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Contents

Foreword

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

Introduction

The purpose of Metropolitan Area Network (MAN) interconnection is to enable users connected to different MANs using the same bearer service to communicate with each other.

MANs are based upon a shared medium access and cover a restricted geographical area.

In order to cover larger areas, MAN interconnection is needed.

As described in ETS 300 211 [1], a MAN is composed of one MSS (MAN Switching System) and one or more access facilities connected to the MSS. Since interconnection of MANs is achieved by the coupling of MSSs, in this ETS the term "MAN interconnection" is synonymous to "MSS interconnection".

The Protocol Implementation Conformance Statement (PICS) proforma for the protocol specified in this ETS can be found in ETS 300 268 [4], with the exceptions specified in Clause 8.

The reference for the PICS proforma structure and definitions is ETS 300 268 [4] Clause 4.

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1 Scope

This European Telecommunication Standard (ETS) describes the direct interconnection between European Metropolitan Area Networks (MANs), as defined in European MAN ETSs, by means of dedicated links.

Interworking between MANs and other networks is outside the scope of this ETS.

Although MAN interconnection is intended to cover all services as defined in ETS 300 211 [1] (i.e. connectionless, isochronous and connection-oriented non-isochronous), this ETS is restricted to the connectionless service, as defined in ETS 300 217 [2].

Interconnection within a network operator domain and between different network operator domains is specified.

This ETS provides the general principles and functional requirements and specifies the corresponding interfaces for interconnection of MANs, assuming ETS 300 211 [1] as a basis.

The protocol at the interfaces between MAN Switching Systems (MSSs) is the MSS Interconnection Protocol (MIP), specified in this ETS and based on Distributed Queue Dual Bus (DQDB) protocol as specified in ETS 300 212 [3].

The interconnection of MSSs via Asynchronous Transfer Mode (ATM) links is specified in DE/NA-2104: "Interconnection of MSSs based on an ATM interface".

This ETS defines the reference configuration, functional blocks, and their corresponding Protocol Reference Models (PRMs), related to MAN direct interconnection.

Neither routeing protocol, nor congestion procedures are specified.

The scope of this ETS is presently limited to the case where there is no need for an explicit operator selection.

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] ETS 300 211 (1992): "Network Aspects (NA); Metropolitan Area Network (MAN) Principles and Architecture".

[2] ETS 300 217 (1992): "Network Aspects (NA); Connectionless Broadband Data Service (CBDS)".

[3] ETS 300 212 (1992): "Network Aspects (NA); Metropolitan Area Network (MAN) Media access control layer and physical layer specification".

[4] ETS 300 268: "Network Aspects (NA); Metropolitan Area Network (MAN) Protocol Implementation Conformance Statement".

[5] CCITT Recommendation E.164 (1991): "Numbering plan interworking for the ISDN era".

[6] CCITT Recommendation M.3010 (1992): "Principles for a Telecommunications Management Network".

[7] ETS 300 273: "Network Aspects (NA); Metropolitan Area Network (MAN) Medium Access Control (MAC) layer management".

[8] DE/NA-052104: "Interconnection of MSSs based on an ATM interface".

[9] ISO/IEC 8802-6: "Distributed Queue Dual Bus (DQDB) Subnetwork of a Metropolitan Area Network".

3 Abbreviations and definitions

3.1 Abbreviations

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

AF1	Access Facility 1
AF2	Access Facility 2
ATM	Asynchronous Transfer Mode
BAsize	Buffer Allocation size
BEtag	Beginning End tag
BT	Bit sublayer
CBDS	Connectionless Broadband Data Service
CEQ	Customer EQuipment
CIB	CRC Indicator Bit
DA	Destination Address
DM	Derived MAC sublayer
DQDB	Distributed Queue Dual Bus
HE	Header Extension
HEL	Header Extension Length
IM	Initial MAC sublayer
IMI	Inter MSS Interface
IMPDU	Initial MAC Protocol Data Unit
IMSI	Inter MAN System Interface
INI	Inter Network operator Interface
MAN	Metropolitan Area Network
MIP	MSS Interconnection Protocol
MMF	MSS Management Function
MIMF	MAN Interconnection Management Functions
MSS	MAN Switching System
NE	Network Entity
PDU	Protocol Data Unit
PI	Protocol Identification
PICS	Protocol Implementation Conformance Statement
PL	Physical Layer
PRM	Protocol Reference Model
QOS	Quality Of Service
RF	Relay Function
SA	Source Address
SLT	Slot sublayer
SM	Segment sublayer
SV	Service sublayer
TAF	Transit Access Functions
TAT	Transit Access Termination
TC	Transmission Convergence sublayer
TM	Transmission sublayer
TMN	Telecommunication Management Network
TN	Transit Network
UMI	User MAN Interface

3.2 Definitions

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

Metropolitan Area Network (MAN): see ETS 300 211 [1].

Inter MSS Interface (IMI): interface between two MSSs within the same network operator domain.

MAN Switching System (MSS): see ETS 300 211 [1].

Inter Network operator Interface (INI): interface between two MSSs, belonging to different network operators.

Transit Access Termination (TAT): the collection of functions residing in the MSS, for terminating the transit link at the Z_M reference point and for the interconnection with other MSSs.

Transit Network (TN): a network which provides transmission, switching and maintenance functions to allow the MSS interconnection. It can be implemented through point-to-point links, digital cross connect, B-ISDN transit node, etc. For further details see ETS 300 211 [1].

Network operator domain: the area (not strictly geographical) which a single network operator is responsible for; inside this area the MAN Network Entities (NEs) are managed according to the Telecommunication Management Network (TMN) architectural model.

Dedicated link: is a semi-permanent or permanent point-to-point connection, which may be offered by digital cross connect.

Telecommunication Management Network (TMN): see CCITT Recommendation M.3010 [6].

Relay Functions (RF) block: contains the relay functionality.

Transit Access Functions (TAF) block: contains functions to receive and transmit information over a medium. It is based on the MIP specified in this document which is based on the DQDB protocol as specified in ETS 300 212 [3].

MAN Interconnection Management Functions (MIMF) functional component: it includes both protocol layer management functions for the TAF block and management functions related to operational aspects of the RF block; it also contains functionality to gather statistics for traffic exchanged between MSSs.

MSS Management Functions (MMFs) block: contains the functions related to the management of MSS local resources and optionally the connected Access Facility 1 (AF1) and Access Facility 2 (AF2) resources.

4 MAN interconnection interface characteristics

MAN Interconnection interface characteristics support the service described in ETS 300 217 [2].

The transparent transfer of Initial MAC Protocol Data Units (IMPDUs) (see ETS 300 212 [3]) between source and destination MSSs is guaranteed.

The definition of these interface characteristics encompasses the two cases of MSSs belonging to the same or different network operators.

Two techniques are allowed to forward/receive the PDUs across the IMI/INI interfaces:

- encapsulation of the IMPDU defined at the Y_M reference point within the MIP_IMPDU defined at the Z_M reference point; or

- non-encapsulation of the IMPDU.

The following requirements for the use of encapsulation / non-encapsulation apply:

- for the interconnection of MSSs belonging to different network operator domain encapsulation is always used for both group and individually addressed PDUs;

- for the interconnection of the MSSs within the same network operator domain encapsulation and/or non-encapsulation may be used, depending on the choice of the network operator.

This ETS specifies the encapsulation technique only.

IMPDU sequence order is preserved between MSSs to maintain the sequence order between end users.

The protocol elements for interconnection of MSSs reside inside the OSI layer 2.

5 General architecture

5.1 Architectural model for MSS interconnection

In this ETS, the TN, as mentioned in ETS 300 211 [1], is reduced to a dedicated link.

The general architectural model for MSS interconnection is depicted in figure 1. For the support of CBDS data transport between source and destination CEQ, configurations involving several directly interconnected MSSs are possible as shown in figure 1.

The coexistence between the interfaces described in this ETS and the interfaces for the interconnection between MSSs via a TN including switching functionalities is not precluded and is therefore also shown in figure 1.

However the description of the interfaces between MSSs and TN which include switching functionalities is outside the scope of this ETS.

In figure 1, the TN is not indicated in those cases where the TN is reduced to a dedicated link.

For direct MSS interconnection two interfaces are envisaged:

- the IMI is located between two MSSs that are directly connected, within the same network operator domain[1)];

- the Inter Network operator Interface (INI) is located between two MSSs belonging to different network operators. The MSSs are directly connected. This interface provides functions and requirements in order to assure the connectivity of MANs belonging to different network operators, while taking into account different management systems[1)].

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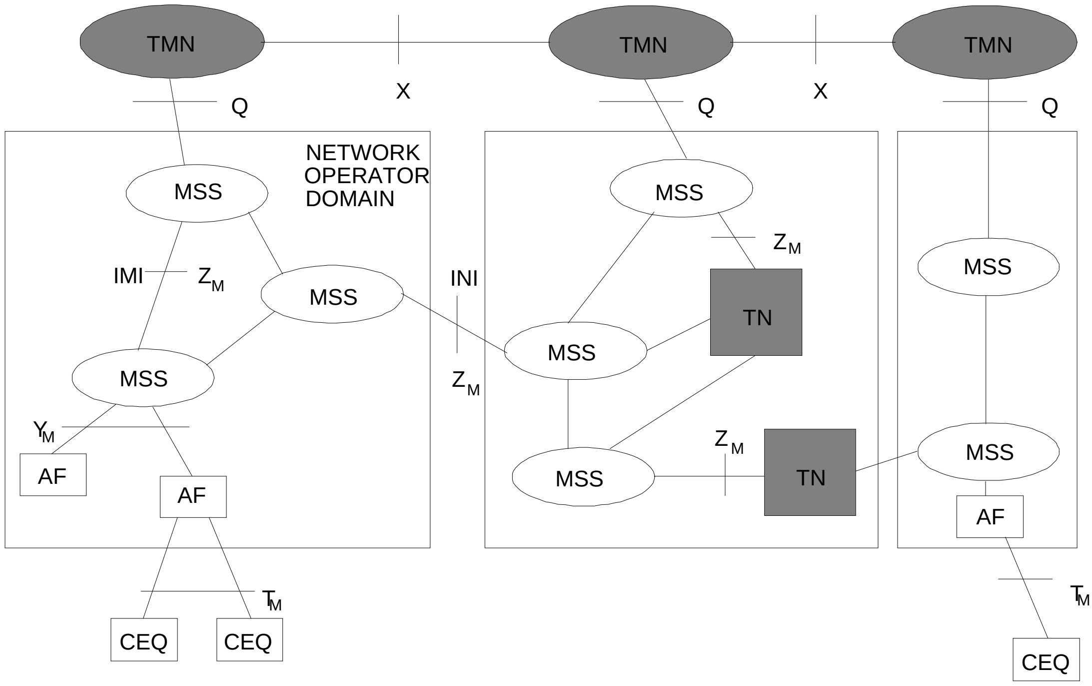
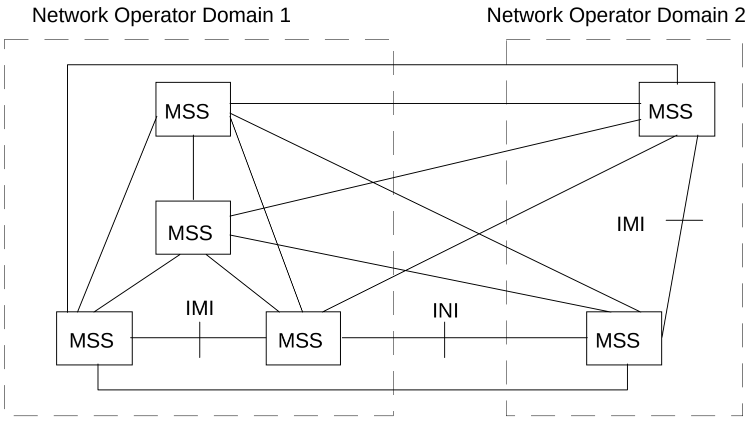
1) In ETS 300 211 [1] the IMI (and INI) are referred to as IMSI.

Examples of topologies for direct interconnection of MSSs are shown in figure 2.

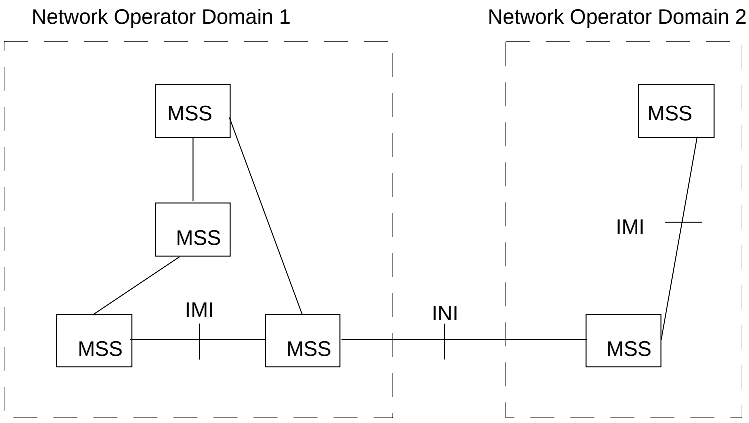


NOTE: The TN is only indicated in this figure whenever it contains switching functionality; when it is reduced to a dedicated link it is omitted.

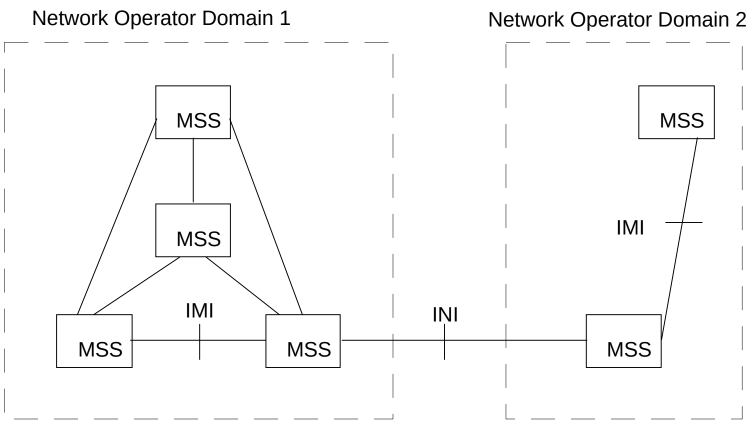
Figure 1: General architectural model for MSS interconnection



2a: Fully meshed interconnection of MSSs



2b: Non-meshed interconnections of MSSs



2c: Meshed within, non-meshed outside an operator domain

Figure 2: Direct connections between MSSs

5.2 Reference configuration

The reference configuration for direct connection of MSSs is derived from the general reference configuration as defined in ETS 300 211 [1] and is depicted in figure 3.

The TN which is reduced to a dedicated link is not indicated.

The interface between MSSs is referred to as the IMI or INI, for the interconnection between MSSs belonging to the same or different network operators, respectively, and is located at the Z_M reference point.

A detailed description of other reference points and functional blocks in figure 3 is given in ETS 300 211 [1].

Taking into account the MSS functional configuration described in ETS 300 211 [1], functions related to ensure interworking with other MSSs are provided in the TAT.

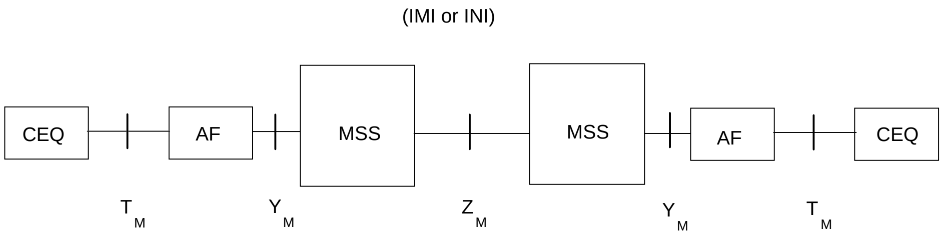


Figure 3: Reference configuration for MSS interconnection

5.3 TAT functional model

As depicted in figure 4, the TAT terminates the transit link at the Z_M reference point where the IMI and INI are defined.

A MSS can contain more than one TAT, one for each connection to another MSS. Based on addressing information, the MSS decides which TAT shall forward the IMPDU across the IMI/INI interface (the way this function is implemented is outside the scope of this ETS).

Two functional blocks are envisaged within the TAT for IMI/INI (see figure 4):

a) Transit Access Function (TAF) block: this contains functions to receive and transmit information over a medium. It is based on the MIP protocol which is based on the DQDB protocol as specified in ETS 300 212 [3]. Only one TAF block is contained in each TAT.

b) Relay Functions (RF) block: this contains the relay functionality, including:

   1) receiving IMPDU function (from the IMI/INI interface towards the MSS): this function handles all that is necessary to receive the MIP_IMSDU and the control information from the TAF block. The MIP_IMSDU is the IMPDU without the Common PDU Trailer, if encapsulation has been performed at the IMI/INI interface (see figure 7). The PI value indicates the use of encapsulation technique as specified in Clause 8. Then the receiving functions create the IMPDU;

      - the receiving IMPDU function allows both pipelining procedures (part of the IMPDU may be forwarded before all slots associated with the packet have been received) and reassembly procedures (no part of the IMPDU is forwarded until all slots associated with the packet have been received by the TAT block);

2) address look-up function:

- from the IMI/INI interface towards the MSS: this function decides, on basis of the CCITT Recommendation E.164 [5] number, whether to pass the IMPDU to the MSS internally or to the discard IMPDU function; in the first case it may perform group address resolution;

- from the MSS towards the IMI/INI interface: this function may perform group address resolution if the MSS is involved in the group address resolution for the group; the IMPDU to be transmitted and the associated control information (e.g. addressing information) are then sent to the forwarding function.

3) forward IMPDU function (from the MSS towards IMI/INI interface):

- the forwarding function in the selected TAT handles all what is necessary to create the MIP_IMSDU and the control information to be forwarded to the TAF block; The MIP_IMSDU is the IMPDU without the Common PDU Trailer, if encapsulation has to be performed at the IMI/INI interface. The PI value indicates the use of the encapsulation technique as specified in Clause 8.

4) discard IMPDU function (from the IMI/INI interface towards the MSS): this function performs all the actions necessary to free resources reserved by the MSS, for instance in case when an IMPDU is received whose destination address is unknown.

The functions described above do not imply any particular implementation.

5.4 Management functions

The management functions related to the TAT block to manage the IMI and INI interfaces are included in the MMF block (see ETS 300 211 [1]) that contains the functions related to the MSS management.

As far as the management of INI and IMI interfaces are concerned, the MIMF functional components are envisaged.

The MIMF is included inside the MMF block and is depicted in figure 4.

MIMF includes both protocol layer management functions for the TAF block (see ETS 300 273 [7]) and management functions related to operational aspects of the RF block (e.g. loading and resetting of the addressing table, error reporting in the case of repeated attempts to reach an unknown destination address).

MIMF also contains functionality to gather statistics for traffic exchanged between MSSs; as far as INI is concerned this functionality can be used in order to provide charging capabilities between different network operators.

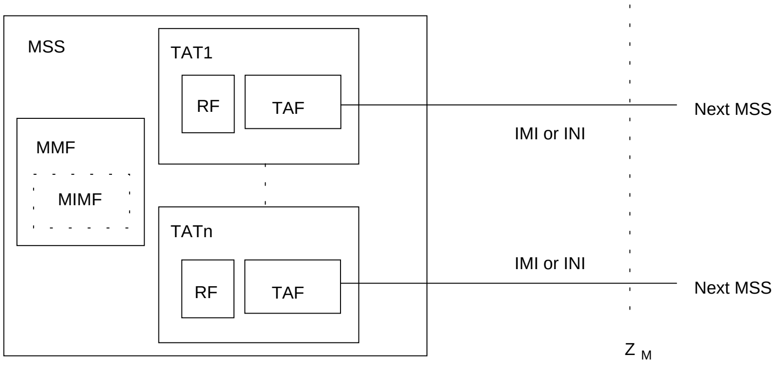


Figure 4: Transit access termination functional model

6 Addressing aspects

End users (see ETS 300 211 [1], Customer Equipment (CEQ)) are addressed at the T_M reference point using addresses modelled according to CCITT Recommendation E.164 [5].

The same addressing scheme is used to transfer MIP_IMPDUs between MSSs.

The forwarding of MIP_IMPDUs is based on the hierarchical CCITT Recommendation E.164 [5] number. Both individual and group addresses are supported, according to ETS 300 217 [2].

The way group addressing is supported is outside the scope of this ETS, and it will be specified in an additional ETS.

7 Protocol reference model for MSS interconnection

The protocol reference model for IMI and INI is depicted in figure 5. It includes the MSS Interconnection Protocol (MIP), specified in Clause 8 of this ETS which is based on the DQDB protocol stack (see ETS 300 212 [3]).

The functionalities, characteristics, and protocol specification of each sublayer, except for the MIP_IM, are defined in ETS 300 211 [1] and ETS 300 212 [3]. The MIP_IM sublayer is specified in Clause 8 of this ETS.

NOTE: The protocol implementation could be restricted to those functions which are required for a point-to-point application (see ETS 300 268 [4] and Clause 8).

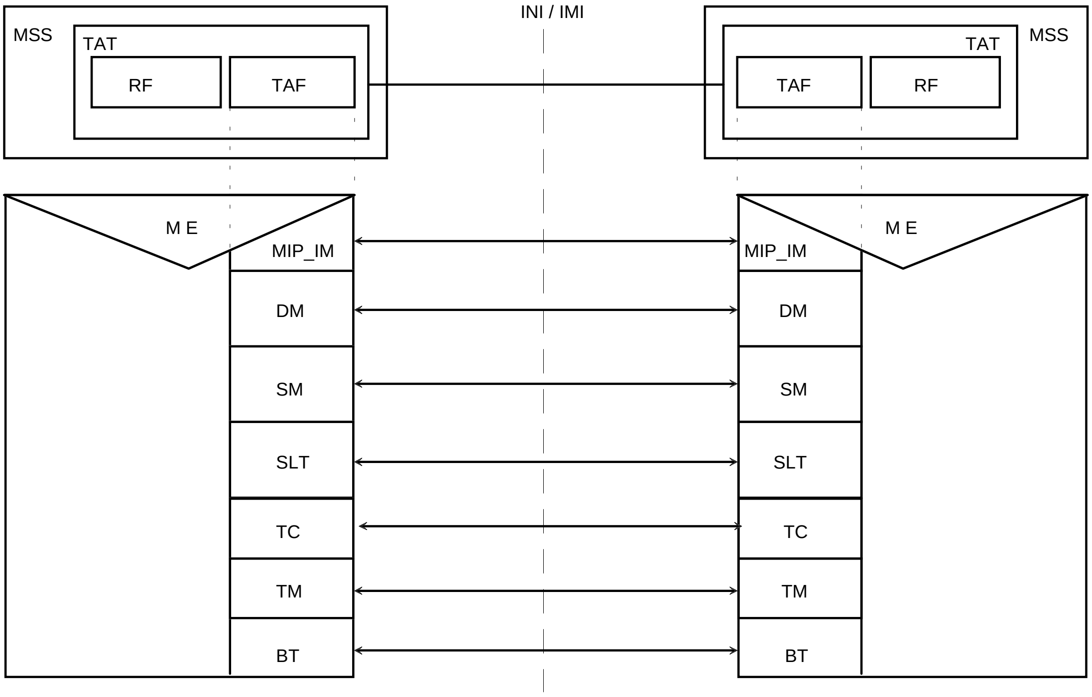


Figure 5: Protocol reference model for IMI and INI

8 MSS Interconnection Protocol (MIP) specification

The MIP supports the Connectionless Broadband Data Service (CBDS) as specified in ETS 300 217 [2] between MAN Switching Systems (MSSs), inside a network operator domain and between two network operator domains, interconnected by a dedicated link.

The specification of the MIP is restricted to the use of encapsulation.

The MIP shall be applied at the IMI / INI interface.

The MIP is based on the DQDB protocol; the IM sublayer of DQDB is replaced with the MIP_IM sublayer specified in this ETS.

8.1 Service provided by the MIP_IM sublayer

The MIP_IM sublayer provides for the transparent transfer of the part of the IMPDUs covered by the CRC32 between IMI / INI interfaces in such a manner that lost or corrupted data units are not retransmitted. The service primitives are defined in subclause 8.3.3.

8.2 MIP_IM Protocol Data Unit (PDU) structure and encoding

The detailed structure of the MIP_IMPDU is illustrated in figure 6.

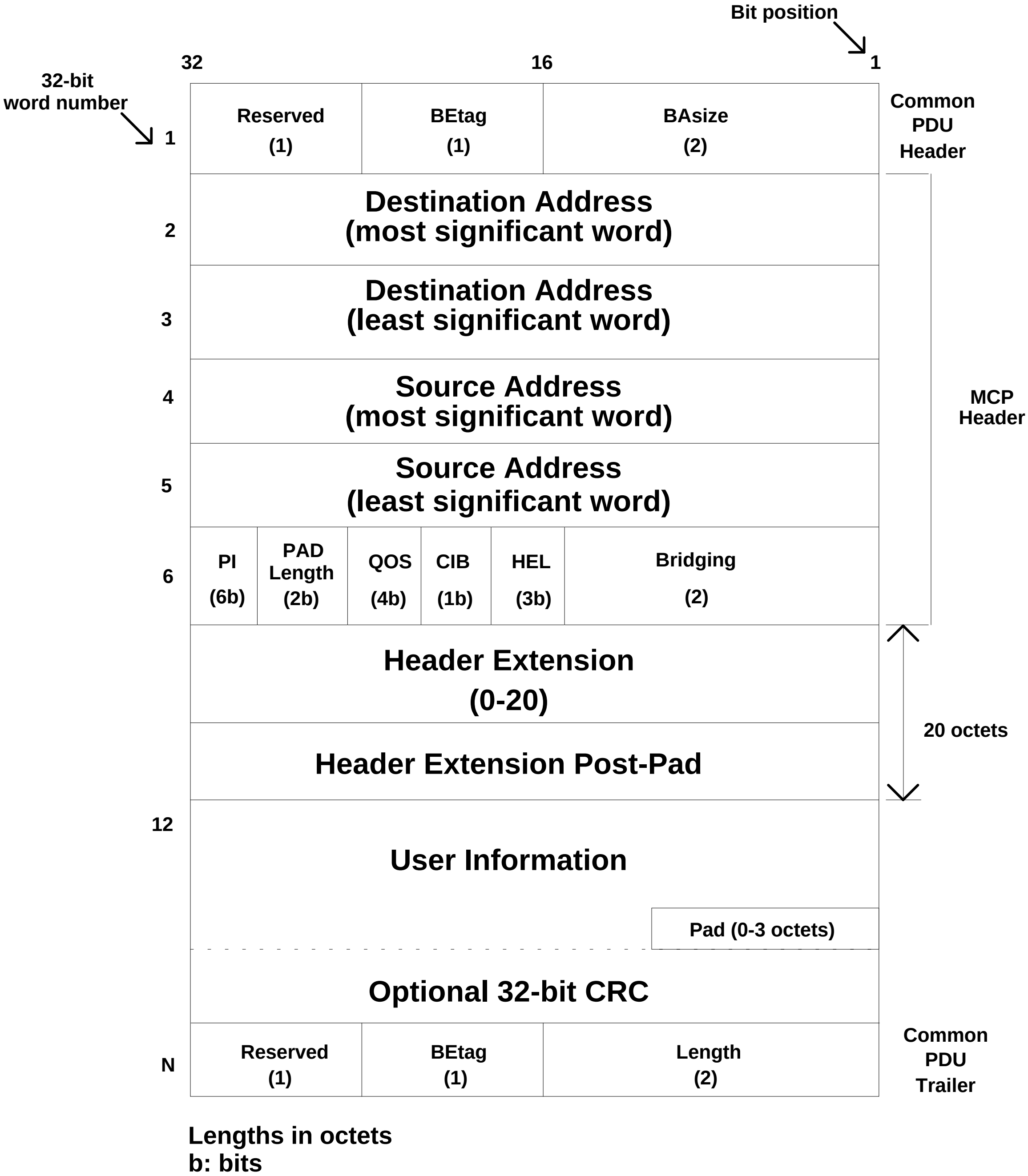


Figure 6: Structure of the MIP_IMPDU

The MIP_IMPDU contains the following fields:

8.2.1 Reserved

This 1-octet field shall be set to 0.

8.2.2 Beginning-End tag (BEtag)

This 1-octet field allows the association of the Beginning Of Message (BOM) DMPDU with the End Of Message (EOM) DMPDU derived from the same MIP_IMPDU. For a given MIP_IMPDU the sender shall insert the same value in the BEtag field of the header and in the BEtag field of the trailer. The sender shall increment by one (modulo 256) the BEtag field value for sequential MIP_IMPDUs transmitted.

8.2.3 Buffer Allocation size (BAsize)

This 2-octets field is intended for buffer allocation purposes at the destination. It shall be set to the length, in octets, of the portion of the MIP_IMPDU that extends from the DA field up to the PAD field and optional 32-bit CRC field (if present).

8.2.4 Destination Address (DA)

This 8-octet field contains a 4-bit 'address-type' subfield, followed by the 60-bit 'address' subfield. The 'address-type' subfield indicates whether the 'address' subfield contains a publicly administered 60-bit individual address or a publicly administered 60-bit group address. The privately administered 60-bit address is f.f.s.

The structure of the 'address' subfield is modelled according to CCITT Recommendation E.164 [5]. The encoding of the 'address_type' and 'address' subfields is described in Annex A.

8.2.5 Source Address (SA)

This 8-octet field contains a 4-bit 'address-type' subfield, followed by the 60-bit 'address' subfield. The 'address-type' subfield always indicates that the 'address' subfield contains a publicly administered 60-bit individual address. The privately administered 60-bit address is f.f.s.

The structure of the 'address' subfield is modelled according to CCITT Recommendation E.164 [5]. The encoding of the 'address_type' and 'address' subfields is described in Annex A.

8.2.6 Protocol Identification (PI)

This 6-bit field takes a value in the range of 44-47 to indicate that the MIP_IMPDU is an encapsulating one.

8.2.7 PAD Length

This 2-bit field indicates the length of the Pad field (0 - 3 octets). The number of PAD octets is such that the total length of the 'user information' field and the Pad field together is an integral multiple of 4 octets. This field shall be coded to 0.

8.2.8 Quality of Service (QOS)

This 4-bit field is used to indicate the quality of service requested for the MIP_IMPDU. The semantics of this field and its exact use in relationship with the network service support functions are for further study. The default encoding of this field is 0.

8.2.9 CRC Indication Bit (CIB)

This 1-bit field indicates the presence (CIB=1) or absence (CIB=0) of a 32-bit CRC. This field shall be coded as '0'.

8.2.10 Header Extension Length (HEL)

This 3-bit field can take on any value from 0 - 5 and indicates the number of 32-bit words in the header extension field.

8.2.11 Bridging

This 16-bit field is reserved for future use. The default encoding of this field is 0.

8.2.12 Header Extension

This variable-length field can range from 0 up to 20 octets, its length is indicated by the value of the Header Extension Length field. The structure, coding and semantics of this field and its use are for further study.

8.2.13 HE Post-Pad

This field has a length in octets equal to 20 minus the length of the Header Extension field. It is inserted in the MIP_IMPDU in order to always bring the overall length of the MIP_IMPDU header of an encapsulating PDU (including Reserved, BEtag, BAsize, DA, SA, PI, PAD Length, QOS, CIB, HEL, Bridging, HE and HE Post-Pad) to 44 octets.

The coding of this field is for further study.

8.2.14 User Information

This field is of variable length, up to 9 236 octets.

This field carries the encapsulated IMPDU without its Common PDU Trailer.

8.2.15 Reserved

This 1-octet field shall be set to 0.

8.2.16 Beginning-End tag (BEtag)

This 1-octet field allows the association of the Beginning Of Message (BOM) DMPDU with the End Of Message (EOM) DMPDU derived from the same MIP_IMPDU. For a given MIP_IMPDU the sender shall insert the same value in the BEtag field of the header and in the BEtag field of the trailer. The sender shall increment by one (modulo 256) the BEtag field value for sequential MIP_IMPDUs transmitted.

8.2.17 Length

This 2-octets field shall be set to the length, in octets, of the portion of the MIP_IMPDU that extends from the DA field up to the PAD field and optional 32-bit CRC field (if present).The same value shall be inserted in the BAsize field of the header.

8.3 Encapsulation mechanism specification

8.3.1 Introduction

This subclause specifies the encapsulation mechanism of ISO/IEC 8802-6 [9] IMPDUs within MIP_IMPDUs at the IMI / INI interface.

The MIP as well as the encapsulation mechanism are defined in such a way that pipelining of DM-PDUs is possible.

8.3.2 Mapping Entity functionalities

The Mapping Entity (ME), depicted in figure 5, is a logical collection of MSS functions that supplements the MIP_IM sublayer functionalities in order to provide CBDS service over a multi-MSS network. The Mapping Entity is introduced to ensure proper encapsulation/decapsulation of IMPDUs into/from MIP_IMPDUs.

8.3.2.1 Transfer of PDUs from MSS towards IMI / INI

The Mapping Entity, within an MSS, strips off the Common PDU Trailer (Reserved, BEtag, Length field) when receiving an IMPDU.

The IMPDU without the Common PDU Trailer shall be encapsulated into a MIP_IMPDU.

Figure 7 illustrates the encapsulation of the IMPDU using the information processed by the Mapping Entity.

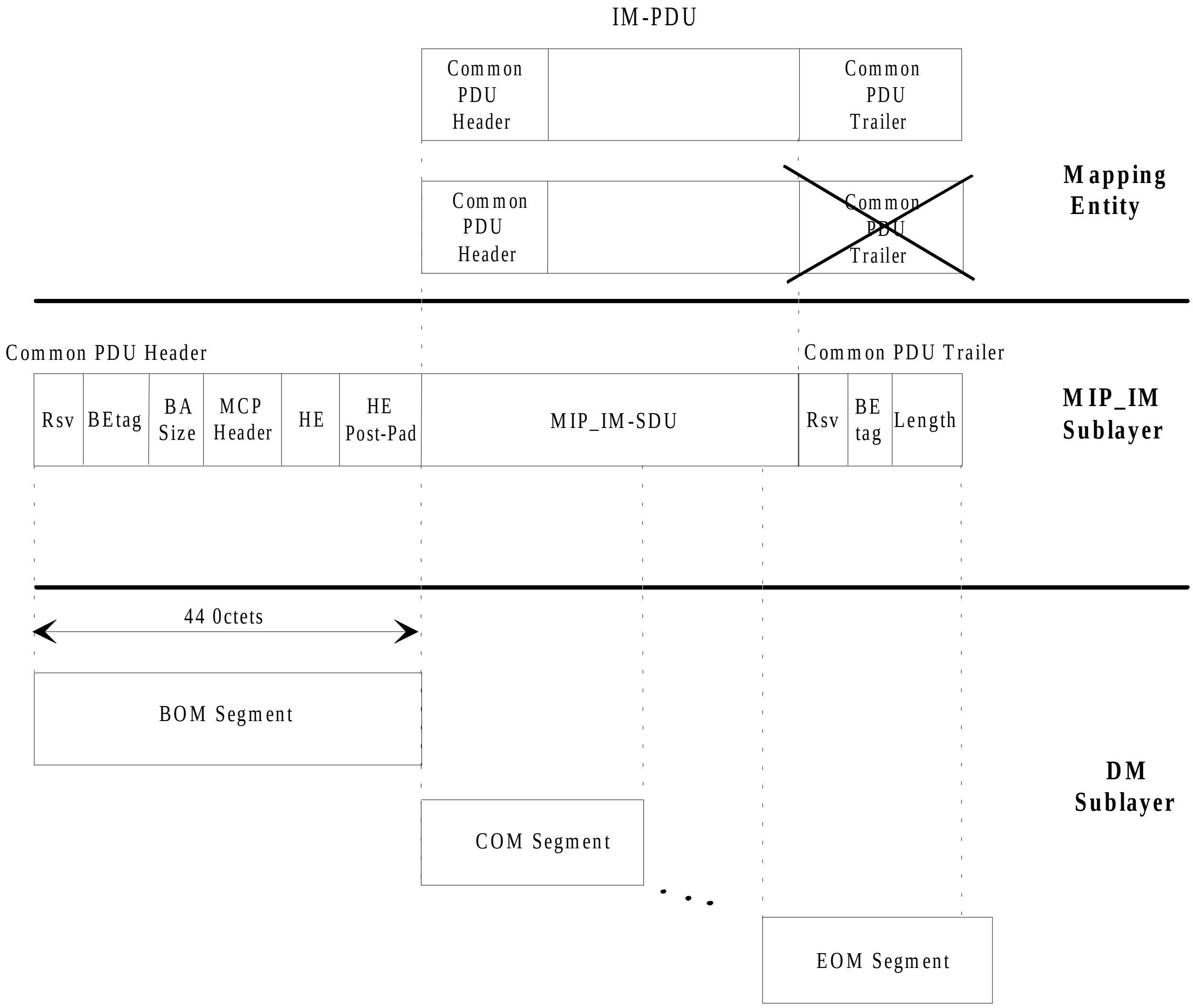


Figure 7: Encapsulation of an IMPDU within a MIP_IMPDU

8.3.2.2 Transfer of PDUs from IMI / INI towards MSS

The Mapping Entity, within an MSS, when receiving the MIP_IMSDU (which consists of the IMPDU without the Common PDU Trailer) creates the IMPDU adding a Common PDU Trailer in which the Length field is set to the BAsize value recovered from the received Common PDU Header.

8.3.3 Interaction between Mapping Entity and MIP_IM sublayer

The description of the interaction between the Mapping Entity and the MIP_IM sublayer is made in terms of primitives and parameters passing.

The information exchanged between the MIP_IM sublayer and the Mapping Entity includes the following primitives:

a) MIP_IM_UNITDATA.request (source_address,
destination_address
protocol_identifier
header_extension
data,
QOS)

This primitive is issued by the Mapping Entity to the MIP_IM sublayer, requesting the transport of the IMPDU across the IMI / INI interface.

Each MIP_IM_UNITDATA.request primitive has six parameters:

1) **source_address:** this parameter shall identify the address of the source interface that originated the data unit;

2) **destination_address:** this parameter shall identify the address of the intended recipient(s). This parameter may be different from the destination_address parameter received in the IMPDU (e.g., due to group address resolution);

3) **protocol_identifier:** this parameter shall indicate that the encapsulation technique shall be used in the construction of the MIP_IMPDU; it shall contain any value in the range from 44 to 47 inclusive;

4) **header_extension:** this parameter shall indicate the content of the Header Extension field of the resulting MIP_IMPDU;

5) **data:** this parameter shall indicate the content of the MIP_IM-SDU, i.e. an IMPDU without the Common PDU Trailer;

6) **QOS:** this parameter shall specify the quality of service desired for the resulting MIP_IMPDU.

b) MIP_IM_UNITDATA.indication (source_address
destination_address
protocol_identifier
header_extension
data
QOS)

This primitive is issued by the MIP_IM sublayer to the Mapping Entity, terminating the transport of the PDU, encapsulated in a MIP_IMPDU, across the IMI / INI interface.

Each MIP_IM_UNITDATA.indication primitive has six parameters:

1) **source_address:** this parameter shall contain the value of the Source Address field of the received MIP_IMPDU;

2) **destination_address:** this parameter shall contain the value of the Destination Address field of the received MIP_IMPDU;

3) **protocol_identifier:** this parameter shall indicate that the encapsulation technique has been used in the construction of the received MIP_IMPDU;

4) **header_extension:** this parameter shall contain the value of the Header Extension field of the received MIP_IMPDU;

5) **data:** this parameter shall contain the IMPDU without the Common PDU Trailer;

6) **QOS:** this parameter shall contain the value of the QOS field of the received MIP_IMPDU.

This interaction does not imply any particular implementation.

8.3.4 Error conditions

Various errors may occur in receiving MIP_IMPDUs.

8.3.4.1 Mandatory error condition

Whenever one of the following conditions is encountered at the receiver the respective MIP_IMPDU processing shall be stopped:

- value in the BEtag field in the header not equal to value in the BEtag field in the trailer;
- value in the BASize field less than 40 or greater than 9 276;
- invalid address fields encoding;
- MIP_IM Source Address different from IMPDU Source Address;
- MIP_IM Destination Address different from IMPDU Destination Address in the case that the latter is an individual address;
- value in the Length field not equal to the value in the BAsize field.

8.3.4.2 Optional error conditions

Whenever one of the following conditions is encountered at the receiver the respective MIP_IMPDU processing should be stopped:

- value in the Reserved field different from 0;
- Pad length different from 0;
- Quality Of Service (QOS) field other than 0;
- value in the Header Extension Length field not within the range 0-5;
- MIP_IM CRC Indicator Bit (CIB) equal to 1;
- Bridging field other than 0;
- value in the Length field not equal to the number of octets received for the MIP_IMPDU.

8.4 Protocol Implementation Conformance Statement (PICS) proforma for the MIP_IMPDU format and validation

Table 1

Item	Feature	Reference	Receive Status	Transmit Status	Value	Support
8.1	MIP_IMPDU format	8.2 figure 6	m	m		Y[ ] N[ ] X_
8.2	BEtag	8.2.2 8.2.16	m	m	0 .. 255	Y[ ] N[ ] X_
8.3	Destination Address (DA) and Source Address (SA) field format	8.2.4 8.2.5	m	m		Y[ ] N[ ] X_
8.4	Protocol Identification (PI) field	8.2.6	m	m	44 .. 47	Y[ ] N[ ] X_
8.5	Pad Length	8.2.7	o	m,d	00	Y[ ] N[ ] X_
8.6	Quality Of Service (QOS)	8.2.8	o	m,d	0000	Y[ ] N[ ] X_
8.7	CRC Indication Bit (CIB)	8.2.9	o	m,d	0	Y[ ] N[ ] X_
8.8	Header Extension Length (HEL)	8.2.10	o	m	0 .. 5	Y[ ] N[ ] X_
8.9	Bridging	8.2.11	o	m,d	0000 0000 0000 0000	Y[ ] N[ ] X_
8.10	Node shall be able to receive User Information fields up to 9 236 octets	8.2.14	m	n/a		Y[ ] N[ ] X_
8.11	Reserved field	8.2.15 8.2.1	o	m,d	0000 0000	Y[ ] N[ ] X_
8.12	BAsize and Length	8.2.3 8.2.17	m	m	BAsize = Length	Y[ ] N[ ] X_
8.13	Validation of the MIP_IIMPDU	8.3.4.1	m	n/a		Y[ ] N[ ] X_
8.14	Validation of the MIP_IMPDU	8.3.4.2	o	n/a.		Y[ ] N[ ] X_

Annex A (normative): Encoding of the 'address_type' and 'address' subfields

Table A.1: Destination address field

Address type	Address structure/meaning
0100	reserved (see NOTE)
1000	reserved (see NOTE)
1100	E.164 publicly administered individual address
1101	reserved (see NOTE)
1110	E.164 publicly administered groupaddress
1111	reserved (see NOTE)
All other codes	reserved for future standardization
NOTE: The usage of these values is defined in ISO/IEC DIS 8802-6 [9].	

Table A.2: Source address field

Address type	Address structure/meaning
0100	reserved (see NOTE)
1000	reserved (see NOTE)
1100	E.164 publicly administered individual address
1101	reserved (see NOTE)
All other codes	reserved for future standardization
NOTE: The usage of these values is defined in ISO/IEC DIS 8802-6 [9].	

The E.164 number carried in the 60-bit address subfield is the international ISDN number. The international ISDN number can consist of up to 15 decimal digits. If numbers have fewer than 15 decimal digits the number is placed in the most significant bits of the address subfield. The remaining part of the address subfield is coded to all 1's.

The E.164 numbers are coded using Binary Coded Decimal (BCD).

History

Document history	
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