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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication procedures

Gateway control protocol: Termination connection model package

ITU-T Recommendation H.248.51

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AUDIOVISUAL AND MULTIMEDIA SYSTEMS

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ITU-T Recommendation H.248.51

Gateway control protocol: Termination connection model package

Summary

ITU-T Recommendation H.248.51 contains a H.248 package that enables a media gateway controller to audit a media gateway to determine what termination connection configurations are allowed in a context. The termination connection configuration may be the particular termination types allowed to be connected together, and/or the maximum number of a particular termination type allowed in a context for a multi-terminations scenario, e.g., conference or multicast.

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Gateway control protocol: Termination connection model package

1   Scope

This package allows a media gateway controller to audit a media gateway in order to determine what termination connection configurations are allowed in a context. It provides the media gateway controller an automatic means to determine the information contained in Appendix III of [ITU-T H.248.1], clause 6.4 "Connection Model". Based on this information, the media gateway controller should use the allowed termination connection configurations in its indication to the media gateway for connecting terminations in a context, thereby avoiding the potential failure.

The termination connection configuration may be the termination types allowed to be connected together, and/or the maximum number of a particular termination type allowed in a context for a multi-terminations scenario, e.g., conference or multicast.

It provides an enhanced capability of topology auditing to unambiguously describe the allowed termination connection configurations.

In order to provide a mapping between the type of termination and the TerminationID, a meaningful TerminationID scheme should be used. This scheme shall be provisioned on both the MGC and MG. Using a meaningful scheme allows the TerminationID to be wildcarded in order to describe the terminations connection configurations.

Even where this package is not implemented by a media gateway, the descriptions and syntax described in this Recommendation may be used by those defining Profiles when describing the connection model section of the H.248 Profile Template (Appendix III of [ITU-T H.248.1], clause 6.4).

1.1   Relationship with H.248.38 property "number of terminations in a context"

H.248.51 is about termination connection configurations, which are allowed in a possible context, whereas H.248.38 *bc/numterm* property is about the number of terminations present in a concrete, established context. Both functionalities are thus disjoint.

1.2   Relationship with multiplexed terminations

Multiplexed terminations are defined in clauses 6.2 (Terminations) and 7.1.3 (Multiplex Descriptor) of [ITU-T H.248.1]. This Recommendation does not allow the description of Termination Connection Models (see clause 3.2.1) with multiplexed termination types.

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]   ITU-T Recommendation H.248.1 (2005), *Gateway control protocol: Version 3*.

[ITU-T Q.1950]   ITU-T Recommendation Q.1950 (2002), *Bearer independent call bearer control protocol*.

[ETSI TS 129 232]   ETSI TS 129 232 v6.9.0 (2007), *Universal Mobile Telecommunications System (UMTS); Media Gateway Controller (MGC) – Media Gateway (MGW) interface; Stage 3 (3GPP TS 29.232 version 6.9.0 Release 6).*

3   Definitions

3.1   Terms defined elsewhere

None.

3.2   Terms defined in this Recommendation

This Recommendation defines the following term:

3.2.1   termination connection model: Such a model is characterized by:

a)   (maximum) *number* of terminations per context;

b)   possible termination *types* (Note 1) in such a context;

c)   possible *topologies* between the terminations in such a context; and

d)   supported topology *associations* for each possible topology in such a context.

A MG may support one or multiple different termination connection model(s). The *termination type* is typically related to a specific *bearer technology* (Note 2) of the termination.

NOTE 1 – The type of a termination may be visible via the Termination Identifier (Tid). For instance, H.248 Profile specifications often define "prefix" elements (e.g., 'ALN', 'TDM', 'IP', 'RTP', 'Ephemeral', 'AAL2', etc.) as part of the Tid names (for H.248 text encoding). Another example is dedicated codepoints, like the 3-bit 'termination type' codepoint in [ETSI TS 129 232], in ASN.1 coding schemes (for H.248 binary encoding). Such a prefix or codepoint may be used for unambiguous indications of a termination type.

NOTE 2 – H.248 implementations may not support a means to determine the bearer type through the Termination Identifier. In this case, they may use a dedicated H.248 package for bearer technologies: the Bearer Characteristics package (see clause A.3 of [ITU-T Q.1950]) defines a maximum of 255 different bearer types. This property *BCP/BNCChar* is actually synonym to 'termination type'. In this case, the use of the TCM package does not provide information on the connection of bearer types.

4   Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

AAL2   ATM Adaptation Layer 2

ALN   Analog Line

IP   Internet Protocol

MG   Media Gateway

MGC   Media Gateway Controller

RTP   Real-time Transport Protocol

TDM   Time Division Multiplex

5   Conventions

None.

6 Termination Connection Model Package

Package Name: Termination Connection Model

PackageID: tcm (0x00c6)

Description: This package allows an MGC to audit a MG to determine the supported termination connection models.

Version: 1

Extends: None

6.1 Properties

6.1.1 Supported Termination Connections

Property Name: Supported Termination Connections

PropertyID: stc (0x0001)

Description: This root-only property describes the allowed termination configurations in a MG.

Type: Sub-List of type String

Possible values: The String is defined by the following H.248.1 Annex B ABNF:

```
connectionConfig = LBRKT configChoice *(COMMA configChoice) RBRKT
; at-most-once
configChoice = topologyDescriptor / conferenceDescriptor / multicastDescriptor
topologyDescriptor = TopologyToken LBRKT topologyTriple *(COMMA topologyTriple)
RBRKT
topologyTriple = terminationA COMMA terminationB COMMA topologyDirection [COMMA
eventStream]
topologyDirection = BothwayToken / IsolateToken / OnewayToken /
OnewayExternalToken / OnewayBothToken
conferenceDescriptor = ConferenceToken LBRKT conferenceDuple *(COMMA
conferenceDuple) RBRKT
conferenceDuple = terminationA COMMA UINT16
multicastDescriptor = MulticastToken LBRKT multicastTriple *(COMMA
multicastTriple) RBRKT
multicastTriple = terminationA COMMA terminationB COMMA UINT16
terminationA = TerminationID [LSBRKT instanceID RSBRKT]
terminationB = TerminationID [LSBRKT instanceID RSBRKT]
instanceID = UINT16
ConferenceToken = ("Conference" / "CNF")
MulticastToken = ("Multicast" / "MLT")
```

NOTE – Any elements not described in this ABNF are defined in Annex B of [ITU-T H.248.1].

Each instance of string in the "Sub-list of" describes a single overall connection configuration, e.g., one connectionConfig.

Default: None

Defined in: TerminationState

Characteristics: ReadOnly

6.1.2 Non-Supported Termination Connections

Property Name: Non-Supported Termination Connections

PropertyID: nstc (0x0002)

Description: This root-only property describes the termination configurations that are not allowed in a MG.

Type: Sub-List of type String

Possible values: As per clause 6.1.1

Default: None

Defined in: TerminationState

Characteristics: ReadOnly

6.2 Events

None.

6.3 Signals

None.

6.4 Statistics

None.

6.5 Error Codes

None.

6.6 Procedures

6.6.1 Supported and Non-Supported Connections

Normally the MG should be configured with the information of its supported and/or non-supported termination connection configurations. To determine the supported configuration, a MGC may send an AuditValue command request to a MG that supports this package. The MGC should audit both the "Supported Termination Connections" and the "Non-supported Termination Connections" properties.

If the "Supported Termination Connections" returns an empty result and the "Non-supported Termination Connections" returns values by the MG in the reply, then ONLY the configurations in "Non-supported Termination Connections" are non-supported by the MG, and the MGC may consider any configuration other than those returned against "Non-supported Termination Connections" is supported by the MG.

If the "Supported Termination Connections" returns values and the "Non-supported Termination Connections" returns an empty result by the MG in the reply, then ONLY the configurations in "Supported Termination Connections" are supported by the MG, and the MGC may consider any configuration other than those returned against "Supported Termination Connections" is non-supported by the MG.

If both the "Supported Termination Connections" and "Non-supported Termination Connections" are empty in the reply, then the MGC is free to use any configuration.

NOTE – Practically speaking, this does not mean every conceivable configuration is possible. The MG may still return an error.

If both the "Supported Termination Connections" and "Non-supported Termination Connections" return values in the reply, the same configuration shall not appear in both properties. The MGC should then only use the configurations listed in the "Supported Termination Connections", and avoid using the configurations listed in the "Non-Supported Termination Connections".

The termination types to be used in either the "Supported Termination Connections", or in the "Non-supported Termination Connections", or in both, according to the above rules, should be provisioned between the MG and the MGC.

6.6.2 Connection values

Each string associated with the "Supported Termination Connections" and "Non-supported Termination Connections" properties describes a Connection Configuration. This Connection Configuration may take the form of a Topology Description Triple, a Conference Description Duple and/or a Multicast Description Triple.

Each TerminationID in the Topology Description Triple, Conference Description Duple, and Multicast Description Triple may have an InstanceID associated with it. The InstanceID allows a particular instance of TerminationID to be linked when multiple triples/duples are specified within a single Connection Configuration.

The descriptions should be applied to connections according to the order they are received.

A single Connection Configuration describes a termination connection within a single context.

6.6.2.1 Topology Description

The Topology Description string is of a (TerminationA, TerminationB, TopologyDirection) format, in which the TerminationA and TerminationB represent the termination types, and the TopologyDirection represents the direction between the TerminationA and TerminationB, and may be absent for bothway. This is similar to the definition of TopologyDescriptor. However, there is a difference that an optional InstanceID may be associated with a TerminationA or TerminationB. This is used instead of fully specifying an individual TerminationID and allows wildcarding of the TerminationID.

The Topology Description is used to provide the same level of description as the TopologyDescriptor.

For example, the case of 2 terminations in a context is represented by:

$$\text{tcm/sc} = [\{\text{tp}\{*,*,\text{bothway}\}\}]$$

For example, the case of 3 terminations in a context with one termination listening to the other's bothway connection is represented by:

$$\text{tcm/sc} = [\{\text{tp}\{*[0],*[1],\text{bothway},*[0],*[2],\text{oneway},*[1],*[2],\text{isolate}\}\}]$$

6.6.2.2 Conference Description

The Conference Description string is of the form of a (<termination>,<integer of the number of the termination>) duple. This allows the description of the maximum number of a particular termination type allowed in a context for the purposes of conferencing. The Duple allows the configuration of different termination types mixed in a conference to be described. When specifying the maximum number it implies support for all conferencing numbers up to and including the maximum number. The first Duple specifies the maximum number of all termination types of terminations within that conference. Subsequent Duples provide the maximum number of the individual types of terminations within that conference.

An optional InstanceID may be associated with <termination>. This is used instead of fully specifying an individual TerminationID and allows wildcarding of the TerminationID. If the InstanceID is used on the <termination>s then the first termination of <termination>s will receive that InstanceID. The InstanceID of each subsequent termination in the range specified by <integer> shall be incremented by 1. E.g., given: (*[1],3) the InstanceIDs of <termination> shall be 1, 2, 3 respectively.

For example, the case of a 20 terminations conference in a context is represented by:

$$tcm/sc = [\{cnf\{*,20\}\}]$$

For example, the case of a 30 terminations conference with a maximum number of 10 TDM terminations in a context is represented by:

$$tcm/sc = [\{cnf\{*,30,TDM/*,10\}\}]$$

6.6.2.3   Multicast Description

The Multicast Description string is of the form of a (<termination from>,<terminations to>,<integer of number of terminations to>) triple. This allows the description of the maximum number of a particular termination type allowed to be multicasted (broadcasted?) to. The Triples allows the configuration of different termination types mixed in a multicast to be described. When specifying the maximum number it implies support for all multicasted numbers up to and including the maximum number. The first Triple specifies the maximum number of all termination types of terminations within that multicast. Subsequent Triples provide the maximum number of the individual types of terminations within that multicast.

An optional InstanceID may be associated with <termination from> or <terminations to>. This is used instead of fully specifying an individual TerminationID and allows wildcarding of the TerminationID. If the InstanceID is used on the <terminations to> then the first termination of <terminations to> will receive that InstanceID. The InstanceID of each subsequent termination in the range specified by <integer of number of terminations to> shall be incremented by 1. E.g., given: (*[1],*[2],3) the InstanceIDs of <terminations to> shall be 2, 3, 4 respectively.

When using subsequent Triples the <termination from> value shall be the same as the original Triple, including the InstanceID if included.

For example, the case of a 20 terminations multicast in a context is represented by:

$$tcm/sc = [\{mlt\{*,*,20\}\}]$$

For example, the case of a 30 terminations multicast with a maximum number of 10 TDM terminations in a context is represented by:

$$tcm/sc = [\{mlt\{*,*,30,*,TDM/*,10\}\}]$$

6.6.2.4   Description interactions

As described above, the Topology, Conference and Multicast descriptions can be combined to define a Connection Configuration for a context. As such, there may be interactions between the different types of descriptions. Typically, the linkage between the types of descriptions is provided by the TerminationID in the descriptions. Where the TerminationID may prove ambiguous, it is recommended that the InstanceID be used to unambiguously define the relationship.

The following examples illustrate Connection Configurations where multiple descriptions are used.

Example 1: Multicast and Topology Description

For example, the case of a 3 terminations multicast connection, where the sending termination may be bothway connected to another termination, may be represented by Figure 6-1 and the following syntax:

$$tcm/sc = ["\{mlt\{*[1],*,3\}\}","\{tp\{*[1],*,bothway\}\}"]$$
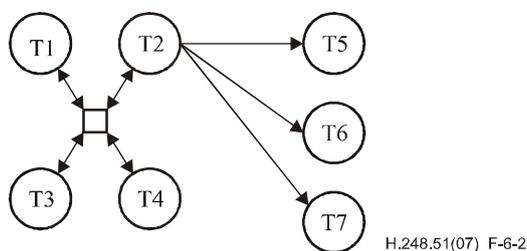
H248.51(07)_F-6-1
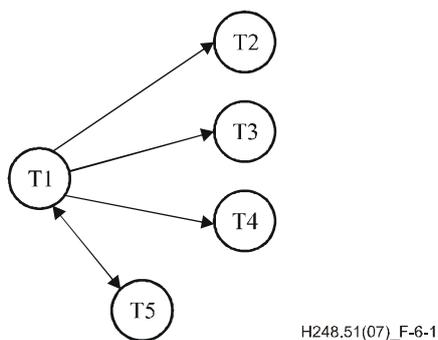
Figure 6-1 – Multicast and Topology connection

Example 2: Conference and Multicast Description

For example, the case of a 4 terminations conference connection where a termination may be multicasting to 3 terminations may be represented by Figure 6-2 and the following syntax:

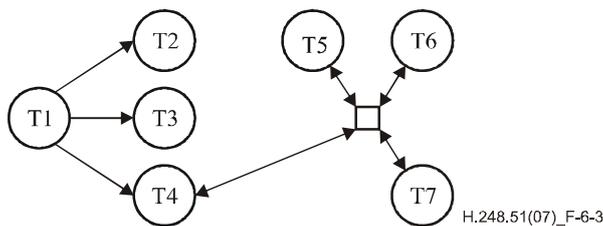tcm/sc = ["{cnf{*,4}}",{mlt{*,*,3}}]

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Figure 6-2 – Conference and Multicast connection

Example 3: Multicast and Conference Descriptor

For example, the case of a 3 terminations multicast where one of the terminations being multicasted may be conference connected to 3 terminations may be represented by Figure 6-3 and the following syntax:

tcm/sc = [{mlt{*,*[2],3}},{cnf{*[4],4}}]

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Figure 6-3 – Multicast and Conference connection

NOTE – When specifying Connection Configurations with both of multicast and conference connection, specifiers should be aware of the potential for InstanceID overlap due to the way InstanceIDs are automatically assigned with these description types.

6.6.3   Message examples

Given the connection model and the TerminationID scheme as follows:

•   Context[a](RTP, TDM);

•   Context[b](TDM, TDM).

the MGC would audit the Supported Connections property. The response would be:

```
MEGACO/3 [125.125.125.111]:55555
Reply = 50007 {
    Context = - {
        AuditValue = Root {
            Media {
                TerminationState {
                    tcm/sc = ["{tp{tdm/*,tdm/*,bothway}}",
                    " {tp{rtp/*,tdm/*,bothway}}"]
                }
            }
        }
    }
}
```

The response indicates that any TDM termination can be connected to any other TDM termination. It also indicates that any RTP termination can be connected to any TDM termination, and vice versa. As RTP to RTP is not described, RTP to RTP termination connection is not supported.

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