INTERNATIONAL TELECOMMUNICATION UNION

ITU-T G.7041/Y.1303

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Amendment 2
(03/2003)

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ITU-T Recommendation G.7041/Y.1303

Generic framing procedure (GFP)

Amendment 2

Summary

This amendment contains the following additions for Rec. ITU-T G.7041/Y.1303 (12/01):

- The addition of a UPI code point and section placeholder for the IEEE 802.17 Resilient Packet Ring (RPR) frame mapping into GFP.
- The addition, in Table 6-3, of a reference to Rec. ITU-T G.806 and a note pointing to it regarding how new code points are assigned.
- Addition of an appendix to illustrate the relationship between the Ethernet MAC frame data rate and the SDH channel rate.

Source

Amendment 2 to ITU-T Recommendation G.7041/Y.1303 (2001) was prepared by ITU-T Study Group 15 (2001-2004) and approved under the WTSA Resolution 1 procedure on 16 March 2003.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

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.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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ITU-T Recommendation G.7041/Y.1303

Generic framing procedure (GFP)

Amendment 2

1) Clause 2, References

Add the following reference:

– ITU-T Recommendation G.806 (2000), *Characteristics of transport equipment – Description methodology and generic functionality*.

2) Clause 4, Abbreviations

Add the following abbreviation:

RPR Resilient Packet Ring

3) Table 6-3

Modify Table 6-3 as follows:

Table 6-3/G.7041/Y.1303 – User Payload Identifiers for GFP Client Frames

PTI = 000	
User Payload Identifier (binary) TYPE Bits <7:0>	**GFP Frame Payload Area**
0000 0000 1111 1111	Reserved and not available
0000 0001	Frame-Mapped Ethernet
0000 0010	Frame-Mapped PPP
0000 0011	Transparent Fiber Channel
0000 0100	Transparent FICON
0000 0101	Transparent ESCON
0000 0110	Transparent Gb Ethernet
0000 0111	Reserved for future
0000 1000	Frame-Mapped Multiple Access Protocol over SDH (MAPOS)
0000 1001	Transparent DVB ASI
0000 1010	Frame-Mapped IEEE 802.17 Resilient Packet Ring
0000 1011 through 1110 1111	Reserved for future standardization
1111 0000 through 1111 1110	Reserved for proprietary use (Note)
NOTE – The use of proprietary code values is described in Appendix V/G.806.	

4) New clause 7.4

Add the following new clause:

7.4 RPR payload

The mapping of this payload according to IEEE 802.17 is under study.

5) New Appendix V

Add the following new Appendix:

Appendix V

Bandwidth requirements for Ethernet transport

This appendix shows the transport bandwidth requirements for client data over Ethernet over GFP over SDH as a function of the Ethernet MAC rate, the client payload field length, whether or not the network has inserted a VLAN tag, and whether or not the GFP pFCS used. This information is shown in Tables V.1 to V.4.

NOTE – The MAC bit rate in Tables V.1 to V.4 is 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).

Table V.1/G.7041/Y.1303 – Maximum (un)tagged MAC bit rate per "10 Mbit/s" MAC server signal

			Payload bit rate (nominal bit rate for Ethernet)								
			10,000	9,600		11,200		8704		10880	
			MAC bit rate (kbit/s), throughput (%) relative to maximum MAC bit rate								
GFP-FCS	VLAN Tag	MAC-size (bytes)	10Base-T	VC-11-6v	throughput	VC-11-7v	throughput	VC-12-4v	throughput	VC-12-5v	throughput
0	0	64	7,619	8,533	112.0	9,956	131	7,737	101.5	9,671	127
0	0	128	8,649	9,035	104.5	10,541	122	8,192	94.7	10,240	118
0	0	256	9,275	9,309	100.4	10,861	117	8,440	91.0	10,550	114
0	0	512	9,624	9,452	98.2	11,028	115	8,570	89.0	10,713	111
0	0	1,024	9,808	9,526	97.1	11,113	113	8,637	88.1	10,796	110
0	0	1,518	9,870	9,550	96.8	11,141	113	8,658	87.7	10,823	110
0	0	9,618	9,979	9,592	96.1	11,191	112	8,697	87.1	10,871	109
0	1	64	7,727	8,589	111.2	10,021	130	7,788	100.8	9,735	126
0	1	128	8,684	9,051	104.2	10,560	122	8,207	94.5	10,258	118
0	1	256	9,286	9,313	100.3	10,866	117	8,444	90.9	10,555	114
0	1	512	9,627	9,453	98.2	11,029	115	8,571	89.0	10,714	111
0	1	1,024	9,809	9,526	97.1	11,114	113	8,637	88.0	10,796	110
0	1	1,518	9,870	9,550	96.8	11,141	113	8,658	87.7	10,823	110
0	1	9,618	9,979	9,592	96.1	11,191	112	8,697	87.1	10,871	109
1	0	64	7,619	8,084	106.1	9,432	124	7,330	96.2	9,162	120
1	0	128	8,649	8,777	101.5	10,240	118	7,958	92.0	9,947	115
1	0	256	9,275	9,170	98.9	10,699	115	8,314	89.6	10,393	112
1	0	512	9,624	9,380	97.5	10,944	114	8,505	88.4	10,631	110
1	0	1,024	9,808	9,489	96.7	11,070	113	8,603	87.7	10,754	110
1	0	1,518	9,870	9,525	96.5	11,112	113	8,636	87.5	10,795	109
1	0	9,618	9,979	9,588	96.1	11,186	112	8,693	87.1	10,866	109
1	1	64	7,727	8,160	105.6	9,520	123	7,398	95.7	9,248	120
1	1	128	8,684	8,800	101.3	10,267	118	7,979	91.9	9,973	115
1	1	256	9,286	9,176	98.8	10,706	115	8,320	89.6	10,400	112
1	1	512	9,627	9,382	97.5	10,945	114	8,506	88.4	10,633	110
1	1	1,024	9,809	9,489	96.7	11,071	113	8,604	87.7	10,754	110
1	1	1,518	9,870	9,525	96.5	11,112	113	8,636	87.5	10,795	109
1	1	9,618	9,979	9,588	96.1	11,186	112	8,693	87.1	10,866	109

NOTE 1 – GFP-FCS; No = 0, Yes = 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 minimum IPG). 8-Byte Encapsulation overhead for GFP without GFP-FCS and 12-Byte Encapsulation overhead for GFP with GFP-FCS.

Table V.2/G.7041/Y.1303 – Maximum (un)tagged MAC bit rate per "100 Mbit/s" MAC server signal

			Payload bit rate (nominal bit rate for Ethernet)				
			100,000	96,768		149,760	
			MAC-bit rate (kbit/s), throughput (%) relative to maximum MAC bit rate				
GFP-FCS	VLAN Tag	MAC-size (bytes)	100Base-T	VC-3-2v	throughput	VC-4	throughput
0	0	64	76,190	86,016	100.0	133,120	100.0
0	0	128	86,486	91,076	100.0	140,951	100.0
0	0	256	92,754	93,836	100.0	145,222	100.0
0	0	512	96,241	95,279	99.0	147,456	100.0
0	0	1,024	98,084	96,018	97.9	148,599	100.0
0	0	1,518	98,700	96,261	97.5	148,975	100.0
0	0	9,618	99,792	96,688	96.9	149,636	100.0
0	1	64	77,273	86,582	100.0	133,996	100.0
0	1	128	86,842	91,238	100.0	141,202	100.0
0	1	256	92,857	93,879	100.0	145,290	100.0
0	1	512	96,269	95,291	99.0	147,474	100.0
0	1	1,024	98,092	96,021	97.9	148,604	100.0
0	1	1,518	98,703	96,262	97.5	148,977	100.0
0	1	9,618	99,793	96,688	96.9	149,636	100.0
1	0	64	76,190	81,489	100.0	126,114	100.0
1	0	128	86,486	88,474	100.0	136,923	100.0
1	0	256	92,754	92,435	99.7	143,054	100.0
1	0	512	96,241	94,552	98.2	146,330	100.0
1	0	1,024	98,084	95,647	97.5	148,025	100.0
1	0	1,518	98,700	96,009	97.3	148,585	100.0
1	0	9,618	99,792	96,647	96.8	149,573	100.0
1	1	64	77,273	82,253	100.0	127,296	100.0
1	1	128	86,842	88,704	100.0	137,280	100.0
1	1	256	92,857	92,499	99.6	143,153	100.0
1	1	512	96,269	94,569	98.2	146,356	100.0
1	1	1,024	98,092	95,651	97.5	148,032	100.0
1	1	1,518	98,703	96,011	97.3	148,588	100.0
1	1	9,618	99,793	96,647	96.8	149,573	100.0

NOTE 1 – GFP-FCS; No = 0, Yes = 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 minimum IPG). 8-Byte Encapsulation overhead for GFP without GFP-FCS and 12-Byte Encapsulation overhead for GFP with GFP-FCS.

Table V.3/G.7041/Y.1303 – Maximum (un)tagged MAC bit rate per "1 Gbit/s" MAC server signal

			Payload bit rate (nominal bit rate for Ethernet)				
			1,000,000	898,560		1,048,320	
			MAC-bit rate (kbit/s), throughput (%) relative to maximum MAC bit rate				
GFP-FCS	VLAN Tag	MAC-size (bytes)	1000Base-X	VC-4-6v	throughput	VC-4-7v	throughput
0	0	64	761,905	798,720	100.0	931,840	100.0
0	0	128	864,865	845,704	97.8	986,654	100.0
0	0	256	927,536	871,331	93.9	1,016,553	100.0
0	0	512	962,406	884,736	91.9	1,032,192	100.0
0	0	1,024	980,843	891,594	90.9	1,040,193	100.0
0	0	1,518	986,996	893,849	90.6	1,042,824	100.0
0	0	9,618	997,925	897,813	90.0	1,047,449	100.0
0	1	64	772,727	803,975	100.0	937,971	100.0
0	1	128	868,421	847,214	97.6	988,416	100.0
0	1	256	928,571	871,737	93.9	1,017,027	100.0
0	1	512	962,687	884,842	91.9	1,032,315	100.0
0	1	1,024	980,916	891,621	90.9	1,040,225	100.0
0	1	1,518	987,030	893,862	90.6	1,042,839	100.0
0	1	9,618	997,926	897,814	90.0	1,047,449	100.0
1	0	64	761,905	756,682	99.3	882,796	100.0
1	0	128	864,865	821,541	95.0	958,464	100.0
1	0	256	927,536	858,326	92.5	1,001,380	100.0
1	0	512	962,406	877,982	91.2	1,024,313	100.0
1	0	1,024	980,843	888,152	90.5	1,036,177	100.0
1	0	1,518	986,996	891,512	90.3	1,040,098	100.0
1	0	9,618	997,925	897,440	89.9	1,047,014	100.0
1	1	64	772,727	763,776	98.8	891,072	100.0
1	1	128	868,421	823,680	94.8	960,960	100.0
1	1	256	928,571	858,918	92.5	1,002,071	100.0
1	1	512	962,687	878,138	91.2	1,024,495	100.0
1	1	1,024	980,916	888,192	90.5	1,036,224	100.0
1	1	1,518	987,030	891,531	90.3	1,040,119	100.0
1	1	9,618	997,926	897,441	89.9	1,047,014	100.0

NOTE 1 – GFP-FCS; No = 0, Yes = 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 minimum IPG). 8-Byte Encapsulation overhead for GFP without GFP-FCS and 12-Byte Encapsulation overhead for GFP with GFP-FCS.

Table V.4/G.7041/Y.1303 – Maximum (un)tagged MAC bit rate per "10 Gbit/s" MAC server signal

			Payload bit rate (nominal bit rate for Ethernet)						
			10,000,000	9,884,160		9,953,280		9,995,277	
			MAC-bit rate (kbit/s), throughput (%) relative to maximum MAC bit rate						
GFP-FCS	VLAN Tag	MAC-size (bytes)	10GBase-R	VC-4-66v	throughput	ODU1-4v	throughput	ODU2	throughput
0	0	64	8,311,688	8,785,920	100.0	8,847,360	100.0	8,884,691	100.0
0	0	128	9,078,014	9,302,739	100.0	9,367,793	100.0	9,407,319	100.0
0	0	256	9,516,729	9,584,640	100.0	9,651,665	100.0	9,692,390	100.0
0	0	512	9,752,381	9,732,096	99.8	9,800,153	100.0	9,841,503	100.0
0	0	1,024	9,874,638	9,807,539	99.3	9,876,123	100.0	9,917,794	100.0
0	0	1,518	9,915,088	9,832,343	99.2	9,901,100	99.9	9,942,877	100.0
0	0	9,618	9,986,502	9,875,945	98.9	9,945,008	99.6	9,986,970	100.0
0	1	64	8,395,062	8,843,722	100.0	8,905,566	100.0	8,943,143	100.0
0	1	128	9,103,448	9,319,351	100.0	9,384,521	100.0	9,424,118	100.0
0	1	256	9,523,810	9,589,110	100.0	9,656,167	100.0	9,696,910	100.0
0	1	512	9,754,253	9,733,257	99.8	9,801,322	100.0	9,842,677	100.0
0	1	1,024	9,875,120	9,807,834	99.3	9,876,421	100.0	9,918,093	100.0
0	1	1,518	9,915,309	9,832,478	99.2	9,901,237	99.9	9,943,014	100.0
0	1	9,618	9,986,508	9,875,949	98.9	9,945,011	99.6	9,986,974	100.0
1	0	64	8,311,688	8,323,503	100.0	8,381,709	100.0	8,417,075	100.0
1	0	128	9,078,014	9,036,946	99.5	9,100,142	100.0	9,138,539	100.0
1	0	256	9,516,729	9,441,586	99.2	9,507,611	99.9	9,547,727	100.0
1	0	512	9,752,381	9,657,805	99.0	9,725,342	99.7	9,766,377	100.0
1	0	1,024	9,874,638	9,769,672	98.9	9,837,991	99.6	9,879,502	100.0
1	0	1,518	9,915,088	9,806,637	98.9	9,875,215	99.6	9,916,883	100.0
1	0	9,618	9,986,502	9,871,843	98.9	9,940,877	99.5	9,982,822	100.0
1	1	64	8,395,062	8,401,536	100.0	8,460,288	100.0	8,495,985	100.0
1	1	128	9,103,448	9,060,480	99.5	9,123,840	100.0	9,162,337	100.0
1	1	256	9,523,810	9,448,094	99.2	9,514,165	99.9	9,554,309	100.0
1	1	512	9,754,253	9,659,520	99.0	9,727,069	99.7	9,768,112	100.0
1	1	1,024	9,875,120	9,770,112	98.9	9,838,434	99.6	9,879,947	100.0
1	1	1,518	9,915,309	9,806,839	98.9	9,875,419	99.6	9,917,087	100.0
1	1	9,618	9,986,508	9,871,848	98.9	9,940,882	99.5	9,982,827	100.0

NOTE 1 – GFP-FCS; No = 0, Yes = 1. VLAN tag; value gives the number of VLAN tags (No VLAN tag = 0).

NOTE 2 – Encapsulation overhead; 13 Bytes for physical Ethernet interface (7-Byte Preamble, 1-Byte SFD and 5 minimum IPG). 8-Byte Encapsulation overhead for GFP without GFP-FCS and 12-Byte Encapsulation overhead for GFP with GFP-FCS.

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