



INTERNATIONAL TELECOMMUNICATION UNION

# ITU-T

TELECOMMUNICATION  
STANDARDIZATION SECTOR  
OF ITU

## X.81

### PUBLIC DATA NETWORKS

### TRANSMISSION, SIGNALLING AND SWITCHING

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## INTERWORKING BETWEEN AN ISDN CIRCUIT - SWITCHED AND A CIRCUIT- SWITCHED PUBLIC DATA NETWORK (CSPDN)

### ITU-T Recommendation X.81

(Extract from the *Blue Book*)

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## NOTES

- 1 ITU-T Recommendation X.81 was published in Fascicle VIII.3 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 X.81

### INTERWORKING BETWEEN AN ISDN CIRCUIT-SWITCHED AND A CIRCUIT-SWITCHED PUBLIC DATA NETWORK (CSPDN)

(Melbourne, 1988)

The CCITT,

*considering*

- (a) that I-Series Recommendations describe the integrated services digital network (ISDN);
- (b) that interface characteristics, line multiplexing and inter-exchange signalling for use in CSPDNs are described by Recommendations such as X.26/X.27/X.50/X.51/Q.761 to Q.766/X.60/X.61/X.71/X.80;
- (c) that Recommendation X.200 describes the reference model for Open System Interconnection;
- (d) that Recommendation X.213 describes the Network Service Definition for Open Systems Interconnection for CCITT applications;
- (e) 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;
- (f) that Recommendation X.301 defines the general arrangements for call control within a subnetwork and between subnetworks for the provision of data transmission services;
- (g) that Recommendation X.302 defines the general arrangements for internal network utilities within a subnetwork and between subnetworks for the provision of data transmission services;
- (h) that Recommendation X.305 describes functionalities of subnetworks relating to the support of the OSI Network Service;
- (i) that Recommendation X.10 describes categories of access to PSPDNs and ISDNs for the provision of data transmission services;
- (j) that the I.230 Series Recommendations describe the bearer services supported by an ISDN;
- (k) that Recommendation X.30 describes the support of X.21, X.21 *bis* and X.20 *bis* based DTEs on the ISDN;
- (l) the need for arrangements when interworking between ISDN circuit switched and CSPDNs for the provision of data transmission services.

*unanimously declares the view*

that the scope of this Recommendation is intended to cover interworking between an ISDN using circuit-switched connection types and a CSPDN.

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## 0 Introduction

This Recommendation is one of a set of Recommendations produced to facilitate considerations of interworking between networks. It is based on 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 how collections of physical equipment can be represented as "Subnetworks" for consideration in interworking situations.

This Recommendation describes the interworking arrangements between ISDNs (circuit switched bearer) and CSPDNs for the provision of data transmission services.

## 1 Scope and field of application

The purpose of this Recommendation is to describe the detailed arrangements for the interworking between CSPDNs and ISDNs (CS) for the provision of data transmission services. These arrangements are applicable only to the interworking involving transmission capabilities, and not to interworking involving communication capabilities as described in Recommendation X.300.

- a) within the scope of interworking between an ISDN using circuit-switched connection types and a CSPDN the following cases of network interworking can be identified:
  - i) where the terminals connected to the interworking networks use identical data transmission services and have identical high layer capabilities. The identity of data transmission services in both networks assumes that both terminals involved in a communication belong to the same user class of service;
  - ii) where the terminals connected to the interworking networks use non-identical data transmission services but have identical high layer capabilities. In this case two terminals involved in a communication may belong to different user classes of service, e.g. user classes of service 4 and 30.
- b) Not within the scope of this Recommendation is asynchronous mode of operation at the network-to-network interface (ISDN-to-CSPDN interface). In the case, that the ISDN supports the connection of asynchronous mode terminals via an appropriate terminal adaptor (TA) (see Recommendation X.30) and that interworking has to be provided to asynchronous terminals connected to a CSPDN, then the interworking arrangements as for synchronous mode operation will be used. Asynchronous to synchronous conversion may be provided within the TA for ISDN-connected terminals and at the terminal or at the CSPDN for CSPDN-connected terminals.

*Note* - The typing of subnetworks in this Recommendation is based on the support for the OSI connection-mode Network Service and is therefore only valid in this context.

## 2 References

- [1] Recommendation X.1
- [2] Recommendation X.2
- [3] Recommendation X.10
- [4] Recommendation X.20
- [5] Recommendation X.21
- [6] Recommendation X.21 *bis*
- [7] Recommendation X.25
- [8] Recommendation X.27
- [9] Recommendation X.30
- [10] Recommendation X.50
- [11] Recommendation X.51
- [12] Recommendation X.60
- [13] Recommendation X.61
- [14] Recommendation X.71
- [15] Recommendation X.300
- [16] Recommendation X.321
- [17] I.230 and I.250 Series Recommendations
- [18] Recommendation G.703
- [19] Recommendation G.708
- [20] Recommendation G.811
- [21] Recommendation Q.761-Q.766

## 3 Definitions

This Recommendation makes use of the following terms defined in the Recommendation as indicated:

| Terms                     | Defined in Recommendation |
|---------------------------|---------------------------|
| Bearer service            | I.230 Series              |
| Data transmission service | X.10; X.300               |
| OSI network layer service | X.213                     |
| User class of service     | X.1                       |
| Supplementary services    | I.250 Series; X.2         |

## 4 Abbreviations

|          |                                                     |
|----------|-----------------------------------------------------|
| DTE      | Data terminal equipment                             |
| DCE      | Data circuit-terminating equipment                  |
| SS No. 7 | Common channel signalling system number 7           |
| CSPDN    | Circuit switched public data network                |
| ISDN     | Integrated services digital network                 |
| IWF      | Interworking functions                              |
| LAPB     | Link access protocol, balanced                      |
| OSI-NLS  | Open system interconnection - Network layer service |
| HDLC     | High level data link control                        |
| TA       | Terminal adaptor                                    |
| TE       | Terminal equipment                                  |
| UC       | User class of service                               |

## *Abbreviations of SS No. 7 messages and X.71 signals*

### *SS No. 7 messages:*

|      |                     |
|------|---------------------|
| ACM  | Address complete    |
| ANS  | Answer              |
| IAM  | Initial address     |
| INF  | Information         |
| INR  | information message |
| REL  | Release             |
| RLC  | Release complete    |
| RLSD | Released            |

### *X.71 signals:*

|          |                             |
|----------|-----------------------------|
| CC       | Call connected              |
| CCF      | Call confirmation           |
| CDI      | Called line identification  |
| CLI      | Calling line identification |
| CLEAR    | Clearing signal             |
| CLEAR C. | Clear confirmation          |
| SEL      | Selection signals           |
| TTC      | Transit through connect     |

### *Additional information contained in SS No. 7 messages and X.71 signals*

|      |                                     |
|------|-------------------------------------|
| CDI  | Called line identification          |
| CDIR | Called line identification request  |
| CLI  | Calling line identification         |
| CLIR | Calling line identification request |

## **5 General aspects**

This Recommendation, in describing interworking arrangements between two subnetworks for the provision of data transmission services, adheres to the general principles of Recommendation X.300. The environments of these two subnetworks are described in the following sections.

### **5.1 CSPDN**

The CSPDN provides circuit switched data transmission services as defined in Recommendations X.1 and X.2 for the provision of data transmission services, the CSPDN may be accessed by DTEs by the categories of access B as defined in Recommendation X.10. Other possibilities of access, which are not relevant to this Recommendation are described in Recommendation X.321.

### **5.2 ISDN**

The ISDN provides circuit switched data transmission services/bearer services/supplementary services as defined in Recommendation X.1, the I.230 Series and I.250 Series. For the provision of data transmission services the ISDN may be accessed by TE2s by the categories of access S as defined in Recommendation X.10 and by TEs as defined in the I.230 Series. (circuit-mode 64 kbit/s unrestricted, unstructured). Other possibilities of access which are not relevant to this Recommendation are described in Recommendation X.321.

### **5.3 Call control between the CSPDN and ISDN**

The general arrangements for call control between the CSPDN and ISDN circuit switched are as defined in Recommendation X.301. Network utilities used between the CSPDN and ISDN circuit switched are as defined in Recommendation X.302 (not visible for users).