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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication
procedures

Gateway control protocol: QoS support packages

Recommendation ITU-T H.248.52

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Recommendation ITU-T H.248.52

Gateway control protocol: QoS support packages

Summary

Recommendation ITU-T H.248.52 provides H.248 packages for different quality of service (QoS) support mechanisms. The QoS class package may be used in various areas with relations to QoS, e.g., media gateway level admission control functions. The Differentiated Services package is specifically designed to support QoS marking for IPv4- or IPv6-based H.248 streams/terminations, but limited to the 6-bit DiffServ field within the IP header. The General IP Header QoS Octet package allows QoS marking and modification of the entire 8-bit field, related to QoS protocol control information elements in IPv4 and IPv6 packet headers.

Amendment 1 (03/2009), which is integrated in this edition, defines a new version of the *Differentiated Services* package, which clarifies the procedures for copying DSCP values from ingress packets to egress ones.

Source

Recommendation ITU-T H.248.52 was approved on 13 June 2008 by ITU-T Study Group 16 (2005-2008) under the Recommendation ITU-T A.8 procedure. This edition includes the Amendment approved on 16 March 2009 by ITU-T Study Group 16 (2009-2012) under the Recommendation ITU-T A-8 procedure.

FOREWORD

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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 H.248.52

Gateway control protocol: QoS support packages

1 Scope

This Recommendation provides H.248 packages for different quality of service (QoS) support mechanisms.

The QoS class package (clause 6) defines a single property for signalling a QoS class codepoint. Such a codepoint may be correlated with a set of network performance parameters. Such parameters may be used in the area of transport resource management or admission control.

The Differentiated Services package (clause 7) defines a property to control the 6-bit differentiated services (DS) field of the IP header, as defined in [IETF RFC 2474]. The media gateway controller (MGC) can set the quality of service (QoS) for egress media flows without having to provision the media gateway (MG) with a default differentiated service code point (DSCP) value.

Thus both packages have a slightly different scope as described in the clauses below (see also Appendix II).

The General IP Header QoS Octet package (clause 8) provides an extended capability, in comparison to the Differentiated Services package, in order to address the entire 8-bit field, and enable modification of individual bits.

1.1 Typical application of the QoS class package

This package is only relevant for ephemeral terminations, i.e., packet-switched bearer technologies. Any packet-based bearer connection traverses a set of packet nodes in the network. Even within an MG, a bearer may traverse a number of queuing points. To set up a bearer, generally resources must be reserved at each transport path/interface and/or MG-internally (see Note 1). The availability check, selection and allocation of resources are related to admission control (AC) functions (see Note 2), e.g., there could be admission control functions in an MG on the level of contexts (CoAC), terminations (TeAC) or even streams (StAC).

NOTE 1 – This may depend on how the network capacity and/or MG capacity is engineered, e.g., the MG external network interfaces may be "over-provisioned", operated in a "best effort" manner, or strict deterministic resource allocation schemes, etc. Similar resource management models may be applied internally to the MG.

NOTE 2 – The concept is very similar to the connection admission control (CAC) concept defined for B-ISDN/ATM [b-ITU-T I.371].

Any admission control function is motivated by QoS support and determines the admissibility of a new bearer (i.e., H.248 context, termination and/or stream; see Note 3) by checking the availability of various resources. Network performance parameters may be part of such an AC function and thus could be described by this package.

NOTE 3 – This may depend in particular on the H.248 connection model (e.g., IP-to-IP context), or single/multiple H.248 streams per termination, etc.

It has to be noted that the area of admission control is just one possible application of the QoS class package. The diversity of potential applications (see Note 4) is much broader due to the definition of the *qos* package property. The particular application should be defined in a profile specification.

NOTE 4 – Further applications are, e.g., support of path-coupled QoS signalling, or support of pushing/pulling QoS-specific policies, or even support of QoS marking.

1.2 Typical application of the Differentiated Services and General IP Header QoS Octet packages

"Packet marking" (also known as "QoS marking") is a QoS building block for support of quality of service in packet networks (see clause 8.4 of [ITU-T Y.1291]). This function involves assigning a value to a designated IP header field in IP networks. QoS marking in IP domains is the primary scope of the *ds* and *gih* packages and includes marking of:

- IPv4 Type-of-Service (ToS) field ([b-IETF RFC 1349]);
- IPv4 Explicit Congestion Notification (ECN) field ([b-IETF RFC 3168]);
- IPv4 ToS together with ECN;
- IPv4 Differentiated Services (DS) field ([IETF RFC 2474]);
- IPv6 Traffic Class field ([b-IETF RFC 2460]); or
- IPv6 Differentiated Services (DS) field ([IETF RFC 2474]).

The *ds* package is predestined for DS codepoint (DSCP) marking, but is also applicable for non-DS IP domains.

The function of QoS marking is illustrated by examples in Appendix IV. The *ds* package is furthermore applicable for controlling DS conditioning functions and per-hop behaviour (PHB).

1.3 Avoidance of interaction between the Differentiated Services and General IP Header QoS Octet packages

The two properties *ds/dscp* and *gih/ico* overlap at a common 6-bit field in the IP header. Any parallel application of both properties to the same H.248 stream may thus lead to contradictory semantics. It is therefore recommended to use only one property per stream, and not both. Where both will result in a conflict, error code #473 ("Conflicting property values") is returned.

Likewise, parallel application of the *ds/tb* and *the gih/tm* properties to the same H.248 stream may lead to contradictory semantics. It is also recommended to use only one of these two properties per stream, and not both. Where both will result in a conflict, error code #473 "Conflicting property values" is returned.

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 H.248.1] Recommendation ITU-T H.248.1 (2005), *Gateway control protocol: Version 3*.
- [ITU-T H.248.15] Recommendation ITU-T H.248.15 (2002), *Gateway control protocol: SDP H.248 package attribute*.
- [ITU-T Y.1291] Recommendation ITU-T Y.1291 (2004), *An architectural framework for support of Quality of Service in packet networks*.
- [IETF RFC 2474] IETF RFC 2474 (1998), *Definition of the Differentiated Services Field (DS field) in the IPv4 and IPv6 Headers*.
<<http://www.ietf.org/rfc/rfc2474.txt>>

3 Terms and definitions

3.1 Terms defined elsewhere

None.

3.2 Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1 QoS class: QoS refers to a set of (network) performance parameters. Such a set could, for instance, constitute the traffic contract between the subscriber equipment and the network. Examples of such performance parameters include: packet loss ratio, packet transfer delay, and packet delay variation tolerance. The parameters are used to define distinct QoS classes.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AC	Admission Control
ATM	Asynchronous Transfer Mode
BCAC	Bearer Connection Admission Control
BCP	Bearer Control Protocol
B-ISDN	Broadband Integrated Services Digital Network
CAC	Connection Admission Control
CES	Circuit Emulation Service
CoAC	Context Admission Control
CoS	Class of Service
CU	Currently Unused (DiffServ)
DiffServ	Differentiated Services
DS	Differentiated Services
DSCP	Differentiated Services Code Point
ECN	Explicit Congestion Notification
ER	Edge Router
IP	Internet Protocol
IPDV	Internet Protocol packet Delay Variation
IPER	Internet Protocol packet Error Ratio
IPLR	Internet Protocol packet Loss Ratio
IPRR	Internet Protocol packet Reordering Ratio
IPTD	Internet Protocol packet Transfer Delay
MG	Media Gateway
MGC	Media Gateway Controller
MLPP	Multi-Level Precedence and Preemption
NGN	Next Generation Network