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SERIES X: DATA COMMUNICATION NETWORKS:
SERVICES AND FACILITIES, INTERFACES

Services and facilities

INTERNATIONAL DATA TRANSMISSION SERVICES AND OPTIONAL USER FACILITIES IN PUBLIC DATA NETWORKS AND ISDNs

Reedition of CCITT Recommendation X.2 published in the Blue Book, Fascicle VIII.2 (1988)

NOTES

1 CCITT Recommendation X.2 was published in Fascicle VIII.2 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.

Recommendation X.2

INTERNATIONAL DATA TRANSMISSION SERVICES AND OPTIONAL USER FACILITIES IN PUBLIC DATA NETWORKS AND ISDNs

(Geneva, 1972; amended at Geneva, 1976, 1980; Malaga-Torremolinos, 1984 and Melbourne, 1988)

The CCITT,

considering

(a) the international user classes of service and categories of access defined in Recommendations X.1 and X.10;

(b) the need to standardize data transmission services, optional user facilities and *DTE services*, in public data networks and ISDNs, which should be made available on an international basis;

(c) the need to standardize additional optional user facilities and *DTE services* which may be provided by Administrations and which may be available on an international basis;

(d) that the optional user facilities indicated in this Recommendation are defined in other Recommendations, for example Recommendation X.301 for network implementations, where appropriate, and Recommendations X.21, X.25, etc., for network procedures;

Note – Alignment and interworking between the facilities in Recommendations X.2 and supplementary services in the I.250 series are for further study.

(e) the need to standardize the identification methods applicable to these *DTE services*, which identification methods should be made available on an international basis, and which identification methods may be provided by Administrations and may be available on an international basis;

(f) the impact which these optional user facilities and *DTE services* could have on tariff structures,

unanimously declares

(1) that the optional user facilities should be standardized for each of the user classes of service indicated in Recommendation X.1 for each of the following:

i) circuit switched data transmission services;

ii) packet switched data transmission services;

iii) leased circuit data transmission services.

Note 1 – Recommendation X.10 defines the various categories of access to public data communication services.

Note 2 – Further study is necessary to establish whether the service and optional user facilities provided by ISDNs for circuit switched data transmission services are adequately defined in Recommendation X.2.

(2) that the optional user facilities to be made available on an international basis are indicated in in the following sections. Some of the optional user facilities are available on a per-call basis and others may be assigned for an agreed contractual period. In all cases, the user has the option of requesting a given optional user facility;

(3) that the DTE services and the relative identification methods used when the packet switched data transmission service is obtained via a Public Switched Telephone Network (PSTN), a Circuit Switched Public Data Network (CSPDN) or an Integrated Services Digital Network (ISDN) should also be standardized and are indicated in the following sections.

1 Circuit switched data transmission service

Table 1/X.2 indicates the optional user facilities which should be made available on an international basis in the circuit switched data transmission service and those facilities which may be available in certain data networks and may also be available internationally.

Note – The subject of interworking between the packet switching service and the circuit switching service is for further study.

TABLE 1/X.2

Optional user facilities in circuit switched data transmission service

Optional user facility		All user classes of service
1.	*Optional user facilities assigned for an agreed contractual period*	
1.1	Direct call	A
1.2	Closed user group	E
1.3	Closed user group with outgoing access	A
1.4	Closed user group with incoming access	A
1.5	Incoming call barred within a closed user group	A
1.6	Outgoing call barred within a closed user group	A
1.7	Calling line identification	A
1.8	Outgoing calls barred	A
1.9	Bilateral closed user group	A
1.10	Bilateral closed user group with outgoing access	A
1.11	Incoming calls barred	A
1.12	Reverse charging acceptance	A
1.13	Connect when free	A
1.14	Waiting allowed	A
1.15	Redirection of calls	A
1.16	On-line facility parameter registration/cancellation	A
1.17	DTE inactive registration/cancellation	A
1.18	Date and time indication	A
1.19	Hunt group	A
2.	*Optional user facilities requested by the DTE on a per-call basis*	
2.1	Direct call	A
2.2	Abbreviated address calling	A
2.3	Multi-address calling (see Note)	A
2.4	Reverse charging	A
2.5	RPOA selection	A
2.6	Charging information	A
2.7	Called line identification	A

Note – This optional user facility provides also the user with the capability to request the establishment of a point-to-multipoint configuration amongst the following: centralized multipoint, decentralized multipoint, broadcasting.

2 Packet switched data transmission services

2.1 *Direct connection to a packet switched data transmission service*

Table 2/X.2 and Table 3/X.2 indicate the services and the optional user facilities, respectively, which should be made available on an international basis in the packet switched data transmission service and those which may be available on certain data networks and may also be available internationally, in case of a direct connection to a packet switched data transmission service.

These services and optional user facilities are described in Recommendation X.25.

A DTE may make use of one or more of these services and facilities.

It should be noted that Recommendation X.25 has inherent features (e.g. the conveying of an address extension), which can be used end-to-end by users for providing an OSI network service (see Recommendations X.213 and X.223). Such features are described in Recommendation X.25 and are so-called "CCITT-defined DTE facilties" (see Recommendation X.25, Annex G).

Note 1 – The subject of interworking between the packet switching service and the circuit switching service is for further study.

Note 2 – The study of "connectionless services" is for further study.

TABLE 2/X.2

Services in packet switched data transmission service (direct connection)

	User classes of service	
	8-11 and 13	20-23
Virtual call service	E	E
Permanent virtual circuit service	E (Note)	FS

Note – This service continues to be allocated an "E" classification. However, while some Administrations continue to believe that the offering of this service is an essential feature of the international service, other Administrations have expressed the view that they will not offer the service internationally. The international application depends on bilateral agreement. This service may not be available for the maritime mobile services.

TABLE 3/X.2

Facilities of packet switched data transmission service (direct connections)

Optional user facility	User classes of service			
	8-11 and 13		20-23 (Note 1)	
	VC	PVC	VC	PVC
1. *Optional user facilities assigned for an agreed contractual period*				
1.1 Extended frame sequence numbering	A	A	–	–
1.2 Multilink procedure	A	A	–	–
1.3 On-line facility registration	A	–	FS	–
1.4 Extended packet sequence numbering (modulo 128)	A	A	–	–
1.5 D-bit modification	A	A	FS	–
1.6 Packet retransmission	A	A	–	–
1.7 Incoming calls barred	E	–	A	–
1.8 Outgoing calls barred	E	–	A	–
1.9 One-way logical channel outgoing	E	–	–	–
1.10 One-way logical channel incoming	A	–	–	–
1.11 Nonstandard default packet sizes 16, 32, 64, 256, 512, 1024, 2048, 4096	A	A	FS	FS
1.12 Nonstandard default window sizes	A	A	–	–
1.13 Default throughput classes assignment	A	A	FS	FS
1.14 Flow control parameter negotiation	E	–	FS	–
1.15 Throughput class negotiation	E	–	FS	–
1.16 Closed user group	E	–	E	–
1.17 Closed user group with outgoing access	A	–	A	–
1.18 Closed user group with incoming access	A	–	A	–
1.19 Incoming call barred within a closed user group	A	–	A	–
1.20 Outgoing call barred within a closed user group	A	–	A	–
1.21 Bilateral closed user group	A	–	A	–
1.22 Bilateral closed user group with outgoing access	A	–	A	–
1.23 Fast select acceptance	E	–	FS	–
1.24 Reverse charging acceptance	A	–	A	–
1.25 Local charging prevention	A	–	FS	–
1.26 NUI subscription	A	–	A	–
1.27 NUI override	A	–	–	–
1.28 Charging information	A	–	A	–
1.29 RPOA subscription	A	–	A	–
1.30 Hunt group	A	–	A	–
1.31 Call redirection	A	–	FS	–
1.32 Call deflection subscription	A	–	–	–
1.33 TOA/NPI address subscription	FS	–	FS	–
1.34 Direct call	FS	–	A	–

TABLE 3/X.2 *(cont.)*

Optional user facility	User classes of service			
	8-11 and 13		20-23 (Note 1)	
	VC	PVC	VC	PVC
2. *Optional user facilities on a per-call basis*				
2.1 Flow control parameter negotiation	E	–	–	–
2.2 Throughput class negotiation	E	–	–	–
2.3 Closed user group selection	E	–	E	–
2.4 Closed user group with outgoing access selection	A	–	A	–
2.5 Bilateral closed user group selection	A	–	FS	–
2.6 Reverse charging	A	–	A	–
2.7 Fast select	E	–	FS	–
2.8 NUI selection	A	–	A	–
2.9 Charging information	A	–	A	–
2.10 RPOA selection	A	–	A	–
2.11 Call deflection selection	A	–	–	–
2.12 Call redirection or call deflection notification	A	–	FS	–
2.13 Called line address modified notification	A	–	FS	–
2.14 Transit delay selection and indication (see Note 2)	E	–	–	–
2.15 Abbreviated address calling	FS	–	A	–

E An essential user service or facility to be made available internationally.
A An additional user service or facility which may be available in certain data networks and may also be available internationally.
FS For further study.
– Not applicable.
VC Applicable when the virtual call service is being used.
PVC Applicable when the permanent virtual circuit service is being used.

Note 1 – The use of a PAD function is assumed for virtual call service (see Recommendation X.3). Its applicability for permanent virtual circuit service is for further study.

Note 2 – Attention of users is drawn to the fact that the implementation of such a facility might happen with different time schedules, depending on national conditions.

2.2 *Switched connection to a packet switched data transmission service (classes of service 20-23)*

The definition of services and optional user facilities is for further study.

2.3 *Switched connection to a packet switched data transmission service (classes of service 8-13)*

2.3.1 *DTE services and identification methods*

Table 4/X.2 indicates the *DTE services* and the relative *identification methods* which should be made available on an international basis with classes 8-13 of the packet switched data transmission service when the service is accessed via a switched connection, and those which may be available in certain data networks and may also be available internationally, in case of a direct connection to a packet switched data transmission service.

Permanent virtual circuits are not provided in the scope of § 2.3.

The detailed definitions of the DTE services and the identification methods are contained in Recommendation X.32.

TABLE 4/X.2

DTE services and identification methods

DTE services		User classes of service 8-13	DTE identification					DCE identification			
			NO	PSN	XID	Reg	NUI	NO	PSN	XID	Reg
1. Nonidentified (dial-in-by-the-DTE)		A/E (Note 1)	X (Note 1)					X		X	X
2. Nonidentified (dial-out-by-the-PSPDN)		A	X					X	X	X	X
3. Identified	Dial-in-by-the-DTE	A/E (Note 1)		X (Note 1)	X	X	X	X		X	X
	Dial-out-by-the-PSPDN			X				X			
4. Customized (Note 2)	Dial-in-by-the-DTE	A		X	X	X		X		X	X
	Dial-out-by-the-PSPDN			X	X	X		X	X	X	X

NO No identification.
PSN Identification provided by Public Switched Network.
XID Identification provided by means of the link layer XID procedure.
Reg Identification provided by means of the packet layer registration procedure.
NUI Identification provided by means of the *NUI selection* facility.
PSPDN Packet Switched Public Data Network.
E An essential *DTE service* to be made available internationally.
A An additional *DTE service* which may be available in certain data networks and may also be available internationally.
X DTE or DCE identification method which can be provided by the network when it provides the corresponding *DTE service*.

Note 1 – An Administration providing a switched connection to a packet switched data transmission service for classes of service 8-13 should provide at least the *nonidentified DTE service (dial-in-by-the-DTE)* with no DTE identification method or the *identified DTE service (dial-in-by-the-DTE)* with the provided-by-PSN DTE identification method.

Note 2 – The *customized DTE service* is one *DTE service* for which dial-out-by-the-PSPDN may be provided or not provided. However, the possible identification methods are different for dial-in-by-the-DTE and dial-out-by-the-PSPDN.

2.3.2 *Facilities*

For the *nonidentified (dial-in-by-the-DTE)*, the *nonidentified (dial-out-by-the-PSPDN)*, and the *identified DTE services*, the optional user facilities provided at the DTE/DCE interface are default values specified in Recommendation X.32.

For the customized DTE service, the optional user facilities which should be made available internationally, and those which may be available on certain data networks and may also be available internationally are indicated in Table 5/X.2.

TABLE 5/X.2

Facilities of packet switched data transmission service for customized DTE service

	Optional user facility	User classes of service 8-13
1.	*Optional user facilities assigned for an agreed contractual period*	
1.1	Extended frame sequence numbering	A
1.2	Multilink procedure	FS
1.3	On-line facility registration	A
1.4	Extended packet sequence numbering (modulo 128)	A
1.5	D-bit modification	A
1.6	Packet retransmission	A
1.7	Incoming calls barred	E
1.8	Outgoing calls barred	E
1.9	One-way logical channel outgoing	E
1.10	One-way logical channel incoming	A
1.11	Nonstandard default packet sizes 16, 32, 64, 256, 512, 1024, 2048, 4096	A
1.12	Nonstandard default window sizes	A
1.13	Default throughput classes assignment	A
1.14	Flow control parameter negotiation	E
1.15	Throughput class negotiation	E
1.16	Closed user group	E
1.17	Closed user group with outgoing access	A
1.18	Closed user group with incoming access	A
1.19	Incoming call barred within a closed user group	A
1.20	Outgoing call barred within a closed user group	A
1.21	Bilateral closed user group	A
1.22	Bilateral closed user group with outgoing access	A
1.23	Fast select acceptance	E
1.24	Reverse charging acceptance	A
1.25	Local charging prevention	A
1.26	NUI subscription	A
1.27	NUI override	A
1.28	Charging information	A
1.29	RPOA subscription	A
1.30	Hunt group	A
1.31	Call redirection	A
1.32	Call deflection subscription	A
1.33	TOA/NPI address subscriprion	FS
1.34	Direct call	FS
2.	*Optional user facilities on a per-call basis*	
2.1	Flow control parameter negotiation	E
2.2	Throughput class negotiation	E
2.3	Closed user group selection	E
2.4	Closed user group with outgoing access selection	A
2.5	Bilateral closed user group selection	A
2.6	Reverse charging	A
2.7	Fast select	E
2.8	NUI selection	A
2.9	Charging information	A
2.10	RPOA selection	A
2.11	Call deflection selection	A
2.12	Call redirection or call deflection notification	A
2.13	Called line address modified notification	A
2.14	Transit delay selection and indication (see Note)	E
2.15	Abbreviated address calling	FS

TABLE 5/X.2 *(cont.)*

Optional user facility	User classes of service 8-13
3. *X.32 optional user facilities*	
3.1 Secure dial-back	A
3.2 Temporary location	A

E An essential user service or facility to be made available internationally.
A An additional user service or facility which may be available in certain data networks and may also be available internationally.
FS For further study.

Note – Attention of users is drawn to the fact that the implementation of such a facility might happen with different time schedules, depending on national conditions.

3 Leased circuit data transmission services

Table 6/X.2 indicates the optional user facilities which should be made available on an international basis with the leased circuit data transmission services and those which may be available in certain data networks and may also be available internationally.

TABLE 6/X.2

Facilities of leased circuit data transmission service

Optional user facility	User classes of service	
	1-2	3-7
1. Point to point	E	E
2. Multipoint		
2.1 Centralized multipoint	A	A
2.2 Decentralized multipoint	A	A
2.3 Broadcasting	A	A

E An essential user service or facility to be made available internationally.
A An additional user service or facility which may be made available in certain data networks and may also be made available internationally.

APPENDIX I

(to Recommendation X.2)

Recommendation X.25 uses facility codes in the facility field of call set-up and clearing packets, and registration codes in the registration field of registration packets. Recommendation X.32 uses X.32 facility codes and identification protocol elements in the user data field of the XID frames or the registration field of the registration packets. Recommendation X.75 uses utility codes in the utility field of call set-up and clearing packets.

The principles for the encoding of these codes (i.e., class A, B, C or D, depending on the length of the parameter following the code) are described in Recommendations X.25 and X.75.

As far as possible, the same code is used in several contexts only when it has an equivalent semantic. However, due to historical reasons, it is not always the case.

Table I-1/X.2 gives the list of the various codes used in these Recommendations.

TABLE I-1/X.2

Coding of the facility, registration, protocol element and utility codes

Code Bits 8 7 6 5 4 3 2 1	X.25 fac	X.25 dte	X.25 reg	X.32	X.75	
CLASS A						
0 0 0 0 0 0 0 0	X	X	X	X	X	Marker
0 0 0 0 0 0 0 1	X				X	Fast select and/or reverse charging Fast select and/or reverse charging indication
0 0 0 0 0 0 1 0	X		X		X	Throughput class negotiation Default throughput classes assignment Throughput class indication
0 0 0 0 0 0 1 1	X				X	Closed user group selection (basic format) Traffic class indication
0 0 0 0 0 1 0 0	X					Charging information (requesting service)
0 0 0 0 0 1 0 1			X			Facilities that may be negotiated only when all logical channels used for virtual calls are in state p1
0 0 0 0 0 1 1 0			X			Non-negotiable facilities values
0 0 0 0 0 1 1 1				X	X	Diagnostic element Tariffs
0 0 0 0 1 0 0 0	X				X	Called line address modified notification
0 0 0 0 1 0 0 1	X					Closed user group with outgoing access selection (basic format)
0 0 0 0 1 0 1 0		X				Quality of service negotiation: minimum throughput class
0 0 0 0 1 0 1 1		X				Expedited data negotiation
0 0 0 0 1 1 0 0 to 0 0 1 1 1 1 1 1						Unused

TABLE I-1/X.2 *(cont.)*

Code Bits 8 7 6 5 4 3 2 1	X.25 fac	X.25 dte	X.25 reg	X.32	X.75	
CLASS B						
0 1 0 0 0 0 0 0						Unused
0 1 0 0 0 0 0 1	X				X	Bilateral closed user group selection Transit network identification
0 1 0 0 0 0 1 0	X		X		X	Flow control parameter negotiation (packet size) Non-standard default packet sizes Packet size indication
0 1 0 0 0 0 1 1	X		X		X	Flow control parameter negotiation (window size) Non-standard default window sizes Window size indication
0 1 0 0 0 1 0 0	X				X	RPOA selection (basic format) RPOA selection
0 1 0 0 0 1 0 1			X			Facilities that may be negotiated at any time
0 1 0 0 0 1 1 0			X			Availability of facilities
0 1 0 0 0 1 1 1	X					Closed user group selection (extended format)
0 1 0 0 1 0 0 0	X					Closed user group with outgoing access selection (extended format)
0 1 0 0 1 0 0 1	X				X	Transit delay selection and indication Transit delay indication
0 1 0 0 1 0 1 0					X	Clearing network identification code
0 1 0 0 1 0 1 1					X	Transit delay selection
0 1 0 0 1 1 0 0 to 0 1 0 1 1 1 1 1						Unused
0 1 1 0 0 0 0 0						Reference number (see Note)
0 1 1 0 0 0 0 1 to 0 1 1 1 1 1 1 1						Unused
CLASS C						
1 0 0 0 0 0 0 0						Unused
1 0 0 0 0 0 0 1					X	Call identifier
1 0 0 0 0 0 1 0 to 1 0 1 1 1 1 1 1						Unused

TABLE I-1/X.2 *(cont.)*

Code Bits 8 7 6 5 4 3 2 1	X.25 fac	X.25 dte	X.25 reg	X.32	X.75	
CLASS D						
1 1 0 0 0 0 0 0						Unused
1 1 0 0 0 0 0 1	X					Charging information (call duration)
1 1 0 0 0 0 1 0	X					Charging information (segment count)
1 1 0 0 0 0 1 1	X				X	Call redirection or call deflection notification Closed user group indication
1 1 0 0 0 1 0 0	X					RPOA selection (extended format)
1 1 0 0 0 1 0 1	X					Charging information (monetary unit)
1 1 0 0 0 1 1 0	X				X	NUI selection NUI
1 1 0 0 0 1 1 1					X	Closed user group with outgoing access indication
1 1 0 0 1 0 0 0			X			Logical channel types ranges
1 1 0 0 1 0 0 1		X				Called address extension
1 1 0 0 1 0 1 0		X				Quality of service negotiation: end-to-end transit delay
1 1 0 0 1 0 1 1		X				Calling address extension
1 1 0 0 1 1 0 0				X		Identity element
1 1 0 0 1 1 0 1				X		Signature element
1 1 0 0 1 1 1 0				X		Random number element
1 1 0 0 1 1 1 1				X		Signed response element
1 1 0 1 0 0 0 0				X		Temporary location
1 1 0 1 0 0 0 1	X					Call deflection selection
1 1 0 1 0 0 1 0		X				Quality of service negotiation: priority
1 1 0 1 0 0 1 1		X				Quality of service negotiation: protection
1 1 0 1 0 1 0 0 to 1 1 1 1 1 1 1 0						Unused
1 1 1 1 1 1 1 1	X	X	X	X	X	Reserved for extension

Notes to Table I-1/X.2:

X.25 fac: code used in the facility field of X.25 call set-up and/or clearing packets for X.25 facilities.

X.25 dte: code used in the facility field of X.25 call set-up and/or clearing packets for CCITT-defined DTE facilities.

X.25 reg: code used in the registration field of registration packets.

X.32: code defined in Recommendation X.32 and used in the user data field of the XID frames or the registration field of the registration packets.

X.75: code defined in Recommendation X.75 and used in the utility field of the call set-up and/or clearing packets.

Note – This value is reserved for ISO/8208.

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