considerations may also apply to certain supplementary services, i.e. the functional entities on either side of a stand-alone T reference point may differ from those on either side of coincident S and T reference points. This may, again, lead to differences in the behaviour of the public ISDN LE and differences in the signalling protocol, depending on whether a TE or a PTNX is attached.

APPENDIX B

List of Acronyms and Abbreviations

CC	Call Control
CCA	Call Control Agent
ENV	European pre-Norm
FE	Functional Entity
ISDN	Integrated Services Digital Network
ISPBX	Integrated Services Private automatic Branch Exchange
LE	Local Exchange
PTN	Private Telecommunication Network
PTNX	Private Telecommunication Network Exchange
S	S Reference Point
T	T Reference Point
TE	Terminal Equipment

