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**Information technology — International  
Standardized Profiles TB, TC, TD and  
TE — Connection-mode Transport Service  
over connection-mode Network Service —  
(Part 21)**

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

INTERNATIONAL

ISO/IEC



Reference number  
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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 10609-21 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*

*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*

*Part 25: Subnetwork-type dependent requirements for Q.931 circuit-switched operation*

*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*

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*Part 34: Definition of profile TC43111*

*Part 35: Definition of profile TC43112*

*Part 36: Definition of profile TC43211*

*Part 37: Definition of profile TC43212*

*Part 38: Definition of profile TC4331*

*Part 40: Definition of profile TD1131*

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*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 21. 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 21:

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

### iTeh STANDARD PREVIEW (standards.iteh.ai)

#### 1 Scope

ISO/IEC ISP 10609-21:1995

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 DTE operation (Semi-permanent or Circuit-mode service).

#### 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.*

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).*

### 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
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
OSI	Open Systems Interconnection
PICS	Protocol Implementation Conformance Statement
SABM	Set Asynchronous Balanced Mode
SABME	Set Asynchronous Balanced Mode Extended
SDL	Specification and Description Language
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 with one or more than one other end system, the packet layer of each B-channel connection shall be processed independently from the packet layer of each other B-channel connection (e.g. DTE/DCE role assignment, logical channel range, etc.).
- (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 capable of adopting the role of a DTE or a DCE at the packet layer.

The DTE or DCE role shall be either :

- i) agreed for a period of time, or;
- ii) determined by the Restart procedure described in ISO/IEC 8208

NOTE - Both options i) and ii) above may be implemented in a single system.

- (d) Only two way VCs shall be provided by an end system. Consequently, only values of parameters LTC (Lowest Two way channel) and HTC (Highest Two way Channel) from ISO 8208/IEC shall be defined.
- (e) The value of LTC shall be 1.
- (f) The minimum value for HTC shall be 1.
- (g) If additional logical channels are required and a DTE is capable of initiating a Registration Request packet, then the Registration parameter fields shall be set as follows :

The LIC, HIC, HOC, LOC parameters shall be set to zero. The LTC shall be set to the value 1. The value in the total number of logical channels parameter field shall be set equal to value in the HTC parameter field.

No other Optional User Facilities shall be identified in the Registration Request packet, and may be ignored by a responder if they are present.

If a DTE is capable of responding with a Registration Confirmation packet, the maximum number of two way logical channels allowed between the two DTEs shall be indicated in the HTC parameter field. The value in the HTC parameter field shall be less than or equal to the value requested in the HTC field in the Registration Request packet.

Registration of facilities normally applies in one direction only for the DTE/DTE case (i.e. registration of facilities is performed independently for each direction), but for the logical channel range negotiation it applies to both directions.

NOTE - Registration Request packets may be ignored by a responder. However, it is recommended that DTEs are capable of responding with a Registration Confirmation packet even if they only support a single two-way logical channel. This will prevent unnecessary delays for the initiator in transmitting a Call Request packet. Such delays are determined by the initiator's values for Timer T28 and retry counter R28.

- (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 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)".

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

NOTE - Included in these 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.

## 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/DTE operation;
- (b) behave in accordance with the requirements of the ISPICS requirements list in annex A.

### 5.2.2 Additional dynamic conformance requirements

NSAP address:

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

## 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.