Recommendation X.302

DESCRIPTION OF THE GENERAL ARRANGEMENTS FOR INTERNAL NETWORK UTILITIES WITHIN A SUBNETWORK AND INTERMEDIATE UTILITIES BETWEEN SUBNETWORKS FOR THE PROVISION OF DATA TRANSMISSION SERVICES

(Formerly part of Recommendation X.300, Malaga-Torremolinos, 1984, amended at Melbourne, 1988)

The CCITT,

considering

(a) that Recommendation X.300 defines the general principles for interworking between public networks and between public networks and other networks for the provision of data transmission services;

(b) that Recommendation X.301 defines the general arrangements for call control within a subnetwork and between subnetworks for the provision of data transmission services;

(c) that interworking with common channel signalling network (CCSN) needs to be considered, in view of the requirements for transferring operational information between Administrations;

(d) the need that interconnected networks can communicate the necessary internal utilities related to the operation of the data transmission services;

(e) that Recommendations X.61, X.70, X.71 and X.75 already specify the detailed procedures applicable to call control between two PDNs of the same type;

(f) the need for arrangements for interworking between subnetworks;

(g) the need, in particular, for certain inter-network utilities defined between international exchange systems for the provision of data transmission services;

(h) the need for compatibility and uniformity in the principle for realization of internal network utilities within a subnetwork and between subnetworks for the provision of data transmission services,

unanimously recommends

that arrangements for internal utilities within a subnetwork and between subnetworks for the provision of data transmission services, and that the necessary elements for realization of such internal network utilities be in accordance with the principles and arrangements specified in this Recommendation.

CONTENTS

0 *Introduction*

1 *Scope and field of application*

2 *References*

3 *Definitions*

4 *Abbreviations*

5 *General aspects of call control*

6 *Arrangements for internal network utilities*

6.1 Network identification

6.1.1 General

6.1.2 Originating network identification

6.1.3 Destination network identification

6.1.4 Transit network identification

6.1.5 Clearing network identification

6.2 Call identifier

6.3 Target quality of service parameters

6.4 Tariffs

6.5 Network user identification

0 Introduction

This Recommendation is one of a set of Recommendations produced to facilitate consideration of interworking between networks. It is related to Recommendation X.300, which defines the general principles for interworking between public networks, and between public networks and other networks for the provision of data transmission services. Recommendation X.300 indicates in particular combinations of physical equipment can be represented as "subnetworks" for consideration of interworking situations.

This Recommendation describes utilities that can be used within a subnmetwork and between subnetworks for the provision of data transmission services. Only those utilities are described that are needed for the internal and inter-network operation, and that are not visible to the end users of a call. Facilities that are (also) visible to end users of a call are subject of other Recommendations (e.g. those arrangements described in Recommendation X.301).

1 Scope and field of application

The purpose of this Recommendation is to describe general arrangements for internal network utilities applicable to interworking at the network layer. Such arrangements are not visible for the end users of the network layer connection and apply within a subnetwork and between subnetworks.

These arrangements are not applicable to interworking involving communication capability as described in § 7 of Recommendation X.300.

2 References

X.61 Signalling system No. 7 - Data user part.

X.70 Terminal and transit control signalling system for start-stop services on international circuits between anisochronous data networks

X.71 Decentralized terminal and transit control signalling system on international circuits between synchronous data networks

X.75 Packet switched signalling system between public networks providing data transmission services

X.121 International numbering plan for public data networks

X.300 General principles for interworking between public networks, and between public networks and other networks for the provision of data transmission services

X.301 Description of the general arrangements for call control within a subnetwork and between subnetworks for the provision of data transmission services.

3 Definitions

This Recommendation makes use of the following terms defined in Recommendation X.300:

a) transmission capability;

b) communication capability;

c) data transmission services.

This Recommendation makes use of the following terms defined in Recommendation X.301:

a) call request phase;

b) call information phase;

c) data transfer phase;

d) call clearing phase.

4 Abbreviations

CCSN Common channel signalling network

CNIC Clearing network identification code

CSPDN Circuit switched public data network

DCC Data country code

DCE Data circuit-terminating equipment

DNIC Data network identification code

DTE Data terminal equipment

IDSE International data switching exchange

INIC ISDN network identification code

ISDN Integrated services digital network

NI Network identifier

NUI Network user identification

PDN Public data network

PSPDN Packet switched public data network

5 General aspects

The network utilities described in this Recommendation can be applied for internal network operation and for arrangements between networks, and are not conveyed across the DTE/DCE interface.

The general principles concerning inter-network signals are defined in Recommendation X.301, in particular the phases related to a call:

- call request and call confirmation phases,
- data transfer phase,
- call clearing phase.

The corresponding model applicable to inter-network arrangements is reproduced in Figures 5-1/X.302 and 5-2/X.302.

Figure 5-1/X.302 - T0706190-88

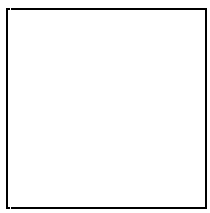
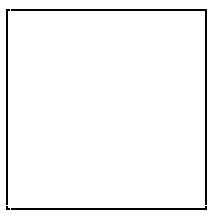


Figure 5-2/X.302 - T0706200-88



6 Arrangements for internal network utilities

6.1 *Network identification*

6.1.1 *General*

The international *network identification* utilities provide information about the network(s) from, via or to which an international call is routed. In the general case, the term network identifier (NI) is the name of the number that identifies a network. Depending on the type of network and geographic location of the network, the format of the NI may vary.

A PDN is identified by four decimal digits that indicate:

a) in the case of the network of a country using the DCC format of the international data numbering plan (see Recommendation X.121), the applicable DCC plus one digit consistent with the numbering plan;

b) in the case of a network using the DNIC format of the international data numbering plan (see Recommendation X.121), the applicable DNIC.

In the short term, an ISDN is identified by a 4-digit INIC (ISDN network identification code), that has been designed not to coincide with a valid PDN DNIC value (see Recommendation X.75).

Note - The long term solution for network identification (NI) is for further study.

6.1.2 Originating network identification

The *originating network identification* utility identifies the originating network of a call.

In the packet-switched data transmission service in PSPDNs, the identity of the originating network (DNIC) is transferred in the *call request* phase to the destination networks as part of the international data number (see Recommendation X.75). To perform the function of the *originating network identification* utility this DNIC, which is part of the international data number, is always either inserted or checked by the originating network.

Provision of *originating network identification* as an optional network utility on request by a transit or destination network on a per call basis is mandatory for the circuit-switched data transmission service.

In the case of common channel signalling (see Recommendation X.61), a network requiring identification of the originating network requests such identification by returning an *originating network identification* request indication. When receiving such a request the originating network responds by sending:

a) the complete calling line identity in accordance with § 6.2.4 of Recommendation X.301 in the case where the *calling line identification* facility is provided by the originating network and such identification is also requested;

b) the originating network identity in the case where *calling line identification* is not provided or requested.

In the case of decentralized signalling (see Recommendations X.70 and X.71), a network requiring identification of the originating network requests such identification by returning a *calling line identification* request indication. When receiving such a request, the originating network responds with the calling line identity or the originating network identity depending on whether or not the *calling line identification* facility is provided by the originating network (see § 6.2.4 of Recommendation X.301).

6.1.3 Destination network identification

The *destination network identification* utility identifies the destination network of a call.

In the circuit-switched data transmission service in CSPDNs *destination network identification* for all international calls is a mandatory network utility. Thus, for each international call the identity of the destination network is returned in accordance with the applicable signalling procedures (see Recommendations X.61, X.70 and X.71).

In the packet-switched data transmission service, the identity of the destination network (DNIC) may be transferred in the *call confirmation* phase to the originating network as part of the international data number (see Recommendation X.75). When transferred, this DNIC must either be inserted or checked by the destination network.

6.1.4 Transit network identification

The transit network identification utility identifies the transit network(s) via which the call has been set up, and is conveyed during the call request phase.

In the packet-switched data transmission service in PSPDNs and ISDNs *transit network identification*, in both the forward and backward directions, is a mandatory network utility for international calls (see Recommendation X.75).

In the circuit-switched data transmission service in CSPDNs *transit network identification* in the backward direction is a mandatory network utility for international calls (see Recommendations X.61, X.70 and X.71).

In cases where more than one transit network is identified, the identities are indicated in the order of transit networks traversed by the call following the established path from the calling user towards the called user.

6.1.5 *Clearing network identification*

The CNIC utility identifies the network that has cleared the call and is only used when the call clearing phase has been initiated by a network during the data transfer phase.

In the packet switched data transmission service in PSPDNs and ISDNs, the CNIC is an optional network utility, subject to bilateral agreement between Administrations (see Recommendation X.75).

The network initiating the call clearing phase is identified in PDNs and ISDNs by the NI (see Recommendations X.75 and X.121). An IDSE receiving a CNIC will pass this code unchanged whenever applicable.

6.2 Call identifier

The *call identifier* utility gives the identification of a call. When the utility is used in conjunction with the calling DTE address, it uniquely identifies the call over a period of time, the duration of this time period is for further study. This utility is standardized for packet-switched data transmission service in PSPDNs and ISDNs (see Recommendation X.75).

A significant call identifier may or may not be created for a given call (see also Note 2). This is the responsibility of the originating network. Each transit network will always transfer a received significant call identifier without change. The definition of the content of the call identifier, and further specification of the associated signalling mechanisms, require further study.

Note 1 - However, it is for further study whether a transit network can create a significant call identifier, if it received a call identifier which was not significant.

Note 2 - On links designed according to Recommendation X.75, a call identifier utility of 4 octets is always present in the *call request* packet. The value of the 3 octet call identifier parameter may or may not be significant.

In the permanent virtual circuit service, the call identifier might be systematically required. However, it is left for further study.

6.3 Target quality of service parameters

It is for further study whether or not a network utility is required to signal information related to the achievement of target quality of service parameters (e.g. target transit delay) for network purposes outside the control of a user (see also § 7.1 of Recommendation X.301).

6.4 Tariffs

The *tariffs* utility is an optional utility, standardized for PSPDNs and ISDN (PS). Support of this utility for a given inter-network interface is subject to a bilateral agreement between Administrations.

The utility is used to pass information from one network to one or more other networks participating in the call for the purpose of implementating billing, accounting, or tariff arrangements that may exist among the respective Administrations.

The *tariffs* utility may appear in the call request, call confirmation and clear request phases of a call. If this utility appears in the call confirmation or clear request phase, the information it contains relates to the ultimate destination interface of the network. The utility may appear in the clear request phase only if that phase is initiated by the destination DTE or DCE, in direct response to the call request phase.

The content of this utility is determined by the originating or destination network and does not depend on information passed to the network by a DTE.

Even if this utility is supported on the inter-network interface, it may not be present in a phase for a given call if there is no need to exchange tariff-related information with that phase.

6.5 Network user identification (NUI)

The *network user identification* utility is an optional network utility standardized for PSPDNs and ISDNs (PS). The use of this utility is subject to bilateral agreement between Administrations.

The utility may be present in the call request. Use of utility in the call confirmation phase is for further study.

As agreed by the interfacing Administrations, the parameter field of this utility appearing in the call request phase may contain:

a) all, part or none of the parameter field of the NUI selection facility passed to the network by the DTE in the call request phase, and/or

b) an appropriate network-generated identification/verification/security code associated with the corresponding end user.