INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

I.365.4

(08/96)

SERIES I: INTEGRATED SERVICES DIGITAL NETWORK

Overall network aspects and functions – Protocol layer requirements

B-ISDN ATM adaptation layer sublayers: Service specific convergence sublayer for HDLC applications

ITU-T Recommendation I.365.4

(Previously CCITT Recommendation)

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ITU-T RECOMMENDATION I.365.4

B-ISDN ATM ADAPTATION LAYER SUBLAYERS: SERVICE SPECIFIC CONVERGENCE SUBLAYER FOR HDLC APPLICATIONS

Summary

This Recommendation specifies a mapping function that allows narrow-band data communication applications utilizing protocol stacks which include one of the HDLC protocols also to be deployed in a B-ISDN environment. The required mapping function is called "Service Specific Convergence Sublayer for HDLC Applications".

This Recommendation makes use of the fact that the subset of services provided by AAL type 5 (Recommendation I.363.5) can replace the framing and bit error detection part of HDLC.

This Recommendation is applicable to equipment to be attached to an ATM network when protocol stacks developed for a narrow-band environment are deployed in a B-ISDN environment.

Source

ITU-T Recommendation I.365.4 was prepared by ITU-T Study Group 13 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 27th of August 1996.

Keywords

ATM Adaptation Layer (AAL), Asynchronous Transfer Mode (ATM), Broadband ISDN (B-ISDN), High Level Data Link Control (HDLC), Narrow-band ISDN (N-ISDN).

FOREWORD

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The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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CONTENTS

Recommendation I.365.4

B-ISDN ATM ADAPTATION LAYER SUBLAYERS: SERVICE SPECIFIC CONVERGENCE SUBLAYER FOR HDLC APPLICATIONS

(Geneva, 1996)

1 Scope

This Recommendation specifies a function that allows data communication applications utilizing protocol stacks which include HDLC procedures [2] also to be deployed in a B-ISDN environment. The required mapping function specified in this Recommendation is called "Service Specific Convergence Sublayer for HDLC Applications".

This Recommendation makes use of the fact that the functionality of the HDLC framing, i.e. the flag and abort sequences, the zero-bit insertion, and the frame checking sequence (FCS) can be interpreted as a subset of the services offered by the AAL type 5 [1].

This Recommendation is applicable to equipment to be attached to a B-ISDN network when protocol stacks developed for an HDLC-based environment are to be deployed.

2 Normative references

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

[1] ITU-T Recommendation I.363.5 (1996), *B-ISDN ATM Adaptation Layer specification: Type 5 AAL*.

[2] ITU-T Recommendation X.25 (1996), *Interference between Data Terminal Equipment (DTE) and Data Circuit-terminating Equipment (DCE) for terminals operating in the packet mode and connected to public data networks by dedicated circuits.*

[3] ITU-T Recommendation X.200 (1994), *Information technology – Open Systems Interconnection – Basic Reference Model: The Basic Model.*

[4] ITU-T Recommendation X.210 (1993), *Information Technology – Open Systems Interconnection – Basic Reference Model: Conventions for the definition of OSI services.*

3 Definitions

The term "HDLC framing" refers to the framing, transparency, and bit error detection functions of HDLC, i.e., the flag and abort sequences, the zero-bit insertion, and the Frame Checking Sequence (FCS). Extensive use is also made of the layering concepts defined in Recommendation X.200 [3] and the service primitive concepts defined in Recommendation X.210 [4].

The HDLC framing usually is not considered as a separate sublayer but integrated into the HDLC Data Link layer; however, as the definition of HDLC procedures is beyond the scope of this Recommendation, a division into an HDLC control procedure sublayer and a HDLC framing

sublayer is necessary. The primitives for accessing the services of the HDLC framing sublayer are called "DL-FRAME" primitives.

4 Abbreviations

This Recommendation uses the following abbreviations.

AAL	ATM Adaptation Layer
ATM	Asynchronous Transfer Mode
CP	Common Part
CPCS	Common Part Convergence Sublayer
CPCS-CI	CPCS-Congestion Indication
CPCS-LP	CPCS-Loss Priority
CPCS-UU	CPCS-User-to-User-Indication
DL	Data Link
DLCI	Data Link Connection Identifier
FCS	Frame Checking Sequence
HDLC	High Level Data Link Control
PCI	Protocol Control Information
PDU	Protocol Data Unit
SAP	Service Access Point
SDU	Service Data Unit
SSCS	Service Specific Convergence Sublayer

5 General description

The Service Specific Convergence Sublayer for HDLC Applications provides for the possibility to deploy applications developed for an HDLC-based environment also in a B-ISDN environment (see Figure 1); HDLC framing is replaced by the services of the AAL type 5 (Recommendation I.363.5 [1]).

6 Functions of the DL-FRAME SSCS

The purpose of the DL-FRAME SSCS is to map DL-FRAME primitives onto a subset of the AAL type 5 CPCS (Common Part Convergence Sublayer) service. An HDLC frame structure consisting of an Address field, a Control field and possibly an Information field is transported as a CPCS-SDU.

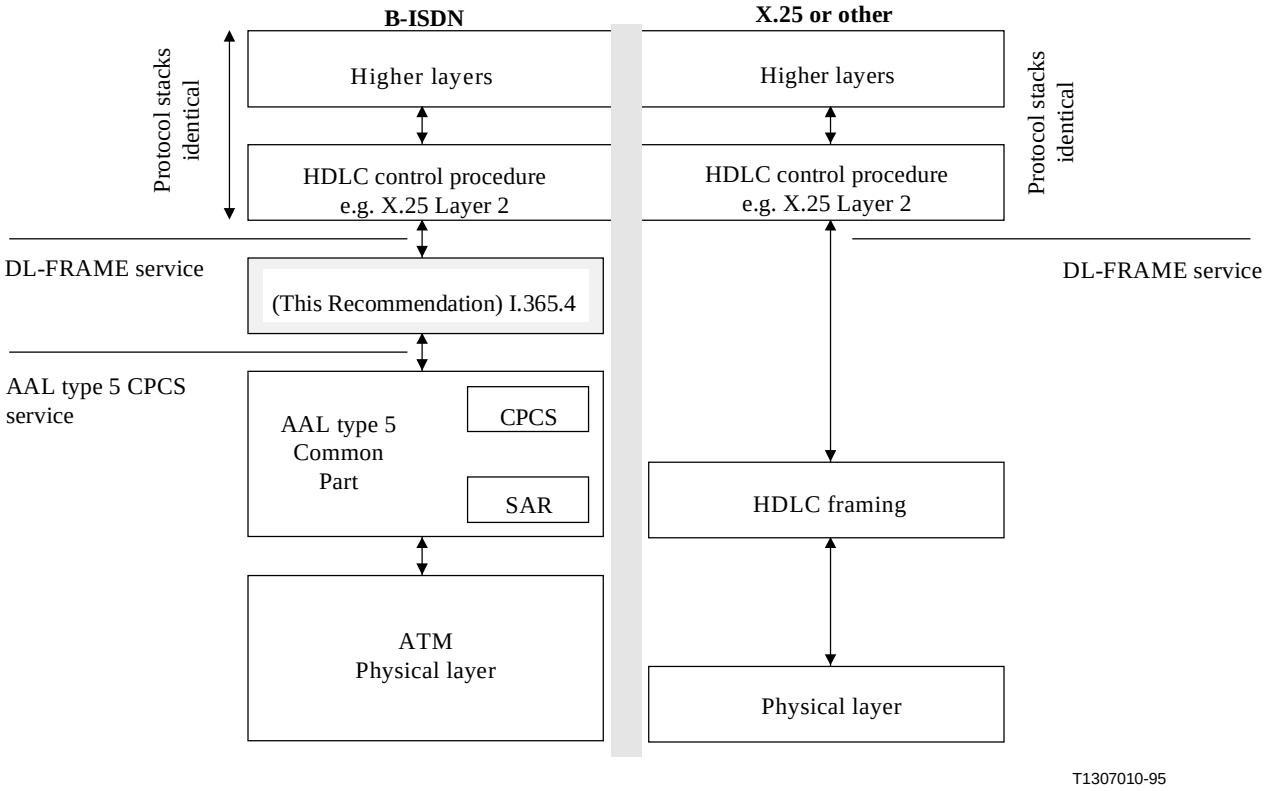

Figure 1/I.365.4 – Environment for the DL-FRAME SSCS for HDLC applications

7 Specification of the DL-FRAME SSCS

7.1 The service of the DL-FRAME SSCS

The DL-FRAME SSCS provides a framing and bit error detection service to its user. The DL-FRAME SSCS sublayer preserves the DL-FRAME-SDU sequence integrity. The primitives across the boundary from the DL-FRAME SSCS user, i.e. the HDLC control procedure sublayer, and the DL-FRAME SSCS are shown in Table 1.

The length of the Interface Data parameter is an integral number of octets. It carries the HDLC Address, Control, and Information field as a PDU constructed and interpreted by the HDLC control procedure sublayer. The maximum length of this parameter is determined by the capability of the AAL type 5 CPCS.

NOTE – Although the absolute maximum length of a CPCS-PDU is 65 535 octets, the actual maximum CPCS-PDU length deployed depends on the error characteristics of the ATM connection.

Table 1/I.365.4 – DL-FRAME SSCS service primitives and parameters

	DL-FRAME-UNITDATA-request	**DL-FRAME F-UNITDATA-indication**
Interface Data	X	X

7.2 The CPCS service of the AAL type 5

The CPCS service of the AAL type 5 is defined in Recommendation I.363.5 [1]. Table 2 summarizes the primitives and parameters in the AAL type 5 CPCS service. Where there are differences between the definitions in this Recommendation and those in Recommendation I.363.5, the one in Recommendation I.363.5 is definitive.

Table 2/I.365.4 – AAL type 5 CPCS service primitives and parameters

	CPCS-UNITDATA.invoke	**CPCS-UNITDATA.signal**
Interface Data (ID)	X	X
More (M) (Note 1)	–	–
CPCS-Loss Priority (CPCS-LP)	X	X
CPCS-Congestion Indication (CPCS-CI)	X	X
CPCS-User-to-User-Indication (CPCS-UU)	X	X
Reception Status (RS) (Note 2)	–	–
NOTE 1 – Not present in message mode. NOTE 2 – Not present as the corrupted data delivery option is not utilized.		

7.3 PDU format

The AAL type 5 CPCS SDU is equivalent to the Interface Data parameter of the DL-FRAME-UNITDATA primitive; no further PCI is added.

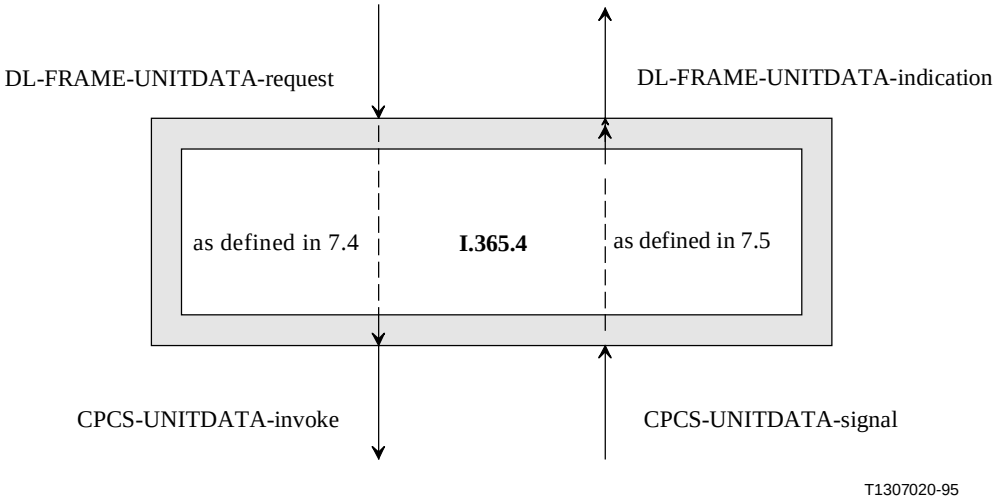

Figure 2/I.365.4 – Relationship of DL-FRAME primitives and AAL type 5 CPCS signals

7.4 Mapping the DL-FRAME-primitive into the AAL type 5 CPCS signal (transmitter)

As shown in Figure 2, upon receipt of a DL-FRAME-UNITDATA-request from the HDLC control procedure sublayer, a CPCS-UNITDATA-invoke signal is formed with the parameters noted below and submitted to the CPCS (only message mode is utilized):

a) The ID paramter is formed as specified in 7.3.

b) The CPCS-LP parameter is set to "0".

c) The CPCS-CI parameter is set to "0".

d) The CPCS-UU parameter is set to "0".

NOTE 1 – The value "0" for the CPCS-LP is the default value; the value "1" may also be used by layer management decision.

NOTE 2 – Further study on the relationship with ATM layer flow control is required.

7.5 Mapping the AAL type 5 CPCS signal into the DL-FRAME-primitive (receiver)

As shown in Figure 2, upon receipt of a CPCS-UNITDATA-signal from the CPCS, a DL-FRAME-UNITDATA-indication primitive is formed with the parameters noted below and sent to the HDLC control procedure sublayer (only message mode without the corrupted data delivery option is utilized):

a) The Interface Data parameter is set to the ID parameter of the CPCS-UNITDATA-signal (see 7.3).

b) The CPCS-LP parameter is ignored.

c) The CPCS-CI parameter is ignored.

d) The CPCS-UU parameter is ignored.

NOTE – Flow control in HDLC procedures may be activated by link layer management functions on the receipt of congestion indications at the DL-FRAME SSCS entity.

7.6 Layer management

No interactions with Layer Management are defined. Interactions to report the values of the congestion management parameter of the AAL type 5 CPCS (i.e. the CPCS-CI parameter) are for further study.

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