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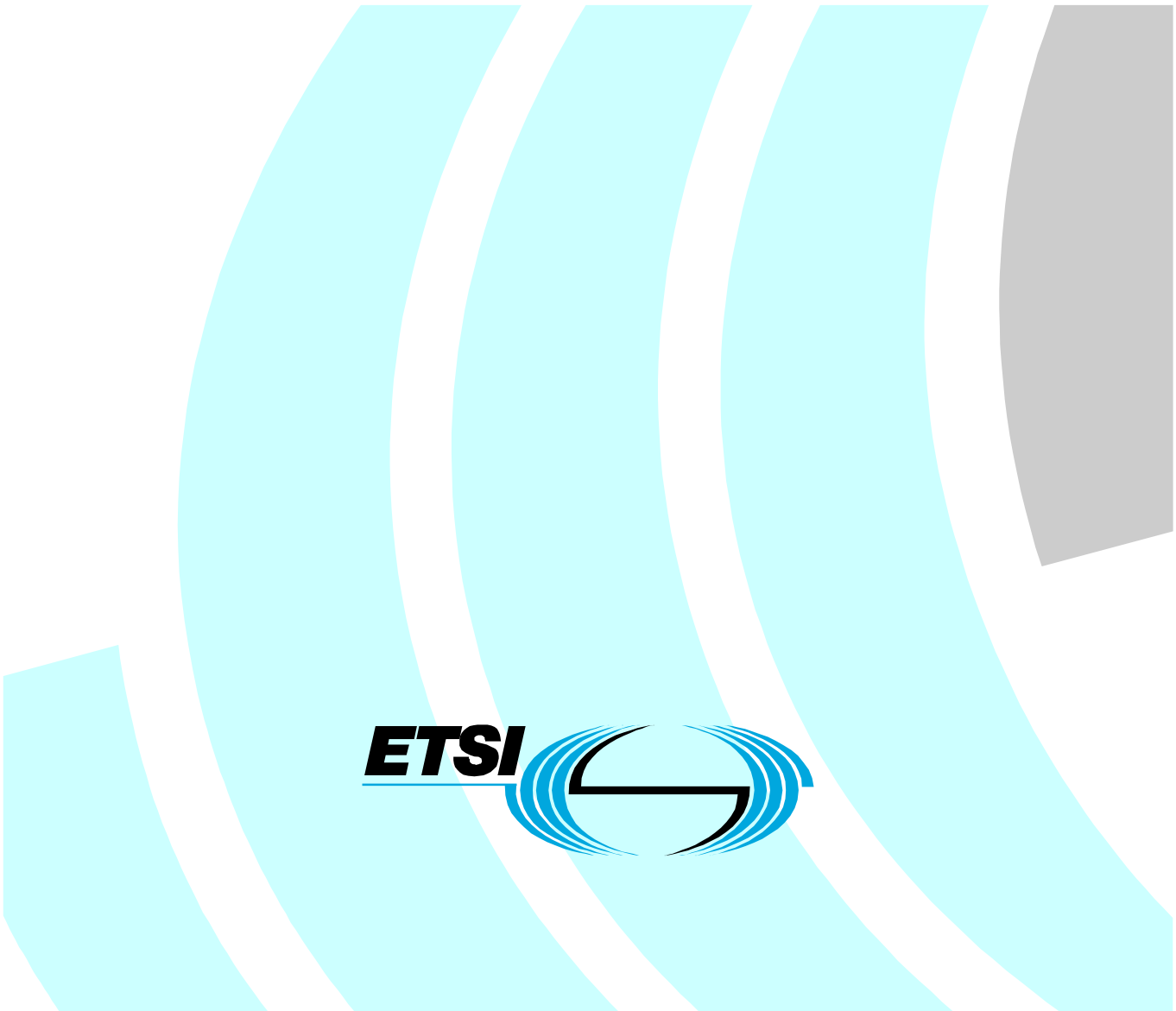
ETSI Standard

Dynamic synchronous Transfer Mode (DTM); Part 12: Mapping of MPLS over DTM



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Contents

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Foreword

This ETSI Standard (ES) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN), and is now submitted for the ETSI standards Membership Approval Procedure.

The present document is part 12 of a multi-part deliverable covering the Dynamic synchronous Transfer Mode (DTM), as identified below:

ES 201 803-1: "System description";

ES 201 803-2: "System characteristics";

ES 201 803-3: "Physical protocol";

ES 201 803-4: "Mapping of DTM frames into SDH containers";

ES 201 803-5: "Mapping of PDH over DTM";

ES 201 803-6: "Mapping of Synchronous Digital Hierarchy (SDH) over DTM";

ES 201 803-7: "Ethernet over DTM Mapping";

ES 201 803-9: "Mapping of ATM over DTM";

TR 101 803-10: "Routeing and switching of IP traffic over DTM";

ES 201 803-11: "Mapping of video streams over DTM";

ES 201 803-12: "Mapping of MPLS over DTM";

ES 201 803-13: "System description of sub-rate DTM".

Introduction

Dynamic synchronous Transfer Mode (DTM) is a time division multiplex and a circuit-switched network technique that combines switching and transport.

Part 1 describes the general properties of DTM and the DTM service over a unidirectional data channel. The overall system architecture is described and fundamental functions are identified.

Part 2 includes system aspects that are mandatory or optional for nodes from different vendors to interoperate. The interworking granularity should be at node level, such that nodes from different vendors can interoperate with regard to well-defined functions.

Part 3 specifies the physical layer for physical links based on 8B10B encoding.

Part 4 describes how DTM frames are mapped onto SDH containers.

The transport of various tributary signals is specified for PDH (part 5), SDH (part 6), Ethernet (part 7), ATM (part 9), IP (part 10), video streaming (part 11) and MPLS (part 12).

Subrate DTM is described in part 13.

1 Scope

The present document:

- specifies a method for mapping MPLS labelled packets over DTM channels;
- specifies the characteristics of critical parameters for mapping MPLS labelled packets over DTM channels;
- gives terms and definitions for mapping encoding and decoding.

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at http://docbox.etsi.org/Reference.

[1] ETSI ES 201 803-2-3: "Dynamic synchronous Transfer Mode (DTM); Part 2: System characteristics; Sub-part 3: Transport network and channel adaptation aspects".

[2] IETF RFC 3031: "Multiprotocol Label Switching Architecture".

[3] IETF RFC 3032: "MPLS Label Stack Encoding".

3 Abbreviations

For the purposes of the present document, the following abbreviations apply:

A	Adapted function
AI	Adapted Information
AP	Access Point
AP1	APplication layer channel adaptation type 1
CI	Characteristic Information
CK	ClocK
CMI	Channel Multiplex Identifier
CP	Connection Point
D	Data
DCAP	DTM Channel Adaptation Protocol
DTM	Dynamic synchronous Transfer Mode
FS	Frame Start signal
LEN	LENgth
LSR	Label Switching Router
MC	MultiCast
MPLS	MultiProtocol Label Switching
PRI	PRIority
Sk	Sink
So	Source
SSF	Server Signal Fail
TL	Transport Layer
TSF	Trail Signal Fail

TT Trail Termination

4 Overview

The MPLS over DTM mapping describes the mapping of MPLS labelled packets over DTM channels. The functionality is part of the DTM Application layer and provides a transport service to the MPLS layer similar to the transport functionality provided by PPP and LAN interfaces in RFC 3032 [3].

The MPLS over DTM mapping enables the service where MPLS Label Switching Routers (LSR) are able to be interconnected over DTM and thus create a MPLS overlay network. No signalling interaction is defined, but the channel capacity may be inferred from the MPLS signalling. The MPLS Architecture is defined in RFC 3031 [2].

5 DTM Application 1 layer (AP1)

The MPLS over DTM transport is specified as the Application 1 (AP1) adaptation functions on top of the DCAP-1 (ES 201 803-2-3 [1]) adaptation functions, providing the MPLS Transport Layer trail over DTM.

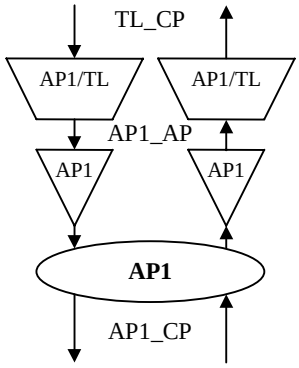

Figure 1: Application 1 atomic functions

5.1 Access point information

5.1.1 Characteristic Information

The Characteristic Information (CI) of the Connection Point (CP) is:

- the MPLS labelled packet set of octet data TL_CI_D;
- the MPLS labelled packet octet clock indication TL_CI_CK;
- the MPLS labelled packet frame start indication TL_CI_FS;
- the MPLS labelled packet length indication TL_CI_LEN;
- the MPLS labelled packet unicast/multicast indication TL_CI_MC.

5.1.2 Adapted Information

The Adapted Information (AI) of the Adaption Point (AP) is described in ES 201 803-2-3 [1] as the Application 1 adapted information.

5.1.3 Management Information

Not applicable. There is no management information defined for this layer.

5.1.4 Timing Information

Not applicable. There is no timing information defined for this layer.

5.2 Connection function (AP1_C)

Not applicable. There are no connection functions defined for this layer.

5.3 Trail Termination functions

The trail termination functions are empty mappings between AI and CI.

5.3.1 Application 1 Trail Termination function (AP1_TT)

The application 1 trail termination functions are empty mappings between AI and CI.

5.3.1.1 Application 1 Trail Termination Source function (AP1_TT_So)

Symbol:

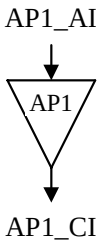

Figure 2: Application 1 Trail Termination Source (AP1_TT_So)

Interfaces:

Table 1: AP1_TT_So Input and output signals

Input(s)	Output(s)
AP1_AI_D	AP1_CI_D
AP1_AI_CK	AP1_CI_CK
AP1_AI_FS	AP1_CI_FS
AP1_AI_LEN	AP1_CI_LEN
AP1_AI_CMI	AP1_CI_CMI
AP1_AI_PRI	AP1_CI_PRI
AP1_AI_TSF	AP1_CI_SSF

Processes and anomalies:

None.

Defects:

None.

Consequent actions:

None.

Defect correlation:

None.

Performance monitoring:

None.

Output mapping:

AP1_CI_D ← AP1_AI_D.

AP1_CI_CK ← AP1_AI_CK.

AP1_CI_FS ← AP1_AI_FS.

AP1_CI_LEN ← AP1_AI_LEN.

AP1_CI_CMI ← AP1_AI_CMI.

AP1_CI_PRI ← AP1_AI_PRI.

AP1_CI_SSF ← AP1_AI_TSF.

Fault management:

None.

Long term performance monitoring:

None.

5.3.1.2 Application 1 Trail Termination Sink function (AP1_TT_Sk)

Symbol:

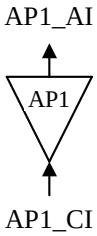

Figure 3: Application 1 Trail Termination Sink (AP1_TT_Sk)

Interfaces:

Table 2: AP1_TT_Sk Input and output signals

Input(s)	Output(s)
AP1_CI_D	AP1_AI_D
AP1_CI_CK	AP1_AI_CK
AP1_CI_FS	AP1_AI_FS
AP1_CI_LEN	AP1_AI_LEN
AP1_CI_CMI	AP1_AI_CMI
AP1_CI_PRI	AP1_AI_PRI
AP1_CI_SSF	AP1_AI_TSF

Processes and anomalies:

None.

Defects:

None.

Consequent actions:

None.

Defect correlation:

None.

Performance monitoring:

None.

Output mapping:

AP1_AI_D ← AP1_CI_D.

AP1_AI_CK ← AP1_CI_CK.

AP1_AI_FS ← AP1_CI_FS.

AP1_AI_LEN ← AP1_CI_LEN.

AP1_AI_CMI ← AP1_CI_CMI.

AP1_AI_PRI ← AP1_CI_PRI.

AP1_AI_TSF ← AP1_CI_SSF.

Fault management:

None.

Long term performance monitoring:

None.

5.4 Adaptation functions

5.4.1 DTM Application 1 to MPLS Transport Layer Adaptation function (AP1/TL_A)

This clause describes the MPLS labelled packet adaptation using Application 1 trail terminators.

5.4.1.1 DTM Application 1 to MPLS Transport Layer Adaptation Source function (AP1/TL_A_So)

Symbol:

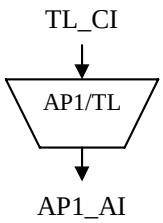

Figure 4: Application 1 to Transport Layer Adaptation Source (AP1/TL_A_So)

Interfaces:

Table 3: AP1/TL_A_So Input and output signals

Input(s)	Output(s)
TL_CI_D	AP1_AI_D
TL_CI_CK	AP1_AI_CK
TL_CI_FS	AP1_AI_FS
TL_CI_LEN	AP1_AI_LEN
TL_CI_MC	AP1_AI_CMI
	AP1_AI_PRI
	AP1_AI_TSF

Processes and anomalies:

When TL_CI_MC is de-asserted, then AI_CMI shall be set to 0. When TL_CI_MC is asserted, then AI_CMI shall be set to 1.

AI_PRI shall be set to 0.

AI_TSF shall be de-asserted.

Defects:

None.

Consequent actions:

None.

Defect correlation:

None.

Performance monitoring:

None.

Output mapping:

AP1_AI_D ← TL_CI_D.

AP1_AI_CK ← TL_CI_CK.

AP1_AI_FS ← TL_CI_FS.

AP1_AI_LEN ← TL_CI_LEN.

AP1_AI_CMI ← AI_CMI.

AP1_AI_PRI ← AI_PRI.

AP1_AI_TSF ← AI_SSF.

Fault management:

None.

Long term performance monitoring:

None.

5.4.1.2 DTM Application 1 to MPLS Transport Layer Adaptation Sink function (AP1/TL_A_Sk)

Symbol:

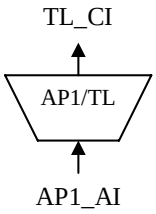

Figure 5: Application 1 to Transport Layer Adaptation Sink (ÁP1/TL_A_Sk)

Interfaces:

Table 4: AP1/TL_A_Sk Input and output signals

Input(s)	Output(s)
AP1_AI_D	TL_CI_D
AP1_AI_CK	TL_CI_CK
AP1_AI_FS	TL_CI_FS
AP1_AI_LEN	TL_CI_LEN
AP1_AI_CMI	TL_CI_MC
AP1_AI_PRI	
AP1_AI_TSF	

Processes and anomalies:

When AP1_AI_CMI is equal to 0, then CI_MC is de-asserted. When AP1_AI_CMI is equal to 1, then CI_MC is asserted.

Defects:

None.

Consequent actions:

None.

Defect correlation:

None.

Performance monitoring:

None.

Output mapping:

TL_CI_D ← AP1_AI_D.

TL_CI_CK ← AP1_AI_CK.

TL_CI_FS ← AP1_AI_FS.

TL_CI_LEN ← AP1_AI_LEN.

TL_CI_MC ← CI_MC.

Fault management:

None.

Long term performance monitoring:

None.

6 Mapping of MPLS over DTM

The mapping of MPLS labelled packets into a DTM Application 1 format (i.e. DCAP-1) requires no additional wrapping. The label stack entries immediately precede the DCAP-1 header and the labelled packet is transparently mapped into DCAP-1 with maintained octet order.

The DCAP-1 length (AP1_AI_LEN) is set to the length of the complete labelled packet. The maximum packet length allowed is 2 032 octets.

The DCAP-1 CMI (AP1_AI_CMI) is set to 0 for MPLS unicast packets and 1 for MPLS multicast packets.

The DCAP-1 priority field (AP1_AI_PRI) is set to 0 for all packets.

Annex A (informative): Bibliography

ETSI ES 201 803-1: "Dynamic synchronous Transfer Mode (DTM); Part 1: System description".

History

Document history			
V1.1.1	October 2004	Membership Approval Procedure	MV 20041224: 2004-10-26 to 2004-12-24