

International Telecommunication Union

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.248.53

(03/2009)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication
procedures

Gateway control protocol: Traffic management packages

Recommendation ITU-T H.248.53

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Recommendation ITU-T H.248.53

Gateway control protocol: Traffic management packages

Summary

H.248 media gateways may support interfaces with packet-switched networks (via ephemeral terminations). Such types of bearer connections could be subject of traffic control mechanisms. Recommendation ITU-T H.248.53 provides three H.248 packages addressing traffic management, traffic policing and packet size control. This Recommendation focuses on the traffic policing function.

This revision contains an update to the traffic policing statistics package. The update adds new statistic elements and expands these package's procedures allowing the reporting of finer-grained information regarding any violations of the policing parameters.

Source

Recommendation ITU-T H.248.53 was approved on 16 March 2009 by ITU-T Study Group 16 (2009-2012) under Recommendation ITU-T A.8 procedures.

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Recommendation ITU-T H.248.53

Gateway control protocol: Traffic management packages

1 Scope

This Recommendation provides three H.248 packages in the area of traffic control. The *Traffic management* package defines properties to control the traffic policing enforcement of the incoming flow and performing admission control in the media gateway (MG). Traffic shaping is out of scope of the *Traffic management* package version 2. The *Traffic policing statistics* package defines statistics for traffic policers (as a complementary protocol element for the *Traffic management* package). The *Packet Size* package allows a media gateway controller (MGC) to signal additional packet size based conditions for the traffic policer.

1.1 Policy rules and policy enforcement behaviour

The *tman* and/or *pacs* packages in this Recommendation may be applied for traffic policing. If applied, the MG provides a "traffic policer" function. Any policy rule is comprised by a set of conditions and a set of actions (see e.g., usage of filter/policy rules in [b-ITU-T H.248.43]). In the case of traffic policing, the set of actions could include:

- 1) transparent packet forwarding,
- 2) packet tagging (Note 1), or
- 3) packet dropping.

NOTE 1 – At the date of approval of this Recommendation, this function is not supported by ITU-T H.248.53.

The number of packets that do not conform to the traffic policing parameters, as well as the number of packets that are dropped due to such violations, may be recorded in H.248 statistics. The statistic being employed depends on the condition that was violated:

- Packets that do not conform to traffic parameters are recorded by statistics of the *tmanr* package (see clause 7.4).
- Packets that do not conform to packet size limitations are recorded by statistics of the *pacs* package (see clause 8.4).

NOTE 2 – These statistics may complement other statistics relating to traffic control, e.g., *gm/dp* (see [b-ITU-T H.248.43]). All statistics combined provide an overview of the various reasons leading to packets being dropped.

1.2 Deriving policy enforcement point parameters

The packages define generic traffic parameters, which may be used for specific traffic policers. The mapping between the H.248 signalling elements and specific, bearer-dependent policy enforcement point (PEP) policing algorithms is the subject of clause 9. Such an algorithm may consider *tman* properties only (i.e., traffic policer conditions on the *bitrate* and/or *delay variation* parameters only), the *pacs* properties only (i.e., traffic policer conditions on the *PDU size* parameters), or the properties of both packages.

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 I.371] Recommendation ITU-T I.371 (2004), *Traffic control and congestion control in B-ISDN*.
- [ITU-T I.378] Recommendation ITU-T I.378 (2002), *Traffic control and congestion control at the ATM Adaptation Layer type 2*.
- [ITU-T Y.1221] Recommendation ITU-T Y.1221 (2002), *Traffic control and congestion control in IP-based networks*.
- [ITU-T Y.1291] Recommendation ITU-T Y.1291 (2004), *An architectural framework for support of Quality of Service in packet networks*.
- [ATM-F AF-TM-0121] ATM Forum (ATM-F) AF-TM-0121.000 (1999), *Traffic Management Specification*, Version 4.1.
- [IETF RFC 2216] IETF RFC 2216 (1997), *Network Element Service Specification Template*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 traffic policing [ITU-T Y.1291]: Traffic policing deals with the determination of whether the traffic being presented (i.e., the *ingress* H.248 stream in a H.248 ephemeral termination) is (on a hop-by-hop basis) compliant with pre-negotiated policies or contracts. Traffic policing is e.g., according to clause 7.1.3 of [ITU-T Y.1221] (called "parameter control") for IP, or clause 7.2.3 of [ITU-T I.371] (called "Usage Parameter Control (UPC) and Network Parameter Control (NPC)") for ATM.

3.1.2 traffic scheduling (queuing and scheduling) [ITU-T Y.1291]: This mechanism controls which packets to select for transmission on an outgoing link. Scheduling is e.g., further detailed for IP in clause 7.1.6 of [ITU-T Y.1221] on packet scheduling, for ATM in clause 7.2.6 of [ITU-T I.371] on cell scheduling, or for AAL2 in clause 7.2.5 of [ITU-T I.378] on packet scheduling.

3.1.3 traffic shaping [ITU-T Y.1291]: A mechanism that alters the traffic characteristics of the traffic *leaving* a node (i.e., the *egress* H.248 stream from an H.248 ephemeral termination). Traffic is shaped e.g., according to clause 7.1.5 of [ITU-T Y.1221] for IP, clause 7.2.7 of [ITU-T I.371] for ATM, or clause 7.2.4 of [ITU-T I.378] for AAL2.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 policer: A functional or physical entity that enforces pre-negotiated policies or contracts.

3.2.2 shaper: A functional or physical entity that modifies the characteristics of data leaving the entity.

3.2.3 scheduler: A functional or physical entity that controls which packets to select for transmission.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AAL2	ATM Adaptation Layer type 2
ATM	Asynchronous Transfer Mode
ATM-F	ATM Forum
<i>B</i>	Bucket size of a token bucket
<i>B_p</i>	Bucket size of peak token bucket
<i>B_s</i>	Bucket size of sustainable token bucket
CLP	Cell Loss Priority
CPS	Common Part Sublayer
GBRA	Generic Byte Rate Algorithm
GCRA	Generic Cell Rate Algorithm
GoS	Grade of Service
IETF	Internet Engineering Task Force
INI	Inter-Network Interface
IP	Internet Protocol
LD	Local Descriptor
<i>M</i>	Maximum allowed packet size
MG	Media Gateway
MGC	Media Gateway Controller
MPLS	Multiprotocol Label Switching
<i>N</i>	Size (in byte) of an IP packet
NPC	Network Parameter Control
OAM	Operations, Administration, Maintenance
PCI	Protocol Control Information
PCR	Peak Cell Rate
PDP	Policy Decision Point
PDU	Protocol Data Unit
PEP	Policy Enforcement Point
QoS	Quality of Service
<i>R</i>	Rate of a token bucket
<i>R_p</i>	Rate of peak token bucket
<i>R_s</i>	Rate of sustainable token bucket
RTCP	RTP Control Protocol
RTP	Real-time Transport Protocol
SCR	Sustainable Cell Rate
SDP	Session Description Protocol



TB	Token Bucket
UDPTL	User Datagram Protocol Transport Layer Protocol
UNI	User Network Interface
UPC	Usage Parameter Control

5 Conventions

The term 'packet' is used in a broader sense in this Recommendation related to every bearer technology for packet-switched networks. A 'packet' could be e.g., an IP datagram, an ATM cell, an AAL type 2 CPS-PDU, a MPLS packet, etc.

6 Traffic management package

Package name:	Traffic management package
Package ID:	tman (0x008d)
Description:	This package allows traffic descriptors to be defined for a stream and allows policing to be explicitly enabled. Version 1 is defined for a single traffic flow per H.248 stream. Version 2 supports multiple traffic flows per H.248 stream.
Version:	2
Extends:	None.

6.1 Properties

6.1.1 Peak data rate

Property name:	Peak data rate
Property ID:	pdr (0x0001)
Description:	This property defines the peak data rate in bytes per second that is permitted for the stream.
Type:	Sub-list of Integer

The *type* represents a list of one or more integer values. A list with one item only relates to traffic policing on a *stream* level, a list with multiple items relates to traffic policing on a *flow* level. Flow level policing is only applicable in case of *multi-flow* stream structures (see also clause 6.6). The size of the list must be equal for **all** *tman* properties applied to the **same** stream.

- Association between the *flow component* and the *list item*: According to the order of appearance (see clause 6.6.2.1) within the signalled H.248 media descriptor (e.g., a voice media group may appear before a T.38 media group (or vice versa); or an RTP media flow may appear before its associated RTCP control flow). Clause 6.6.2.1 provides detailed information concerning the flow-to-list position relationship.

The MG should reply with error code "473 – Conflicting Property Values" when the number of flows on the stream does not match the sub-list length.

Possible values:	Any integer, –1 and up.
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- Non-policed traffic flows: There might be particular flows in a multi-flow stream structure without peak data rate policing. Any such flow shall be indicated by using a value of "-1".

Default: Provisioned (Note 1).

Defined in: Local Control

Characteristics: Read/write.

6.1.2 Sustainable data rate

Property name: Sustainable data rate

Property ID: sdr (0x0002)

Description: This property defines the sustainable data rate in bytes per second that is permitted for the stream.

Type: Sub-list of Integer
List syntax and semantic according to clause 6.1.1.

Possible values: Any integer, -1 and up.

- Non-policed traffic flows: There might be particular flows in a multi-flow stream structure without sustainable data rate policing. Any such flow shall be indicated by using a value of "-1".

Default: Provisioned (Note 1).

Defined in: Local Control

Characteristics: Read/write.

6.1.3 Maximum burst size

Property name: Maximum burst size

Property ID: mbs (0x0003)

Description: This property defines the maximum burst size in bytes for the stream.

Type: Sub-list of Integer
List syntax and semantic according to clause 6.1.1.

Possible values: Any non-negative integer.

Default: Provisioned (Note 1).

Defined in: Local Control

Characteristics: Read/write.

6.1.4 Delay variation tolerance

Property name: Delay variation tolerance

Property ID: dvt (0x0004)

Description: This property defines the delay variation tolerance for the stream in tens of microseconds (i.e., setting *tman/dvt* to "x" indicates a delay variation tolerance of $x \cdot 10^{-5}$ seconds).

Type: Sub-list of Integer
List syntax and semantic according to clause 6.1.1.

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Possible values: Any non-negative integer.

Default: Provisioned (Note 1).

Defined in: Local Control

Characteristics: Read/write.

6.1.5 Policing

Property name: Policing

Property ID: pol (0x0005)

Description: If set to true policing is to be applied at the termination for traffic entering the MG.

Type: Sub-list of Boolean

List syntax and semantic according to clause 6.1.1.

Possible values: On/off

Default: Provisioned (Note 2).

Defined in: Local Control

Characteristics: Read/write.

NOTE 1 – Default values may be provided via configuration management or derived from other property values (e.g., information elements in the local descriptor).

NOTE 2 – The original *tman* v1 definition (see [b-ETSI TS 102 333]) did not provide any default value and is ambiguous (from the procedural text) concerning default behaviour for traffic policing. The specification of "provisioned" allows to specify a particular default behaviour (i.e., enable policing or disable policing) per H.248 control association (e.g., by a profile specification).

6.2 Events

None.

6.3 Signals

None.

6.4 Statistics

None.

6.5 Error codes

None.

6.6 Procedures

6.6.1 Traffic policing in general

The principles for traffic policing are identical to package *tman* version 1 (see clause II.1).

6.6.2 Single-flow versus multi-flow stream structures

Every H.248 stream may carry one or more *media groups*. Every media group itself may consist of one or more *traffic flows*, e.g., a *media flow* plus a *control flow*. Complex multi-flow stream structures are thus possible, containing any number of flows from one up. It should be noted that *all individual flows* of a multi-flow stream structure may be considered as a *single aggregated flow*.