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Digitalno omrežje z integriranimi storitvami (ISDN) - Specifikacija podatkovne povezovalne plasti vmesnika uporabnik-omrežje - Aplikacija priporočil CCIT Q.920/I.440 in Q.921/I.441

Integrated Services Digital Network (ISDN); User-network interface data link layer specification; Application of CCITT Recommendations Q.920/I.440 and Q.921/I.441

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Foreword

This European Telecommunication Standard (ETS) has been produced by the Signalling, Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standard Institute (ETSI), and was adopted, having passed through the ETSI standards approval procedure.

This ETS is a revised version of CEPT Recommendation T/CS 46-20 (Edition of December 15, 1987; Revision 1988). It is based on the CCITT Recommendations Q.920/I.440 and Q.921/I.441 versions according to the BLUE BOOK, Vol. VI, Fascicle VI.10. It is intended to reduce the number of options which exist within CCITT Recommendations Q.920/I.440 and Q.921/I.441 and to provide the additional specification text necessary for clarification as well as to ensure harmonisation of the ISDN user-network interface within Europe.

All procedures at the ISDN user-network interface apply to both, the S and T reference points.

CCITT Recommendations Q.920/I.440 and Q.921/I.441 apply with the modifications specified below. The modifications are presented based on the CCITT Recommendations according to the BLUE BOOK, Vol. VI, Fascicle VI.10.

The following editorial conventions have been applied:

- the layout of this standard is aligned with CCITT Recommendations Q.920/I.440 and Q.921/I.441 according to the BLUE BOOK, Vol. VI, Fascicle VI.10, except modifications which require additional sections or figures and tables;
- modifications made for the sake of consistency and clarification are indicated by a revision bar in the left margin;
- modifications to select options for networks are indicated by a revision bar in the left margin or encircled by asterisks; **(standards.iteh.ai)**
- editorial modifications are indicated by a revision bar in the right margin.

In addition this standard is based on the following considerations:

- (a) CCITT Recommendations Q.920/I.440 and Q.921/I.441 define the ISDN user-network interface data link layer;
- (b) there are a number of options and points requiring further specification in Recommendations Q.920/I.440 and Q.921/I.441;
- (c) the harmonisation of the ISDN user-network interface is an important requirement for European network operators;
- (d) European network operators who wish to provide ISDN services should apply the CCITT Recommendations Q.920/I.440 and Q.921/I.441 in accordance with the specification defined below.

NOTE: Some references in this standard reflect the fact that the text was initially produced in CEPT working groups. For practical reasons it has not always been possible to re-edit the text appropriately at this stage.

Scope

This standard specifies the user-network interface data link layer of the pan European Integrated Services Digital Network (ISDN) as provided by European public telecommunication operators at the T reference point or coincident S and T reference point (as defined in CCITT Recommendation I.411 [13] by means of Digital Subscriber Signalling System No. 1 (DSS1).

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PART 1: Application of CCITT Recommendation Q.920(I.440)

ISDN user-network interface data link layer - General aspects

1 General

This Recommendation describes in general terms the Link Access Procedure on the D-channel, LAPD. The application of this protocol to other channel types is for further study. Details are provided in Recommendation Q.921(I.441) [1].

The purpose of LAPD is to convey information between layer 3 entities across the ISDN user-network interface using the D-channel.

The definition of LAPD takes into consideration the principles and terminology of:

- Recommendations X.200 [2] and X.210 [3] - the reference model and layer service conventions for Open Systems Interconnection (OSI);
- Recommendation X.25 [4] - LAPB user-network interface for packet mode terminals; and
- ISO 3309 [5] and ISO 4335 [6] - High-level Data Link Control (HDLC) standards for frame structure and elements of procedures.

LAPD is a protocol that operates at the data link layer of the OSI architecture. The relationship between the data link layer and other protocol layers is defined in Recommendation I.320 [7].

NOTE 1: The physical layer is currently defined in Recommendations I.430 [8] and I.431 [9], and prETS 300 012 [14] and prETS 300 011 [15], respectively, and layer 3 is defined in Recommendations Q.930 (I.450) [10], Q.931 (I.451) [11] and ETS 300 102-1 [16], ETS 300 102-2 [17], and X.25 [4]. References should be made to these Recommendations for the complete definition of the protocols and procedures across the ISDN user-network interface. [SIST ETS 300 125:1996](https://standards.iteh.ai/catalog/standards/sist/62fb10f-fae9-4f56-ae50-4320741228/sist-ets-300-125-1996)

NOTE 2: The term "data link layer" is used in the main text of this Recommendation. However, mainly in figures and tables, the terms "layer 2" and "L2" are used as abbreviations. Furthermore, in accordance with Recommendations Q.930 (I.450) [10] and Q.931 (I.451) [11], and ETS 300 102-1 [16] and ETS 300 102-2 [17], the term "layer 3" is used to indicate the layer above the data link layer.

LAPD is independent of transmission bit rate. It requires a duplex, bit transparent D-channel.

The characteristics of the D-channel are defined in Recommendation I.412 [12].

§ 2 below describes basic concepts used in this Recommendation and Recommendation Q.921.

§ 3 gives an overview description of LAPD functions and procedures.

§ 4 summarises the services that the data link layer provides to layer 3 and the services that the data link layer requires from the physical layer.

§ 5 provides an overview of the data link layer structure.

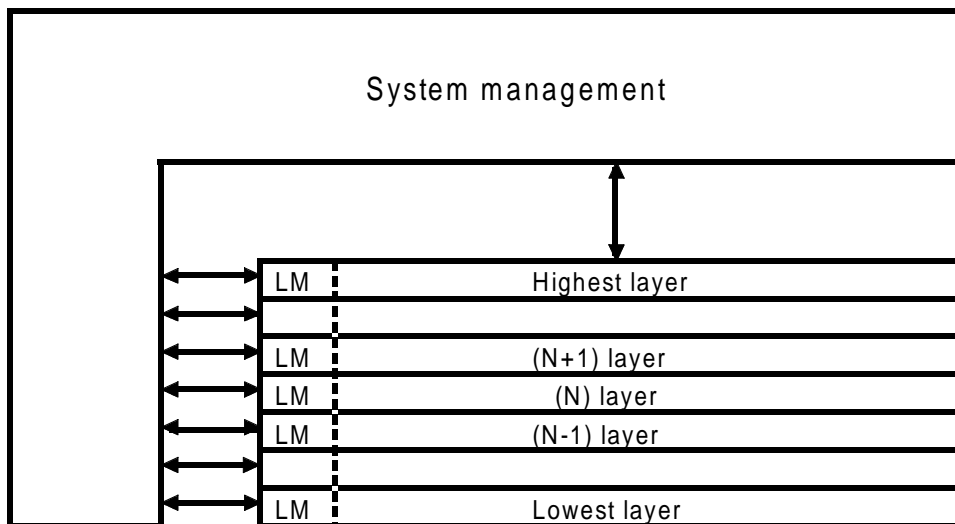
2 Concepts and terminology

The basic structuring technique in the OSI reference model is layering. According to this technique, communication among application processes is viewed as being logically partitioned into an ordered set of layers represented in a vertical sequence as shown in figure 1/Q.920.

A data link layer Service Access Point (SAP) is the point at which the data link layer provides services to layer 3. Associated with each data link layer SAP is one or more data link connection endpoint(s). See

figure 2/Q.920. A data link connection endpoint is identified by a data link connection endpoint identifier as seen from layer 3 and by a Data Link Connection Identifier (DLCI) as seen from data link layer.

Entities exist in each layer. Entities in the same layer, but in different systems which must exchange information to achieve a common objective are called "peer entities". Entities in adjacent layers interact through their common boundary. The services provided by the data link layer are the combination of the services and functions provided by both the data link layer and the physical layer.



LM Layer management (see figure 10/Q.920)

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Figure 1/Q.920: Layering

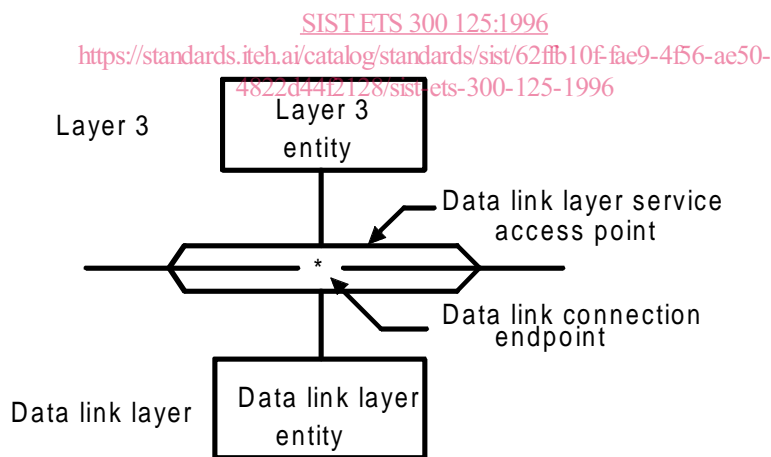


Figure 2/Q.920: Entities, service access points and endpoints

Cooperation between data link layer entities is governed by a peer-to-peer protocol specific to the layer. In order for information to be exchanged between two or more layer 3 entities, an association must be established between the layer 3 entities in the data link layer using a data link layer protocol. This association is called a data link connection. Data link connections are provided by the data link layer between two or more SAPs (see figure 3/Q.920).

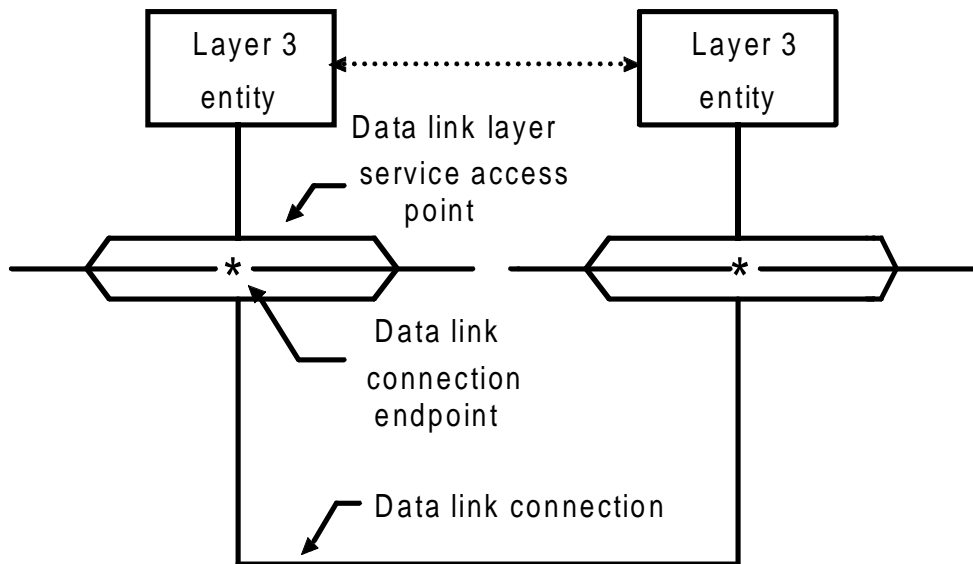


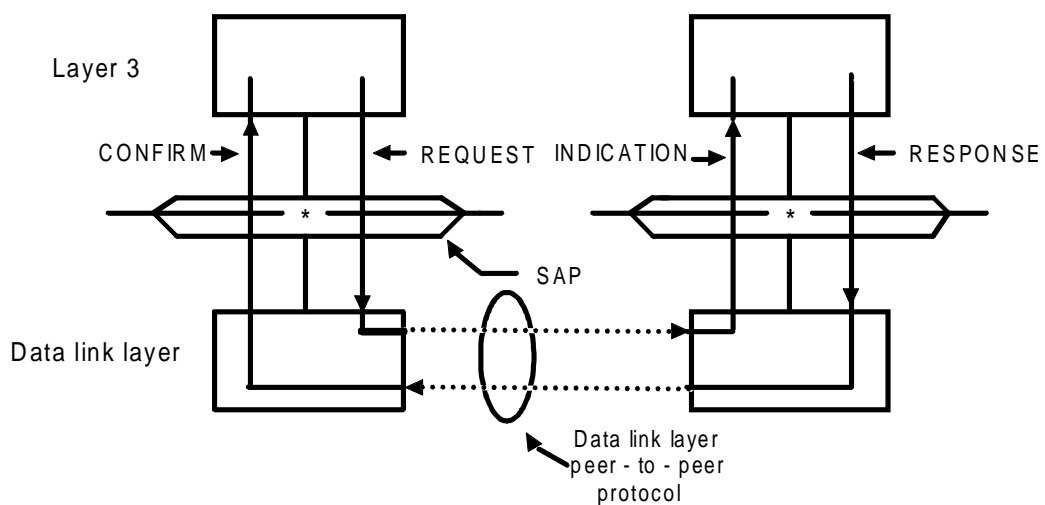
Figure 3/Q.920: Peer-to-peer relationship

Data link layer message units are conveyed between data link layer entities by means of a physical connection.

Layer 3 requests services from the data link layer via service primitives. The same applies for the interaction between the data link layer and the physical layer. The primitives represent, in an abstract way, the logical exchange of information and control between the data link layer and adjacent layers. They do not specify or constrain implementation.

The primitives that are exchanged between the data link layer and adjacent layers are of the following four types (see also figure 4/Q.920):

- a) REQUEST;
- b) INDICATION;
- c) RESPONSE; and
- d) CONFIRM.



NOTE 1: The same principle applies for data link layer - physical layer interactions.

Figure 4/Q.920: Primitive action sequence: