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

Next Generation Networks – Quality of Service and
performance

Ethernet QoS control for next generation networks

Recommendation ITU-T Y.2113



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Recommendation ITU-T Y.2113

Ethernet QoS control for next generation networks

Summary

Recommendation ITU-T Y.2113 specifies dynamic Ethernet quality of service (QoS) control for next generation networks. Specifically, it defines service definitions and general requirements, a QoS control architecture, and a set of traffic management mechanisms for Ethernet-based NGNs. Related OAM and protection and restoration mechanisms are specified by reference to other Recommendations.

Source

Recommendation ITU-T Y.2113 was approved on 23 January 2009 by ITU-T Study Group 13 (2009-2012) under Recommendation ITU-T A.8 procedures.

FOREWORD

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Recommendation ITU-T Y.2113

Ethernet QoS control for next generation networks

1 Scope

This Recommendation addresses Ethernet quality of service (QoS) control for next generation networks. It specifies the following:

- Service definitions and general requirements for Ethernet-based NGNs.
- Reference model of QoS architecture for Ethernet-based NGNs.
- Traffic management mechanisms for Ethernet-based NGNs.
- Operation, administration and maintenance (OAM) mechanisms for Ethernet-based NGNs.
- Protection and restoration mechanisms for Ethernet-based NGNs.

The OAM and protection and restoration mechanisms are specified by reference to other Recommendations.

Ethernet-based NGN is broadly characterized as the employment of IP protocols for the control of Ethernet data flows. In the data link layer, data link features and interfaces defined in [b-IEEE 802.3] will not be altered.

As considered in this Recommendation, the Ethernet network encompasses not only the customer's local network but also the operator's access and core networks, which are assumed to employ Ethernet technology.

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.7041] Recommendation ITU-T G.7041/Y.1303 (2005), *Generic framing procedure (GFP)*.
- [ITU-T G.8001] Recommendation ITU-T G.8001/Y.1354 (2008), *Terms and definitions for Ethernet frames over transport*.
- [ITU-T G.8010] Recommendation ITU-T G.8010/Y.1306 (2004), *Architecture of Ethernet layer networks*.
- [ITU-T G.8011] Recommendation ITU-T G.8011/Y.1307 (2004), *Ethernet over Transport – Ethernet services framework*.
- [ITU-T G.8012] Recommendation ITU-T G.8012/Y.1308 (2004), *Ethernet UNI and Ethernet NNI*.
- [ITU-T G.8021] Recommendation ITU-T G.8021/Y.1341 (2007), *Characteristics of Ethernet transport network equipment functional blocks*.
- [ITU-T G.8031] Recommendation ITU-T G.8031/Y.1342 (2006), *Ethernet linear protection switching*.

- [ITU-T G.8032] Recommendation ITU-T G.8032/Y.1344 (2008), *Ethernet ring protection switching*.
- [ITU-T Y.1221] Recommendation ITU-T Y.1221 (2002), *Traffic control and congestion control in IP-based networks*.
- [ITU-T Y.1541] Recommendation ITU-T Y.1541 (2006), *Network performance objectives for IP-based services*.
- [ITU-T Y.1730] Recommendation ITU-T Y.1730 (2004), *Requirements for OAM functions in Ethernet-based networks and Ethernet services*.
- [ITU-T Y.1731] Recommendation ITU-T Y.1731 (2006), *OAM functions and mechanisms for Ethernet based networks*.
- [ITU-T Y.2012] Recommendation ITU-T Y.2012 (2006), *Functional requirements and architecture of the NGN release 1*.
- [ITU-T Y.2111] Recommendation ITU-T Y.2111 (2006), *Resource and admission control functions in Next Generation Networks*.
- [IEEE 802.1Q] IEEE Standard 802.1Q (2005), IEEE standard for local and metropolitan area networks – *Virtual Bridged Local Area Networks*.

3 Definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 Ethernet user to network interface (E-UNI): An interface that uses the Ethernet frame structure between a user (an end user or a customer network) and a network element of the transport network.

3.2.2 Ethernet network to network interface (E-NNI): An interface that uses the Ethernet frame structure between network elements within separate transport networks.

3.2.3 Ethernet virtual connection (EVC): An instance of an association of two or more E-UNIs. These E-UNIs are said to be "in the EVC". A given UNI can support more than one EVC via the service multiplexing attribute.

NOTE – This terminology is used in a different way as defined in [ITU-T G.8011] and [ITU-T G.8001].

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations:

AAA	Authentication, Authorization, Accounting
AR	Access Rate
ARP	Address Resolution Protocol
ATM	Asynchronous Transfer Mode
B-Tag	Backbone VLAN Tag
BW	Bandwidth

CAC	Connection Admission Control
CBR	Constant Bit Rate
CBS	Committed Burst Size
CE	Customer Edge
CF	Coupling Flag
CIR	Committed Information Rate
CL-PS	Connectionless, Packet-Switched
CM	Colour Mode
CMTS	Cable Modem Termination System
CO-CS	Connection Oriented, Circuit-Switched
CO-PS	Connection Oriented, Packet-Switched
CoS	Class of Service
CPE	Customer Premises Equipment
C-Tag	Customer VLAN Tag
C-VID	Customer VLAN ID
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
E-AF	Ethernet Assured Forwarding
E-DF	Ethernet Default Forwarding
E-EF	Ethernet Expedited Forwarding
E-LAN	Ethernet LAN
E-LINE	Ethernet Line
E-NNI	Ethernet Network to Network Interface
E-PHB	Ethernet Per-Hop Behaviour
E-Tree	Ethernet Tree
E-UNI	Ethernet User to Network Interface
EAP	Extensible Authentication Protocol
EAPoL	EAP over LAN
EBS	Excess Burst Size
EIR	Excess Information Rate
EPL	Ethernet Private Line
EPLAN	Ethernet Private LAN
EVC	Ethernet Virtual Connection
EVPL	Ethernet Virtual Private Line
EVPLAN	Ethernet Virtual Private LAN
FRS	Frame Relay Service
GFP	Generic Framing Procedure

GGSN	Gateway GPRS Support Node
GMPLS	Generalized MultiProtocol Label Switching
GPRS	General Packet Radio Service
I-Tag	Backbone Service Instance Tag
ID	Identifier
IP	Internet Protocol
LDP	Label Distribution Protocol
LSP	Label Switched Path
MAC	Media Access Control
MBS	Maximum Burst Size
MPLS	MultiProtocol Label Switching
NACF	Network Attachment Control Function
NGN	Next Generation Network
nrt-VBR	non real-time Variable Bit Rate
OAM	Operation, Administration and Maintenance
OTH	Optical Transport Hierarchy
P-Tag	Provider Tag
PAE	Port Access Entity
PD-FE	Policy Decision Functional Entity
PDH	Plesiochronous Digital Hierarchy
PE-FE	Policy Enforcement Functional Entity
PE	Provider Edge
PNNI	Private Network to Network Interface
QoS	Quality of Service
RACF	Resource and Admission Control Functions
RADIUS	Remote Authentication Dial In User Service
RARP	Reverse Address Resolution Protocol
RSVP	Resource ReserVation Protocol
S-Tag	Service VLAN Tag
SCF	Service Control Functions
SDH	Synchronous Digital Hierarchy
SGSN	Serving GPRS Support Node
SLA	Service Level Agreement
SONET	Synchronous Optical Network
TE	Traffic Engineering
TPID	Tag Protocol Identifier
TRC-FE	Transport Resource Control Functional Entity

UNI	User to Network Interface
VBR	Variable Bit Rate
VC	Virtual Connection
VLAN	Virtual Local Area Network
VPLS	Virtual Private LAN Service
VPN	Virtual Private Network

5 Conventions

None.

6 Concept and general requirements for the Ethernet-based NGN

6.1 Definition of Ethernet-based NGN concept

The key idea of Ethernet-based NGN is to use the Ethernet frame format throughout an NGN transport network. No format conversion occurs during the end-to-end delivery of Ethernet frames. Without a change in the basic Ethernet frame format, it is required that the Ethernet header fields contain information of QoS provisioning as specified in [IEEE 802.1Q] in order to support the control and management functions of NGN. Ethernet-based NGN means the network using the Ethernet technology through any physical media, including fixed and wireless environments in the NGN transport stratum. The Ethernet-based NGN services are various services provided by network operators using Ethernet transport networks. Figure 1 illustrates the generic architecture model and services of Ethernet-based NGN. The Ethernet is a transfer medium for core transport as well as the access transport of NGN.

It is optional that non-Ethernet-based access networks (e.g., DSL) are connected to Ethernet-based core networks. However, non-Ethernet-based access network technologies are beyond the scope of this Recommendation.

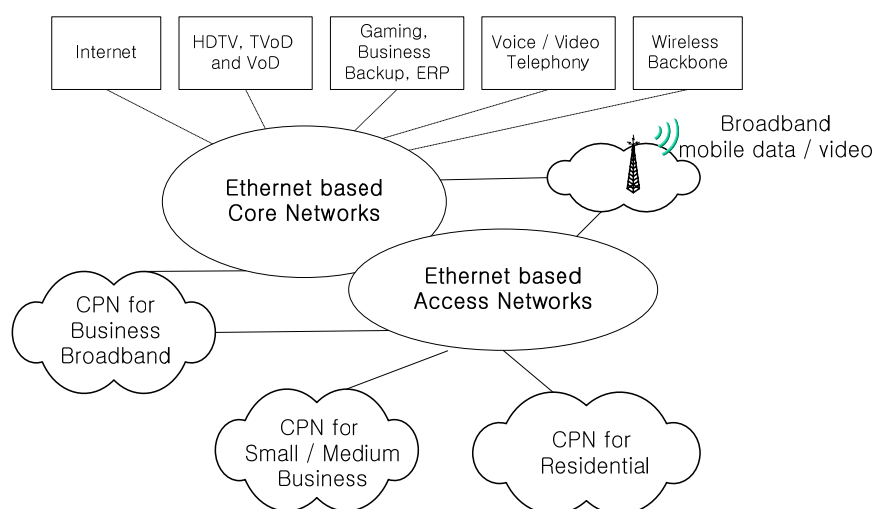


Figure 1 – Generic architecture model and services of Ethernet-based NGN

6.2 General requirements for Ethernet-based NGN service

The general requirements for the Ethernet-based NGN service fall into two categories: user equipment and network.