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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication procedures

Gateway control protocol: Hanging Termination Detection package

Recommendation ITU-T H.248.36

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Recommendation ITU-T H.248.36

Gateway control protocol: Hanging Termination Detection package

Summary

Recommendation ITU-T H.248.36 describes the Hanging Termination Detection package which is used to determine potential information mismatch in the record of Context and Termination identities between the media gateway controller and the media gateway. It also offers guidance on the action to take once a potential mismatch is detected.

This revision incorporates a clarification as to how a media gateway notifies a media gateway controller of hanging terminations.

History

Edition	Recommendation	Approval	Study Group
1.0	ITU-T H.248.36	2005-09-13	16
2.0	ITU-T H.248.36	2013-03-16	16

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.

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.

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As of the date of approval of this Recommendation, ITU had 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/.

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Gateway control protocol: Hanging Termination Detection package

1 Scope

This package is used to determine potential information mismatch in the record of Context and Termination identities between media gateway controllers and media gateways for individual terminations, not the MG as a whole (e.g., root termination). It can be applied in such situations as status synchronization of call and bearer, garbage collection for hanging resources, re-synchronization after short disconnection, etc., and cannot be applied in such situations as media inactivity detection, idle bearer detection, re-synchronization after long disconnection or system reboot, auditing for hanging resources, etc. It also offers guidance on the action to take once a potential mismatch is detected.

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 (2013), *Gateway control protocol: Version 3*.

[ITU-T H.248.8]   Recommendation ITU-T H.248.8 (2013), *Gateway control protocol: Error code and service change reason description*.

3 Definitions

This Recommendation defines the following term:

3.1   **hanging termination**: Every ITU-T H.248 termination has an associated record of Termination information. There are consequently two corresponding records at the MGC and MG level. The record of Termination information may be further embedded in a superior record of Context information. There are again corresponding records at the MGC and MG level. If there is a mismatch between corresponding records at the MGC and MG level, a Termination is considered hanging.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

MG   Media Gateway

MGC   Media Gateway Controller

5 Hanging Termination Detection package

Package name: Hanging Termination Detection package

Package ID: hangterm (0x0098)

Description: This package contains an event that generates a periodic Notify message for the MG to determine if an MGC still has a record of the termination that the event is enabled on.

Version: 1

Extends: None

5.1 Properties

None.

5.2 Events

5.2.1 Termination Heartbeat

Event name: Termination Heartbeat

Event ID: thb (0x0001)

Description: Indicates that (timer x) time has elapsed since the last message exchange between the MGC and MG for the indicated termination.

5.2.1.1 EventDescriptor parameters

5.2.1.1.1 Timer X

Parameter name: Timer X

Parameter ID: timerx (0x0001)

Description: This parameter sets the time period (x) between the last message exchanged and the generation of this event. This timer is reset by any messaging between (including the Notify containing this event) the MGC and MG for the indicated termination. It is recommended to set timerx with a value of a multiple of the typical Context lifetime. The lifetime of the ITU-T H.248 Context is characteristically related to mean call or session holding times of the underlying (tele) service. Timerx is greater than call holding time (timerx >> CHT).

Type: Integer

Optional: Yes

Possible values: 0   No Heartbeat message to be sent
1 up   Time period in seconds

Default: Provisioned

5.2.1.2 ObservedEventsDescriptor parameters

None.

5.3 Signals

None.

5.4 Statistics

None.

5.5 Error codes

None.

5.6 Procedures

5.6.1 Detection of hanging terminations

For the correct operation of gateways, synchronization of termination information between the MGC and MG is essential for traffic, maintenance and charging purposes. It is also essential to detect any information mismatches as soon as possible to minimize the time hanging terminations are consuming resources that could be used for a chargeable call. ITU-T H.248.1 enables an MGC to perform periodic audits on terminations to see if the terminations are still responding to ITU-T H.248.1 messages. The MGC may issue a wildcard "ALL" audit of termination state but, in large media gateways, this will result in very large messages that are undesirable from a messaging performance point of view. The MGC may issue periodic audits on particular terminations or ranges of terminations that decreases message size but increases the number of messages sent. There is also the danger that the MGC has lost a record of a termination and thus cannot audit it. As a result of the audit, the MGC may detect terminations it did not know existed, or detect that the MG has lost a record of the termination. The action taken is MGC dependent but the likely result is that the termination is subtracted. For terminations that the MGC has lost a record of, the MG is dependent on the MGC detecting its own loss. This may not prove to be 100% reliable.

In the case where the MGC is unable to detect these terminations, the MG needs to be able to detect and clean up terminations that are hanging by sending Notify commands to the MGC identifying the hanging Terminations. The MG can detect hanging terminations by error responses to commands. Typically, during a stable speech call state, very few ITU-T H.248.1 messages are generated by the MG, thus a mechanism is needed to trigger a periodic message from the MG. The MG may issue a periodic Notify command on the concerned termination and check the response to determine if the MGC has a record of the termination or not. The time period for this Notify may be parameter driven.

A Notify response command from an MGC may contain many different errors. However, it is only the error codes listed below that would indicate that there is a problem with information and that there is a potential hanging termination:

– Error Code #: 411 Name: The transaction refers to an unknown ContextID;

– Error Code #: 430 Name: Unknown TerminationID;

– Error Code #: 435 Name: Termination ID is not in specified Context.

After generating the Notify Response, action taken by the MGC is dependent on the error code.

5.6.2 Use of termination heartbeat

To enable the periodic Notify to be sent, the event "*hangterm/thb*" with the "*timerx*" parameter is set by the MGC or provisioned on the applicable termination. This parameter sets the time period (x) between the last message exchanged and the generation of the "*hangterm/thb*" event. This timer is reset by any messaging between the MGC and MG for the indicated termination (including the Notify containing the event).

A response to this Notify without an error code indicates that the MGC and the MG agree that the context identity / termination identity combination exists.

A response to this Notify containing error codes:

– Error Code #: 411 Name: The transaction refers to an unknown ContextID;

– Error Code #: 430 Name: Unknown TerminationID;

– Error Code #: 435 Name: Termination ID is not in specified Context

indicates that there is a potential information mismatch between the MGC and MG. A response to the Notify containing other error codes should be handled according to [ITU-T H.248.8].

On reception of the "*hangterm/thb*" event, the MGC shall be responsible for correcting the mismatch. For example: The MGC may subract the indicated termination and clear any associated context. The MGC may audit the termination Servicestate to check its records before taking further action.

Appendix I

Applicability statements

(This appendix does not form an integral part of this Recommendation.)

I.1 Applicability

This package is applicable in the following situations (this list is not exhaustive):

1) Synchronization of call (MGC) and corresponding bearer (MG) status.

2) Garbage collection for hanging resources, hanging ITU-T H.248 Terminations, hanging ITU-T H.248 contexts.

   NOTE 1 – Garbage collection is an important mechanism for high-available, long time running network elements.

3) Re-synchronization after (short) temporary losses of MGC-MG interconnection.

   NOTE 2 – "Short" here in the sense that all records on MGC and MG level are "almost consistent".

4) ITU-T H.248.36 is termination-type independent, therefore applicable for physical and ephemeral terminations.

5) Detection capability of hanging ITU-T H.248 terminations on MGC level.

6) Non-root terminations only.

I.2 Non-applicability

This package is not applicable (or not intended) in the following situations (this list is not exhaustive):

1) Media inactivity detection.

2) Idle bearer detection.

3) Emergency standalone mode.

4) Termination is in state "out-of-service" (according ServiceState property in TerminationState descriptor) (to be checked).

5) Re-synchronization after (long) losses of MGC-MG interconnection, or cold reboots of ITU-T H.248 systems (this is tackled rather by service change and auditing procedures).

   NOTE – "Long" here in the sense of data inconsistency between MGC and MG level.

6) Addressing potential issues related to bulk auditing.

7) Different or dedicated types of auditing for "detection of hanging resources".

8) Detection capability of hanging ITU-T H.248 terminations on MG level.

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