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**Information technology —
Telecommunications and information
exchange between systems — Protocol
mappings for the OSI Data Link service**

*Technologies de l'information — Télécommunications et échange
d'information entre systèmes — Applications du protocole au service de
liaison de données OSI*



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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. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 11575 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

Information technology — Telecommunications and information exchange between systems — Protocol mappings for the OSI Data Link service

1 Scope

This International Standard specifies general principles for the mappings between the OSI Data Link service (ISO/IEC 8886), both connection-mode (CO-DLS) and connectionless-mode (CL-DLS), and standard Data Link protocols, as follows:

- M1: CO-DLS — HDLC X.25 LAPB-compatible DTE procedures, single link procedures (ISO/IEC 7776)
- M2: CO-DLS — HDLC Unbalanced operation Normal response mode Class, UNC (ISO/IEC 3309, ISO/IEC 4335 and ISO/IEC 7809)
- M3: CO-DLS — Logical link control (LLC) Type 2 (ISO/IEC 8802-2)
- M4: CL-DLS — LLC Type 1 (ISO/IEC 8802-2)
- M5: CL-DLS — HDLC Balanced operation Connectionless-mode Class, BCC (ISO/IEC 3309, ISO/IEC 4335 and ISO/IEC 7809)
- M6: CL-DLS — HDLC Unbalanced operation Connectionless-mode Class, UCC (ISO/IEC 3309, ISO/IEC 4335 and ISO/IEC 7809)

This International Standard specifies the detailed mappings M1, M2, M5 and M6; it also specifies the main features of the mappings M3 and M4.

This International Standard does not specify individual implementations or products, nor does it constrain the implementation of Data Link entities and interfaces within an information processing system.

NOTES

- 1 The above designations M1 to M6 for the mappings are used elsewhere in this International Standard.
- 2 The possibility of adding further mappings to the above list in the future is not precluded (for example, to cover Frame Relay protocols).

2 Normative references

The following standards contain provisions which, through reference in this text, constitute provisions of this International Standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards.

ISO/IEC 3309: 1993, *Information technology — Telecommunications and information exchange between systems — High-level data link control (HDLC) procedures — Frame structure*.

ISO/IEC 4335: 1993, *Information technology — Telecommunications and information exchange between systems — High-level data link control (HDLC) procedures — Elements of procedures*.

ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1: 1994, *Information technology — Open Systems Interconnection — Basic Reference Model: The basic model*.

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 7809: 1993, *Information technology — Telecommunications and information exchange between systems — High-level data link control (HDLC) procedures — Classes of procedures*.

ISO/IEC 8802-2:1994, *Information technology — Telecommunications and information exchange between systems — Local and metropolitan area networks — Specific requirements — Part 2: Logical link control*.

ISO/IEC 8886:1992, *Information technology — Telecommunications and information exchange between systems — Data Link service definition for Open Systems Interconnection*.

ITU-T Recommendation X.210 (1993) | ISO/IEC 10731:1994, *Information technology — Open Systems Interconnection — Basic Reference Model — Conventions for the definition of OSI services*.

3 Definitions

3.1 This International Standard uses the following terms defined in ITU-T Rec. X.200 | ISO/IEC 7498-1:

DL-address
DL-connection
DL-connectionless-mode transmission
DL-entity
DL-group address
DL-layer
DL-protocol-data-unit
DL-service access point
DL-service access point address
DL-service-data-unit
DL-subsystem

3.2 This International Standard uses the following terms defined in ITU-T Rec. X.210 | ISO/IEC 10731:

DLS provider
DLS user
primitive
request (primitive)
indication (primitive)
response (primitive)
confirm (primitive)

3.3 For the purposes of this International Standard, the following definitions apply:

3.3.1 **frame:** A DL-PDU.

3.3.2 **instance of DL-communication:** A DL connection or a single DL-connectionless-mode transmission.

4 Abbreviations

BCC	balanced operation connectionless-mode class
CL	connectionless-mode
CO	connection-mode
DISC	disconnect
DL	Data Link
DLC	Data Link connection
DLS	Data Link service
DLSAP	Data Link service access point
DLSDU	Data Link service data unit
DM	disconnected mode
FRMR	frame reject
HDLC	High-level data link control
I	information
LLC	Logical Link Control
NRM	normal response mode
PDU	protocol data unit
QOS	quality of service
SABM	set asynchronous balanced mode
SABME	set asynchronous balanced mode extended
SLP	single link procedure
SNRM	set normal response mode
SNRME	set normal response mode extended
UA	unnumbered acknowledgment

UCC	unbalanced operation connectionless-mode class
UI	unnumbered information
UNC	unbalanced operation normal response mode class

5 Conformance

There is no direct conformance of equipment to this International Standard considered in isolation. The provisions of this International Standard have normative application to equipment implementing Network-layer protocols that are specified in terms of their use of the OSI Data Link service. For such Network-layer protocols, this International Standard links the behaviour of the underlying Data Link protocols to the relevant features of the Data Link service, and thus provides the basis for establishing conformance of the Network-layer protocol implementations to the specified usage of the Data Link layer.

NOTES

1 This International Standard therefore functions as “glue” between Network-layer protocol standards, written in terms of their use of the OSI Data Link service, and Data Link protocol standards written — usually for historical reasons — without reference to the OSI Data Link service. Conformance to such a Data Link protocol standard will be expressed entirely in terms of the procedures and PDUs, etc., specified in that standard; conformance to such a Network-layer standard in respect of its use of the Data Link layer will be expressed in terms of, for example, the transfer of NPDU as DLSDUs, and (for the CO-DLS) of procedures that apply in the event of DL connection reset or DL connection release. This International Standard specifies precisely how the procedures, etc., of the Data Link protocol in question are to be interpreted in terms of the OSI Data Link Service, and therefore establishes a precise relationship between the specifications of the Network-layer protocol and of the Data Link protocol.

2 Use of the OSI Data Link service in Network-layer protocol specifications offers the benefits of layer-independence, in that such a Network-layer specification is available, without change, for use over new or alternative Data Link technologies, provided only that the appropriate mapping is specified between the OSI Data Link service and the relevant Data Link technology.

6 General principles of the protocol mappings

6.1 Data Link architecture

The OSI Data Link service defines the properties of individual instances of DL-communication between pairs of DLS users. The definition is abstractly expressed in terms of primitives and parameters exchanged, at Data Link service access points (DLSAPs), between each DLS user and a single DLS provider: this is illustrated in figure 1.

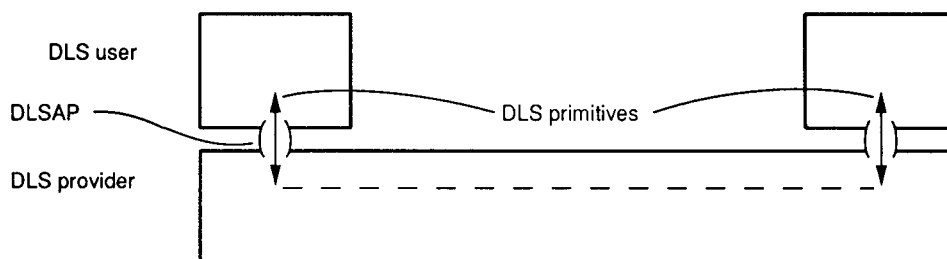


Figure 1 — Model of Data Link service provision

Operation of the DLS provider is modelled in terms of the exchange of DL-PDUs, in accordance with DL-protocols, between DL-entities (figure 2). Each DLSAP is attached to a unique DL-entity; a given DL-entity can have one or more DLSAPs attached to it, depending upon system configuration and the nature of the underlying DL-protocols.

When real equipment is considered, a data link consists of two or more stations communicating according to a particular DL-protocol or set of related DL-protocols, together with the interconnecting media supporting information exchange among the stations. Possible configurations of a real data link (see figure 3) include:

- point-to-point data links, with just two stations (mappings M1 and M5 are for protocols used in data links of this type);
- centralized multipoint data links, with one station controlling communication between itself and a number of subsidiary stations (mappings M2 and M6 are for protocols used in data links of this type);
- distributed multipoint data links, with a number of stations any of which can communicate with any other (local area networks are of this type, see mappings M3 and M4).

The definition of stations and data links has a logical dimension, deriving from the protocols used, in addition to the physical equipment used in constructing particular real data links. A single real system can be attached to two or more data links, in which case it is considered to contain the corresponding number of distinct stations; a single real system can contain two or more stations attached to the same data link; and it is possible for a single set of communications equipment to support two or more distinct data links.