

SLOVENSKI STANDARD

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Broadband Integrated Services Digital Network (B-ISDN); Asynchronous Transfer Mode (ATM); Adaptation Layer (AAL) specification - type 5

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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].

This ETS constitutes one of a set of ETSs describing different Asynchronous Transfer Mode (ATM) Adaptation Layer (AAL) types.

Transposition dates	
Date of adoption of this ETS:	28 July 1995
Date of latest announcement of this ETS (doa):	30 November 1995
Date of latest publication of new National Standard or endorsement of this ETS (dop/e):	31 May 1996
Date of withdrawal of any conflicting National Standard (dow):	31 May 1996

Introduction

The AAL type 5 enhances the service provided by the ATM layer to support functions required by the next higher layer. The AAL type 5 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 5 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 5 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 5 and the next higher layer, and the AAL type 5 and the ATM layer, as well as AAL type 5 peer-to-peer operations.

This ETS is applicable to variable bitrate sources where there exists no timing relation between the source and the destination of the data.

This ETS defines the common part of AAL type 5 and can be complemented with standards for the service specific part of the convergence sublayer.

2 Normative references

This ETS incorporates by dated or 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 specification".

3 Definitions

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

In addition, for the purposes of this ETS, 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.

4 Abbreviations

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

AAL	ATM Adaptation Layer
AAL-IDU	AAL type 5 IDU
AAL-SAP	AAL Service Access Point
AAL-SDU	AAL type 5 Service Data Unit
ATM	Asynchronous Transfer Mode
ATM-SDU	ATM Service Data Unit
AUU	ATM-layer-User to ATM-layer-User indication
CLP	Cell Loss Priority
CPCS	Common Part Convergence Sublayer
CPCS-CI	CPCS-Congestion Indication
CPCS-IDU	CPCS Interface Data Unit
CPCS-LP	CPCS-Loss Priority
CPCS-PDU	CPCS Protocol Data Unit
CPCS-SDU	CPCS Service Data Unit
CPCS-UU	CPCS-User to User indication
CPI	Common Part Indicator
CRC	Cyclic Redundancy Check
CS	Convergence Sublayer
ID	Interface Data
IDU	Interface Data Unit
LP	Loss Priority
M	More
MM	Message Mode
Pad	Padding
PICS	Protocol Implementation Conformance Statement
PT	Payload Type
QoS	Quality of Service
RS	Reception Status
SAP	Service Access Point
SAR	Segmentation And Reassembly
SAR-CI	SAR-Congestion Indication
SAR-IDU	SAR IDU
SAR-LP	SAR-Loss Priority
SAR-PDU	SAR Protocol Data Unit
SAR-SDU	SAR Service Data Unit
SDU	Service Data Unit
SDL	Specification and Description Language
SM	Streaming Mode
SSCS	Service Specific CS
SSCS-PDU	SSCS Protocol Data Unit

5 AAL type 5

5.1 Framework of AAL type 5

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). Different SSCS protocols, to support specific AAL type 5 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 5 to CPCS and vice-versa. SSCS protocols are specified in separate ETSS.

The description contained in this ETS defines the functional behaviour of the AAL type 5 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 SAR and CPCS is arbitrary and is not visible to the outside. The allocation of functions to the two sublayers has been made in order to simplify the description.

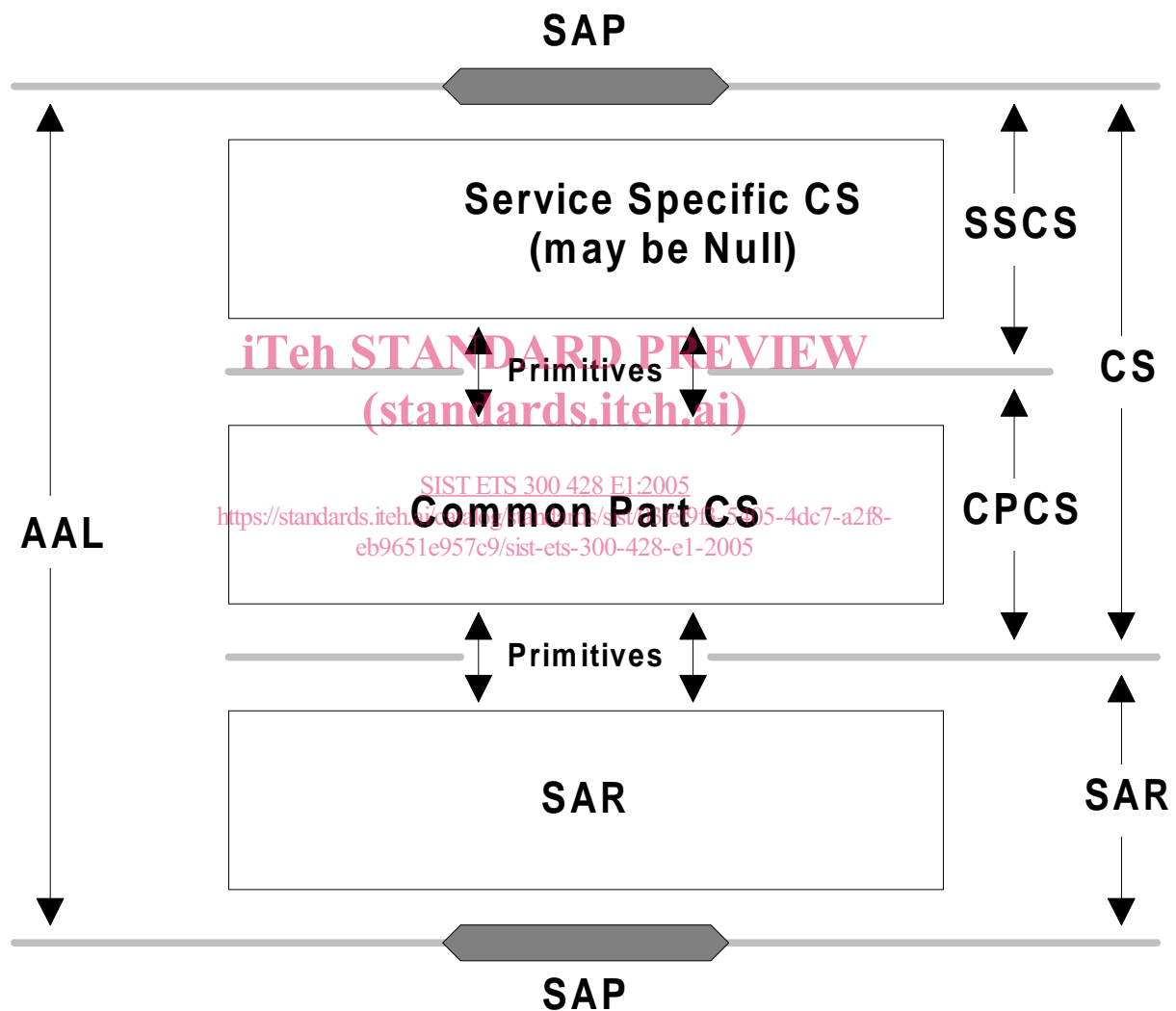


Figure 1: Structure of the AAL type 5

5.2 Information flow across the AAL-ATM boundary

The AAL type 5 makes use of the ATM layer services as defined in ITU-T Recommendation I.361 [1].

NOTE: The addition of the "Received Loss Priority" parameter in the ATM-DATA-indication primitive as agreed by CCITT SG XVIII in January 1993 is assumed.

5.3 Service provided by the AAL type 5

The AAL type 5 provides the capabilities to transfer the AAL type 5 Service Data Unit (AAL-SDU) from one AAL type 5 user to another AAL type 5 user through the ATM network. The Message Mode service, Streaming Mode service, and assured and non-assured operations as defined below for AAL type 5 are identical to those defined for AAL type 3/4 (see ETS 300 349).

Two modes of service are defined: Message and Streaming:

- a) Message Mode service: the AAL-SDU is passed across the AAL type 5 interface in exactly one AAL type 5 Interface Data Unit (AAL-IDU). This service provides the transport of fixed size or variable length AAL-SDUs:
 - 1) 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);
 - 2) in case of variable length AAL-SDUs an internal AAL-SDU message segmentation/reassembling function in the SSCS may be applied. In this case, a single AAL-SDU is transferred in one or more SSCS-PDUs;
 - 3) where the above options 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 Service Data Unit (CPCS-SDU);
- b) Streaming Mode service: the AAL-SDU is passed across the AAL type 5 interface in one or more AAL-IDU. The transfer of these AAL-IDUs across the AAL type 5 interface may occur separated in time. This service provides the transport of variable length AAL-SDUs:
 - 1) an internal AAL-SDU message 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 5 entity initiates the transfer to the receiving AAL type 5 entity before it has the complete AAL-SDU available;
 - 3) where option 1) 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.

The Streaming Mode service includes an abort service by which the discarding of an AAL-SDU partially transferred across the AAL type 5 interface can be requested.

Summaries of the service mode and feature options are provided in tables 1 and 2.

NOTE: An end-to-end specification of the SDU length in Message Mode with Blocking/Deblocking is needed.

Table 1: Combination of service mode and internal function

	AAL-SDU Message Segmentation/reassembly in the SSCS	AAL-SDU Message 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 sender and receiver side

Receiver	Sender		
	MM/Blocking	MM/Segmentation	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		

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 5 connections;
- non-assured operations:
integral AAL-SDUs may be lost or corrupted. Lost and corrupted AAL-SDUs are not corrected by retransmission. An optional feature may be provided to allow corrupted AAL-SDUs to be delivered to the user (i.e. optional delivery of corrupted data). Flow control may be provided as an option.

5.3.1 Description of AAL type 5 connections

The AAL type 5 provides the capabilities to transfer the AAL-SDU from one AAL Service Access Point (AAL-SAP) to one other AAL-SAP through the ATM network (see figure 2). The AAL type 5 users 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).

The AAL type 5 makes use of the service provided by the underlying ATM layer (see figure 3). Multiple AAL type 5 connections may be associated with a single ATM layer connection, allowing multiplexing at the AAL type 5; however, if multiplexing is used in the AAL type 5, it occurs in the SSCS. The AAL type 5 user selects the QoS provided by the AAL type 5 through the choice of the AAL-SAP used for data transfer.