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Širokopasovno digitalno omrežje z integriranimi storitvami (B-ISDN) – Asinhroni prenosni način (ATM) – Specifikacija prilagodilne plasti (AAL), tip 3/4

Broadband Integrated Services Digital Network (B-ISDN); Asynchronous Transfer Mode (ATM); Adaptation Layer (AAL) specification - type 3/4

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Foreword

This European Telecommunication Standard (ETS) has been prepared by the Network Aspects (NA) Technical Committee of the European Telecommunications Standards Institute (ETSI).

The content of this ETS is derived from ITU-T Recommendation I.363 [2] and specifies the interactions between the Asynchronous Transfer Mode (ATM) Adaptation Layer (AAL) type 3/4 and the next higher layer, and the AAL type 3/4 and the ATM layer, as well as AAL type 3/4 peer-to-peer operations. This ETS is one of a set of ETSs describing different AAL types.

Transposition dates	
Date of latest announcement of this ETS (doa):	31 May 1995
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	30 November 1995
Date of withdrawal of any conflicting National Standard (dow):	30 November 1995

Introduction

The AAL type 3/4 enhances the service provided by the ATM layer to support functions required by the next higher layer. The AAL type 3/4 performs functions required by the user, control and management planes and supports the adaptation between the ATM layer and the next higher layer. The functions performed in the AAL type 3/4 depend upon the higher layer requirements.

The AAL supports multiple protocols (AAL types) to suit the needs of the different AAL service users. The service provided by the AAL type 3/4 to the higher layer and the functions performed are specified in this ETS.

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1 Scope

This European Telecommunication Standard (ETS) specifies the interactions between the Asynchronous Transfer Mode (ATM) Adaptation Layer (AAL) type 3/4 and the next higher layer, and the AAL type 3/4 and the ATM layer, as well as AAL type 3/4 peer-to-peer operations.

This ETS is applicable to variable bit rate sources where there exists no timing relation between the source and the destination of the data; it is applicable for both connection-oriented and connectionless type of communication.

This ETS defines the common part of AAL type 3/4 and can be complemented with standards for the service specific part of the convergence sublayer.

2 Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1] ITU-T Recommendation I.361 (1993): "B-ISDN ATM layer specification".

[2] ITU-T Recommendation I.363 (1993): "B-ISDN ATM Adaptation Layer (AAL) specification".

[3] CCITT Recommendation X.200 (1988): "Reference Model for Open Systems Interconnection for CCITT Applications".

[4] CCITT Recommendation X.210 (1988): "Open Systems Interconnection (OSI) Layer Service Definition Conventions".

[5] ISO/IEC 9646-1 (1991) | CCITT Recommendation X.290 (1991): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 1: General concepts".

[6] ISO/IEC 9646-2 (1991) | CCITT Recommendation X.291 (1991): "Information technology - Open Systems Interconnection - Conformance testing methodology and framework - Part 2: Abstract test suite specification".

3 Definitions

For the purposes of this ETS, the definitions given in CCITT Recommendations X.200 [3] and X.210 [4] apply, in addition, the following definitions apply:

message mode: A Service data Unit (SDU) is passed across the (sub)layer interface in exactly one Interface Data Unit (IDU) (see note).

streaming mode: A SDU is passed across the (sub)layer interface in one or more IDUs. The transfer of the IDUs across the sub(layer) may occur separated in time (see note).

pipelining: The sending peer entity initiates the data transfer to the receiving peer entity before the complete SDU is available (see note).

NOTE: The implementation of these concepts is not always externally visible.

Illustration of the data unit naming convention used in this ETS can be found in annex B.

4 Abbreviations

For the purposes of this ETS, the following abbreviations apply:

AAL	ATM Adaptation Layer
AALM	AAL Management
AL	Alignment
ATM	Asynchronous Transfer Mode
BASize	Buffer Allocation Size
BOM	Beginning Of Message
Btag	Beginning tag
CEP	Connection Endpoint identifier
COM	Continuation of Message
CP-AAL	Common Part of AAL type 3/4
CPCS	Common Part CS
CPI	Common Part Indicator
CRC	Cyclic Redundancy Check
CS	Convergence Sublayer
EOM	End of Message
Etag	End tag
IDU	Interface Data Unit
LI	Length Indicator
LSB	Least Significant Bit
MID	Multiplexing Identification
MM	Message Mode
MSB	Most Significant Bit
OAM	Operation And Maintenance
PAD	Padding
PDU	Protocol Data Unit
QOS	Quality of Service
SAP	Service Access Point
SAR	Segmentation And Reassembly sublayer
SDU	Service Data Unit
SLP	Submitted Loss Priority
SM	Streaming Mode
SN	Sequence Number
SSCS	Service Specific CS
SSM	Single Segment Message
ST	Segment Type

5 AAL type 3/4

5.1 Framework of AAL type 3/4

The Convergence Sublayer (CS) has been subdivided into the Common Part CS (CPCS) and the Service Specific CS (SSCS) as shown in figure 1. Further clarification can be found in annex C.

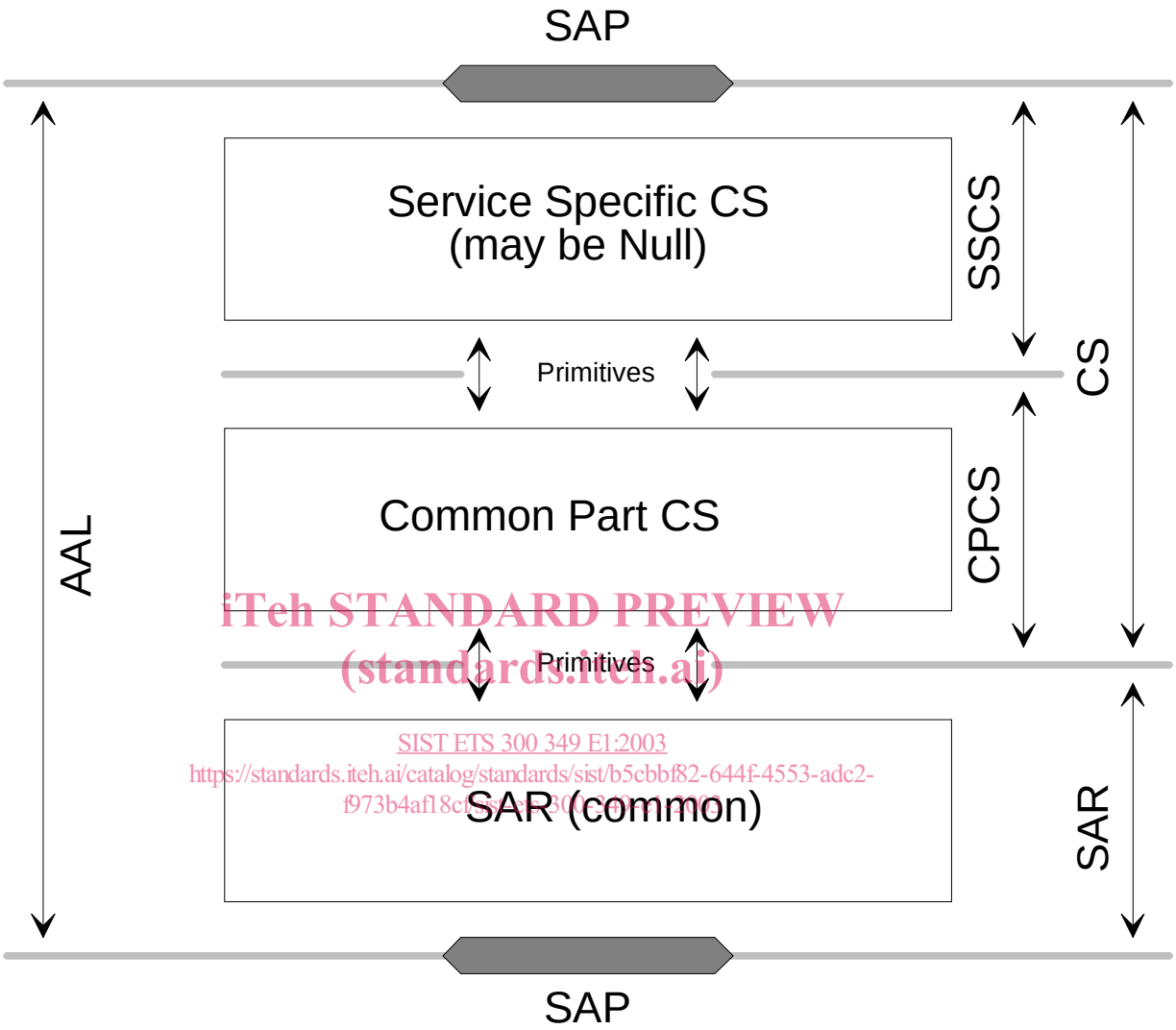

Figure 1: Structure of the AAL type 3/4

Different SSCS protocols, to support specific AAL type 3/4 user services, or groups of services, may be defined. The SSCS may also be null, in the sense that it only provides for the mapping of the equivalent primitives of the AAL type 3/4 user to CPCS and vice-versa.

The description contained in this ETS defines the functional behaviour of the AAL type 3/4 common part and does not preclude any implementation as long as the external behaviour of the implementation follows this ETS. The separation of the functionality between the SAR sublayer and CPCS is arbitrary and not visible to the outside. The allocation of function to the two sublayers was made for the sake of the ease of description.

5.2 Information flow across the ATM-AAL type 3/4 boundary

The AAL type 3/4 makes use of the ATM layer service as defined in ITU-T Recommendation I.361 [1].

5.3 Service provided by the AAL type 3/4

The AAL type 3/4 provides the capabilities to transfer the AAL-SDU from one AAL type 3/4 user to another AAL type 3/4 user through the ATM network. Two modes of service are defined, message mode and streaming mode:

a) message mode service: the AAL-SDU is passed across the AAL type 3/4 interface in exactly one AAL-IDU. This service provides the transport of fixed size or variable length AAL-SDUs:

   1) in case of variable length AAL-SDUs, an internal AAL-SDU segmentation/reassembling function in the SSCS may be applied (e.g. an AAL-SDU exceeds the length limit imposed by the capability of the CPCS). In this case a single AAL-SDU is transferred in one or more SSCS-PDUs;

   2) in case of short fixed size AAL-SDUs, an internal blocking/deblocking function in the SSCS may be applied; it provides the transport of one or more fixed size AAL-SDUs in one SSCS Protocol Data Unit (SSCS-PDU);

   3) where the options a1) and a2) are not used, a single AAL-SDU is transferred in one SSCS-PDU. When the SSCS is null, the AAL-SDU is mapped to one CPCS-SDU;

b) streaming mode service: the AAL-SDU is passed across the AAL type 3/4 interface in one or more AAL-IDU. The transfer of these AAL-IDUs across the AAL type 3/4 interface may occur separated in time. This service provides the transport of variable length AAL-SDUs. The streaming mode service includes an abort service by which the discarding of an AAL-SDU partially transferred across the AAL type 3/4 interface can be requested:

   1) an internal AAL-SDU segmentation/reassembling function in the SSCS may be applied. In this case all the AAL-IDUs belonging to a single AAL-SDU are transferred in one or more SSCS-PDU;

   2) an internal pipelining function may be applied. It provides the means by which the sending AAL type 3/4 entity initiates the transfer to the receiving AAL type 3/4 entity before it has the complete AAL-SDU available;

   3) where option b1) is not used, all the AAL-IDUs belonging to a single AAL-SDU are transferred in one SSCS-PDU. When the SSCS is null, the AAL-IDUs belonging to a single AAL-SDU are mapped to one CPCS-SDU.

Table 1: Combination of service mode and internal function

	AAL-SDU Message segmentation/reassembly in the SSCS	AAL-SDU blocking/deblocking in the SSCS	Pipelining
Message			
Option 1	O	N/A	N/A
Option 2	N/A	O	N/A
Streaming	O	N/A	O
Option 1: long variable size SDUs		O: Optional	
Option 2: short fixed size SDUs		N/A: Not Applicable	

Table 2: Combination of service mode at the sending and receiving side

Receiver	Sender		
	MM/Block	MM/Seg	SM
MM/deblocking	A	N/A	N/A
MM/reassembly	N/A	A	A
SM	N/A	A	A
MM: Message Mode		A: Applicable	
SM: Streaming Mode		N/A: Not Applicable	

NOTE: An end-to-end specification of the SDU length in MM with blocking/deblocking is needed.

Both modes of service may offer the following peer-to-peer operational procedures:

- assured operations:
  every assured AAL-SDU is delivered with exactly the data content that the user sent. The assured service is provided by retransmission of missing or corrupted SSCS-PDUs. Flow control is provided as a mandatory feature. The assured operation may be restricted to point-to-point AAL type 3/4 connections;

- non-assured operations:
  integral AAL-SDUs may be lost or corrupted. Lost and corrupted AAL-SDUs will not be corrected by retransmission. An optional feature may be provided to allow corrupted AAL-SDUs to be delivered to the user (i.e. optional error discard). Flow control may be provided as an option.

5.3.1 Description of AAL type 3/4 connections

The AAL type 3/4 provides the capabilities to transfer the AAL-SDU from one AAL-SAP to one or more AAL-SAPs through the ATM network (see annex F). The AAL type 3/4 users will have the capability to select a given AAL-SAP associated with the Quality of Service (QOS) required, to transport that AAL-SDU (for example, delay and loss sensitive QOS).

AAL type 3/4 makes use of the service provided by the underlying ATM layer (see figure 2). Multiple AAL type 3/4 connections may be associated with a single ATM connection, allowing SAR-PDU multiplexing at the AAL type 3/4. The AAL type 3/4 user selects the QOS provided by the AAL type 3/4 through the choice of the AAL-SAP used for data transfer.

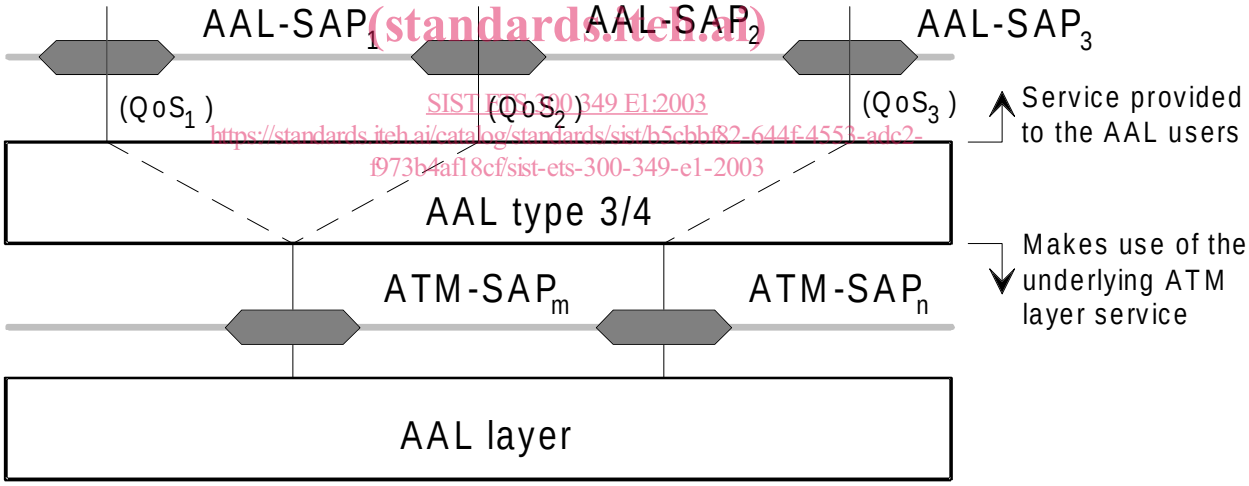

Figure 2: Relation between AAL-SAP and ATM-SAP

5.3.2 Primitives for the AAL type 3/4

These primitives depend on the SSCS protocol used; they are defined independently for each SSCS protocol.

If the SSCS is null, it only provides for the mapping of the equivalent primitives of the AAL type 3/4 to CPCS and vice-versa. In this case, the primitives for the AAL type 3/4 are equivalent to those for the CPCS (see subclause 6.1.1.1) but identified as AAL-UNITDATA-request, AAL-UNITDATA-indication, AAL-U-Abort-request, AAL-U-Abort-indication and AAL-P-Abort-indication, consistent with the primitive naming convention at a SAP.