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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication procedures

Gateway control protocol: Statistic conditional reporting package

Recommendation ITU-T H.248.47

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Recommendation ITU-T H.248.47

Gateway control protocol: Statistic conditional reporting package

Summary

Recommendation ITU-T H.248.47 defines a H.248 package with a generic method of reporting when statistics meet a pre-defined condition. Enabling the reporting of statistics allows the media gateway controller (MGC) to better manage resources, particularly in the areas of charging and quality of service.

This version of this Recommendation allows an MGC to control whether a timestamp is reported with the detection of the events in this package. It also extends the reporting conditions with value-based metric conditions.

Source

Recommendation ITU-T H.248.47 was approved on 22 July 2008 by ITU-T Study Group 16 (2005-2008) under Recommendation ITU-T A.8 procedure.

FOREWORD

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Gateway control protocol: Statistic conditional reporting package

1 Scope

This package defines a generic method of reporting when statistics meet a pre-defined condition. By enabling the reporting of statistics, it allows the MGC to better manage resources, particularly in the areas of charging and quality of service. Furthermore, it allows an MGC to control event timestamp reporting.

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.248.30] Recommendation ITU-T H.248.30 (2007), *Gateway control protocol: RTCP extended performance metrics packages.*

[ITU-T H.248.59] Recommendation ITU-T H.248.59 (2007), *Gateway control protocol: Event timestamp notification package.*

3 Definitions

This Recommendation defines the following terms:

3.1 **ADD.req**: Add command request (see [ITU-T H.248.1]).

3.2 **MOD.req**: Modify command request (see [ITU-T H.248.1]).

3.3 **MOV.req**: Move command request (see [ITU-T H.248.1]).

3.4 **NOTIFY.req**: Notify command request (see [ITU-T H.248.1]).

4 Abbreviations

This Recommendation uses the following abbreviations:

MG Media Gateway

MGC Media Gateway Controller

5 Conventions

None.

6 Statistic conditional reporting package

Package name: Statistic Conditional Reporting package

Package ID: scr, 0x00ae

Description: This package defines a mechanism for supporting the real-time reporting of specific statistics based on a particular condition. The term "real-time" means that the MG should immediately notify the MGC when the conditions are met (see clause 6.6.2).

Version: 2

Extends: None

6.1 Properties

None.

6.2 Events

6.2.1 Conditional reporting

Event name: Conditional Reporting

Event ID: cr, 0x0001

Description: This event indicates the identifier of the statistic specified to be reported when it matches a given condition trigger.

6.2.1.1 EventsDescriptor parameters

6.2.1.1.1 Statistic identifier

Parameter name: Statistic Identifier

Parameter ID: si, 0x0001

Description: This parameter indicates the statistic specified to be reported.

Type: Binary: octet (string), Text: string

Optional: No

Possible values: Any valid H.248 PackageID/StatisticID pair.

Formatted according to the pkgdName syntax.

Default: None

6.2.1.1.2 Duration

Parameter name: Duration

Parameter ID: dur, 0x0002

Description: This parameter indicates the time span over which the statistic should be monitored, and in which other conditions may trigger a report of the statistic.

Type: Double

Optional: Yes

Possible values: 1 or more seconds

Default: None

6.2.1.1.3 Period

Parameter name:	Period
Parameter ID:	per, 0x0003
Description:	This parameter indicates the time interval from one statistic report trigger to the next.
Type:	Double
Optional:	Yes
Possible values:	1 or more seconds
Default:	None

6.2.1.1.4 Maximum

Parameter name:	Maximum
Parameter ID:	max, 0x0004
Description:	This parameter indicates the top threshold to trigger the statistic reporting. When this parameter is crossed in the upward direction, the statistic reporting is triggered.
Type:	Double
Optional:	Yes
Possible values:	Values according to the statistic to be reported.
Default:	None

6.2.1.1.5 Minimum

Parameter name:	Minimum
Parameter ID:	min, 0x0005
Description:	This parameter indicates the bottom threshold to trigger the statistic reporting. When this parameter is crossed in the downward direction, the statistic reporting is triggered.
Type:	Double
Optional:	Yes
Possible values:	Values according to the statistic to be reported.
Default:	None

6.2.1.1.6 Normal

Parameter name:	Normal
Parameter ID:	nor, 0x0006
Description:	This parameter indicates when the statistic passes through the minimum or maximum threshold into the normal range.
Type:	Boolean
Optional:	Yes
Possible values:	On/off
Default:	None

6.2.1.1.7 Request timestamp

Parameter name: Request timestamp

Parameter ID: rt, 0x0007

Description: This parameter indicates whether or not an Event Timestamp with the detection time shall be included with the notification of the event. This provides similar functionality as [ITU-T H.248.59].

Type: Enumeration

Optional: Yes

Possible values:

"*requested*"	The timestamp is requested (i.e., included).
"*suppressed*"	The timestamp is suppressed (i.e., excluded).
"*autonomous*"	Determined by the MG itself.

Default: "*autonomous*"

6.2.1.1.8 Value type

Parameter name: Value Type

Parameter ID: typ, 0x0008

Description: This parameter indicates the target value based on a mathematical keyword which is combined with the *Deviation*, *Compliance*, *Direction*, *Duration* and/or *Period* parameters to determine if reporting is required. The MG uses the keyword to calculate the actual statistical value.

Type: Enumeration

Optional: Yes

Possible values:

ini	indicates the initial value of the statistic.
ave	indicates the average value of the statistic.
max	indicates the maximal value of the statistic.
min	indicates the minimal value of the statistic.
gen	indicates the general value of the statistic.

NOTE 1 – The above enumerations relate to values not the similarly-named properties.

Default: *gen*

NOTE 2 – The value "gen" indicates that the *Target Value* parameter is used to provide a value.

6.2.1.1.9 Target value

Parameter name: Target Value

Parameter ID: val, 0x0009

Description: This parameter indicates the MGC supplied actual statistic value which is combined with the *Deviation*, *Compliance*, *Direction*, *Duration* and/or *Period* parameters to determine if reporting is required.

Type: Double

Optional: Yes

Possible values: Values according to the statistic to be reported.

Default: Provisioned

6.2.1.1.10 Deviation

Parameter name: Deviation

Parameter ID: dev, 0x000a

Description: This parameter indicates whether the statistic should be reported when it deviates from a target value. This may be further based on a percentage relative to the target value. The *Direction* parameter indicates whether the deviation is reported in the positive, negative or both directions.

Type: String

Optional: Yes

Possible values: Any percentage, especially 0 for any degree of deviation.

Default: None

6.2.1.1.11 Compliance

Parameter name: Compliance

Parameter ID: com, 0x000b

Description: This parameter indicates whether the statistic should be reported when it returns to a target value. This may be further based on a percentage relative to the target value. The *Direction* parameter indicates whether the compliance is reported in the positive, negative or both directions.

Type: String

Optional: Yes

Possible values: Any percentage, especially 0 for just completed compliance.

Default: None

6.2.1.1.12 Direction

Parameter name: Direction

Parameter ID: dir, 0x000c

Description: This parameter is used with the *Deviation* and/or *Compliance* parameters to indicate the direction the statistic should be reported when it deviates from or returns to the value specified by the *Value Type* or *Target Value* parameters.

Type: Enumeration

Optional: Yes

Possible values:

- *up* indicates the positive direction.
- *down* indicates the negative direction.
- *bi* indicates the positive and negative directions.

Default: "*bi*", however, see bullet f) in clause 6.6.1 for an exception.

6.2.1.2 ObservedEventsDescriptor parameters

6.2.1.2.1 Statistic identifier

Parameter name:	Statistic Identifier
Parameter ID:	si, 0x0001
Description:	This parameter indicates the statistic specified that is reported.
Type:	Binary: octet (string), Text: string
Optional:	No
Possible values:	Any valid H.248 PackageID/StatisticID pair. Formatted according to the pkgdName syntax.
Default:	None

6.2.1.2.2 Value

Parameter name:	Value
Parameter ID:	val, 0x0002
Description:	This parameter indicates the current value of the statistic.
Type:	Double
Optional:	No
Possible values:	Values according to the statistic to be reported.
Default:	None

6.3 Signals

None.

6.4 Statistics

None.

6.5 Error codes

None.

6.6 Procedures

6.6.1 General

To request an MG to provide real-time reporting of a particular statistic, the MGC shall set the Conditional Reporting (*cr*) event on the MG via an ADD.req, MOD.req or MOV.req with the Statistic Identifier (*si*) parameter set to the required statistic. A single event shall be set for each statistic required to be reported.

In addition to the Statistic Identifier parameter, the MGC shall set at least one of the report conditions indicated by the parameters including Duration (*dur*), Period (*per*), Maximum (*max*), Minimum (*min*), Normal (*nor*), Value Type (*typ*), Target Value (*val*), Deviation (*dev*), Compliance (*com*) and Direction (*dir*).

If the MGC sets non-sensical parameters (e.g., a *dev* or *com* parameter without a *typ* or *val* parameter) the MG shall respond with error codes 472 "Required information missing" or 473 "Conflicting property values".

The usage of report condition setting parameters such as *dur*, *per*, *nor*, *max*, *min*, *typ*, *val*, *dev*, *com* and *dir* may be individual or together according to the following rules:

a) If the *dur* parameter exists independently, the statistic shall be reported at the expiry of the dur parameter.

b) If the *per* parameter exists independently without the *dur* parameter, the statistic shall be reported every time at the expiry of the *per* parameter.

c) If the *max*, *min* or *nor* parameters exist independently without the dur parameter, the statistic shall be reported every time the value exceeds the top threshold indicated by the *max* parameter, exceeds the bottom threshold indicated by the *min* parameter, or crosses back through the top or bottom threshold into the normal range if the *nor* parameter is set to "on". The *nor* parameter shall only be set with the *max* and/or *min* parameters.

d) If the *typ*, *val*, *dev*, *com* or *dir* parameters exist independently without the *dur* parameter, the statistic shall be reported when it deviates from or returns to a target value which could be the initial, average, maximal, minimal value indicated by the *typ* parameter or any general value indicated by the *val* parameter, in a certain percentage indicated by the *dev* or *com* parameter and a certain direction indicated by the *dir* parameter. The *dev* or *com* parameter shall only be set with the *typ* and/or *val* parameters. The *dir* parameter shall only be set with the *dev*, *com* and/or *nor* parameters.

e) The *dir* parameter has no effect on the *max* or *min* parameters, however if the *nor* parameter is set to "on" and the *dir* parameter is also set then it will affect whether the statistic shall be reported when it returns through the top, bottom or both thresholds.

f) If the *typ* parameter is set to "max" then the *dev* parameter shall only be set with a *dir* parameter set to "down" and the *com* parameter shall only be set with a *dir* parameter set to "up". If the *typ* parameter is set to "min" then the *dev* parameter shall only be set with a *dir* parameter set to "up" and the *com* parameter shall only be set with a *dir* parameter set to "down".

g) If the *per* parameter exists together with the *dur* parameter, then rule b) shall be applied only during the time of the *dur* parameter.

h) If the *max*, *min* or *nor* parameters exist with the *dur* parameter, then rule c) shall be applied only during the time of the dur parameter.

i) If the *typ*, *val*, *dev*, *com* or *dir* parameters exist with the *dur* parameter, the rule d) shall be applied only during the time of the *dur* parameter.

j) The existence of the *per* and the *max*, *min*, *nor*, *typ*, *val*, *dev*, *com or dir* parameters are generally independent and shall not be considered together.

When the MG detects that the above report conditions are met, it shall send a NOTIFY.req to the MGC indicating the Statistic Identity (*si*) and the Value (*val*) of the statistic. The value of the statistic is not reset upon reporting of the value of the statistic.

For example:

– If the MGC wanted to determine when the Gap Duration (see 6.4.4 of [ITU-T H.248.30]) exceeds a range of 200-1500 ms, the MGC would issue a MOD.req with the Conditional Reporting (*cr*) event with parameter Statistic Identity (*si*) equal to xrbm/gd, parameter Minimum (*min*) equal to 200 and parameter Maximum (*max*) equal to 1500.

– When the MG detects that the xrbm/gd statistic exceeds either the Minimum (*min*) or Maximum (*max*) parameter, then it issues a NOTIFY.req containing a Conditional Reporting (*cr*) ObservedEvent with the Statistic Identity (*si*) parameter equal to xrbm/gd and the Value (*val*) parameter indicating the value of the statistic.

6.6.2 Guidelines on real-time reporting

The rationale behind "real-time reporting" is the fact that there could be many different types of served user instances for statistic reports processing, either physically located at the MGC or remote entities, which may lead to slight differences concerning the real-time time-scale. Recommendations are given by the clauses below. The required behaviour in a specific environment could be defined, e.g., in an H.248 profile specification.

The inclusion of a timestamp with the detection time in a notification of an event may be either requested or suppressed explicitly through the use of the *rt* parameter. If an MG cannot provide a timestamp for the event requested through an Add, Move or Modify command it shall respond with error code 543 "MGC requested event detection timestamp not supported".

If the setting of the *rt* parameter is in conflict with the setting of the *etn/rt* property [ITU-T H.248.59], the MG shall respond with error code 473 "Conflicting property values".

6.6.2.1 Reporting without timestamp

The MG must immediately notify the MGC when the conditions are met. The immediate transfer of statistic reports from MG to MGC is subject only to the normal transmission delays and those imposed by the H.248 message encoding/decoding processes.

6.6.2.2 Time-stamped reporting

The MG must immediately notify the MGC when the conditions are met. The MG must insert parameter "detection time" (timestamp) in the ObservedEvents descriptor (see clause 7.1.17 of [ITU-T H.248.1]: "*detection times are reported with a precision of hundredths of a second*"). The timestamp may be that used for a "precise" time-correlation with regard to the granularity of the period (per) parameter.

6.6.3 Condition calculation

At each sample interval, the MG shall obtain the current sample value of the indicated statistic. This sample value will be replaced by a newer sample value and becomes the previous sample value at the next sample interval. For simplification, the clauses below cite them in "current value" and "previous value".

6.6.3.1 Duration

Upon the setting of the *scr/cr* event with the *dur* parameter, the duration timer starts at zero second and counts to the number of seconds given by the value of this parameter.

6.6.3.2 Period

Upon the setting of the *scr/cr* event with the *per* parameter, the period timer starts at zero second and counts to the number of seconds given by the value of this parameter. The period timer is reset to zero at each expiry and initialized for the next period count.

6.6.3.3 Maximum

The Maximum is provided by the MGC. At each sample interval, the MG shall compare the current value of the indicated statistic with the previous value and the Maximum provided in the *max* parameter to determine when to report the event. If the current value is greater than the previous value and the maximum, and if the event has not already been reported, then the event with the current value of the statistic shall be reported.

6.6.3.4 Minimum

The Minimum is provided by the MGC. At each sample interval, the MG shall compare the current value of the indicated statistic with the previous value and the Minimum provided in the *min* parameter to determine when to report the event. If the current value is less than the previous value

and the Minimum, and if the event has not already been reported, then the event with the current value of the statistic shall be reported.

6.6.3.5 Normal

The "normal range" is defined to be greater than the *min* parameter and less than the *max* parameter. When the *nor* parameter is set to "on", the MG calculates the "normal range". At each sample interval, the MG shall compare the current value of the indicated statistic with the previous value and the "normal range". If the current value is inside the "normal range" and the previous value is outside the "normal range" then the event with the current value of the statistic shall be reported.

6.6.3.6 Value type

The initial, average, maximal or minimal value indicated by the *typ* parameter depends on the MG instead of the MGC. It is used in conjunction with the *dev* or *com* condition, e.g., the MG may provision these values on demand.

The MG may use the time of the reception of the *scr/cr* event as the initial time for calculations for the indicated statistics. The current value of the indicated statistic at the time of setting the *scr/cr* event is regarded as the initial value. At each sample interval, the average, maximal or minimal value is calculated again based on the current value and previous value of the indicated statistic and the time offset from this initial time.

Alternatively, the MG may provision the initial, average, maximal or minimal value for a specific statistic according to its native characters or specific administration requirement.

6.6.3.7 Target value

The general value is provided by the MGC. It is used in conjunction with the *dev* or *com* condition.

6.6.3.8 Deviation

Upon the setting of the *scr/cr* with the *dev* parameter, the MG shall calculate the positive and negative offset range based on the supplied percentage and the target value. At each sample interval, the MG shall compare the current value of the indicated statistic with the previous value and the offset range. If the previous value was inside the offset range and the current value is outside the offset range, the MG shall then use the *dir* parameter to determine if the event with the current value of the statistic is reported.

6.6.3.9 Compliance

Upon the setting of the *scr/cr* with the *com* parameter, the MG shall calculate the positive and negative offset range based on the supplied percentage and the target value. At each sample interval, the MG shall compare the current value of the indicated statistic with the previous value and the offset range. If the previous value was outside the offset range and the current value is inside the offset range, the MG shall then use the *dir* parameter to determine if the event with the current value of the statistic is reported.

6.6.3.10 Direction

This condition shall be used in conjunction with the *dev, com* or *nor* condition.

6.6.4 Usage example

The examples below indicate the behaviour of the MG when the Conditional Reporting (*cr*) event is set with the parameters indicated below, given a statistic with values from a minimum of –150 to a maximum of 250, average 50, initial 0. Parameter settings of:

1) (*dur*=180) means the statistic should be reported after 180 s.

2) *(per*=30) means the statistic should be reported every 30 s.

3) (*dur*=150,*per*=10) means the statistic should be reported every 10 s during a 150 s time span.

4) (*min*=–100,*max*=200,*nor*=ON) means the statistic should be reported when it downward exceeds its bottom threshold value –100 or upward exceeds its top threshold value 200 or enters back into the value zone between –100 and 200.

5) (*min*=–88,*max*=99,*nor*=ON,*dir*=up) means the statistic should be reported when it downward exceeds its bottom threshold value –88 or upward exceeds its top threshold value 99. If the statistic value has downward exceeded the bottom threshold value of –88 then the statistic should be reported when it enters back into the value zone between –88 and 99.

6) (*min*=–88,*max*=99,*nor*=ON,*dir*=down) means the statistic should be reported when it downward exceeds its bottom threshold value –88 or upward exceeds its top threshold value 99. If the statistic value has upward exceeded the top threshold value of 99 then the statistic should be reported when it enters back into the value zone between –88 and 99.

7) (*dur*=150,*min*=–30,*max*=30) means the statistic should be reported when it downward exceeds its bottom threshold value –30 or upward exceeds its top threshold value 30 during a 150 s time span.

8) (*typ*=ini,*dev*=0,*com*=0) means the statistic should be reported when it deviates from or returns to its initial value which may be known by the MG but not the MGC.

9) (*typ*=ave,*dev*=50,*com*=30) means the statistic should be reported when it deviates from ±50% or returns to ±30% of its average value which may be known by the MG but not the MGC.

10) (*typ*=max,*com*=5,*dir*=up) means the statistic should be reported when it upward returns to 5% of its maximal value which may be known by the MG but not the MGC.

11) (*typ*=min,*com*=3,*dir*=down) means the statistic should be reported when it downward returns to 3% of its minimal value which may be known by the MG but not the MGC.

12) (*dur*=150,*val*=123,*dev*=8) means the statistic should be reported when it deviates from ±8% of the value 123 during a 150 s time span.

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