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

Next Generation Networks – Quality of Service and
performance

A QoS control architecture for Ethernet-based IP access networks

ITU-T Recommendation Y.2112

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ITU-T Recommendation Y.2112

A QoS control architecture for Ethernet-based IP access networks

Summary

ITU-T Recommendation Y.2112 specifies a QoS control architecture for Ethernet-based IP access networks. By applying the resource and admission control functions specified in ITU-T Recommendation Y.2111 and Ethernet-specific QoS mechanisms, it enables dynamic QoS control in the access network for a variety of services, such as voice over IP, video on demand and bandwidth on demand.

Source

ITU-T Recommendation Y.2112 was approved on 13 June 2007 by ITU-T Study Group 13 (2005-2008) under the ITU-T Recommendation A.8 procedure.

FOREWORD

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ITU-T Recommendation Y.2112

A QoS control architecture for Ethernet-based IP access networks

1 Scope

This Recommendation specifies a quality of service (QoS) control architecture and requirements covering aspects, such as resource reservation, admission control and gate control, for Ethernet-based IP access networks. Based on the resource and admission control functions (RACF) as defined in [ITU-T Y.2111], this Recommendation provides details specific to Ethernet-based IP access networks. An Ethernet-based IP access network is an IP access network which comprises the Ethernet aggregation network, access nodes, and edge nodes, and may also include the IP aggregation network.

In this Recommendation, the Ethernet aggregation network supports VLANs as defined in [b-IEEE 802.1Q] and [b-IEEE 802.1ad]. Note that the QoS mechanisms for the last mile user access segment are MAC technology-specific and as such are out of the scope of this Recommendation.

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 Y.1231] ITU-T Recommendation Y.1231 (2000), *IP access network architecture*.

[ITU-T Y.2091] ITU-T Recommendation Y.2091 (2007), *Terms and definitions for Next Generation Networks*.

[ITU-T Y.2111] ITU-T Recommendation Y.2111 (2006), *Resource and admission control functions in Next Generation Networks*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 absolute QoS [ITU-T Y.2111]: This term refers to a traffic delivery service with numerical bounds on some or all of the QoS parameters. These bounds may be physical limits, or enforced limits such as those encountered through mechanisms like rate policing. The bounds may result from designating a class of network performance objectives for packet transfer.

3.1.2 gate control [ITU-T Y.2111]: The operation of opening or closing a gate. When a gate is open, the packets in the media flows are allowed to pass through; when a gate is closed, the packets in the media flows are not allowed to pass through.

3.1.3 IP access network [ITU-T Y.1231]: An implementation comprising network entities to provide the required access capabilities between an "IP user" and an "IP service provider" for the provision of IP services. "IP user" and "IP service provider" are logical entities which terminate the IP layer and/or IP related functions, and may also include lower layer functions.

3.1.4 IP core network [ITU-T Y.1231]: IP service provider's network, including one or more IP service providers.

3.1.5 media flow [ITU-T Y.2111]: A unidirectional media stream, which is specified by two endpoint identifiers and bandwidth, as well as class of service, if needed.

3.1.6 relative QoS [ITU-T Y.2111]: This term refers to a traffic delivery service without absolute bounds on the achieved bandwidth, packet delay or packet loss rates. It describes circumstances where certain classes of traffic are handled differently from other classes of traffic, and the classes achieve different levels of QoS.

3.1.7 session [ITU-T Y.2091]: A temporary telecommunication relationship among a group of objects in the service stratum that are assigned to collectively fulfil a task for a period of time. A session has a state that may change during its lifetime. Session-based telecommunications may, but need not be, assisted by intermediaries (see mediated services). Session-based telecommunications can be one-to-one, one-to-many, many-to-one, or many-to-many.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 edge router: An edge router is a router that operates at the edge of access network and aggregates IP datagrams from access network into the core network.

3.2.2 Ethernet-based IP access network: An IP access network that comprises the Ethernet aggregation network, access nodes (such as DSLAM), and edge nodes (such as BRAS) and may also include the IP aggregation network. Edge nodes are typically IP capable. Access nodes may be IP capable.

3.2.3 IP flow: A sequence of packets sent from a particular source to a particular destination, to which common routing is applied.

3.2.4 last mile user access: The portion of the access network between the CPE and the access node.

NOTE – If using IPv4, a flow is identified by the IPv4 5-tuple which includes source/destination IP addresses, protocol ID and source/destination port numbers. If using IPv6, a flow is identified by the IPv6 3-tuple which includes source/destination IP addresses and flow label.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AAA	Authentication, Authorization and Accounting
AN	Access Node
APP	Application Layer
BE	Best Effort
BoD	Bandwidth on Demand
BRAS	Broadband Remote Access Server
CDN	Content Delivery Network
CPE	Customer Premises Equipment

CPN	Customer Premises Network
DHCP	Dynamic Host Configuration Protocol
DSCP	Differentiated Services Code Point
DSL	Digital Subscriber Line
DSLAM	Digital Subscriber Line Access Multiplexer
DST	Destination
EAP	Extensible Authentication Protocol
EN	Edge Node
ER	Edge Router
EXP	Experimental bits
GRE	Generic Routing Encapsulation
HTTP	HyperText Transfer Protocol
ID	Identifier
IMN	InterMediate Node
IP	Internet Protocol
L2TP	Layer 2 Tunnelling Protocol
LLDP	Link Layer Discovery Protocol
LSP	Label Switched Path
MAC	Media Access Control
MPLS	Multi-Protocol Label Switching
NACF	Network Attachment Control Function
PD-FE	Policy Decision Functional Entity
PE-FE	Policy Enforcement Functional Entity
PHB	Per Hop Behaviour
PHY	Physical Layer
PPP	Point-to-Point Protocol
QoS	Quality of Service
RACF	Resource and Admission Control Function
RSVP	Resource ReSerVation Protocol
SCF	Service Control Function
SLA	Service Level Agreement
SNMP	Simple Network Management Protocol
SRC	Source
STP	Spanning Tree Protocol
S-VLAN	Service Virtual Local Area Network
TCP	Transmission Control Protocol
TRC-FE	Transport Resource Control Functional Entity