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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication procedures

Gateway control protocol: H.248.1 packages for H.323 and H.324 interworking

ITU-T Recommendation H.248.12

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ITU-T Recommendation H.248.12

Gateway control protocol: H.248.1 packages for H.323 and H.324 interworking

Summary

This Recommendation defines several H.248.1 packages that are intended for Media Gateways designed to support interworking between H.323 terminals and H.324 terminals. More specifically, this Recommendation contains: package "h324" for creating terminations supporting H.324, package "h245" for creating terminations supporting H.245 channels for H.324 calls, package "h323bc" for creating terminations supporting H.245 channels for H.323 calls, package "h245com" for the communication of H.245 commands between a MGC and MG, and package "h245ind" for the communication of H.245 indications.

NOTE – This Recommendation has been renumbered. It was formerly known as ITU-T Rec. H.248, Annex M4.

Source

ITU-T Recommendation H.248.12 was prepared by ITU-T Study Group 16 (2001-2004) and approved under the WTSA Resolution 1 procedure on 29 July 2001.

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.

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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, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

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ITU-T Recommendation H.248.12

Gateway control protocol: H.248.1 packages for H.323 and H.324 interworking

1 Introduction

This Recommendation gathers packages for H.245, H.245 parameters specific to H-series audiovisual terminals, and Annex C/H.324 terminals for use with the H.248.1 gateway control protocol. The packages in this Recommendation are in conformance with clause 12/H.248.1 package definition guidelines.

2 Scope

This Recommendation describes packages for the H.248.1 gateway control protocol related to interworking of H.323 and H.324 terminals, as follows:

– Package "h324" for termination of H.324 bitstream on MGs.

– Package "h245" for termination of H.245 messages on MGs.

– Package "h323bc" for H.245 parameters specific to H.323.

– Package "h245com" for providing properties that allow the MGC to indicate to the MG that the MGC has sent or received an H.245 command.

– Package "h245ind" for providing properties that allow the MGC to indicate to the MG that the MGC has sent or received an H.245 indication.

With the terminations implementing "h324", "h245com" and "h245ind" packages, the decomposed gateway may support H.324 communication with the H.245 control function in the MGC. In the H.324 and H.323 interworking scenario with this decomposed gateway, H.245 control messages are terminated in the MGC (a backhaul is used between the MG and the MGC to transport H.245 messages between the MG and the MGC, on the H.324 side). The terminations for media on both H.324 and H.323 sides are managed by the MGC.

With the terminations implementing "h324" and "h245" packages, the decomposed gateway may support H.324 communication with H.245 control in the MG. In the H.324 and H.323 interworking scenario with this decomposed gateway, H.245 control messages from the H.324 side and the H.323 side are terminated in the "h245" termination and in the "h323bc" termination respectively, and are processed in the MG. The MG manages the logical channels for media.

3 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.

3.1 Normative references

– ITU-T Recommendation H.223 (2001), *Multiplexing protocol for low bit rate multimedia communication*.

– ITU-T Recommendation H.245 (2001), *Control protocol for multimedia communication*.

– ITU-T Recommendation H.323 (2000), *Packet-based multimedia communications systems*.

– ITU-T Recommendation H.324 (2002), *Terminal for low bit-rate multimedia communication*.

– ITU-T Recommendation V.8 (2000), *Procedures for starting sessions of data transmission over the public switched telephone network*.

– ITU-T Recommendation V.8 *bis* (2000), *Procedures for the identification and selection of common modes of operation between data circuit-terminating equipments (DCEs) and between data terminal equipments (DTEs) over the public switched telephone network and on leased point-to-point telephone-type circuits*.

– ITU-T Recommendation V.34 (1998), *A modem operating at data signalling rates of up to 33 600 bit/s for use on the general switched telephone network and on leased point-to-point 2-wire telephone-type circuits*.

– ITU-T Recommendation V.42 (1996), *Error-correcting procedures for DCEs using asynchronous-to-synchronous conversion*.

– ITU-T Recommendation V.42 *bis* (1990), *Data compression procedures for data circuit-terminating equipment (DCE) using error correction procedures*.

– ITU-T Recommendation V.140 (1998), *Procedures for establishing communication between two multiprotocol audiovisual terminals using digital channels at a multiple of 64 or 56 kbit/s*.

– ITU-T Recommendation X.691 (1997), *Information technology – ASN.1 encoding rules: Specification of Packed Encoding Rules (PER)*.

3.2 Informative reference

– IETF RFC 2960 (2000), *Stream Control Transmission Protocol*.

4 H324 package

Package Name: H.324

PackageID: h324, (0x002c)

Version: 1

Extends: None

Description:

This package is defined to support terminations for calls using ITU-T Rec. H.324. The transport mechanism or bearer channel will be different for each environment where the package is used.

Figure 1 shows the functional view of a H.324 multimedia call and the MGC control points defined in the H.324 package. In ITU-T Rec. H.324, there are three communication modes defined according to the underlying network: a PSTN mode defined in ITU-T Rec. H.324 main body (H.324P), a mobile network mode defined in Annex C/H.324 (H.324M), and an ISDN mode defined in Annex D/H.324 (H.324I). One of these communication modes shall be selected when the termination implementing the H.324 package is invoked by the MGC.

In version 1 of the H.324 package, only the functionalities required of the H.324M mode are defined. The functionalities for H.324P and H.324I are FFS, and will be defined in version 2, or later.

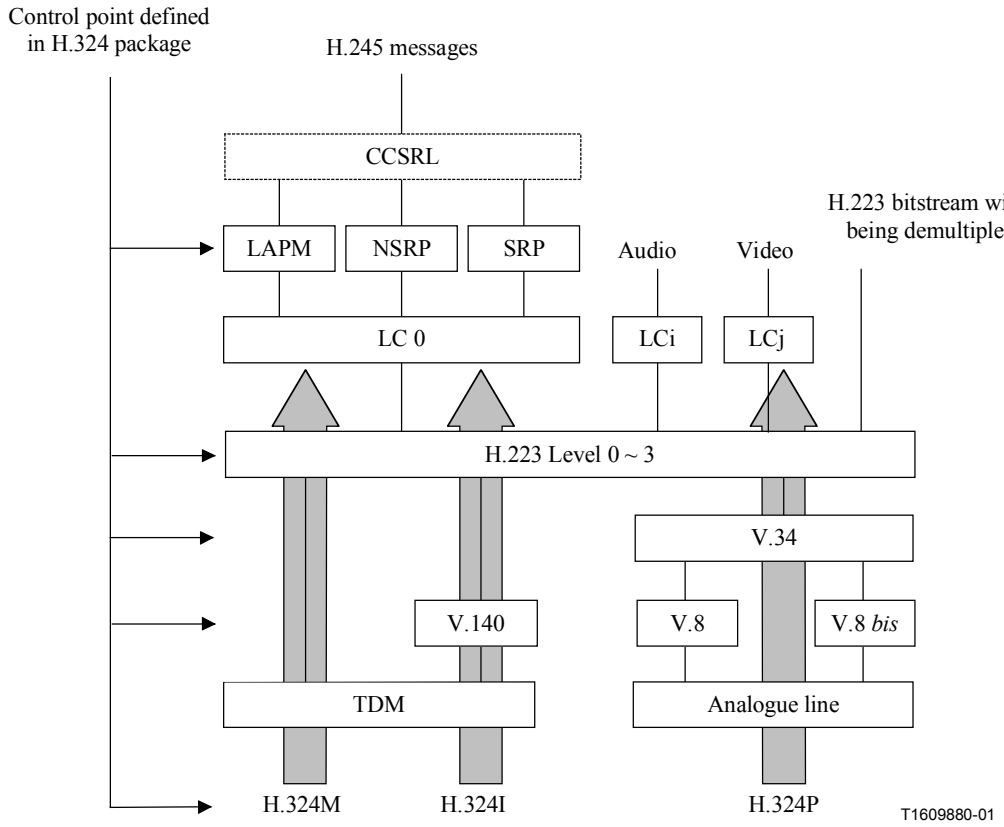

Figure 1/H.248.12 – Control point defined in H.324 package

4.1 Properties

4.1.1 Communication mode

Property Name: Communication mode

PropertyID: cmod (0x0001)

Type: Enumeration

Possible values:

H324P (0x0001) H324 operating in the base PSTN mode using a V-series modem

H324M (0x0002) Annex C/H.324 (Mobile)

H324I (0x0003) Annex D/H.324 (ISDN)

Defined in: TerminationState

Characteristics: Read/Write

Description:

This property indicates the communication mode to be followed by the termination.

4.1.2 Highest Multiplexing Level

Property Name: Highest Multiplexing level

PropertyID: muxlv (0x0002)

Type: Enumeration

Possible values:

Level0	(0x0001) H.223 level 0 defined in ITU-T Rec. H.223
Level1	(0x0002) H.223 level 1 defined in Annex A/H.223
Level2	(0x0003) H.223 level 2 defined in Annex B/H.223
Level3	(0x0004) H.223 level 3 defined in Annex C/H.223

Defined in: TerminationState

Characteristics: Read/Write

Description:

This property indicates the highest level of H.223 multiplexing which can be used by the termination. The indicated level is used in the multiplex level initialization phase as defined in C.6/H.324. The default value is 'Level0'. If the communication mode property is set to 'H324P' or 'H324I', the value of the highest multiplexing level property shall be set to 'Level0'.

4.1.3 Demultiplex

Property Name: Demultiplex

PropertyID: demux (0x0003)

Type: Boolean

Possible values:

TRUE	(0x0001) H.223 multiplexed stream is demultiplexed
FALSE	(0x0000) H.223 multiplexed stream is not demultiplexed

Defined in: LocalControl

Characteristics: Read/Write

Description:

This property specifies the operation on the H.223 multiplexed stream received by the termination. If set to 'FALSE', the H.223 multiplexed stream is relayed to the other termination without being demultiplexed. If set to 'TRUE', each logical channel data is extracted from the multiplexed stream, and is given to the appropriate termination. The default value shall be TRUE.

4.1.4 Remote H.223 capability

Property Name: Remote H.223 capability

PropertyID: h223capr (0x0004)

Type: OCTET STRING

Possible values:

This property indicates the value of the H.245 H223Capability structure encoded by applying the Packed Encoding Rules (PER) specified in ITU-T Rec. X.691.

Defined in: LocalControl

Characteristics: Read/Write

Description:

This property indicates the remote endpoint's capabilities specific to the H.223 multiplex capability. The MGC shall set the value of the 'h223capr' property to the value of the H223Capability in the received H.245 message.

4.1.5 Incoming Multiplex Table

Property Name: Incoming Multiplex Table

PropertyID: muxtbl_in (0x0005)

Type: OCTET STRING

Possible values:

This property indicates the value of H.245 MultiplexEntrySend message received by the MGC (see description for details). The MultiplexEntrySend structure is encoded by applying PER.

Defined in: LocalControl

Characteristics: Read/Write

Description:

This property indicates the H.223 multiplex table which associates each octet within an H.223 MUX-PDU with a particular logical channel number. Upon receipt of the MultiplexEntrySend message from the remote endpoint, the MGC shall decide whether it confirms or rejects each multiplex table entry. The MGC shall create an equivalent MultiplexEntrySend message that contains only the entries that it confirmed to the remote H.324 terminal and the MGC shall send the created message as the content of the muxtbl_in property so that the MG can perform the demultiplexing of the incoming H.223 MUX-PDUs.

4.1.6 Outgoing Multiplex Table

Property Name: Outgoing Multiplex Table

PropertyID: muxtbl_out (0x0006)

Type: OCTET STRING

Possible values:

This property indicates the value of H.245 MultiplexEntrySend message sent by the MGC (see description for details). The MultiplexEntrySend structure is encoded by applying PER.

Defined in: LocalControl

Characteristics: Read/Write

Description:

This property indicates the H.223 multiplex table which associates each octet within an H.223 MUX-PDU with a particular logical channel number. Upon receipt of the MultiplexEntrySendAck message from the remote endpoint, the MGC shall send multiplex table entries which are confirmed by the remote endpoint as the content of the muxtbl_out property. Thus the MG can perform the multiplexing of the outgoing H.223 MUX-PDUs.

4.2 Events

None.

4.3 Signals

None.

4.4 Statistics

4.4.1 MUXPDU sent

StatisticsID: muxsent (0x0001)

Type: Integer

Units: number of MUX-PDUs

Description:

Number of MUX-PDUs sent from the termination.

4.4.2 MUXPDU received

StatisticsID: muxrec (0x0002)

Type: integer

Units: number of MUX-PDUs

Description:

Number of MUX-PDUs received by the termination.

4.4.3 MUXPDU error

StatisticsID: muxerr (0x0003)

Units: number of MUX-PDUs

Description:

Number of the received MUX-PDU in which MUX-PDU header error is detected.

4.5 Procedures

MGC shall create an H.324 termination with the appropriate value of the "cmod" property. MG shall establish the connection according to procedures defined in ITU-T Rec. H.324 for the communication mode indicated by the 'cmod' property.

For the version 1 of the package, only H324M mode is supported.

After the connection is established with the communication mode of 'H324M', the MG shall immediately start the H.223 level setup procedure as defined in Annex C/H.324 according to the value of the 'muxlv' property. After agreement of H.223 multiplexing level, the MG shall start to receive and transmit H.223 MUX-PDUs.

If the 'demux' property is set to 'FALSE', the received MUX-PDUs should be passed to the termination connected to the H.324 termination without being demultiplexed. If the 'demux' property is set to 'TRUE', the MG shall demultiplex the received MUX-PDUs to logical channels. The first logical channel opened after the connection is established, is logical channel 0 for H.245 control messages. The MGC may choose whether H.245 control is located in the MGC or in the MG.

If the MGC decides to allow the MG to manage H.245 control, the termination which implements the H.245 package shall be invoked and connected to the H.324 termination. The H.245 messages are exchanged between the remote endpoint and the H.245 termination via the H.324 termination, and the media logical channels may be opened or closed without indication from the MGC.

If the MGC decides to execute H.245 control on itself, the MGC shall not invoke the H.245 termination connected to the H.324 termination. The H.245 messages received/transmitted by the H.324 termination are forwarded to/from the MGC. The MG shall control the H.223 operation according to the 'h223capr' property indicated by the MGC. The 'muxtbl' property shall be used to inform the MG of the incoming/outgoing multiplex table entry.

5 H245 Package

Package Name: H.245

PackageID: h245, (0x002a)

Version: 1

Extends: None

Description:

This package is defined to support MGC-MG configurations where H.245 messages are received on the MG device. This package shall be implemented only if the MG supports the scenario where the H.245 control function is in the MG. This package shall not be used for H.324 communication where the H.245 control is in the MGC.

5.1 Properties

5.1.1 H.245 channel state

PropertyID: cs (0x0001)

Type: Boolean

Possible values:

TRUE (0x0001) The H.245 channel is open

FALSE (0x0000) Close the H.245 channel

Defined in: TerminationState

Characteristics: Read/Write

Description:

This property specifies whether the H.245 termination is open or closed. The default value shall be "TRUE".

5.1.2 Terminal Type

PropertyID: termtype (0x0002)

Type: Enumeration

Possible values:

H324M 0x0001 H.245 termination is associated with an H324M terminal

H323 0x0002 H.245 termination is associated with an H323 terminal/endpoint

Defined in: TerminationState

Characteristics: Read/Write

Description:

This property defines the type of terminal that is associated with this termination. In this version of the package only two terminal types are defined, but the possible values may be extended in future versions of the package.

5.2 Events

5.2.1 H245 Message

Event Name: Incoming H.245 Message

EventID: h245msg (0x0001)

Description:

This event occurs when the MG detects an incoming H.245 message on the termination realizing this package. The default value for this property shall be "ES" (for detection of End Session commands).

EventsDescriptor Parameters:

Parameter Name: Type of H.245 Message to be detected

ParameterID: h245mt (0x0001)

Type: Sub-list

Possible values:

Value for binary encoding	Value for text encoding	Description
0xffff	"none"	No H.245 Messages
0x0001	"all"	All H.245 Messages
0x0002	"Req"	All H.245 Request Messages
0x0003	"Res"	All H.245 Response Messages
0x0004	"Com"	All H.245 Command Messages
0x0005	"Ind"	All H.245 Indication Messages
0x0006	"NSreq"	Non-Standard Request
0x0007	"MSD"	Master Slave Determination
0x0008	"TCS"	Terminal Capability Set Request
0x0009	"OLC"	Open Logical Channel Request
0x000a	"CLC"	Close Logical Channel Request
0x000b	"RCC"	Request Channel Close Request
0x000c	"MES"	Multiplex Entry Send Request
0x000d	"RME"	Request Multiplex Entry Request
0x000e	"RM"	Request Mode Request
0x000f	"RTD"	Roundtrip Delay Request
0x0010	"ML"	Maintenance Loop Request
0x0011	"CM"	Communication Mode Request
0x0012	"CR"	Conference Request
0x0013	"MR"	Multilink Request
0x0014	"LCR"	Logical Channel Rate Request
0x0015	"NSres"	Non-Standard Response
0x0016	"MSDack"	Master Slave Determination Ack
0x0017	"MSDrej"	Master Slave Determination Reject

Value for binary encoding	Value for text encoding	Description
0x0018	"TCSack"	Terminal Capability Set Ack
0x0019	"TCSrej"	Terminal Capability Set Reject
0x001a	"OLCack"	Open Logical Channel Ack
0x001b	"OLCrej"	Open Logical Channel Reject
0x001c	"CLCack"	Close Logical Channel Ack
0x001d	"RCCack"	Request Channel Close Ack
0x001e	"RCCrej"	Request Channel Close Reject
0x001f	"MESack"	Multiplex Entry Send Ack
0x0020	"MESrej"	Multiplex Entry Send Reject
0x0021	"RMEack"	Request Multiplex Entry Ack
0x0022	"RMErej"	Request Multiplex Entry Reject
0x0023	"RMack"	Request Mode Ack
0x0024	"RMrej"	Request Mode Reject
0x0025	"RTDres"	Roundtrip Delay Response
0x0026	"MLack"	Maintenance Loop Ack
0x0027	"MLrej"	Maintenance Loop Reject
0x0028	"CMres"	Communication Mode Response
0x0029	"Cres"	Conference Response
0x002a	"MLres"	Multilink Response
0x002b	"LCRack"	Logical Channel Rate Ack
0x002c	"LCRrej"	Logical Channel Rate Reject
0x002d	"NScom"	Non-Standard Command
0x002e	"MLO"	Maintenance Loop Off Command
0x002f	"STCS"	Send Terminal Capability Set Command
0x0030	"ENC"	Encryption Command
0x0031	"FC"	Flow Control Command
0x0032	"ES"	End Session Command
0x0033	"MC"	Miscellaneous Command
0x0034	"CMcom"	Communication Mode Command
0x0035	"Ccom"	Conference Command
0x0036	"h223MR"	H223 Multiplex Reconfiguration Command
0x0037	"NAVcom"	New ATM VC Command
0x0038	"MMRcom"	Mobile Multilink Reconfiguration Command
0x0039	"NSind"	Non-Standard Indication
0x003a	"FNU"	Function Not Understood
0x003b	"MSDrel"	Master Slave Determination Release
0x003c	"TCSrel"	Terminal Capability Set Release
0x003d	"OLCcon"	Open Logical Channel Confirm
0x003e	"RCCrel"	Request Channel Close Release
0x003f	"MESrel"	Multiplex Entry Send Release

Value for binary encoding	Value for text encoding	Description
0x0040	"RMErel"	Request Multiplex Entry Release
0x0041	"RMrel"	Request Mode Release
0x0042	"MI"	Miscellaneous Indication
0x0043	"JI"	Jitter Indication
0x0044	"h223SI"	H223 Skew Indication
0x0045	"NAVind"	New ATM VC Indication
0x0046	"UII"	User Input Indication
0x0047	"H2250MSI"	H2250 Maximum Skew Indication
0x0048	"MCL"	MC Location Indication
0x0049	"CI"	Conference Indication
0x004a	"VI"	Vendor Identification
0x004b	"FNS"	Function Not Supported
0x004c	"MLI"	Multilink Indication
0x004d	"LCRrel"	Logical Channel Rate Release
0x004e	"FCind"	Flow Control Indication
0x004f	"MMRind"	Mobile Multilink Reconfiguration Indication

Description:

This parameter defines the type of message(s) that the MGC wants the MG to detect. The MGC may specify "all" if it wants the MG to detect and notify for all the H.245 messages received on the H245 termination. MGC may specify "Req", "Res", "Com" or "Ind" if it wants the MG to detect all the H.245 Request messages, all the H.245 Response messages, all the H.245 Command messages or all the H.245 Indication messages received on the H245 termination. Alternatively the MGC may specify a more specific list of messages for which it wants to be notified by the MG. In principle MGC should not specify individual messages if it uses "all" or "none" in the sub-list. "none" or "all", if present, should be the only element in the sub-list. There may be situations where the MGC wants all the H.245 Requests to be detected along with some other H.245 messages; this is allowed in the sub-list. The MG should ignore all the other elements in the sub-list if "none" is present. If "none " is not present, but "all" is present, the MG should ignore all other elements in the sub-list. The MG should also ignore all elements that specify individual H.245 Request messages, if the element "Req" is present in the sub-list. The same is true with the presence of "Res", "Com" or "Ind", wherein the MG should ignore elements specifying individual H.245 Responses, Commands or Indications. Support for the event notification of commands is optional. Support for the event notification of the EndSession command is recommended in order to ensure smooth call release.

ObservedEventsDescriptor Parameters:

Parameter Name: Contents of H.245 message detected

ParameterID: h245mc (0x0002)

Type: OCTET STRING

Description:

Specifies the actual contents of the H.245 message detected by the MG. The octet string is the actual X.691 encoding received by the MG.

5.2.2 H.245 Channel Closed

Event Name: H.245 Channel Closed

EventID: h245ChC (0x0002)

Description:

This event occurs when the MG completes the closing of a H.245 channel.

EventsDescriptor Parameters:

None.

ObservedEventsDescriptor Parameters:

None.

5.3 Signals

None.

5.4 Statistics

None.

5.5 Procedures

This package may be used on terminations that carry H.245 information, if the MGC wants to process this information on the MG. The MGC may ask the MG for notification on detecting a particular type of H.245 message on the h245 termination.

The MGC shall set the "cs" (Channel State) property to true initially. When the MGC wants MG to close the H.245 channel it shall modify the value of the "cs" property to "FALSE". The MG shall follow the procedures defined in Annex F/H.246 to close the H.245 channel.

6 H323 Bearer Control Package

Package Name: H.323 Bearer Control

PackageID: h323bc, (0x002b)

Version: 1

Extends: h245 Package version 1 (defined in this Recommendation)

Description:

This package specifies an extension to the h245 Package to support H.323 fast start and the H.323 use of H.245 tunnelling. This package shall be implemented only if the MG supports H.323 communication where the H.245 control function is in the MG. This package shall not be used for H.323 communication where the H.245 control is in the MGC.

6.1 Properties

6.1.1 Fast Connect

PropertyID: fastconnect (0x0001)

Type: Enumeration

Possible values:

noFastStart	(0x0001)	MGC using separate H.245 channel or using H.245 tunnelling
fastStart	(0x0002)	Only fastStart procedures are being used, no parallel H.245control

parallelH245 (0x0003) Parallel H.245 control is supported

Defined in: LocalControl

Characteristics: Read/Write

Description:

This property specifies if the fast connect procedure is used. If the MGC rejects or does not initiate the fast connect procedure, this field shall contain "noFastStart". This property indicates to the MG that the MGC has decided to use H.245 tunnelling or a separate channel for H.245 to the H.323 endpoint. If the MGC accepts or initiates a request for the fast connect procedure, this field shall be set to "fastStart". If however the MGC also decides to support the parallel H.245 procedures along with fast connect, this field shall be set to "parallelH245". The default value for this property shall be "noFastStart".

6.1.2 H.245 Message Encapsulation

PropertyID: h245encapstatus (0x0002)

Type: Boolean

Possible values:

FALSE (0x0000) H.245 message encapsulation is disabled

TRUE (0x0001) H.245 message encapsulation is enabled

Defined in: LocalControl

Characteristics: Read/Write

Description:

This property specifies whether H.245 message encapsulation is enabled or not enabled on the connection to the H.323 endpoint. Practically this property reflects the value of **h245Tunneling** element in the H.225.0 messages.

The default value shall be FALSE.

6.2 Events

Event Name: Switch to separate H.245 channel

Event ID: sepH245 (0x0001)

Description:

The MG shall notify the MGC with this event when the MG requires the opening of a separate H.245 channel to the H.323 endpoint. This typically happens in a case where the call was set-up using fastStart procedures and the H.245 message tunnelling was disabled. The MGC shall ignore this event if a separate H.245 channel is already open to the H.323 endpoint.

6.3 Signals

None.

6.4 Statistics

None.

6.5 Procedures

This package supports various ways to start H.245 procedures as specified in 8.2/H.323. The termination that realizes this package shall be made if and only if the processing of H.245 messages

from the H.323 side of the gateway is to be performed in the MG. In the following description, it is premised that the MGC requests the creation of the termination that terminates H.245 control.

The MGC that decides to utilize H.245 tunnelling or initiates a separate H.245 channel with the H.323 side, shall generate the termination with the 'fastconnect' property set to the value "noFastStart".

The MGC that decides to use the fast connect procedure shall request the creation of a termination that has the value of the 'fastconnect' property set to other than "noFastStart" according to the procedure to be taken.

If the MGC decides to use H.245 tunnelling or fast connect procedures (with or without parallelH245), H.245 messages shall terminate at the MGC and the MGC shall be responsible for redirecting H.245 messages to the H323bc termination at the MG. The MGC can implement this H.245 message redirection by using one of its own addresses as the remote address of the h323bc termination when this is created.

The MGC shall indicate a switch to a separate H.245 channel by changing the value of the fastconnect property from "fastStart" or "parallelH245" to "noFastStart", and the value of h245encapstatus property to FALSE (using a MODIFY command). The MGC should not MODIFY the value of the fastconnect property to "fastStart" or "parallelH245" from "noFastStart" if the MG has already received a message on that termination. In the event of a switch from fastStart (or parallel H.245) procedures to a **separate H.245 channel** the MGC may need to subtract and request the creation of a new H245 termination. This termination should be a direct H.245 channel between the MG and the remote H.323 endpoint.

NOTE 1 – A state where value h245encapstatus property is "FALSE", and the value of the fastconnect property is other than "noFastStart", indicates that a switch to a separate H.245 channel would be required if any further H.245 messages are generated.

NOTE 2 – The intent of this package is that it be used by a MG supporting H.323 calls when a H.245 termination is needed on the MG. As an optional capability, the MG may also use this package (and the other procedures of this Recommendation) in support of H.323 calls that employ Fast Connect or H.245 tunnelling. The value for the inherited property "termtype" shall always be H.323.

7 H.245 Command Package

Package Name: H.245 Command

PackageID: h245com, (0x002d)

Version: 1

Extends: None

Description:

This package defines properties that may be used to indicate that the MGC has sent or received an H.245 command message and the MG should take appropriate action.

7.1 Properties

7.1.1 Incoming MiscellaneousCommand

Property Name: Incoming H.245 MiscellaneousCommand

PropertyID: misc_in (0x0001)

Type: OCTET STRING

Possible values:

This property indicates the value of the H.245 MiscellaneousCommand received by the MGC. The MiscellaneousCommand structure is encoded by applying PER.

Defined in: LocalControl

Characteristics: Read/Write

Description:

MG shall take appropriate action as described in B.13.5/H.245.

7.1.2 Outgoing Miscellaneous Command

Property Name: Outgoing H.245 MiscellaneousCommand

PropertyID: misc_out (0x0002)

Type: OCTET STRING

Possible values:

This property indicates the value of the H.245 MiscellaneousCommand sent by the MGC. The MiscellaneousCommand structure is encoded by applying PER.

Defined in: LocalControl

Characteristics: Read/Write

Description:

MG shall take appropriate action as described in B.13.5/H.245.

7.1.3 Incoming H223MultiplexReconfiguration Command

Property Name: Incoming H.223MultiplexReconfiguration Command

PropertyID: h223mr_in (0x0003)

Type: OCTET STRING

Possible values:

This property indicates the value of the H223MultiplexReconfiguration command received by the MGC. The H223MultiplexReconfiguration structure is encoded by applying PER.

Defined in: LocalControl

Characteristics: Read/Write

Description:

A MG which supports the H.223 level change procedure shall start the dynamic H.223 level change procedure as defined in C.7/H.324.

7.1.4 Outgoing H223MultiplexReconfiguration Command

Property Name: Outgoing H.223MultiplexReconfiguration Command

PropertyID: h223mr_out (0x0004)

Type: OCTET STRING

Possible values:

This property indicates the value of the H223MultiplexReconfiguration command sent by the MGC. The H223MultiplexReconfiguration structure is encoded by applying PER.

Defined in: LocalControl

Characteristics: Read/Write

Description:

The MG which supports H.223 level change procedure shall start the dynamic H.223 level change procedure as defined in C.7/H.324.

7.2 Events

None.

7.3 Signals

None.

7.4 Statistics

None.

7.5 Procedures

The H.245 Command package defines the properties that may be used by the MGC to pass on the H.245 commands that it sends or receives to/from the remote terminal. The presence of the property in the LocalDescriptor or the RemoteDescriptor indicates whether the command was sent or received by the MGC (see the descriptions with individual properties for more details).

8 H.245 Indication package

Package Name: H.245 Indication

PackageID: h245ind, (0x002e)

Version: 1

Extends: None

Description:

This package defines properties that may be used to indicate that the MGC has sent or received an H.245 indication message and the MG should take appropriate action.

8.1 Properties

8.1.1 Incoming MiscellaneousIndication

Property Name: Incoming H.245 MiscellaneousIndication

PropertyID: misc_in (0x0001)

Type: OCTET STRING

Possible values:

This property indicates the value of the H.245 MiscellaneousIndication received by the MGC. The MiscellaneousIndication structure is encoded by applying PER.

Defined in: LocalControl

Characteristics: Read/Write

Description:

The MG shall take appropriate action as described in B.14.2/H.245.

8.1.2 Outgoing MiscellaneousIndication

Property Name: Outgoing H.245 MiscellaneousIndication

PropertyID: misc_out (0x0002)

Type: OCTET STRING

Possible values:

This property indicates the value of the H.245 MiscellaneousIndication sent by the MGC. The MiscellaneousIndication structure is encoded by applying PER.

Defined in: LocalControl

Characteristics: Read/Write

Description:

The MG shall take appropriate action as described in B.14.2/H.245.

8.2 Events

None.

8.3 Signals

None.

8.4 Statistics

None.

8.5 Procedures

This package defines the properties that may be used by the MGC to pass on the H.245 indications that it sends or receives to/from the remote terminal. The presence of the property in the LocalDescriptor or the RemoteDescriptor indicates whether the command was sent or received by the MGC (see the descriptions with individual properties for more details).

9 Call flows

This clause describes possible configurations of decomposed gateway and its communication procedures.

9.1 H.323-Annex C/H.324 interworking with H.245 in MG

9.1.1 Calls with origination by the Annex C/H.324 side

The MG which supports interworking between an H.323 and Annex C/H.324 endpoints may support H.245 signalling, H.245 messages translation as specified in Annex F/H.246, and resource control (for example, audio/video streams, transcoding units and so on) without direct commands from the MGC. The MG may support event notification to the MGC such as the result of opening/closing audio/video logical channels. If the MGC decides to allow the MG to control resource for an H.323-Annex C/H.324 call and uses a separate H.245 channel on the H.323 side, the decomposed gateway configuration looks like as shown in Figure 2. In this case, the MG shall manage audio and video streams without commands from the MGC.

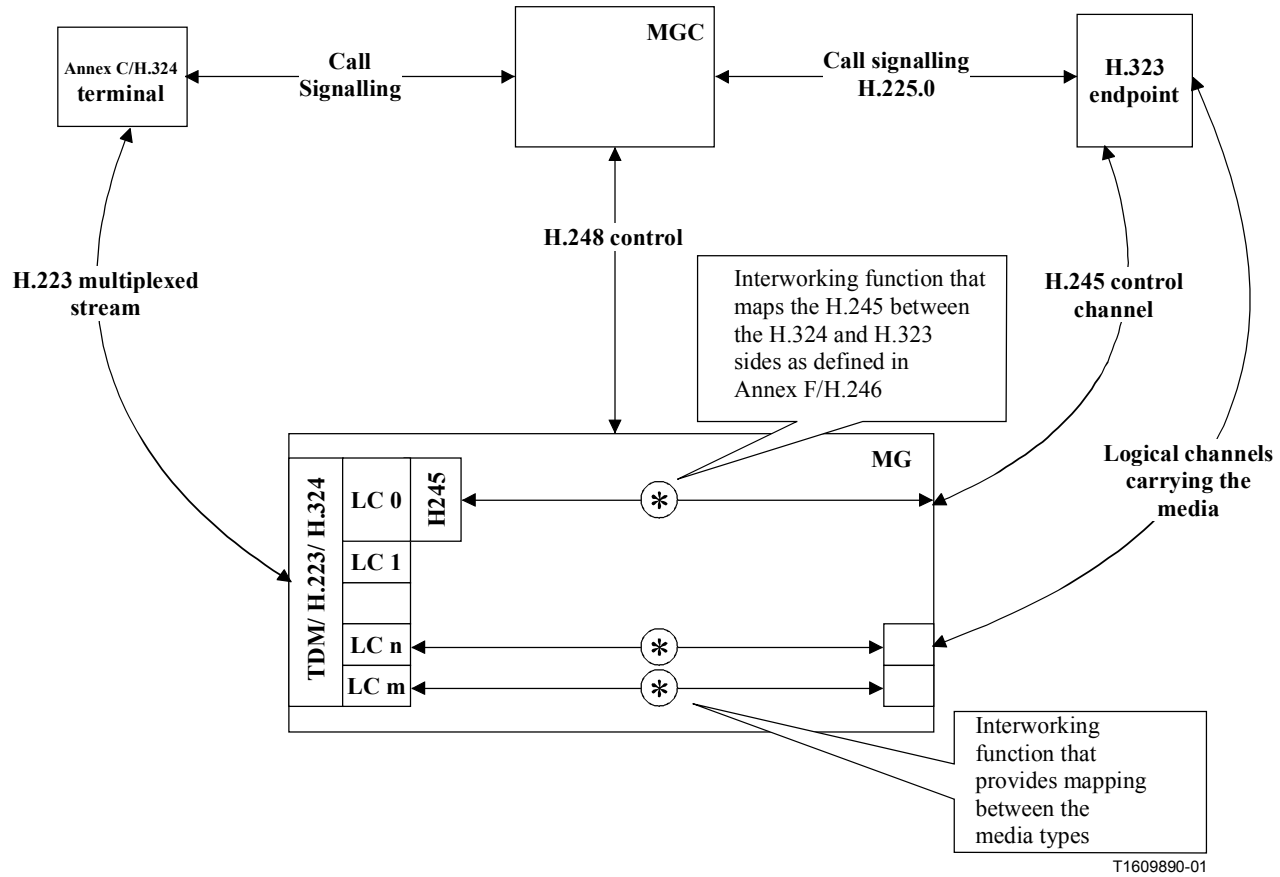

Figure 2/H.248.12 – Resource control at the MG (without fastStart/H.245 tunnelling)

The following steps are involved in a call originated by the H.324M side.

1) MGC detects an incoming call from a H.324M terminal.

2) MGC shall establish a call using H.225.0 with the H.323 side without using fastStart or H.245 message encapsulation.

3) MGC shall create a TDM termination, specify an appropriate value for h324/Muxlv and set h324/demux property to TRUE. H324/cmod shall be set to "H324M" (0x0002).

4) MGC shall create a termination that realizes h245 package and initialize properties to appropriate values. The h245/termtype property shall be set to "H324M". MGC shall add this termination as the first in the MuxDescriptor of the h324 termination created in step 2).

5) MGC shall create a termination that realizes h323bc package and set the fastconnect property to "noFastStart", and h245encapstatus property to FALSE. The MGC assigns appropriate addressing information in both local and remote descriptors according to the values exchanged in the H.225.0 channel.

6) MGC shall associate the H245 termination created in step 4) and h323bc termination created in step 5) in a context.

7) MG shall perform H.245 mapping between the two terminations as defined in Annex F/H.246.

If the MGC decides to use H.245 tunnelling but no fastStart, it shall set the h245encapstatus to TRUE, and specify the transport address (which may be an IPv4 address) such that a channel is formed between the MG and the MGC. The MGC shall then relay the messages received in the h245Control element of the H.225.0 messages to the MG on this channel. The MG can safely treat them as messages originating directly at the remote H.323 endpoint. MGC shall encapsulate any

H.245 messages received on this channel from the MG in the h245Control field of the H.225.0 messages for transport to the H.323 endpoint.

9.1.2 Calls with origination by the H.323 side

Described in this clause are the four different methods of H.323 call setup: conventional H.323 call setup using a separate connection for the H.245 channel, call setup with H.225.0 tunnelling of H.245 messages, Fast Connect, and Fast Connect with the use of H.245 tunnelling (i.e. parallel H.245).

The following steps are involved for calls originating from the H.323 side if no H.245 message encapsulation or fast connect procedures are used (i.e. conventional H.323 call setup):

1) MGC detects an incoming call from H.323 endpoint.

2) MGC shall establish a call to the H.324M terminal.

3) MGC shall create an h324 termination with MediaTx property as TDM Circuit, and specify the appropriate Multiplex level, and Demultiplex property set to TRUE. H324/cmod shall be set to "H324M" (0x0002).

4) MGC shall create a termination that realizes the h245 package and initialize properties to appropriate values. The h245/termtype property shall be set to "H324M". MGC shall add this termination as the first in the MuxDescriptor of the h324 termination created in step 3) above.

5) MGC shall create a termination that realizes h323bc package and set the fastconnect property to "noFastStart", and h245encapstatus property to FALSE. The MGC assigns appropriate addressing information in both local and remote descriptors according to the values exchanged in the H.225.0 channel.

6) MGC shall associate the H245 termination created in step 4) and h323bc termination created in step 5) in a context.

7) MG shall perform H.245 mapping between the two terminations as defined in Annex F/H.246.

8) The MG shall be responsible for the creation of any logical channels that are negotiated via H.245 channel. Each of these new logical channels shall be a locally controlled media stream.

9) When an EndSession command is encountered, the MG shall follow the procedures of Annex F/H.246 and close any logical channels that are open. MG shall notify the MGC when the H.245 logical channel is closed from its side.

If the MGC decides to use fastStart or parallel H.245, it shall do the following in step 5).

If the MGC decides to use H.245 tunnelling but no fastStart, it shall set the h245encapstatus to TRUE, and specify the transport address (which may be an IPv4 address) such that a channel is formed between the MG and the MGC. The MGC shall then relay the messages received in the h245Control element of the H.225.0 messages to the MG on this channel (see Figure 3). The MG can safely treat them as messages originating directly at the remote H.323 endpoint. The MGC shall encapsulate any H.245 messages received on this channel from the MG in the h245Control field of the H.225.0 messages for transport to the H.323 endpoint.

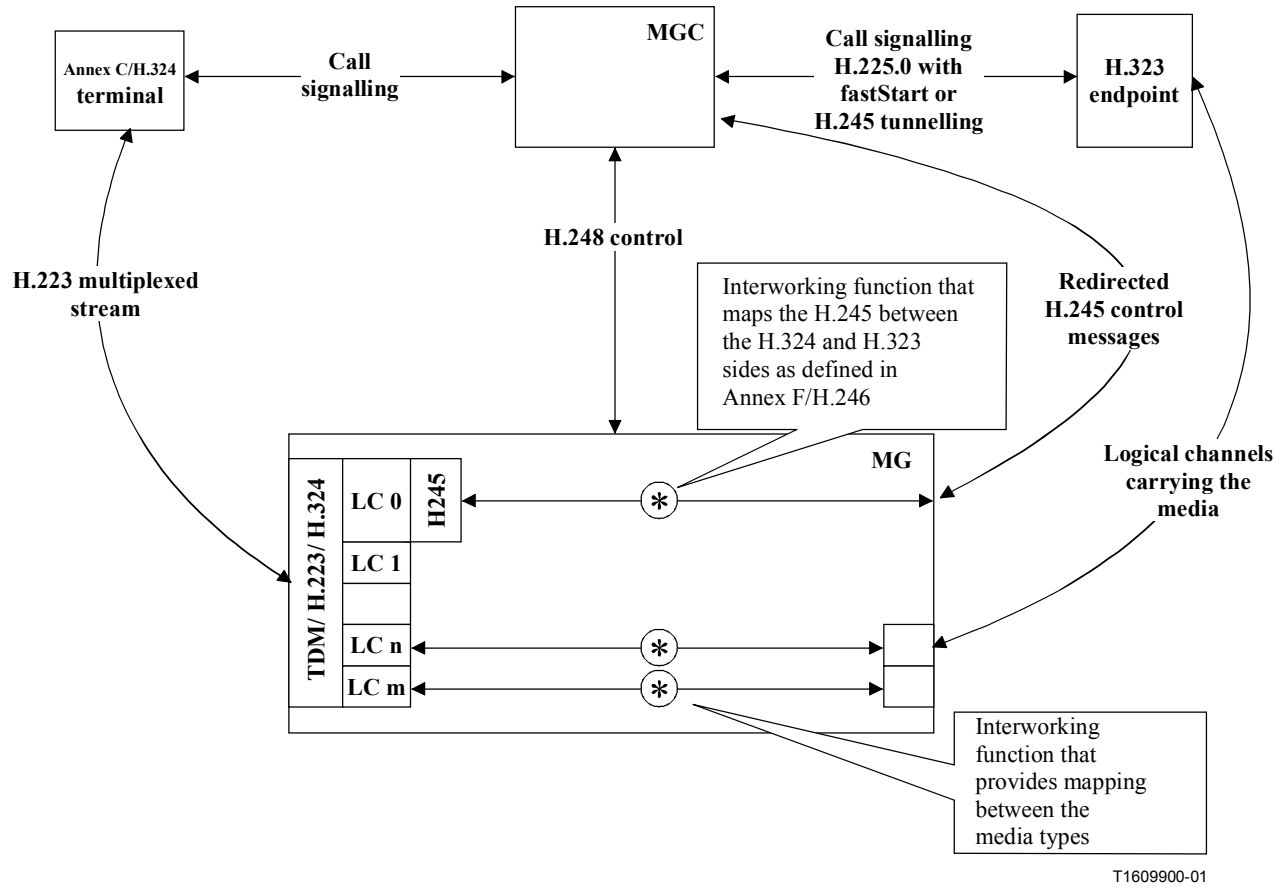

Figure 3/H.248.12 – Resource control at the MG (with fastStart/H.245 tunnelling)

If the MGC decides to use fastStart or parallel H.245, it shall do the following in step 5).

It shall set the fastconnect property to "fastStart" or parallelH245 accordingly. h245encapstatus property shall be set to reflect the h245Tunneling flag in the H.225.0 messages exchanged with the H.323 endpoint. MGC shall specify the transport address (which may be an IPv4 address) such that a channel is formed between the MG and the MGC. The MGC shall then relay the messages received in the fastStart or parallelH245 element of the H.225.0 messages to the MG on this channel. The MG can safely treat them as messages originating directly at the remote H.323 endpoint. The MGC shall encapsulate any Logical Channel messages received on this channel from the MG in the fastStart field of the H.225.0 messages for transport to the H.323 endpoint. Capability Exchange and Master Slave determination messages shall be sent in the **h245Control/parallelH245Control** field.

The MGC shall set the fastconnect property to "noFastStart" as soon as the fast connect procedures are completed, regardless of whether these procedures were successful or not.

9.2 H.323-Annex C/H.324 interworking with H.245 in MGC

Figure 4 shows the configuration of the decomposed gateway where the H.245 control is in the MGC. In this configuration, the MGC shall know the H.324 related capabilities of the MG before starting the H.245 capability negotiation with the remote endpoint. The retrieval of the capability set of the MG is out of the scope of this Recommendation.

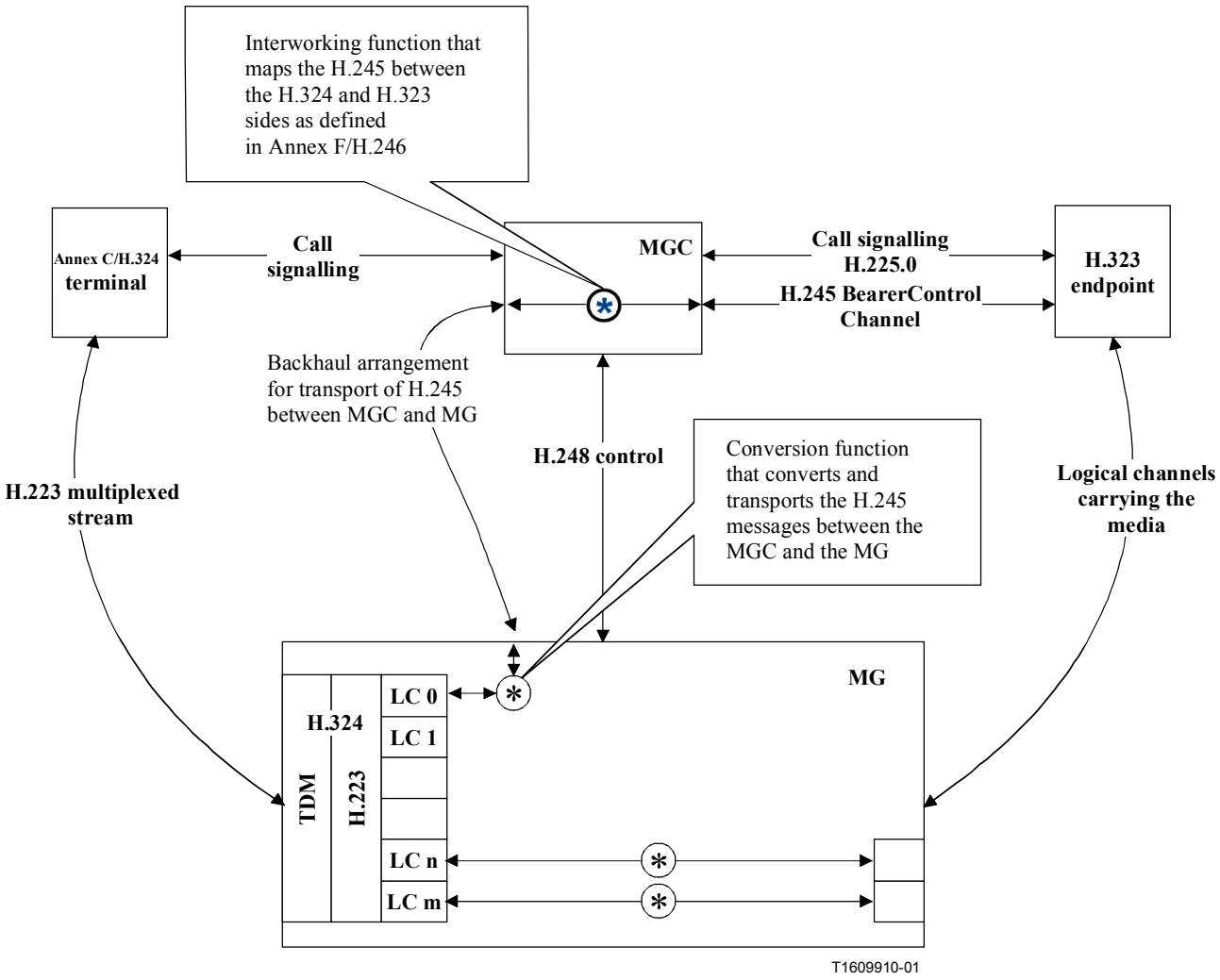

Figure 4/H.248.12 – Resource control concentrated at the MGC

The following is an example call flow for the call originated by the Annex C/H.324 terminal.

1) MGC detects an incoming call from the remote endpoint. The MGC may identify the incoming call type as H.324 call using the information contained in the call signalling messages.

2) MGC establishes a call with the remote H.324 endpoint.

3) MGC creates an h324 termination with MediaTx property as TDM Circuit, and specifies the appropriate Multiplex level, and Demultiplex property set to TRUE.

4) After the MG establishes the digital communication with the remote endpoint, the MG, which wants to start Annex C/H.324 communication, shall initiate H.223 level setup procedure according to the Multiplex level indicated in the previous step. After the level setup, the H.245 control channel shall be opened according to the procedure given in C.8/H.324.

5) MG and MGC shall transport the H.245 messages between each other. One way is a SCTP connection between the MGC and the MG as defined in IETF RFC 2960 to reliably transport the H.245 message, and associate the SCTP connection to the h324 termination. The exact nature of interfaces with SCTP for transport of H.245 messages between the MG and the MGC is out of the scope of this Recommendation. As a result the MG will transmit any h245 messages detected on the h324 termination to the MGC via the SCTP connection. Also the MG will transmit any messages received via the SCTP connection to the H.324M terminal.

6) MGC shall map the H.245 control information between the H.324 and the H.323 endpoints as defined in Annex F/H.246.

7) MGC shall create and associate appropriate media terminations on the MG to realize the creation of Logical channel.

8) When the end session procedure is initiated by either the remote endpoint or the MGC, the MGC shall transmit the H.245 EndSessionCommand message, and then stop all H.245 message transmissions. After the completion of the end session procedure, the MGC shall send Subtract message to the MG to disconnect the H.324 termination from its Context.

9.3 Tunnelling of Annex C/H.324 bitstream

The scenario described in this clause enables the H.324 bitstream transmission over an IP-based network between the gateways. The configuration of the decomposed gateway that supports this scenario is shown in Figure 5. The MGC, which decides to create IP tunnelling for H.324 call between MGs, creates a context that contains H.324 terminations on the TDM and IP sides. It is optional for the decomposed gateway to support this function.

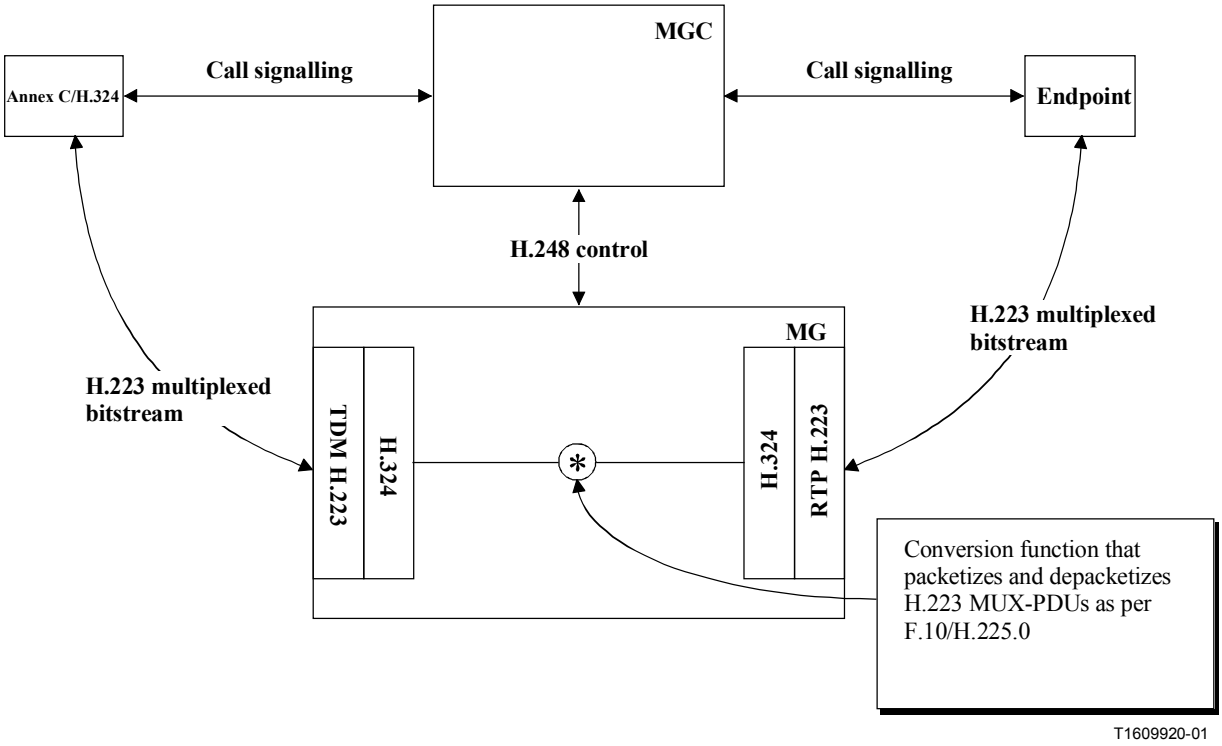

Figure 5/H.248.12 – Configuration for IP tunnelling of Annex C/H.324 bitstream

The following is the call flow example for this scenario.

1) If the MGC decides to create IP tunnelling for H.324 upon receipt of the audiovisual call from the H.324 endpoint, the MGC shall request the MG to create a new context and create terminations, which support H.324 package, in the context. On the H.324 side, the 'h324' termination is created with MediaTx property of TDM, 'muxlv' property of appropriate value, and 'demux' property of 'FALSE'. On the IP side, the 'h324' termination is created with MediaTx property of RTP, 'muxlv' property of 'Level0', and 'demux' property of 'FALSE'.

2) The MG shall perform the mapping of H.324 bitstream (i.e. H.223 multiplexed bitstream) from TDM to RTP, and vice versa, according to procedures stated in F.10/H.225.0.

3) Upon receipt a message to release the call (e.g. Q.931 Release Complete message), the MGC shall send Subtract message/s to the MG to disconnect the corresponding H.324 termination/s from the Context.

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