INTERNATIONAL STANDARDIZED PROFILE

ISO/IEC ISP 10609-22

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Information technology — International Standardized Profiles TB, TC, TD and TE — Connection-mode Transport Service over connection-mode Network Service —

Part 22:

Subnetwork-type dependent requirements for Network Layer and Data Link Layer for ISDN B-channel X.25 DTE to DCE operation

Technologies de l'information — Profils normalisés internationaux TB, TC, TD et TE — Service de transport en mode connexion sur service de réseau en mode connexion —

Partie 22: Prescriptions dépendantes du type de sous-réseau pour la couche réseau et la couche liaison de données pour ISDN en opération sur DTE X.25 canal B à DCE



Reference number
ISO/IEC ISP 10609-22:1995(E)

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. In addition to developing International Standards, ISO/IEC JTC 1 has created a Special Group on Functional Standardization for the processing of International Standardized Profiles.

An International Standardized Profile is an internationally agreed, harmonized document which identifies a standard or group of standards, together with options and parameters, necessary to accomplish a function or set of functions.

Draft International Standardized Profiles are circulated to national bodies for voting. Publication as an International Standardized Profile requires approval by at least 75% of the national bodies casting a vote.

International Standardized Profile ISO/IEC ISP 10609-22 was prepared with the collaboration of

- Asia-Oceania Workshop (AOW);
- European Workshop for Open Systems (EWOS);
- Open Systems Environment Implementors' Workshop (OIW).

ISO/IEC ISP 10609 consists of the following parts, under the general title *Information technology - International Standardized Profiles TB, TC, TD and TE - Connection-mode Transport Service over connection-mode Network Service*:

Part 1: Subnetwork-type independent requirements for Group TB

Part 2: Subnetwork-type independent requirements for Group TC

Part 3: Subnetwork-type independent requirements for Group TD

Part 4: Subnetwork-type independent requirements for Group TE

Part 5: Definition of profiles TB1111/TB1121

Part 6: Definition of profiles TC1111/TC1121

Part 7: Definition of profiles TD1111/TD1121

Part 8: Definition of profiles TE1111/TE1121

Part 9: Subnetwork-type dependent requirements for Network Layer, Data Link Layer and Physical Layer concerning permanent access to a packet switched data network using virtual calls

Part 10: LAN subnetwork-dependent, media-independent requirements

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Part 11: CSMA/CD LAN subnetwork-dependent, media-dependent requirements

Part 12: Definition of profile TC51, provision of the OSI connection-mode Transport Service using the OSI connection-mode Network Service in an End System attached to a CSMA/CD LAN

Part 14: Definition of profile TC53, provision of the OSI connection-mode Transport Service using the OSI connection-mode Network Service in an End System attached to a Token Ring LAN

Part 15: Definition of profile TC54, provision of the OSI connection-mode Transport Service using the OSI connection-mode Network Service in an End System attached to an FDDI LAN

Part 20: Overview of the generalized multi-part ISP structure for TC and TD Group profiles for OSI usage of ISDN

Part 21: Subnetwork-type dependent requirements for Network Layer and Data Link Layer for ISDN B-channel X.25 DTE to DTE operation

Part 22: Subnetwork-type dependent requirements for Network Layer and Data Link Layer for ISDN B-channel X.25 DTE to DCE operation

Part 23: Subnetwork-type dependent requirements for Network Layer and Data Link Layer for Data Transfer concerning a packet switched mode Integrated Services Digital Network using virtual calls: B-channel access case

Part 24: Subnetwork-type dependent requirements for Network Layer and Data Link Layer for Data Transfer concerning a packet switched mode Integrated Services Digital Network using virtual calls: D-channel access case

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Part 26: Subnetwork-type dependent requirements for Network Layer for Call Control procedures concerning the outgoing call of a packet switched mode Integrated Services Digital Network in case B using virtual calls

Part 27: Subnetwork-type dependent requirements for Network Layer for Call Control procedures concerning the incoming call of a packet switched mode Integrated Services Digital Network in case B using virtual calls

Part 28: Subnetwork-type dependent requirements for Data Link Layer for end systems attached to an ISDN subnetwork

Part 30: Definition of profile TC1131

Part 31: Definition of profile TC1231

Part 32: Definition of profile TC4111

Part 33: Definition of profile TC4211

Part 34: Definition of profile TC43111

Part 35: Definition of profile TC43112

Part 36: Definition of profile TC43211

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Part 37: Definition of profile TC43212

Part 38: Definition of profile TC4331

Part 40: Definition of profile TD1131

Part 41: Definition of profile TD1231

Part 42: Definition of profile TD4111

Part 43: Definition of profile TD4211

Part 44: Definition of profile TD43111

Part 45: Definition of profile TD43112

Part 46: Definition of profile TD43211

Part 47: Definition of profile TD43212

Part 48: Definition of profile TD4331

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Introduction

This International Standardized Profile (ISP) is defined in accordance with the principles specified by ISO/IEC Technical Report 10000, "Information technology - Framework and taxonomy of International Standardized Profiles".

The context of Functional Standardization is one area in the overall field of Information Technology (IT) standardization activities, covering base standards, profiles, and registration mechanisms. A profile defines a combination of base standards that collectively perform a specific well-defined IT function. Profiles standardize the use of options and other variations in the base standards, and provide a base for the development of uniform, internationally recognized system tests.

ISPs are produced not simply to "legitimize" a particular choice of base standards and options, but to promote real system interoperability. One of the most important roles for an ISP is to serve as the basis for the development (by organizations other than ISO and IEC) of internationally recognized test methods. The development and widespread acceptance of tests based on this and other ISPs is crucial to the successful realization of this goal.

ISO/IEC ISP 10609 consists of several parts of which this is part 22. This part of ISO/IEC ISP 10609 specifies subnetwork-dependent and media-dependent requirements. There are further parts which specify profile requirements that are subnetwork-independent. In addition, for each individual profile there is a part of ISO/IEC ISP 10609 which identifies the specific requirements of that profile, making reference to appropriate material from parts 2 or 3, and from the subnetwork dependent parts of ISO/IEC ISP 10609.

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Information technology — International Standardized Profiles TB, TC, TD and TE — Connection-mode Transport Service over connection-mode Network Service —

Part 22:
Subnetwork-type dependent requirements for Network Layer and Data Link Layer for ISDN B-channel X.25 DTE to DCE operation

1 Scope

ISO/IEC ISP 10609 is applicable to end systems concerned with operating in the Open Systems Interconnection (OSI) environment. It specifies a combination of OSI standards, which collectively provide the connection-mode Transport Service using the connection-mode Network Service.

This part of ISO/IEC ISP 10609 specifies the requirements for Network Layer and Data Link Layer that apply specifically to configurations involving access to an ISDN subnetwork for B-channel X.25 DTE to DCE operation.

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC ISP 10609. At the time of publication, the editions indicated were valid. All documents are subject to revision and parties to agreements based on this part of ISO/IEC ISP 10609 are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by ISPs to such documents is that they may be specific to a particular edition. Members of IEC and ISO maintain registers of currently valid International Standards and ISPs, and ITU-T maintains published editions of its current Recommendations.

ISO/IEC 7776:1995, *Information technology - Telecommunications and information exchange between systems - High-level data link control procedures - Description of the X.25 LAPB-compatible DTE data link procedures.*

ISO/IEC 8208:1995, *Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment.*

ISO/IEC 8348:1993, *Information technology - Open Systems Interconnection - Network Service Definition.*

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NOTE - ISO/IEC 7776:1995, ISO/IEC 8208:1995 and ISO/IEC 8348:1993 supersede ISO 7776:1986, ISO/IEC 8208:1990 and ISO 8348:1987 respectively. However, when this part of ISO/IEC ISP 10609 was under development, the previous editions were valid and this part of ISO/IEC ISP 10609 is therefore based on these editions. The new editions give extensions and incorporate all of the amendments and corrigenda to the previous editions, which are listed below.

ISO 7776:1986, *Information processing systems - Data communications - High-level data link control procedures - Description of the X.25 LAPB-compatible DTE data link procedures.*

ISO 7776:1986/Cor.1:1989, *Information processing systems - Data communications - High-level data link control procedures - Description of the X.25 LAPB-compatible DTE data link procedures - Technical Corrigendum 1.*

ISO 7776:1986/Cor.2:1989, *Information processing systems - Data communications - High-level data link control procedures - Description of the X.25 LAPB-compatible DTE data link procedures - Technical Corrigendum 2.*

ISO 7776:1986/Cor.3:1991, *Information processing systems - Data communications - High-level data link control procedures - Description of the X.25 LAPB-compatible DTE data link procedures - Technical Corrigendum 3.*

ISO/IEC 7776:1986/Amd.1:1992, *Information technology - Information processing systems - High-level data link control procedures - Description of the X.25 LAPB-compatible DTE data link procedures - Amendment 1: Conformance requirements.*

ISO/IEC 8208:1990, *Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment (see also CCITT Recommendation X.25-1988).*

ISO/IEC 8208:1990/Amd.3:1991, *Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment - Amendment 3: Conformance requirements.*

ISO/IEC 8208:1990/Cor.1:1992, *Information technology - Data communications - X.25 Packet Layer Protocol for Data Terminal Equipment - Technical Corrigendum 1.*

ISO 8348:1987, *Information processing systems - Data communications - Network service definition (see also CCITT Recommendation X.213-1988).*

ISO 8348:1987/Add.2:1988, *Information processing systems - Data communications - Network service definition - Addendum 2: Network layer addressing (see also CCITT Recommendation X.213-1988).*

ISO/IEC 8878:1992, *Information technology - Telecommunications and information exchange between systems - Use of X.25 to provide the OSI Connection-mode Network Service.*

ISO/IEC 9574:1992, *Information technology - Provision of the OSI connection-mode network service by packet mode terminal equipment connected to an integrated services digital network (ISDN).*

CCITT Rec. X.32 (1988), *Interface between data terminal equipment (DTE) and data circuit-terminating equipment (DCE) for terminals operating in the packet mode and accessing a packet switched public data network through a public switched telephone network or an integrated services digital network or a circuit switched public data network.*

3 Definitions

The terms used in this part of ISO/IEC ISP 10609 are defined in the referenced base standards (see clause 2).

4 Abbreviations

The following abbreviations are used in this part of ISO/IEC ISP 10609:

AEF Address Extension Facility
BCD Binary Coded Decimal

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DCE	Data Circuit-terminating Equipment
DTE	Data Terminating Equipment
HIC	Highest Incoming Channel
HOC	Highest Outgoing Channel
HTC	Highest Two-way Channel
IPRL	ISPICS Requirements List
ISDN	Integrated Services Digital Network
ISP	International Standardized Profile
ISPICS	ISP Implementation Conformance Statement
LIC	Lowest Incoming Channel
LOC	Lowest Outgoing Channel
LTC	Lowest Two-way Channel
LAPB	Link Access Protocol Balanced
NSAP	Network Service Access Point
NUI	Network User Identification
OSI	Open Systems Interconnection
PICS	Protocol Implementation Conformance Statement
SABM	Set Asynchronous Balanced Mode
SABME	Set Asynchronous Balanced Mode Extended
VC	Virtual Call
XID	eXchange Identification

5 Subnetwork-type dependent requirements for the Network Layer

5.1 Static conformance requirements

5.1.1 Overall requirements

An implementation conforming to this part of ISO/IEC ISP 10609 shall:

(a) meet the static conformance requirements specified in clause 17 of ISO/IEC 8208/Amd. 3;

(b) meet the additional static conformance requirements for ISO/IEC 8208, as constrained by ISO/IEC 8878, in subclause 5.1.2 below;

(c) implement all the features identified as requirements in the ISPICS requirements list in annex A.

5.1.2 Additional static conformance requirements

(a) If an end system operates more than one B-channel connection, the packet layer of each B-channel connection shall be processed independently from the packet layer of each other B-channel connection.

(b) The procedures defined in ISO/IEC 8878, subject to any additional requirements defined in the remainder of subclause 5.1.2, shall be used to support the OSI connection-mode Network Service over each X.25 virtual call.

NOTE - Although the Network Service may be provided over multiple B-channels, each Network Service connection is independent and uses only one of these B-channels. In general, the Network Service user is not explicitly aware of the number of B-channels supporting the Network Service.

(c) The end system shall be adopt the role of a DTE at the packet layer.

(d) Local knowledge of the PSDN default or agreed logical channel range is required, unless the Online Facility Registration is available at the PSDN port and implemented in the end system, in which case it may be used to negotiate the range.

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(e) The Receipt Confirmation service is not supported. The D-bit shall always be set to 0. If a conforming implementation receives a DATA packet with the D-bit set to 1, then it is recommended to clear the logical channel with a cause indicating "DTE Originated" and with the diagnostic "D-bit Procedure Not Supported (code 166)".

(f) Encoding of the calling, called and responding NSAP addresses in the address and address extension fields of call set up and clear packets shall be as specified in ISO/IEC 8878 for explicitly conveying the full NSAP address.

NOTE - Included in this requirement is implementation of the Address Extension Facility (AEF) to carry up to a 40-digit NSAP Address. Furthermore, for the AEF, "split" NSAP addresses, previously allowed in ISO/IEC 8208, are prohibited whereas non-BCD information, previously prohibited in ISO/IEC 8208, is allowed.

(g) The address in the called DTE address field is required when sending. The encoding depends on the requirements of the PSDN. The use of the calling DTE address field is dependent on the requirements of the PSDN.

(h) The end system shall indicate "no restriction on response" when using the fast select facility.

(i) Non-use of expedited data shall be negotiated when transport protocol class 0 or class 2 is used.

(j) The end system shall be able to operate with the "non-identified DTE" service and shall support the "identification provided by the public switched network" method, as defined in Recommendation X.32.

(k) For the identified or customized service, as defined in Recommendation X.32, if the Network User Identification (NUI) procedure is used as the identification method, the NUI optional facility shall be supported.

(l) For the identified or customized service, if the Link Layer Exchange Identification (XID) procedure is used as the identification method, the XID frame shall be supported.

5.2 Dynamic conformance requirements

5.2.1 Overall requirements

An implementation conforming to this part of ISO/IEC ISP 10609 shall:

(a) implement the packet layer protocol procedures as described in ISO/IEC 8208 for DTE/DCE operation;

(b) meet the additional dynamic conformance requirements for ISO/IEC 8208 in subclause 5.2.2 below;

(c) behave in accordance with the requirements of the ISPICS requirements list in annex A.

5.2.2 Additional dynamic conformance requirements

(a) The system shall support all the formats and syntaxes defined in ISO/IEC 8348/Add.2. A conforming implementation shall handle NSAP Address as defined in ISO/IEC 8878.

The use of the Called/Calling Address Extension Facilities is preferred for conveying the NSAP Addresses even when the three conditions described in ISO/IEC 8878, subclause 6.2.2.1.1, are satisfied.

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(b) The Expedited Data Transfer Service is not supported. If a conforming implementation receives an INTERRUPT packet during the data transfer phase, it is recommended to transmit a CLEAR REQUEST packet (cause code "DTE Originated" with a diagnostic code 44) across the DTE/DCE interface. If a CLEAR REQUEST packet is transmitted, an N-DISCONNECT indication primitive shall be signalled.

(c) The Receipt Confirmation Service is not supported. The D-bit shall always be set to 0. If a conforming implementation receives a DATA packet with the D-bit set to 1, then it is recommended to clear the logical channel with a cause indicating "DTE Originated" and with the diagnostic "D-bit Procedure Not Supported (code 166)".

(d) A conforming implementation shall agree to the following facilities for a period of time:

- Fast Select Acceptance;
- Flow Control Parameter Negotiation; and
- Throughput Class Negotiation.

6 Subnetwork-type dependent requirements for the Data Link Layer

6.1 Static conformance requirements

6.1.1 Overall requirements

An implementation conforming to this part of ISO/IEC ISP 10609 shall:

(a) meet the static conformance requirements in accordance with ISO 7776/Amd.1;

(b) meet the additional static conformance requirements for ISO 7776 in subclause 6.1.2 below;

(c) implement all the features identified as requirements in the ISPICS requirements list in annex A.

6.1.2 Additional static conformance requirements

(a) Only the Single Link Procedure shall be supported.

(b) An independent LAPB protocol shall operate over each B-channel.

(c) Parameter N1 (maximum number of bits in an I frame) shall be such that the Data Link layer is capable of carrying the maximum packet size negotiated at the packet layer, plus the related packet layer and Data Link layer control information. Guidance on the derivation of the value of N1 can be found in annex C.

(d) In the normal procedure for disconnection, the Data Link shall be disconnected before disconnecting the B-channel.

6.2 Dynamic conformance requirements

An implementation conforming to this part of ISO/IEC ISP 10609 shall:

(a) implement the procedures as described in ISO 7776 for DTE/DCE operation;

(b) behave in accordance with the requirements of the ISPICS requirements list in annex A.

There are no additional dynamic conformance requirements.

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Annex A
(normative)

ISPICS requirements list

A.1 Introduction

The IPRLs in this annex specify requirements for implementation of the Network Layer and Data Link Layer.

The Network Layer IPRL in clause A.3 specifies the additional requirements for ISO/IEC 8208/Amd.3. The requirements of ISO/IEC 8208/Amd.3 apply to each item for which there is no entry in the IPRL (clause A.3).

These IPRLs specify subnetwork dependent requirements for an end system attached to an ISDN subnetwork for B-channel X.25 DTE to DCE operation.

A conforming implementation shall satisfy the mandatory conformance requirements of the base standards referenced in this part of ISO/IEC ISP 10609.

A.2 Notation

The following symbols are used to identify the capabilities to be supported by a conforming implementation:

a) Base standard status notation

Standard Type or Range:

M	mandatory;
O	optional;
O.<*n*>	optional, but at least one of the group of options labelled by the same numeral <*n*> is required;
-	not applicable;
pred:	conditional item symbol, including predicate identification;
pred::	this group predicate symbol applies to the status of each of the items that follows, until another such group predicate occurs or until the next horizontal rule separating groups of items. The items are only completed when the predicate is true.

b) IPRL status notation

The status column of profile features is entered using the one character or the two character notation. The one character notation indicates the static conformance requirements only. For the two character notation, the first character indicates the static conformance requirements and the second indicates the dynamic conformance requirements.

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1) Static:

m mandatory, mandatory to be implemented;
o optional, optional to be implemented;
o.<*n*> optional, but at least one of the group of options labelled by the same numeral <*n*> is required;
i out of scope, not relevant to this profile.

2) Dynamic:

m mandatory, mandatory to be used;
x excluded, prohibited to be used in the context of this profile.

A.3 IPRL for ISO/IEC 8208

The relevant base standard PICS proforma is given in annex B of ISO/IEC 8208/Amd.3. This part of ISO/IEC ISP 10609 imposes the following constraints:

A.3.1 General DTE characteristics

Base Standard Features				Profile Features	
Item	Protocol Feature	References	Status	ISP References	Status
	Major capabilities				
	Service supported:				
Vp	- PVC		O.1		i
Vs	- VC		O.1		mm
	What environments are supported?	3, 3.2		clause 5	
Ec/0	- DTE/DCE (1980)		O.2		ox
Et/t	- DTE/DTE in fixed role as DTE		O.2		i
Et/c	- DTE/DTE in fixed role as DCE		**Vs**:O.2		**Vs**:i
Et/d	- DTE/DTE with dynamic role selection	4.5	**Vs**:O.2		**Vs**:i
	What packet sequence numbering is supported?	13.2, 12.1.1, Table 3		clause 5	
M8	- Modulo 8		O.3		mm
M128	- Modulo 128 (extended)		O.3		ox

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A.3.2 Procedures, packet types and packet formats

Base Standard Features				Profile Features	
Item	Protocol Feature	References	Status	ISP References	Status
	VC service only: Call Setup				
	Are outgoing Virtual Calls supported:	5.2.1, 5.2.5, table 33		clause 5	
S1a	- Fast Select, no restriction on response?	5.2.4, 13.16	O	5.1.2 (h)	o.2
S1b	- Fast Select with restricted response?	13.16	O	5.1.2 (h)	ox
S1c	- non-Fast-Select?	5.2.4	O		ox
SP1b	send CALL REQUEST, basic format	12.2.1.1	**S1ab**:O.4		**S1ab**:m
SP1e	send CALL REQUEST, extended format	12.2.1.1, 12.2.1.2	**S1ab**:O.4		**S1ab**:m
	Are incoming Virtual Calls supported:	5.2.2, 5.2.5, table 33		clause 5	
S2a	- Fast Select with acceptance possible?	5.2.3, 13.17	O		o.2
S2b	- Fast Select, always cleared?	13.17	O		ox
S2c	- non-Fast-Select, acceptance possible?	5.2.3	O		ox
S2d	- non-Fast-Select, always cleared?	5.2.3	O		**S2a**:mm
SP4b	send CALL ACCEPTED, basic format	12.2.2.1	**S2axc**:O.5		**S2axc**:m
SP4e	send CALL ACCEPTED, extended format	12.2.2.1, 12.2.2.2	**S2axc**:O.5		**S2axc**:m
	Is D-bit negotiation supported:			clause 5	
DN1	- for outgoing Virtual Calls	6.3	**S1ac**:O		**S1ac**:mm
DN2	- for incoming Virtual Calls	6.3	**S2ac**:O		**S2ac**:mm
	Call Clearing				
	Is call clearing supported, as:	5.5.4 table 33		clause 5	
C1	- response to indication of clearing?	5.5.2	O		mm
C2c	- originating clearing of an established Virtual Call?	5.5.1, 5.5.3	O		**S1**:mm
CP3b	send CLEAR REQUEST, basic format	12.2.3.1	**C2bcxa**:O.6		**C2bcxa**:m
CP3e	send CLEAR REQUEST, extended format	12.2.3.1, 12.2.3.2	**C2bcxa**:O.6		**C2bcxa**:m
	Resetting of Logical Channels				
	Is resetting supported:	8, 8.3, 8.4, table 34		clause 5	
RSi	- as initiator?	8.1	O		mm
	send RESET REQUEST	12.5.1			
	receive RESET INDICATION/CONFIRMATION	12.5.2			
RSr	- as responder?	8.2	O		mm
	receive RESET INDICATION	12.5.1			
	send RESET CONFIRMATION	12.5.2			

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Base Standard Features				Profile Features	
Item	Protocol Feature	References	Status	ISP References	Status
	Interrupt Transfer				
Is	Is sending interrupts supported? send INTERRUPT REQUEST receive INTERRUPT CONFIRMATION	6.8, 6.8.1, 6.8.3, table 35 12.3.2 13.3.3	O	5.1.2 (i)	i
Ir	Is receiving interrupts supported? receive INTERRUPT INDICATION send INTERRUPT CONFIRMATION	6.8, 6.8.2, 6.8.3, table 35 12.3.2 12.3.3	O	5.1.2 (i) 5.2.2 (b)	i
	Normal Data Transfer and Flow Control				
DS1	Is sending DATA packets supported?	6, 6.1, 6.2, 7.1.1, 7.1.2, 7.1.3, 12.3.1	O	clause 5	mm
DS5a	- Sending Q = 0 in DATA packets	6.6	O.10		mm
DS5b	- Sending Q = 1 in DATA packets	6.6	O.10		ox
DS7a	- ERROR-R action on expiry	11.2.1(a)	O		ox
DS8	- Discard of over-length flow control packets (instead of ERROR-R)	table 36 Note 2	O		ox
DR1	Receiving DATA packets	6, 6.1, 6.2, 7.1.1, 7.1.2, 7.1.3, 12.3.1	O	clause 5	mm
DR3	- Flow control by sending RNR and RR packets	7.1.5, 7.1.6, 12.4.1, 12.4.2	O		mm[1)]
DR4b	- Receiving M=1 in DATA packets	6.4, 6.5, 6.7	O		mm
DR5a	- Receiving Q = 0 in DATA packets	6.6	O.11		mm
DR5b	- Receiving Q=1 in DATA packets	6.6	O.11		i
DR7c	- ignoring the packet and waiting for a correct retransmitted packet	11.3(c)	O.12		ox
DR8c	- ignoring the packet and waiting for a correct retransmitted packet	11.3(c)	O.13		ox
DR9	- Window Status Transmission Timer procedure	11.2.2	O		ox
DC	Is Delivery confirmation supported?	6.3, 6.5, 6.7, 7.1.4	O	5.1.2 (e), 5.2.2 (c)	ox

NOTE 1 - It is only necessary to use this feature if and when the implementation encounters a shortage of buffer space.

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A.3.3 Miscellaneous features and options

Base Standard Features				Profile Features	
Item	Protocol Feature	References	Status	ISP References	Status
	Value of Cause and Diagnostic Code fields				
Y1d	- Cause = 128, private diagnostic codes	12.6.1.1, 12.6.1.2, tables 24 - 25	O.14	clause 5	ox
Y3d	- Cause = 128, private diagnostic codes	12.3.1.1, 12.3.1.2, tables 24 - 25	O.15	clause 5	ox
Y5d	- Cause = 128, private diagnostic codes	12.5.1, 12.5.2, tables 24 - 25	O.16	clause 5	ox

A.3.4 Facilities

Base Standard Features				Profile Features	
Item	Protocol Feature	References	Status	ISP References	Status
	Facilities sent in CALL REQUEST packets			clause 5	
FS1pi	Flow Control Parameter Negotiation, packet size	13.12, 15.2.2.1.1, table 11	O		m
FS1wi	Flow Control Parameter Negotiation, window size	13.12, 15.2.2.1.2, table 11	O		m
FS2i	Throughput Class Negotiation	13.13, 15.2.2.2, table 18	O		mm
FS6a	Fast Select	13.16, 15.2.2.6	O		mm
FS12	Transit Delay Selection and Indication	13.27, 15.2.2.13	O		m
FS20i	Facility Marker, CCITT-Specified DTE facilities	15.1	O		mm
FS21i	Calling Address Extension	14.1, 15.3.2.1	O		m
FS22i	Called Address Extension	14.2, 15.3.2.2	O		m
FS23i	Minimum Throughput Class Negotiation	14.3, 15.3.2.3	O		mm
FS24i	End-to-End System Transit Delay Negotiation	14.4, 15.3.2.4	O		mm
FS26i	Priority	14.5, 15.3.2.5	O		**Ec/8**:mm

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Base Standard Features				Profile Features	
Item	Protocol Feature	References	Status	ISP References	Status
	Facilities sent in CALL ACCEPTED packets			clause 5	
FS1pr	Flow Control Parameter Negotiation, packet size	13.12, 15.2.2.1.1, table 11	O		m
FS1wr	Flow Control Parameter Negotiation, window size	13.12, 15.2.2.1.2, table 11	O		m
FS2i	Throughput Class Negotiation	13.13, 15.2.2.2, table 18	O		mm
FS20r	Facility Marker, CCITT-Specified DTE facilities	15.1	O		mm
FS22r	Called Address Extension	14.2, 15.3.2.2	O		m
FS24r	End-to-End Transit Delay Negotiation	14.4, 15.3.2.4	O		mm
FS26r	Priority	14.5, 15.3.2.5	O		**Ec/8**:mm
	Facilities sent in CLEAR REQUEST packets			clause 5	
FS20d	Facility Marker, CCITT-Specified DTE facilities	15.1	O		mm
FS22d	Called Address Extension	14.2, 15.3.2.2	O		m
	Facilities received in INCOMING CALL packets			clause 5	
FR1pi	Flow Control Parameter Negotiation, packet size	13.12, 15.2.2.1.1, table 12	O		mm
FR1wi	Flow Control Parameter Negotiation, window size	13.12, 15.2.2.1.2, table 12	O		mm
FR2i	Throughput Class Negotiation	13.13, 15.2.2.2, table 18	O		mm
FR6a	Fast Select	13.16, 13.17, 15.2.2.6	O		mm
FR12i	Transit Delay Selection and Indication	13.27, 15.2.2.13	O		mm
FR20i	Facility Marker, CCITT - Specified DTE Facilities	15.1	O		mm
FR21	Calling Address Extension	14.1, 15.3.2.1	O		mm
FR22i	Called Address Extension	14.2, 15.3.2.2	O		mm
FR23	Minimum Throughput Class Negotiation	14.3, 15.3.2.3	O		mm
FR24i	End-to-End Transit Delay Negotiation	14.4, 15.3.2.4	O		mm
FR25i	Expedited Data Negotiation	14.7, 15.3.2.7	O		mm
FR26i	Priority	14.5, 15.3.2.5	O		**Ec/8**:mm

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Item	Protocol Feature	References	Status	ISP References	Status
	Facilities received in CALL CONNECTED packets			clause 5	
FR1pr	Flow Control Parameter Negotiation, packet size	13.12, 15.2.2.1.1, table 12	O		mm
FR1wr	Flow Control Parameter Negotiation, window size	13.12, 15.2.2.1.2, table 12	O		mm
FR2r	Throughput Class Negotiation	13.13, 15.2.2.2, table 18	O		mm
FR12r	Transit Delay Selection and Indication	13.27, 15.2.2.13	O		i[1)]
FR20r	Facility Marker, CCITT - Specified DTE Facilities	15.1	O		mm
FR22r	Called Address Extension	14.2, 15.3.2.2	O		mm
FR24r	End-to-End Transit Delay Negotiation	14.4, 15.3.2.4	O		mm
FR25r	Expedited Data Negotiation	14.7, 15.3.2.7	O		mm
FR26r	Priority	14.5, 15.3.2.5	O		Ec/8:mm
	Facilities received in CLEAR INDICATION packets			clause 5	
FR20d	Facility Marker, CCITT - Specified DTE Facilities	15.1	O		mm
FR22d	Called Address Extension	14.2, 15.3.2.2	O		mm

NOTE 1 - The system shall accept this parameter if it is present and may or may not use it.

A.3.5 Parameter values and ranges

Base Standard Features				Profile Features	
Item	Protocol Feature	References	Status	ISP References	Status
	Values for flow control parameters and throughput class, Virtual Call Service				
	What values are supported for:				
V3s	- Default throughput classes, sending (bits per second):	16.2.2.7, table 22	75 150 300 600 1200 2400 4800 9600 19200 48000 64000	clause 5	64000 (See note 1)
V3r	- Default throughput classes, receiving (bits per second):	16.2.2.7, table 22	75 150 300 600 1200 2400 4800 9600 19200 48000 64000	clause 5	64000 (See note 1)

NOTE 1 - The value 64000 shall be supported. Any of the other values may also be supported.

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Base Standard Features				Profile Features	
Item	Protocol Feature	References	Status	ISP References	Status
	Parameters				
	Timer Parameters	Table 26			
T24	Window Status Transmission Timer		O	clause 5	ox
T25	Window Rotation Timer		O	clause 5	ox
	Retransmission Count Parameters	Table 27			
R25	Data Packet Retransmission Count		O	clause 5	ox

A.4 IPRL for ISO 7776

The relevant base standard PICS proforma is given in annex A of ISO 7776/Amd.1. This part of ISO/IEC ISP 10609 imposes the following constraints:

A.4.1 Major capabilities

Base Standard Features				Profile Features	
Item	Protocol Feature	Reference	Status	ISP reference	Status
Ls	Single Link procedure	1	M	6.1.2 (a)	mm

A.4.2 Basic/extended operation

Base Standard Features				Profile Features	
Item	Protocol Feature	Reference	Status	ISP reference	Status
M8	Basic (modulo 8) operation	1, 3, 4.1.1	O.1	clause 6	mo

A.4.3 Link setup

Base Standard Features				Profile Features	
Item	Protocol Feature	Reference	Status	ISP reference	Status
LSR	Transmission of unsolicited DM response to request the remote DTE to initiate link setup	4.3.8, 5.3.1, 5.5	O	clause 6	i

A.4.4 Frame formats

Base Standard Features				Profile Features	
Item	Protocol Feature	Reference	Status	ISP reference	Status
F1a	Sending of non-octet aligned frames	3.4	O	clause 6	ox

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A.4.5 Parameter values and ranges

Base Standard Features				Profile Features	
Item	Protocol Feature	Reference	Status	ISP reference	Status
	System Parameters				
SPN1	Maximium number of bits in an I frame (N1)	5.7.3		6.1.2 (c)	**M8:** $\geq$2104 **M128:** $\geq$2112
SPk	Maximum number of outstanding frames (k)	5.7.4	**M8:** $1 \leq k \leq 7$	clause 6	**M8:** Must support value 7

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Annex B
(informative)

Recommendations

B.1 Introduction

The information in this annex is tutorial in nature. It does not constitute a normative part of this part of ISO/IEC ISP 10609.

In the absence of specific applications making alternative behaviour appropriate, it is recommended that the features described in this annex are implemented.

In addition to the recommendations given below, attention is drawn to appendix V of X.25 (1992) which contains guidelines on dealing with long round trip delays and high transmission rates, with respect to Data Link layer operation. Similar considerations also apply to packet layer.

B.2 ISO/IEC 8208 recommendations

(a) The packet layer optional user facilities that are shown in table 1 are those for which implementation is recommended for greater flexibility. The use of these depends on operational requirements.

Table 1 - Recommended Packet Layer Facilities (from [ISO/IEC 8208] [X.2] and [X.25])

Facility
Online Facility Registration
Network User Identification
Called Line Address Modification
Call Redirection Notification
Protection
Call Deflection Subscription

(b) In the normal procedure for clearing, all virtual calls shall be cleared before disconnecting the data link.

B.3 ISO 7776 recommendations

(a) For parameter N2 (maximum number of attempts), the value 10 is recommended.

(b) The following procedure is recommended as a means of synchronising the activation of the ISO 7776 entities in the two systems, in order to ensure that neither entity sends its first frame until the peer entity is ready to receive it. The ISO 7776 entity performs the following sequence of activities:

--`,,```,,,,````-`-`,,`,,`,`,,`---

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(i) Send a sequence of "1" bits until notified of B-channel connection establishment.
(ii) Activate receiver.
(iii) Send sequence of flags.
(iv) Wait until first flag is received from remote entity.
(v) Consider remote entity as active and start communication.

(c) It is recommended that Timer T1 (retransmission) is set to a value in the range 100ms to 15s.

(d) If implemented, Timer T3 (disconnected) is recommended to be greater than or equal to 1 second.

(e) It is recommended to implement timer T4.

(f) It is recommended that an RR frame be used as an acknowledgement, unless an outgoing I-frame is available.

(g) It is strongly recommended that both methods of Link Layer address assignment, as described in section 5.2 of CCITT X.32, are implemented. Which method is used depends upon the operational requirements of the PSDN.

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Annex C
(informative)

Guidance on the derivation of the value for N1

When the maximum length of the data field of a Data packet supported is less than or equal to the default value of 128 octets, the determining factor for N1 is the Clear Request packet rather than the Data packet. Thus for universal operation a DTE should support a value for N1 which is not less than 263 or 264 octets, derived as shown in table 2.

Table 2 - Derivation of the minimum value of N1

Name of the field	Length of the field (octets)
Header (Layer 3)	3
Clearing Cause (Layer 3)	1
Diagnostic Code (Layer 3)	1
DTE Address Length (Layer 3)	1
DTE Address(es) (Layer 3)	15
Facility Length (Layer 3)	1
Facilities (Layer 3)	109
Clear User Data (Layer 3)	128
Layer 3 Total	259
Address (Layer 2)	1
Control (Layer 2)	1 or 2*
FCS (Layer 2)	2
TOTAL	263 or 264*

* If Layer 2 Modulo 128 operation is supported.

When the maximum length of user data field of a Data packet supported is greater than the standard default value of 128 octets, the determining factor is the Data packet rather than the Clear Request packet. Therefore a DTE should support a value for N1 which is greater than or equal to :

The maximum length of the Data packet +
the length of the address field (Layer 2) +
the length of the control field (Layer 2) +
the length of the FCS field (Layer 2).

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Table 3 indicates the possible values for N1.

Table 3 - Various cases and corresponding minimum N1 values

Layer 2 Modulo 128	p≥256	N1 (octets)
		259 + 4*
	X	p + 3** + 4*
X		259 + 4* + 1***
X	X	p + 3** + 1*** + 4*

* The number of octets for Modulo 8 Layer 2 frame fields.
** The number of octets for Layer 3 packet header fields.
*** Additional octet for Layer 2 Modulo 128 operations.
p = The maximum length of the data field in a data packet.

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