International Telecommunication Union

ITU-T G.8112/Y.1371

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Amendment 1
(04/2014)

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Packet over Transport aspects – MPLS over Transport aspects

SERIES Y: GLOBAL INFORMATION INFRASTRUCTURE, INTERNET PROTOCOL ASPECTS AND NEXT-GENERATION NETWORKS

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Interfaces for the MPLS Transport Profile (MPLS-TP) layer network

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Recommendation ITU-T G.8112/Y.1371

Interfaces for the MPLS Transport Profile (MPLS-TP) layer network

Amendment 1

New Appendix II

Summary

Amendment 1 to Recommendation ITU-T G.8112/Y.1371 (2012) introduces a new Appendix II on bandwidth requirements for MPLS-TP transport.

History

Edition	Recommendation	Approval	Study Group	Unique ID*
1.0	ITU-T G.8112/Y.1371	2006-10-07	15	11.1002/1000/8783
1.1	ITU-T G.8112/Y.1371 (2006) Cor. 1	2007-01-09	15	11.1002/1000/9006
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2.1	ITU-T G.8112/Y.1371 (2012) Amd. 1	2014-04-04	15	11.1002/1000/12187

* To access the Recommendation, type the URL http://handle.itu.int/ in the address field of your web browser, followed by the Recommendation's unique ID. For example, http://handle.itu.int/11.1002/1000/11830-en.

FOREWORD

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The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSA Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

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Recommendation ITU-T G.8112/Y.1371

Interfaces for the MPLS Transport Profile (MPLS-TP) layer network

Amendment 1

New Appendix II

Add the following new appendix to Recommendation ITU-T G.8112/Y.1371 (2012)

Appendix II

Bandwidth requirements for MPLS-TP transport

(This appendix does not form an integral part of this Recommendation.)

This appendix shows the transport bandwidth requirements for ETH client encapsulation over MPLS-TP over ETH link as a function of the Ethernet MAC rate, the client payload field length, whether or not the network has inserted a VLAN tag. This is shown in Tables II.1 and II.2.

NOTE – The MAC bit rate in Table II.1 is the actual bit rate of the Ethernet MAC frames after the removal of the 12-byte inter-packet gap plus 7-byte preamble + 1-byte start of frame delimiter. In other words, MAC bit rate = (Ethernet interface rate) (# of bits in the MAC frame)/(# of bits in the MAC frame + 12-byte inter-packet gap + 7-byte preamble + 1-byte start of frame delimiter). The calculations in Table II.2 are the same except that 10 gigabit Ethernet uses a 5-byte minimum inter-packet gap instead of 12 bytes.

Table II.1 – Maximum (un)tagged MAC bit rate per "1 Gbit/s" MAC server signal

		Payload bit rate (bit/s, nominal bit rate for Ethernet)					
		1 000 000 000	**1 000 000 000**		**1 000 000 000**	**1 000 000 000**	
		MAC bit rate (kbit/s), throughput (%) relative to maximum MAC bit rate			**Packets per second (pps), throughput (%) relative to maximum packet per second**		
VLAN tag	**MAC-size (Bytes)**	**1000Base-X**	**MPLS-TP over 1000Base-X**	**Through-put**	**1000Base-X**	**MPLS-TP over 1000Base-X**	**Through put**
0	64	761,905	581,818	76.36%	1,488,095	1,136,364	76.36%
0	128	864,865	735,632	85.06%	844,595	718,391	85.06%
0	256	927,536	847,682	91.39%	452,899	413,907	91.39%
0	512	962,406	917,563	95.34%	234,962	224,014	95.34%
0	1024	980,843	957,009	97.57%	119,732	116,822	97.57%
0	1518	986,996	970,588	98.34%	81,274	79,923	98.34%
0	9618	997,925	995,240	99.73%	12,969	12,935	99.73%
1	64	772,727	596,491	77.19%	1,420,455	1,096,491	77.19%
1	128	868,421	741,573	85.39%	822,368	702,247	85.39%
1	256	928,571	849,673	91.50%	446,429	408,497	91.50%

Table II.1 – Maximum (un)tagged MAC bit rate per "1 Gbit/s" MAC server signal

		Payload bit rate (bit/s, nominal bit rate for Ethernet)					
		1 000 000 000	1 000 000 000		1 000 000 000	1 000 000 000	
		MAC bit rate (kbit/s), throughput (%) relative to maximum MAC bit rate			Packets per second (pps), throughput (%) relative to maximum packet per second		
VLAN tag	MAC-size (Bytes)	1000Base-X	MPLS-TP over 1000Base-X	Through-put	1000Base-X	MPLS-TP over 1000Base-X	Through put
1	512	962,687	918,149	95.37%	233,209	222,420	95.37%
1	1024	980,916	957,169	97.58%	119,275	116,387	97.58%
1	1518	987,030	970,663	98.34%	81,064	79,719	98.34%
1	9618	997,926	995,242	99.73%	12,964	12,929	99.73%

NOTE 1 – VLAN tag; value gives the number of VLAN tags (no VLAN tag = 0).

NOTE 2 – Encapsulation overhead; 20 bytes for physical Ethernet interface (7-byte preamble, 1-byte SFD and 12-byte minimum IPG). 26-byte Encapsulation overhead for ETH client over MPLS-TP with Control Word.

Table II.2 – Maximum (un)tagged MAC bit rate per "10 Gbit/s" MAC server signal

		Payload bit rate (nominal bit rate for Ethernet)					
		10 000 000 000	10 000 000 000		1 000 000 000	1 000 000 000	
		MAC bit rate (kbit/s), throughput (%) relative to maximum MAC bit rate			Packets per second (pps), throughput (%) relative to maximum packet per second		
VLAN tag	MAC-size (Bytes)	10GBase-R	MPLS-TP over 10GBase-R	Throughput	10GBase-R	MPLS-TP over 10GBase-R	Throughput
0	64	7,619,048	5,818,182	76.36%	14,880,952	11,363,636	76.36%
0	128	8,648,649	7,356,322	85.06%	8,445,946	7,183,908	85.06%
0	256	9,275,362	8,476,821	91.39%	4,528,986	4,139,073	91.39%
0	512	9,624,060	9,175,627	95.34%	2,349,624	2,240,143	95.34%
0	1024	9,808,429	9,570,093	97.57%	1,197,318	1,168,224	97.57%
0	1518	9,869,961	9,705,882	98.34%	812,744	799,233	98.34%
0	9618	9,979,249	9,952,401	99.73%	129,695	129,346	99.73%
1	64	7,727,273	5,964,912	77.19%	14,204,545	10,964,912	77.19%
1	128	8,684,211	7,415,730	85.39%	8,223,684	7,022,472	85.39%
1	256	9,285,714	8,496,732	91.50%	4,464,286	4,084,967	91.50%
1	512	9,626,866	9,181,495	95.37%	2,332,090	2,224,199	95.37%
1	1024	9,809,160	9,571,695	97.58%	1,192,748	1,163,873	97.58%
1	1518	9,870,298	9,706,633	98.34%	810,636	797,194	98.34%
1	9618	9,979,257	9,952,420	99.73%	129,641	129,293	99.73%

NOTE 1 – VLAN tag; value gives the number of VLAN tags (no VLAN tag = 0).

NOTE 2 – Encapsulation overhead; 20 bytes for physical Ethernet interface (7-byte preamble, 1-byte SFD and 12-byte minimum IPG). 26-byte Encapsulation overhead for ETH client over MPLS-TP with Control Word.

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