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G.8012/Y.1308

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

Digital networks – General aspects

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

Internet protocol aspects – Transport

Ethernet UNI and Ethernet NNI

ITU-T Recommendation G.8012/Y.1308

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ITU-T Recommendation G.8012/Y.1308

Ethernet UNI and Ethernet NNI

Summary

This Recommendation specifies the Ethernet UNI and the Ethernet NNI. A set of physical Ethernet interfaces is defined for the Ethernet UNI and the Ethernet NNI. Further, a set of Ethernet over Transport interfaces are defined for the Ethernet NNI. The Ethernet over Transport NNI uses various server layer networks like ATM, OTH, PDH and SDH.

Source

ITU-T Recommendation G.8012/Y.1308 was approved on 22 August 2004 by ITU-T Study Group 15 (2001-2004) under the ITU-T Recommendation A.8 procedure.

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ITU-T Recommendation G.8012/Y.1308

Ethernet UNI and Ethernet NNI

1 Scope

This Recommendation specifies the Ethernet UNI and the Ethernet NNI, where the Ethernet UNI is formed by an Ethernet interface and the Ethernet NNI by an Ethernet interface or an Ethernet over Transport interface. The Ethernet over Transport NNI uses various server layer networks like ATM, OTH, PDH and SDH. The detailed requirements are specified in a number of ITU-T Recommendations, ANSI Standards, IEEE Standards and IETF RFC, which are referred to.

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 Recommendation G.691 (2003), *Optical interfaces for single channel STM-64 and other SDH systems with optical amplifiers*.

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

– ITU-T Recommendation G.707/Y.1322 (2003), *Network node interface for the synchronous digital hierarchy (SDH)*.

– ITU-T Recommendation G.709/Y.1331 (2003), *Interfaces for the optical transport network (OTN)*.

– ITU-T Recommendation G.832 (1998), *Transport of SDH elements on PDH networks – Frame and multiplexing structures*, plus Amendment 1 (2004), *Payload type code for virtual concatenation of 34 368 kbit/s signals*.

– ITU-T Recommendation G.7041/Y.1303 (2003), *Generic framing procedure (GFP)*.

– ITU-T Recommendation G.7042/Y.1305 (2004), *Link capacity adjustment scheme (LCAS) for virtual concatenated signals*.

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

– ITU-T Recommendation G.8010/Y.1306 (2004), *Architecture of Ethernet layer networks*.

– ITU-T Recommendation G.8011/Y.1307 (2004), *Ethernet over transport – Ethernet services framework*.

– ITU-T Recommendation G.8040/Y.1340 (2004), *GFP frame mapping into plesiochronous digital hierarchy (PDH)*.

– ITU-T Recommendation I.363.5 (1996), *B-ISDN ATM Adaptation Layer specification: Type 5 AAL*.

– ITU-T Recommendation X.85/Y.1321 (2001), *IP over SDH using LAPS*, plus Amendment 1 (2004), *Bit-oriented method for LAPS*.

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– ITU-T Recommendation X.86/Y.1323 (2001), *Ethernet over LAPS*.

– ITU-T Recommendation Y.1730 (2004), *Requirements for OAM functions in Ethernet-based networks and Ethernet services*.

– IEEE Std 802-2001, *IEEE Standard for Local and Metropolitan Area Networks: Overview and Architecture*.

– IEEE Std 802.1D-1998, *Information Technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Common specifications – Media Access Control (MAC) Bridges*.

– IEEE Std 802.1Q-2003, *IEEE standard for local and metropolitan area networks: Virtual Bridged Local Area Networks*.

– IEEE Std 802.2-1998, *Information technology – Telecommunications and information exchange between systems – Local and metropolitan area networks – Specific requirements – Part 2: Logical Link Control*.

– IEEE Std 802.3-2002, *Information technology – Telecommunication and Information Exchange Between Systems – LAN/MAN – Specific requirements – Part 3: Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications*.

– IEEE Std 802.3ae-2002, *IEEE Standard for Carrier Sense Multiple Access with Collision Detection (CSMA/CD) Access Method and Physical Layer Specifications – Media Access Control (MAC) Parameters, Physical Layer and Management Parameters for 10 Gb/s Operation*.

– IETF RFC 2684 (1999), *Multiprotocol Encapsulation over ATM Adaptation Layer 5*.

– ANSI T1.107 (2002), *Digital Hierarchy – Formats Specifications*.

3 Terms and definitions

This Recommendation defines the following terms:

3.1 ETH_CI traffic unit: See ITU-T Rec. G.8010/Y.1306.

3.2 network termination: The network element in the transport network, which is connected to the customer edge equipment.

3.3 UNI: An interface that is used for the interconnection of customer equipment with a network element of the transport network.

3.4 Ety-UNI: An UNI for the transfer of ETH_CI traffic unit over a physical Ethernet interface.

3.5 NNI: An interface that is used for the interconnection of networks elements within a transport network.

3.6 EoT-NNI: An NNI for the transfer of ETH_CI traffic unit over a transport layer network referred to in this Recommendation.

3.7 Ety-NNI: An NNI for the transfer of ETH_CI traffic unit over a physical Ethernet interface.

4 Acronyms and abbreviations

This Recommendation uses the following abbreviations:

ANSI American National Standards Institute

ATM Asynchronous Transfer Mode

C-Tag Customer Tag

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C-VID	Customer VID
CE	Customer Edge
CI	Characteristic Information
DA	Destination Address
EoA	Ethernet over ATM
EoM	Ethernet over MPLS
EoO	Ethernet over OTH
EoP	Ethernet over PDH
EoR	Ethernet over RPR
EoS	Ethernet over SDH
EoT	Ethernet over Transport
EoT-NNI	Ethernet over Transport NNI
ETH	Ethernet MAC layer network
ETH_CI	Ethernet MAC Characteristic Information
ETHP	ETH path layer
ETHS	ETH segment sublayer
ETY	Ethernet PHY layer
ETYn	Ethernet PHY layer network of type *n*
Ety-NNI	Ethernet NNI
Ety-UNI	Ethernet UNI
Ety-UNI-C	Customer side of the Ety-UNI
Ety-UNI-N	Network side of the Ety-UNI
EUG	Ethernet Unit Group
EUGn	EUG level n
FCS	Frame Check Sequence
GFP	Generic Framing Procedure
GFP-F	Generic Framing Procedure – Frame Mapped
IaDI	Intra-Domain Interface
IEEE	Institute of Electrical and Electronics Engineers
IETF	Internet Engineering Task Force
IrDI	Inter-Domain Interface
LAN	Local Area Network
LAPS	Link Access Procedure – SDH
LCAS	Link Capacity Adjustment Scheme
LLC	Logical Link Control
MAC	Media Access Control
M_SDU	MAC Service Data Unit

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MPLS	Multi-Protocol Label Switching
MS64	Multiplex Section – level 64
NNI	Network Node Interface
NT	Network Termination
ODU	Optical Channel Data Unit
ODUj	Optical Channel Data Unit – order j
ODUj-Xv	Virtual concatenated Optical Channel Data Unit – order j
ODUk	Optical Channel Data Unit – order k
ODUk-Xv	Virtual concatenated Optical Channel Data Unit – order k
OTH	Optical Transport Hierarchy
P11s	1544 kbit/s PDH path layer with synchronous 125 µs frame structure according to ITU-T Rec. G.704
P12s	2048 kbit/s PDH path layer with synchronous 125 µs frame structure according to ITU-T Rec. G.704
P31s	34 368 kbit/s PDH path layer with synchronous 125 µs frame structure according to ITU-T Rec. G.832
P4s	139 264 kbit/s PDH path layer with synchronous 125 µs frame structure according to ITU-T Rec. G.832
PA	(Ethernet) Preamble
PDH	Plesiochronous Digital Hierarchy
PHY	Physical
PMA	Physical Medium Attachment sublayer
PMD	Physical Medium Dependent sublayer
RFC	Request for Comments
RPR	Resilient Packet Ring
RS64	Regenerator Section – level 64
S-Tag	Service Provider Tag
S-VID	Service Provider VID
SA	Source Address
SDH	Synchronous Digital Hierarchy
SFD	Start of Frame Delimiter
SNAP	Sub-Network Access Protocol
STM-N	Synchronous Transport Module – level N
TCI	Tag Control Information
UNI	User Network Interface
VC	Virtual Channel (ATM)
VC	Virtual Container (SDH)
VC-m	Lower Order VC – order m

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VC-n	Higher Order VC – order n
VC-n-Xc	Contiguous concatenated VC – order n
VC-n-Xv	Virtual concatenated VC – order n
VID	VLAN Identifier
VLAN	Virtual LAN
VLAN ID	VLAN Identifier

5 Conventions

None.

6 Ethernet transport network interface structure

The Ethernet transport network as specified in ITU-T Rec. G.8010/Y.1306 implies two interface classes:

- Ethernet interface as specified in IEEE 802.3 series;
- Ethernet-over-Transport (EoT) interface as specified in this Recommendation.

The Ethernet interface can be deployed as an Ethernet User-to-Network Interface (Ety-UNI) at the edge of the transport network and as an Ethernet Network Node Interface (Ety-NNI) within the transport network. The Ethernet NNI may be deployed as an Intra-Domain Interface (IaDI) within a single administrative domain and as an Inter-Domain Interface (IrDI) between two administrative domains.

The Ethernet-over-Transport (EoT) interface can be deployed as an Ethernet IaDI and IrDI NNI within the transport network.

NOTE – The deployment of EoT interface as an Ethernet UNI is for further study.

The Ethernet UNI could be used for the provision of Ethernet services as described in ITU-T Rec. G.8011/Y.1307. Two or more Ety-UNIs are used for such a service as illustrated in Figure 6-1.

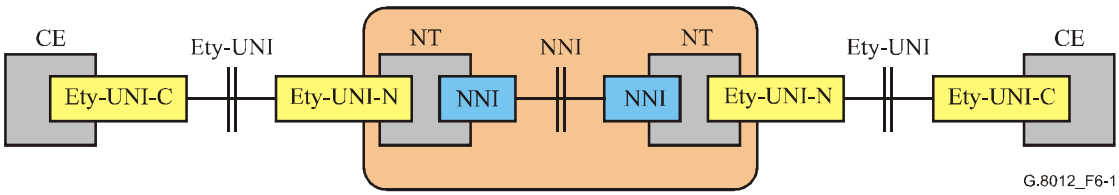

Figure 6-1/G.8012/Y.1308 – Locations of Ethernet Ety-UNI and NNI

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