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Corrigendum 1
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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication procedures

Gateway control protocol: Media gateway overload control package

Corrigendum 1: Clarifying MG_overload event relationship with ADD commands

Recommendation ITU-T H.248.11 (2002) – Corrigendum 1

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Recommendation ITU-T H.248.11

Gateway control protocol: Media gateway overload control package

Corrigendum 1

Clarifying MG_overload event relationship with ADD commands

Summary

Recommendation ITU-T H.248.11 describes a package for media gateway (MG) overload control for use with the H.248.1 gateway control protocol. It serves to protect an MG from processing overload that prevents the timely execution of H.248.1 transactions.

In summary, in this Recommendation, overload protection is achieved as follows:

1) An MG (or virtual MG) detects that it is in overload and notifies its media gateway controller (MGC) of that fact whenever it receives an ADD command.

2) The MGC adaptively throttles the rate it sets up calls using that MG (or virtual MG) to maximize the MG's effective throughput whilst bounding its response times. It does this by throttling the rate at which transactions that set up new calls or that new call legs are sent to the overloaded MG, so as to cause the rate of overload notifications the MGC receives from the overloaded MG (or virtual MG) to converge to a suitably low level.

A separate instance of the overload control shall be initiated at an MGC for each of its dependent MGs (or virtual MGs) that is overloaded. These separate instances should run independently (that is, they do not explicitly exchange information). Their overload control parameters shall be separately configurable, for example, by means of a proprietary management interface, or the use of SNMP to invoke configuration functions.

The most general overload scenario the control can handle is where one or more MGCs are jointly overloading a single MG that has several virtual MGs (virtual MG 'i' interacting only with MGC "i'). The control does not need to know how many MGCs are causing the MG to be overloaded, nor what the MG capacity is. Informative reference [b-Oftel] provides a full explanation of one way this can be achieved, and informative reference [b-whitehead] provides further material on designing overload controls.

The overload control is largely specified by saying how it shall behave, but not how it should be implemented to achieve that behaviour. This has two important consequences.

As a first consequence, part of the package (see clause 8.5) defines a set of overload scenarios, and any fully-compliant implementation of the package must automatically (i.e., without the need for operator intervention to adjust parameter values from one overload scenario to another) satisfy all the requirements for each of the scenarios.

As a second consequence, not all configurable parameters can be known to this package since they depend upon specific implementations of the control. Nevertheless, there is a requirement that the implementation shall provide a means by which an operator can change all parameters which affect the performance of the control. See clause 9 for the management requirements associated with this package. It is expected that they will be realized by a proprietary management interface, or the use of SNMP.

Corrigendum 1 to Recommendation ITU-T H.248.11 clarifies that, when the MG is overloaded, overload events may be sent either only following the first ADD.request which creates a new context, or following all ADD.request commands. These two options result in different normalizations of the overload event rate as an indicator of the level of MG overload. The concept of normalization is explained.

Source

Corrigendum 1 to Recommendation ITU-T H.248.11 (2002) was approved on 13 June 2008 by ITU-T Study Group 16 (2005-2008) under Recommendation ITU-T A.8 procedure.

FOREWORD

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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.

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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.

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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, implementers are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database at http://www.itu.int/ITU-T/ipr/.

Recommendation ITU-T H.248.11

Gateway control protocol: Media gateway overload control package

Corrigendum 1

Clarifying MG_overload event relationship with ADD commands

Modifications introduced by this corrigendum are shown in revision marks. Unchanged text is replaced by ellipsis (…). Some parts of unchanged text (clause numbers, etc.) may be kept to indicate the correct insertion points.

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~~**2.2 Informative references**~~

~~[1] Oftel, PNO-ISC Information Document 015 ISUP Overload Controls, Ref. PD 6673:2001.~~

~~[2] WHITEHEAD (M. J.) and WILLIAMS (P. M.): Adaptive Network Overload Controls, *BT Technology Journal*, Vol. 20, No. 3, July 2002.~~

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5.2.1 MG_Overload

Event name: MG_Overload

EventID: mg_overload, (0x0001)

Description:

This event occurs only when the MG (or virtual MG) receives an ADD command from an MGC and the MG has determined it is overloaded. The event may be correlated with all received ADD commands, or just with the first ADD.request of a new context. This allows normalization of the control loop (see clause 8.6). The event is ordered by the MGC or provisioned.

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8.1 Actions at overloaded MG (or virtual MG)

An MG (or virtual MG) shall be capable of detecting when it is in overload ("MG Overload" is defined in clause 3.4).

An overloaded MG (or overloaded virtual MG) that receives an ADD command from an MGC (either just consideration of the first ADD.request only, or all ADD.request commands, see clause 8.6) shall:

a) continue normal processing of that transaction; and

b) as soon as possible, notify the MGC that it is overloaded (by sending a Notify Request with event "MG_Overload" to the MGC).

NOTE – For the applications listed in ~~the~~ "Scope" ~~of this Recommendation~~, there will usually be just two ADD commands from the MGC per call (this relates, e.g., to the very basic connection model which is behind all two-party, basic communication services). So there will usually be at most two such MG_Overload notifications per call, and they will occur early in the sequence of transactions exchanged between the MG and its MGC (the control loop may be normalized in the case of such a simple connection model, see clause 8.6). Moreover, the rate at which the overloaded MG returns such indications will converge to a configurable low level (the TargetMG_OverloadRate, see clause 8.2.3) – less than one per second. Therefore, sending "MG_Overload" transactions should not impose a significant processing or transmission overhead.

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8.4 Bounding offered rates to MG during initial overload transient

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NOTE 1 – This requirement ensures that the overload control reacts fast enough to prevent the load offered to the overloaded MG from dangerously exceeding the MG's capacity.

NOTE 2 – The MGC may calculate the calling rate (calls/second) as the number of ADD.request commands in some short measurement interval which lead to the creation of a new context, divided by the duration of the measurement interval. The duration of the measurement interval should be chosen appropriately for the calls/second capacity of the MG. Excessively short intervals will contain few calls and result in high statistical error. Excessively long intervals will make the measurement response slow. Either of these extremes would reduce the protection given to the MG against an initial transient overload.

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8.6 Normalization of the control loop

Normalization means the adjustment of the rate-related control variables, starting with the binding of the MG_Overload event notification rate to a particular request rate at the incoming H.248 interface at the MG.

NOTE – The event notification rate relates to the rate ε in clause II.6 of [b-ITU-T H-Sup.6].

8.6.1 Purpose of normalization

Normalization of parameters of a control loop shall improve the efficiency of the control, without any significant impact on the effectiveness of the control itself. The efficiency gain is primarily related to performance savings at the MG and the MGC.

8.6.2 Examples for normalization

The capability of normalization is primarily related to *call-dependent procedures*.

NOTE 1 – Procedures defined by H.248 profiles may be categorized into call-dependent and call-independent procedures and the underlying variety of applied *connection models*.

NOTE 2 – Again a profile capability, see clause 6.4 within Appendix III of [ITU-T H.248.1] at the H.248 *Control Association*.

Both aspects provide the high-level framework for traffic characterization and H.248 traffic modelling. The capability for normalization is thus tightly-coupled with the execution of specific H.248 profiles. Any H.248 control profile is related to a corresponding H.248 traffic profile concerning call-dependent traffic rates.

8.6.2.1 Termination-level traffic rates

For this type of normalization, the MG_Overload event notification should be sent following *all* incoming ADD.request commands which occur whilst the MG detects that it is in overload. This is the default configuration of the control loop, because it represents a good compromise in the case of complex traffic profiles at the H.248 interface.

8.6.2.2 Context-level traffic rates

For this type of normalization, the MG_Overload event notification should be sent only following those *ADD.request commands* received which result in the creation of a new context, and which occur whilst the MG detects that it is in overload. Any subsequent ADD.request or other command types for the same context would *not* lead to any MG_Overload event notification.

8.6.2.3 Others

There are many other possibilities, for instance a H.248 *message-level* based normalization.

8.6.3 Limited applicability of normalization

Normalization is closely related to an appropriate traffic model at the H.248 interface. Such traffic profiles are primarily bounded by H.248 control profiles. Any particular normalization may be thus defined within a H.248 profile specification. The supported connection models, possible context topologies and the stream-to-termination structures defined by an H.248 profile specification may be helpful in evaluating the opportunities for normalization.

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Bibliography

[b-ITU-T H-Sup.6] ITU-T H-series Recommendations – Supplement 6 (2006), *Control load quantum for decomposed gateways*.

[b-Oftel] Oftel, PNO-ISC Information Document 015 ISUP Overload Controls, Ref. PD 6673:2001.

[b-whitehead] Whitehead, M. J., and Williams, P. M. (2002), *Adaptive Network Overload Controls*, BT Technology Journal, Vol. 20, No. 3, July.

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