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TELECOMMUNICATION
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SERIES G: TRANSMISSION SYSTEMS AND MEDIA, DIGITAL SYSTEMS AND NETWORKS

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Internet protocol aspects – Transport

Interfaces for the MPLS transport profile layer network

Recommendation ITU-T G.8112/Y.1371

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Recommendation ITU-T G.8112/Y.1371

Interfaces for the MPLS transport profile layer network

Summary

Recommendation ITU-T G.8112/Y.1371 specifies the interfaces for the multi-protocol label switching transport profile (MPLS-TP) layer network. The interfaces for the MPLS-TP layer network use various server layer networks, like the plesiochronous digital hierarchy (PDH), synchronous digital hierarchy (SDH), optical transport hierarchy (OTH) and the Ethernet MAC layer network (ETH).

History

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Recommendation ITU-T G.8112/Y.1371

Interfaces for the MPLS transport profile layer network

1 Scope

This Recommendation specifies the interfaces for the multi-protocol label switching transport profile (MPLS-TP) layer network, in particular the:

- encapsulation of MPLS-TP client signals into the MPLS-TP characteristic information that will be present on MPLS-TP network-to-network interface (NNI) links in the transport network;
- encapsulation of MPLS-TP characteristic information into the MPLS-TP link frames that will be present on MPLS-TP NNI links in the transport network;
- MPLS-TP layer network within the transport network and associated MPLS-TP multiplexing;
- MPLS-TP nested connection monitoring per layer network level within the transport network;
- MPLS-TP operation, administration and maintenance (OAM) associated with nested connection monitoring in the transport network;
- encapsulation of MPLS-TP control plane information.

The MPLS-TP network uses various server layer networks like optical transport hierarchy (OTH), synchronous digital hierarchy (SDH), plesiochronous digital hierarchy (PDH) and Ethernet MAC layer network (ETH). The detailed requirements are specified in a number of ITU-T Recommendations, ANSI Standards, IEEE Standards and IETF RFCs, which are cited.

This Recommendation specifies point-to-point label-switched paths (LSPs); point-to-multipoint LSPs are for further study.

This Recommendation does not cover inter-operator control plane aspects of the MPLS-TP NNI.

This Recommendation provides a representation of the MPLS-TP technology using the methodologies that have been used for other transport technologies [e.g., SDH, optical transport network (OTN) and Ethernet].[1]

2 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; 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. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T G.704] Recommendation ITU-T G.704 (1998), *Synchronous frame structures used at 1544, 6312, 2048, 8448 and 44 736 kbit/s hierarchical levels*.

[ITU-T G.705] Recommendation ITU-T G.705 (2000), *Characteristics of plesiochronous digital hierarchy (PDH) equipment functional blocks*.

[1] This Recommendation is intended to be aligned with the IETF MPLS RFCs normatively referenced by this Recommendation.

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[ITU-T G.707] Recommendation ITU-T G.707/Y.1322 (2007), *Network node interface for the synchronous digital hierarchy (SDH)*.

[ITU-T G.709] Recommendation ITU-T G.709/Y.1331 (2012), *Interfaces for the optical transport network*.

[ITU-T G.832] Recommendation ITU-T G.832 (1998), *Transport of SDH elements on PDH networks – Frame and multiplexing structures*.

[ITU-T G.951] Recommendation ITU-T G.951 (1988), *Digital line systems based on the 1544 kbit/s hierarchy on symmetric pair cables*.

[ITU-T G.7041] Recommendation ITU-T G.7041/Y.1303 (2011), *Generic framing procedure*.

[ITU-T G.7043] Recommendation ITU-T G.7043/Y.1343 (2004), *Virtual concatenation of plesiochronous digital hierarchy (PDH) signals*.

[ITU-T G.7712] Recommendation ITU-T G.7712/Y.1703 (2010), *Architecture and specification of data communication network*.

[ITU-T G.8001] Recommendation G.8001/Y.1354 (2013), *Terms and definitions for Ethernet frames over transport*.

[ITU-T G.8012] Recommendation G.8012/Y.1308 (2004), *Ethernet UNI and Ethernet NNI*.

[ITU-T G.8040] Recommendation ITU-T G.8040/Y.1340 (2005), *GFP frame mapping into Plesiochronous Digital Hierarchy (PDH)*.

[ITU-T G.8101] Recommendation G.8101/Y.1355 (2015), *Terms and definitions for MPLS transport profile*.

[ITU-T G.8110.1] Recommendation ITU-T G.8110.1/Y.1370.1 (2011), *Architecture of the Multi-Protocol Label Switching transport profile layer network*.

[ITU-T G.8151] Recommendation ITU-T G.8151/Y.1374 (2015), *Management aspects of the MPLS-TP network element*.

[ITU-T Y.1415] Recommendation ITU-T Y.1415 (2005), *Ethernet-MPLS network interworking – User plane interworking*.

[ITU-Y Y.1711] Recommendation ITU-T Y.1711 (2004), *Operation & Maintenance mechanism for MPLS networks*.

[ANSI T1.107] ANSI T1.107[2]-2002, *Digital hierarchy – Formats Specifications*.

[IEEE 802.3] IEEE 802.3-2012, *IEEE Standard for Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications*.

[IETF RFC 3031] IETF RFC 3031 (2001), *Multiprotocol Label Switching Architecture*.

[IETF RFC 3032] IETF RFC 3032 (2001), *MPLS Label Stack Encoding*.

[IETF RFC 5586] IETF RFC 5586 (2009), *MPLS Generic Associated Channel*.

[IETF RFC 5921] IETF RFC 5921 (2010), *A Framework for MPLS in Transport Networks*.

[IETF RFC 5960] IETF RFC 5960 (2010), *MPLS Transport Profile Data Plane Architecture*.

[2] T1 standards are maintained since November 2003 by ATIS.

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[IETF RFC 6215] IETF RFC 6215 (2011), *MPLS Transport Profile User-to-Network and Network-to-Network Interfaces*.

[IETF RFC 7213] IETF RFC 7213 (2014), *MPLS Transport Profile (MPLS-TP) Next-Hop Ethernet Addressing*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 customer edge (CE) [IETF RFC 5921]: The client function that sources or sinks native service traffic to or from the MPLS-TP network. CEs on either side of the MPLS-TP network are peers and view the MPLS-TP network as a single link.

3.1.2 MPLS-TP characteristic information (MPLS-TP_CI) traffic unit [ITU-T G.8101]: An instance of characteristic information and a unit of usage, which consists of an MPLS-TP_AI traffic unit or of a MPLS-TP OAM traffic unit, extended with an MPLS-TP_CI header containing the time-to-live (TTL) field of the MPLS shim header.

NOTE – See more details in [ITU-T G.8110.1].

3.1.3 MPLS-TP provider edge LSR (MPLS-TP PE): See clauses 1.3.5 and 1.3.5.2 of [IETF RFC 5921].

3.1.4 network-to-network interface (NNI) [ITU-T G.8001]: An interface that is used for the interconnection of networks elements within a transport network.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 multi-protocol label switching transport profile network-to-network interface (MPLS-TP NNI): An NNI for the transfer of a MPLS-TP characteristic information (MPLS-TP_CI) traffic unit over a transport layer network referred to in this Recommendation.

3.2.2 user-to-network interface (UNI): An interface that is used for the interconnection of customer equipment with a network element of the multi-protocol label switching transport profile (MPLS-TP) network.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

ACH	Associated Channel Header
AI	Adapted Information
CE	Customer Edge
cHEC	core Header Error Check
CI	Characteristic Information
CII	Common Interworking Indicator
CLNS	Connectionless Network layer Service
CRC	Cyclic Redundancy Check
CW	Control Word
DA	Destination Address

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