



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.248.30

(03/2004)

SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS
Infrastructure of audiovisual services – Communication
procedures

**Gateway control protocol: RTCP extended
performance metrics packages**

ITU-T Recommendation H.248.30

ITU-T H-SERIES RECOMMENDATIONS
AUDIOVISUAL AND MULTIMEDIA SYSTEMS

CHARACTERISTICS OF VISUAL TELEPHONE SYSTEMS	H.100–H.199
INFRASTRUCTURE OF AUDIOVISUAL SERVICES	
General	H.200–H.219
Transmission multiplexing and synchronization	H.220–H.229
Systems aspects	H.230–H.239
Communication procedures	H.240–H.259
Coding of moving video	H.260–H.279
Related systems aspects	H.280–H.299
Systems and terminal equipment for audiovisual services	H.300–H.349
Directory services architecture for audiovisual and multimedia services	H.350–H.359
Quality of service architecture for audiovisual and multimedia services	H.360–H.369
Supplementary services for multimedia	H.450–H.499
MOBILITY AND COLLABORATION PROCEDURES	
Overview of Mobility and Collaboration, definitions, protocols and procedures	H.500–H.509
Mobility for H-Series multimedia systems and services	H.510–H.519
Mobile multimedia collaboration applications and services	H.520–H.529
Security for mobile multimedia systems and services	H.530–H.539
Security for mobile multimedia collaboration applications and services	H.540–H.549
Mobility interworking procedures	H.550–H.559
Mobile multimedia collaboration inter-working procedures	H.560–H.569
BROADBAND AND TRIPLE-PLAY MULTIMEDIA SERVICES	
Broadband multimedia services over VDSL	H.610–H.619

For further details, please refer to the list of ITU-T Recommendations.

ITU-T Recommendation H.248.30

Gateway control protocol: RTCP extended performance metrics packages

Summary

This Recommendation defines a package that provides RFC 3611's RTP Control Protocol Reporting Extensions (RTCP XR) metrics reporting capabilities for ITU-T Rec. H.248 that provide more detailed insight into call quality and causes of degradation than basic RTCP statistics.

Source

ITU-T Recommendation H.248.30 was approved on 15 March 2004 by ITU-T Study Group 16 (2001-2004) under the ITU-T Recommendation A.8 procedure.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Assembly (WTSA), which meets every four years, establishes the topics for study by the ITU-T study groups which, in turn, produce Recommendations on these topics.

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.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

© ITU 2004

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

CONTENTS

	Page
1 Scope	1
2 References.....	1
3 Definitions	1
4 Abbreviations.....	1
5 RTCP XR Base Package.....	2
5.1 Properties.....	2
5.2 Events	2
5.3 Signals	2
5.4 Statistics.....	2
5.5 Procedures	4
6 RTCP XR Burst Metrics Package.....	4
6.1 Properties.....	5
6.2 Events	5
6.3 Signals	5
6.4 Statistics.....	5
6.5 Procedures	6

ITU-T Recommendation H.248.30

Gateway control protocol: RTCP extended performance metrics packages

1 Scope

This Recommendation describes a set of Extended Performance Metrics for Voice over IP QoS reporting that provide more detailed insight into call quality and causes of degradation than basic RTCP statistics. The metrics described in this Recommendation are consistent with those described in the RTCP XR Voice over IP Metrics Payload described in IETF RFC 3611.

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.107 (2003), *The E-Model, a computational model for use in transmission planning*.
- ITU-T Recommendation G.108 (1999), *Application of the E-model: A planning guide*.
- ITU-T Recommendation H.248.1 (2002), *Gateway control protocol: Version 2*.
- IETF RFC 3611 (2003), *RTP Control Protocol Extended Reports (RTCP XR)*.

3 Definitions

This Recommendation defines the following terms:

3.1 burst: A period during which a high proportion of packets are either lost or discarded due to late arrival.

3.2 gap: A period of low packet losses and/or discards.

4 Abbreviations

This Recommendation uses the following abbreviations:

MG	Media Gateway
MGC	Media Gateway Controller
MOSCQ	Mean Opinion Score for Conversational Quality
MOSLQ	Mean Opinion Score for Listening Quality
RTCP	RTP Control Protocol
RTCP XR	RTCP Extended Reports
RTP	Real-time Transfer Protocol

5 RTCP XR Base Package

PackageID: rtcpxr (0x0080)

Version: 1

Extends: rtp version 1

This package defines properties and statistics to report extended quality of service metrics.

5.1 Properties

5.1.1 Packet Loss Concealment Type

PropertyID: plc (0x0001)

Description:

The type of packet loss concealment algorithm in use.

Type: Enumeration

Possible values: "U" (0x0001) Unspecified (Default).

"D" (0x0002) Disabled – Silence insertion is being used.

"S" (0x0003) Standard.

"E" (0x0004) Enhanced.

Defined in: LocalControl

Characteristics: Read/Write

5.2 Events

None.

5.3 Signals

None.

5.4 Statistics

5.4.1 Network Packet Loss Rate

StatisticID: nplr (0x0001)

Description:

The proportion of packets lost since the start of transmission expressed as an 8-bit binary fraction obtained by dividing the number of packets lost in the transmission path by the total number of packets expected and multiplying this value by 256 and taking the integer part. Thus a value of 0 would correspond to a packet loss rate of zero and a value of 64 would correspond to a packet loss rate of 0.25 (corresponding to 25 per cent).

Type: Integer

Possible values: Any value greater than or equal to 0

5.4.2 Jitter Buffer Discard Rate

StatisticID: jdr (0x0002)

Description:

The proportion of packets discarded by the receiving jitter buffer since the start of transmission expressed as an 8-bit binary fraction obtained by dividing the number of

packets discarded by the total number of packets expected and multiplying this value by 256 and taking the integer part.

Type: Integer

Possible values: Any value greater than or equal to 0

5.4.3 RTCP Round-Trip Delay

StatisticID: rtd (0x0003)

Description:

The round-trip delay between the RTP interfaces on the local and remote MGs.

Type: Integer

Possible values: Any value greater than or equal to 0 in milliseconds

5.4.4 End System Delay

StatisticID: esd (0x0004)

Description:

The end system delay, comprising encode, decode and jitter buffer delay. This may be combined with the RTCP Round-Trip Delay to estimate the overall Voice over IP segment round-trip delay.

Type: Integer

Possible values: Any value greater than or equal to 0 in milliseconds

5.4.5 Signal Level

StatisticID: sl (0x0005)

Description:

The ratio of the signal level to a 0 dBm0 reference.

Type: Integer

Possible values: Any value in dB

5.4.6 Noise Level

StatisticID: nl (0x0006)

Description:

The ratio of the silent period background noise level to a 0 dBm0 reference.

Type: Integer

Possible values: Any value less than or equal to 0 in dB

5.4.7 Residual Echo Return Loss

StatisticID: rerl (0x0007)

Description:

The echo return loss after the effects of echo cancellation.

Type: Integer

Possible values: Any value greater than or equal to 0 in dB.

5.4.8 R Factor

StatisticID: ns (0x0008)

Description:

A value representing the receiving end call quality of the RTP stream terminated by this termination, calculated per ITU-T Rec. G.107. Table 1/G.108 provides interpretive information about the value of the R factor.

Type: Integer

Possible values: Any value between 0 and 100

5.4.9 External R Factor

StatisticID: ns (0x0009)

Description:

A value representing the effects of any call segment carried over a network segment external to the RTP stream terminated by this termination, calculated per ITU-T Rec. G.107. Table 1/G.108 provides interpretive information about the value of the R factor.

Type: Integer

Possible values: Any value between 0 and 100

5.4.10 Estimated MOSLQ

StatisticID: lq (0x000a)

Description:

An estimated receiving end Listening Quality MOS, calculated per ITU-T Rec. G.107 and multiplied by 10 as described in IETF RFC 3611.

Type: Integer

Possible values: Any value between 10 to 50

5.4.11 Estimated MOSCQ

StatisticID: cq (0x000b)

Description:

An estimated receiving end Conversational Quality MOS, calculated per ITU-T Rec. G.107 and multiplied by 10 as described by IETF RFC 3611.

Type: Integer

Possible values: Any value between 10 and 50

5.5 Procedures

None.

6 RTCP XR Burst Metrics Package

PackageID: xrbm (0x0081)

Version: 1

Extends: rtpcpxr version 1

This package defines properties and statistics for reporting burst metrics.

6.1 Properties

6.1.1 Minimum Gap Threshold

PropertyID: gmin (0x0002)

Description:

A parameter used to define bursts. This is by default set to 16, which sets the threshold packet loss rate between bursts and gaps to approximately 6%. See the procedures for how to use Gmin to determine a burst. Gmin shall not be altered once the RTP stream is established. Attempts to do so should result in the MG returning error xxx.

Type: Integer

Possible values: Any positive integral value, defaults to 16

Defined in: LocalControl

Characteristics: Read/Write

6.2 Events

None.

6.3 Signals

None.

6.4 Statistics

6.4.1 Burst Loss Density

StatisticID: bld (0x000c)

Description:

The average proportion of packets both lost and discarded during burst periods expressed as an 8-bit binary fraction. This is obtained by dividing the sum of the number of packets lost in the transmission path and discarded by the jitter buffer during burst periods by the total number of packets expected during burst periods, multiplying this value by 256 and taking the integer part.

A burst is a period during which a high proportion of packets are either lost in transit or discarded due to late arrival. In general, a burst is likely to result in audible degradation to call quality.

Type: Integer

Possible values: Any integral value greater than or equal to 0

6.4.2 Burst Duration

StatisticID: bd (0x000d)

Description:

The average length of burst periods.

Type: Integer

Possible values: Any integral number of milliseconds greater than or equal to 0

6.4.3 Gap Loss Density

StatisticID: gld (0x000e)

Description:

The average proportion of packets lost and discarded during gap periods expressed as an 8-bit binary fraction. This is obtained by dividing the sum of the number of packets lost in the transmission path and discarded by the jitter buffer during gap periods by the total number of packets expected during gap periods, multiplying this value by 256 and taking the integer part.

Type: Integer

Possible values: Any integral value greater than or equal to 0

6.4.4 Gap Duration

StatisticID: gd (0x000f)

Description:

The average length of gap periods.

Type: Integer

Possible values: Any integral number of milliseconds greater than or equal to 0

6.5 Procedures

For the purposes of calculating the statistics above:

A burst is defined as the longest sequence that:

- a) starts with a lost or discarded packet;
- b) does not contain any occurrences of consecutive received (and not discarded) packets numbering greater than or equal to the Gmin property value; and
- c) ends with a lost or discarded packet.

A gap is defined as any of the following:

- a) the period from the start of an RTP session to the receipt time of the last received packet before the first burst;
- b) the period from the end of the last burst to either the time of the report or the end of the RTP session, whichever comes first; or
- c) the period of time between two bursts.

SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series B	Means of expression: definitions, symbols, classification
Series C	General telecommunication statistics
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks and open system communications
Series Y	Global information infrastructure, Internet protocol aspects and Next Generation Networks
Series Z	Languages and general software aspects for telecommunication systems