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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Communication
procedures

**Gateway control protocol: Decomposed
multipoint control unit, audio, video and data
conferencing packages**

Recommendation ITU-T H.248.19



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Recommendation ITU-T H.248.19

Gateway control protocol: Decomposed multipoint control unit, audio, video and data conferencing packages

Summary

Recommendation ITU-T H.248.19 describes the functionality of a decomposed multipoint control unit, in particular the interface between a media controller and media processor which is based on Recommendation ITU-T H.248.1. This Recommendation contains guidelines for the use of a decomposed gateway that may support audio, video and data conferencing. This Recommendation contains packages for floor control, volume control, video windows, audio and video mixing for point-to-point, multi-cast and hybrid conferencing scenarios.

This revision incorporates corrections to fix a duplicated binary Release Event identity and a duplicated Result parameter binary identity.

History

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2.0	ITU-T H.248.19	2013-03-16	16

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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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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/>.

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Recommendation ITU-T H.248.19

Gateway control protocol: Decomposed multipoint control unit, audio, video and data conferencing packages

1 Scope

The scope of this Recommendation is the interface between the media controller and media processor in a decomposed multipoint control unit. This Recommendation does not describe the call control functions associated with conferencing services nor does it describe the capabilities of terminals.

The specification of service information for "Dial in" or "Dial out" conferences (e.g., meet me numbers) is out of scope of this Recommendation. It is also assumed that the media controller part of the multipoint control unit is responsible for the management of conference identities.

This Recommendation describes packages and functions associated with the ITU-T H.248 interface for audio, video and data conferencing. This includes the specification of mixing, conference capabilities and core ITU-T H.248.1 protocol usage. The packages and functionality described in this Recommendation are optional according to the rules of [ITU-T H.248.1]. A multipoint control unit may implement one or more of the packages described in this Recommendation.

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.248.2] Recommendation ITU-T H.248.2 (2013), *Gateway control protocol: Facsimile, text conversation and call discrimination packages*.
- [ITU-T H.248.10] Recommendation ITU-T H.248.10 (2001), *Gateway control protocol: Media gateway resource congestion handling package*.
- [ITU-T H.248.27] Recommendation ITU-T H.248.27 (2003), *Gateway control protocol: Supplemental tones packages*.
- [ITU-T T.140] Recommendation ITU-T T.140 (1998), *Protocol for multimedia application text conversation*.
- [IETF RFC 4376] IETF RFC 4376 (2006), *Requirements for Floor Control Protocols*.
- [IETF RFC 4582] IETF RFC 4582 (2006), *The Binary Floor Control Protocol (BFCP)*.
- [IETF RFC 4583] IETF RFC 4583 (2006), *Session Description Protocol (SDP) Format for Binary Floor Control Protocol (BFCP) Streams*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

None.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 listener: The user/endpoint who is receiving media.

3.2.2 speaker: The user/endpoint who is sending media.

3.2.3 local image: The image of user A that is sent to user B.

3.2.4 remote image: The image of user B that user A receives.

3.2.5 floor: A permission to temporarily access or manipulate a specific shared resource or set of resources.

3.6 floor chair (floor controller): A logical entity that manages one floor (grants, denies or revokes a floor).

3.7 floor participant: A logical entity that requests floors.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

BFCP Binary Floor Control Protocol

BNF Backus-Naur Form

FCFS First-Come First-Served

MC Media Controller

MCU Multipoint Control Unit

MP Media Processor

SDP Session Description Protocol

SIP Session Initiation Protocol

TDM Time Division Multiplex

5 Conferencing architecture

A multipoint control unit allows the mixing of one or more input streams of various media into one or more output streams of various media. A decomposed MCU is comprised of two components: the Media Controller (MC) and the Media Processor (MP). The Media Controller terminates call control signalling (e.g., ITU-T H.225, SIP) and is responsible for controlling the MP. It is also responsible for the service logic of any conferencing (e.g., it indicates the floor controller). The MP is responsible for initiating and terminating media streams. In the case of conferencing, it provides mixing, transcoding functions and, if necessary, any additional media-related functions. ITU-T H.248 is used between a media controller and media gateway, which also contain similar functions; thus, ITU-T H.248 may be used in a decomposed MCU. Figure 1 shows a decomposed MCU.

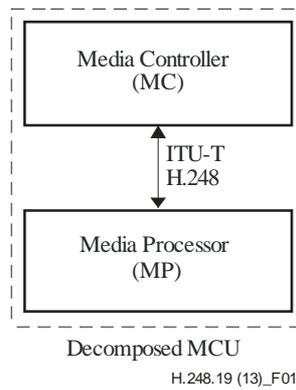


Figure 1 – Decomposed MCU

The ITU-T H.248.1 model allows for different types of conferencing. Typically, an MCU controls what is termed "multipoint" conferences in ITU-T H.32x systems or using SIP terminology "lecture mode", "dial-in" or "dial-out" conferences. An MCU may also control what is termed "point-to-point" conferences in ITU-T H.32x systems or using SIP terminology "end system mixing" or "centralized signalling". However, for the point-to-point mode, the MC will control the conference without any extra conferencing functionality needed to be implemented in the MP.

Clause 6 of [ITU-T H.248.1] describes the connection model. By placing the relevant terminations in the same or different contexts, it allows the MCU to perform the different types of "multipoint" conferencing.

Figure 2 shows the ITU-T H.248 modelling of a "Lecture mode" conference. Termination A represents the "speaker"; terminations B, C or D represent the "listening" terminations. Stream 1 represents an audio stream and the stream mode is used to determine who "speaks" and who "listens".

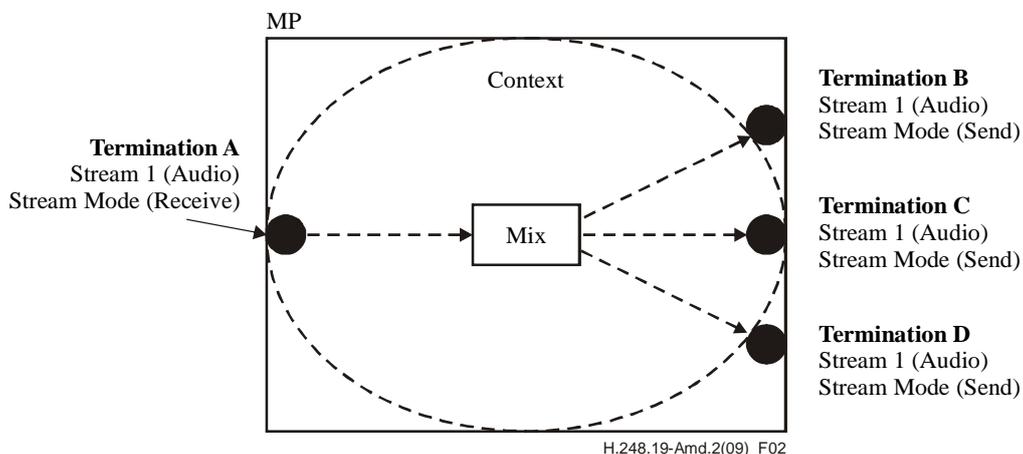


Figure 2 – "Lecture mode" conference

Figure 3 shows the ITU-T H.248 modelling of a "Dial-in" or "Dial out" conference. The MP is unaware of the difference between "Dial-in" and "Dial-out" conferencing. All the terminations have both "speaking" and "listening" capabilities. Stream 1 represents a video stream. Stream mode of send/receive indicates that the user represented by the termination is both a "speaker" and "listener".

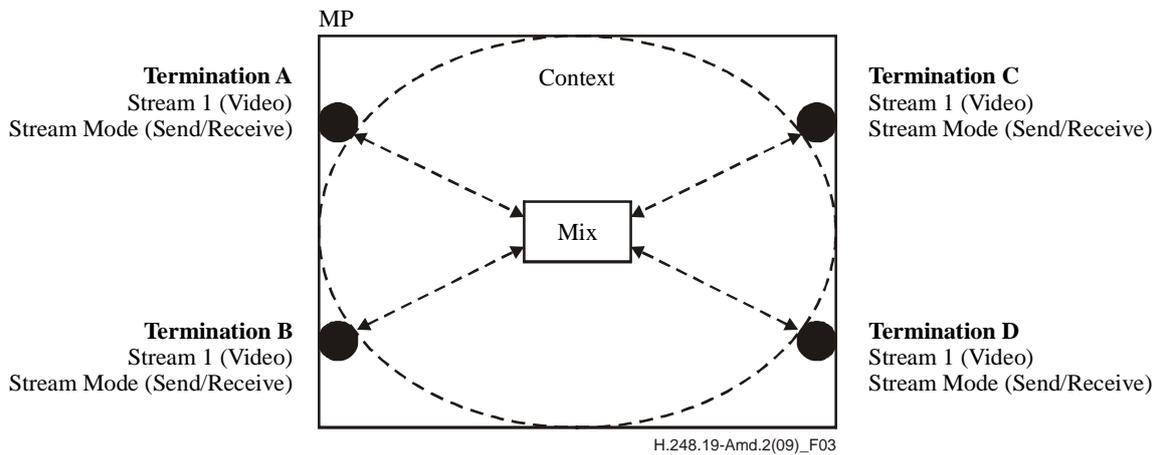


Figure 3 – Multipoint conference

An example of the use of multiple contexts to perform a conference is when there is a centralized conference and a party is put on hold. According to the ITU-T H.248.1 connection model, a separate context is used for the held party. This results in a hybrid conference with two contexts. Another example on the use of multiple contexts is when there is a main conference in one context and side conference in another context. Rather than moving all the participants into one context, a separate call leg termination in both contexts may be used to join the conferences. As a result of the support of multiple context conferences, a conference bridge may be modelled as a central context with a side context for each call leg to a participant.

6 Speaking and listening in a conference

As part of a conference who "speaks" and who "listens" may need to be controlled. This is achieved by setting the stream mode of the stream representing the media on the termination that represents a user that is to be controlled. If the stream mode is set to "send" then the user can only listen or look. If the stream mode is set to "receive" then the user can only speak or send video/text. If the stream mode is set to "send/receive" then the user can speak and listen. The stream mode is described in clause 7.1.7 of [ITU-T H.248.1].

With whom the user can speak and listen to is controlled through the use of stream identities and topology. Stream identities are described in clause 7.1.4 of [ITU-T H.248.1]. The users whose terminations have the same stream identities as other terminations have the possibility to speak and listen for the media represented by that stream identity. The default connection between all the terminations is that everyone can hear and see everyone else. This may be modified by the use of the Topology Descriptor that describes the connection relationship between the termination and streams in a context.

7 Determination and management of conferencing capabilities

An MC may determine the capabilities of a MP through the use of the AuditCapability command (clause 7.2.6 of [ITU-T H.248.1]). By auditing the packages on a MP the MC can determine which conferencing functionality and corresponding packages are supported. The capabilities of an MP may also be determined through provisioning or via a management system.

If at any stage the capabilities of a MP change, the MP can indicate this to the MC through the use of ServiceChange "Capability Change". The MC can then audit to determine which capabilities have changed.

The MC is responsible for requesting resources for the users from the MP via ITU-T H.248 on a per call basis. The MC shall use available procedures (e.g., codec negotiation) to determine the set of

capabilities from each user. The MC may apply a different service logic in the selection of the different capabilities. For example, the service logic policy may require no transcoding between all participants of a conference or it may require that the highest quality codec is to be supported. The MC may also provide the capabilities in the case that these are pre-defined for a particular conference.

The MP is responsible for the management of its own resources. If congestion is a concern, then [ITU-T H.248.10], "Media gateway resource congestion handling package", may be implemented. If partitioning of resources for different accesses is required, then Virtual Media Gateways (clause 11.1 of [ITU-T H.248.1]) should be implemented.

8 Simultaneous support of media types

The ITU-T H.248 model allows the use of different media types towards users through the use of multiple streams per termination. Simultaneous multiple stream or alternate streams may be supported. A separate stream identity shall be used for each media type.

9 MCUs and multiplexed media bearers

If a MP has ITU-T H.22x TDM bearer(s) connected to it where individual media streams are multiplexed across one or more terminations, the audio/video and data properties, signals and events specified by the packages in this Recommendation shall be placed on the multiplexed termination not the individual TDM terminations. Multiplexed terminations are discussed in clauses 6.2 and 7.1.3 of [ITU-T H.248.1].

10 Floor control

An integral part of conferencing is the management of the users in a conference. For the purposes of this Recommendation this is termed "Floor Control". [IETF RFC 4376] describes the requirements associated with floor control.

The packages defined in this clause (along with other ITU-T H.248 packages) allow the coordination of floor control policy and state between an MC and an MP. For example, if the MC receives a request to "make me chair", then it shall use the Floor Control Package to indicate this. If the MC receives a request to "make me broadcaster", then it shall apply a multi-cast configuration as per Figure 2.

Typically, session level signalling is used to determine whether or not floor control is used in a Conference. Floor control may involve the use of a floor control signalling protocol. The packages allow for the establishment of a floor control protocol between an MP (acting as a floor control server) and a client. The packages are used in conjunction with SDP attributes such as the "UserID" (a=userid:) and "Floor Identity" (a=floorid:) attributes (see sections 5 and 6 of [IETF RFC 4583]) in order to provide a linkage between the session level and floor control signalling.

NOTE – The "Floor Control Conference Identity" Context Attribute (see clause 10.6.1.1) is used instead of the SDP "ConferenceID" (a=confid:) attribute to minimize messaging.

The use of a floor control protocol allows the use of multiple floors per Termination. In order to associate resources to a particular floor, the MC shall use both the "Floor and Stream Association" (*fsa*) Context Attribute (see clause 10.6.1.2) and the "Floor Identity" attribute (a=floorid). The MC shall set the *fsa* Context Attribute to associate ITU-T H.248 media streams with a particular FloorID for the particular Context. This indicates to the Terminations in the Context which Floor is allowed for each stream.

In order to indicate that a Termination (representing a user) participates in a floor control instance, the a=floorid SDP attribute is set on the Streams that are relevant for that particular floor on

Terminations that are involved in the floor. If the MC tries to set a FloorID on a media stream that is not listed in the *fsa* Context Attribute, an error shall be returned.

The "Floor Identity Attribute" is defined in section 6 of [IETF RFC 4583] and its Augmented BNF syntax is:

```
floor-id-attribute = "a=floorid:" token [" mstrm:" token *(SP token)]
```

In ITU-T H.248 where multiple media are defined, these appear in separate ITU-T H.248 Streams and the SDP are independent from each other. Therefore, the use of the optional "mstrm" part of the attribute is superfluous and should not be sent to the MP. If the MP receives this optional component, it shall be ignored.

The "a=floorid" attribute may be set on more than one Stream, thus one Context can have multiple floors. A Stream cannot be associated with more than one floor.

The Floor Identity that is set may be used to tie an instance of floor control signalling (between an MP embedded Floor Control Server and Floor Control Client) to the Streams describing the media that the floor has access to.

For example:

An MC establishes a Context with 3 Terminations (A, B and C) each with 3 Streams (1, 2 and 3). There is a single floor (FloorID 123) for both the audio and media and a separate floor (FloorID 456) for messaging.

It sets the *fsa* Context Attribute: "123:1,2","456:3"

Stream(1) is an Audio media stream.

Stream(2) is a Video media stream.

Stream(3) is a Messaging media stream.

Stream(4) is a Stream established for floor control signalling.

Termination(A) does not participate in the floor so the "a=floorid" attribute is not set on that Termination.

Termination(B) participates in the floor for both the Audio and Video media streams, therefore the following is set:

```
Termination(B) Stream(1) a=floorid:123,  
                Stream(2) a=floorid:123,
```

Termination(C) participates in the floor for both the Audio and Video media streams and the Messaging stream, the floor control signalling association is used for both, therefore the following is set:

```
Termination(C) Stream(1) a=floorid:123,  
                Stream(2) a=floorid:123,  
                Stream(3) a=floorid:456
```

10.1 Floor Control Package

Package name: Floor Control Package

Package ID: fcp (0x006e)

Description: This package defines a property to indicate that the termination represents the user who is the conference floor controller (otherwise known as the "Moderator" or "Floor Chair"). In version 2, an additional property is added in order to be able to associate the floor control role to a particular floor/s.

Version: 2
Designed to be extended only: No
Extends: None

10.1.1 Properties

10.1.1.1 Activate Floor Controller

Property name: Activate Floor Controller
Property ID: afc (0x0001)
Description: This property indicates whether or not the termination represents the floor controller or not.
Type: Boolean
Possible values: on (0x0001) Floor Controller Handling
off (0x0000) This Termination is not the Floor Controller
Default: off
Defined in: TerminationState Descriptor
Characteristics: Read/Write

10.1.1.2 Controller's Floor Identity

Property name: Controller's Floor Identity
Property ID: cfi (0x0002)
Description: This property indicates for which floors the Termination is the floor controller.
Type: Sub-list of Integer
Possible values: 0-65535
Default: None
Defined in: TerminationState Descriptor
Characteristics: Read/Write

10.1.2 Events

None.

10.1.3 Signals

None.

10.1.4 Statistics

None.

10.1.5 Error codes

10.1.5.1 Error code No. 479

Name: Only one floor chair per floor is allowed in the Context.

Definition: This error code indicates that the MP is unable to set a floor chair for the particular floor, due to that, a floor chair for the floor has already been allocated to a different Termination in the Context. The command is disregarded.

Error Text in the Error Descriptor: None.

Comment: The MC should remove the floor chair from the other Termination before setting on the new Termination.

10.1.6 Procedures

The MC may set the *Activate Floor Controller (fcp/afc)* property on a media gateway to indicate that the termination relates to the floor controller (otherwise known as "Floor Chair" or "Moderator"). This property may be used where there is a single floor in the Context. Where there are multiple floors, the *Controller's Floor Identity (fcp/cfi)* property is used in order to uniquely identify the floor(s) of which the user is the controller.

The *fcp/afc* and *fcp/cfi* properties may be used by the media processor to mix user plane data for the conference. Furthermore, where the MP contains embedded floor control server functionality, the use of these properties identifies a Termination (user) as the floor chair for the purposes of floor control signalling.

There may only be one floor chair per floor per Context. If the MC tries to set an addition floor chair per floor, error code 479 "One floor chair per floor is allowed in the Context" is returned.

NOTE – The identification of a Floor Chair that is not part of the same Context where the floor is defined (see [IETF RFC 4376]) is for further study.

10.2 Floor Action Package

The Conference Tones Generation Package in [ITU-T H.248.27] supports the following indications:

- Conference Entrance Tone
- Conference Exit Tone
- Conference Lock Tone
- Conference Unlock Tone
- Time Limit Warning Tone.

Depending on the media type, these tone indications may be a tone, an announcement, text, still or moving image which is provisioned on the MP.

10.3 Indication of being viewed package

Package name:	View Package
Package ID:	indview (0x006f)
Description:	This package allows the MC to order the MP to send an indication to a user in a conference that he/she is being viewed and when he/she is not being viewed.
Version:	1
Designed to be extended only:	No
Extends:	None

10.3.1 Properties

None.

10.3.2 Events

None.

10.3.3 Signals

10.3.3.1 Signal name: Being Viewed

Signal ID:	viewed (0x0001)
Description:	This signal initiates the sending of an indication that a user is currently being viewed by other participants in a conference.
Signal Type:	Brief
Duration:	Provisioned

10.3.3.1.1 Additional parameters:

10.3.3.1.1.1 Viewed by whom

Parameter name	Viewed by whom
Description:	Indicates which terminals are doing the viewing.
Parameter ID:	vbw (0x0001)
Type:	Enumeration
Optional:	Yes
Possible values:	all (0x0001) someone (0x0002)
Default:	all

10.3.3.1.1.2 Viewers identity

Parameter name	Viewers identity
Parameter ID:	vid (0x0002)
Description:	This parameter contains a list of the identities of the people who are doing the viewing.
Type:	Sub-list of octet string
Optional:	Yes
Possible values:	Identities of the terminals/parties doing the viewing.
Default:	None

10.3.3.2 Signal name: No viewer

Signal ID:	noviewer (0x0002)
Description:	This signal initiates the sending of an indication to a user that they are no longer being viewed by other participants in a conference.
Signal Type:	Brief
Duration:	Provisioned

10.3.3.2.1 Additional parameters

None.

10.3.4 Statistics

None.

10.3.5 Procedures

The MC sends signal *indview/viewed* to the MP to indicate to a participant of a conference that they are being viewed. Parameter *vbw* may be included to indicate if all participants are doing the

viewing or just a subset. Parameter *vid* may be included to indicate the identities of the viewers and if used must be used in conjunction with parameter *vbw*. As the list of viewer's identities change, then the signal *indview/viewed* should be sent with the new list.

Depending on the media type this indication may be a tone, an announcement, text, still or moving image. The type of indication is provisioned on the MP. The MC sends signal *indview/noviewer* to the MP to indicate to a participant of a conference that they are no longer being viewed. This may have the effect that a tone or audio announcement is sent. For video it may have the effect that a new still or moving image is displayed or the previous one is removed.

Signals *indview/viewed* and *indview/noviewer* need only to be sent once to change state. Sending multiple signals to refresh state is not needed.

10.3.6 Error code

None.

10.4 Floor Control Policy Package

Package name: Floor Control Policy Package

Package ID: fcpoli (0x00ab)

Description: This package allows the MC to set floor control policy for the Conference represented by the Context. The use of Context attributes allows the MC to set the policy per floor only once per Context rather than having to manipulate individual terminations/streams.

NOTE – The use of these Properties in this Package at the TerminationState level is primarily for the support of ITU-T H.248.1 Version 1 and 2 implementations which do not allow Context Attributes.

Version: 1

Extends: None

10.4.1 Properties

10.4.1.1 Floor Control Algorithm

Property name: Floor Control Algorithm

Property ID: fca (0x0001)

Description: This property indicates the algorithm used in granting the floor per floor in the Conference.

Type: Sub-list of String

Possible values: Each instance of String is of type **FCA** defined by the following ABNF:

```
FCA = FloorID COLON Algorithm
FloorID = UINT16
Algorithm = "MOD" / "FCFS" / "RAN"
; MOD indicates "moderator-controlled"
; FCFS indicates "first come first served"
; RAN indicates "Random"
```

Default: None

Defined in: ContextAttribute/TerminationState

Characteristics: Read/Write

10.4.1.2 Max Floor Users

Property name:	Max Floor Users
Property ID:	mfu (0x0002)
Description:	This property indicates the maximum number of users who can hold the floor at the same time.
Type:	Sub-list of String
Possible values:	Each instance of String is of type MFU defined by the following ABNF: <pre>MFU = FloorID COLON NumUsers FloorID = UINT16 NumUsers = UINT16</pre>
Default:	Provisioned.
Defined in:	ContextAttribute/TerminationState
Characteristics:	Read/Write

10.4.1.3 Max Floor Hold Time

Property name:	Max Floor Hold Time
Property ID:	mht (0x0003)
Description:	This property indicates the maximum time period a floor participant can hold the floor for. It relates to the floor holding instance rather than the total amount of time per conference.
Type:	Sub-list of String
Possible values:	Each instance of String is of type MHT defined by the following ABNF: <pre>MHT = FloorID COLON HoldTime FloorID = UINT16 HoldTime = UINT16 ; HoldTime units in 1/10 second</pre>
Default:	Provisioned.
Defined in:	ContextAttribute/TerminationState NOTE – As this is set at a Context level, all users will be subject to the same time. If differing times is needed, this should be defined at the TerminationState level.
Characteristics:	Read/Write

10.4.2 Events

None.

10.4.3 Signals

None.

10.4.4 Statistics

None.

10.4.5 Error codes

None.

10.4.6 Procedures

Where the MP supports conferences with floor control, the MC may provide the conference floor policy. Depending on the information, the MC may provide policy in different ways.

In order to set the media policy for the floor, the MC shall use the SDP "a=floor-id" attribute to associate a floor with a particular media (represented by an ITU-T H.248 Stream). See clause 10 for more details.

In order to set the floor control algorithm policy, the MC shall use the "Floor Control Algorithm" (*fcpoli/fca*) Property to set an algorithm for the floor.

In order to set the maximum number of floor users policy, the MC shall use the "Max Floor Users" (*fcpoli/mfu*) Property to set the maximum number of floor holders for a particular floor.

In order to set the maximum number of floor users policy, the MC shall use the "Max Floor Hold Time" (*fcpoli/mht*) Property to set the maximum time that a user can hold the floor for. When the duration that the floor is granted exceeds the value of the *mht* property, the MP shall release the floor and notify the MC if the *fschp/fsdr* event (which is defined in clause 10.5.2.1) is detected.

Where the Properties are set on the Context level, the policy shall apply to all Terminations/Streams in the Context where the floor is set (see above paragraph).

Where the Properties are set at the Termination level, the policy information should be set on all Terminations participating in floor control. If the MP detects conflicting information between the policies set on different terminations, it shall respond with error code "473 – Conflicting Property Values".

In order to indicate who the floor controller (otherwise known as "floor chair" or "moderator") is, the MC shall use the Floor Control package to assign which Termination represents the controller for the floor.

10.5 Floor Status Change Handling Package

Package name: Floor Status Change Handling Package

Package ID: fschp (0x00aa)

Description: This package defines Signals and Events that are used in order for the MP to indicate a particular floor status change in order for the MC to update the associated media characteristics. It also allows the MC to indicate whether the change of media characteristics has been successful.

Version: 1

Extends: None

10.5.1 Properties

None.

10.5.2 Events

10.5.2.1 Floor Status Detection and Reporting

Event name: Floor Status Detection and Reporting

Event ID: fsdr (0x0001)

Description: The MC sets this Event in order to allow the MP to indicate to the MC that it has determined that the floor status associated with a particular Termination/FloorID needs to change and that the MC should change the associated media characteristics accordingly.

10.5.2.1.1 EventsDescriptor Parameters

10.5.2.1.1.1 Floor Identity

Parameter name: Floor Identity
ParameterID: fid (0x0001)
Description: This is used to identify to which of the Termination's floors the status detection should apply.
Type: Sub-list of Integer
Optional: Yes.
Possible values: 0-65535
Default: 0 (which indicates all floors).

10.5.2.1.2 ObservedEventsDescriptor parameters

10.5.2.1.2.1 Floor Status

Parameter name: Floor Status
Parameter ID: fs (0x0001)
Description: This is used to indicate the required floor status and to identify which of the Termination's floors the change of status applies to.
Type: Sub-list of String
Optional: No.
Possible values: Each instance of String of type "Status". Syntax according to the following ABNF:

```
FloorStatus = FloorID COLON Status  
FloorID = UINT16  
Status = "granted" / "revoked" / "released"
```

Where:

granted (0x0001): the user represented by the termination has been granted the floor.

revoked (0x0002): the floor associated with the user represented by the termination has been revoked.

released (0x0003): the floor associated with the user represented by the termination has been released.

Default: None

10.5.3 Signals

10.5.3.1 Confirm Media Update

Signal name: Confirm Media Update
Signal ID: cmu (0x0001)
Description: This signal allows the MC to indicate whether or not it has

successfully applied the media update related to the floor status change indicated by the Floor Status Detection and Reporting ObservedEvent.

Signal Type: Brief
Duration: Not Applicable

10.5.3.1.1 Additional parameters

10.5.3.1.1.1 Floor Status

Parameter name: Floor Status
Parameter ID: fs (0x0001)
Description: This is used to correlate the results of the media characteristics change with a particular floor status report (*fschp/fsdr* ObservedEvent).
Type: Sub-list of String
Optional: No.
Possible values: Each instance of String of type "Status". Syntax according to the following ABNF:

```
FloorStatus = FloorID COLON Status  
FloorID = UINT16  
Status = "granted" / "revoked" / "released"
```

Where:

granted (0x0001): the user represented by the termination has been granted the floor.

revoked (0x0002): the floor associated with the user represented by the termination has been revoked.

released (0x0003): the floor associated with the user represented by the termination has been released.

Default: None

10.5.3.1.1.2 Result

Parameter name: Result
Parameter ID: res (0x0002)
Description: This parameter is used to indicate whether the media characteristic update has been successful or not.
NOTE – Whilst the *fschp/fsdr* Event allows multiple floors and status, section 4.1 of [IETF RFC 4582] defines that multiple requests are treated as atomic actions. This is, if one fails, then all the floors fail.
Type: Enumeration
Optional: Yes.
Possible values: "Success"0x0001" The media characteristics modifications have been successfully applied.
"Fail"0x0002" The one or more of the media characteristics modifications have failed.
Default: Success.

10.5.4 Statistics

None.

10.5.5 Error code

None.

10.5.6 Procedures

The MC needs to be able to change the media characteristics of a Termination/Stream based on the floor status. Where the MP contains Floor Control Server functionality, this information must be communicated to the MC. In order to receive this information, the MC sets the "Floor Status Detection and Reporting" (*fschp/fsdr*) Event.

The Floor control server functionality in a MP uses a floor control protocol (e.g., BFCP) to determine that the floor status needs to be changed. If the *fschp/fsdr* Event is set, once the MP has determined that the floor status needs to be changed for a particular Termination (representing a user) and floor(s), it shall generate a Notify command with a *fschp/fsdr* ObservedEvent. The ObservedEvent shall contain the FloorIDs and Status that the MC should consider when changing the media characteristics. The Notification indicates to the MC that an update of media characteristics (e.g., change of "Streammode") needs to be made.

NOTE – The MP does not provide exactly which characteristics are to be changed. As per section 3.1 of [IETF RFC 4582], this is out of the scope of floor control protocols.

On reception of the notification, the MC will modify the media characteristics associated with the Termination/Stream based on the TerminationID, FloorID and Status.

Once the media characteristics change attempt has occurred, the MC will send the "Confirm Media Update" (*fschp/cmu*) Signal indicating whether or not the changes have been successful. The signal shall include the same value in the "Floor Status" signal parameter as that received in the "FloorStatus" parameter in the associated ObservedEvent. This is in order to correlate the request and confirmation. In case multiple FloorIDstatus and media characteristic changes are requested, if one change fails, then all changes are deemed to fail. The MC shall (if possible) return the media characteristics to a state before it had processed the *fschp/fsdr* ObservedEvent.

On reception of this *fschp/cmu*, the MP shall analyse the result and where required, the MP will then perform the necessary BFCP signalling to notify the users/chairs associated with the applicable Termination/Floor that the status has changed.

10.6 Floor Control Signalling Package

Package name:	Floor Control Signalling Package
Package ID:	fcsig (0x00e5)
Description:	This package allows an MC to manage a floor control signalling association per Termination (User) on the MP. It assumes that the MP contains an embedded Floor Control Server. An example protocol that may be used over this control association is the binary floor control protocol (BFCP) defined in [IETF RFC 4582].
Version:	1
Extends:	None

10.6.1 Properties

10.6.1.1 Floor Control Conference Identity

Property name:	Floor Control Conference Identity
-----------------------	-----------------------------------

Property ID: fconfid (0x0001)

Description: This property indicates the Conference Identity associated with a Floor Control Conference.

NOTE 1 – Whilst the ITU-T H.248 ContextID uniquely identifies a conference instance on a MP, the BFCP utilizes a Conference Identity that is provided in session level SDP signalling. This must be communicated to the MP.

NOTE 2 – The usage of the Conference Identity at a Context level imposes the restraint that there may only be one FCS conference per ITU-T H.248 Context.

Type: Integer

Possible values: Any integer

Default: None

Defined in: ContextAttribute

Characteristics: Read/Write

10.6.1.2 Floor and Stream Association

Property name: Floor and Stream Association

Property ID: fsa (0x0002)

Description: This property indicates which media streams may be associated with a particular floor. There may only be one FloorID per media stream.

Type: Sub-list of String

Possible values: Each instance of String of type "Association". Syntax according to the following ABNF:

```
Association = FloorID COLON StreamID [* COMMA
                        StreamID]
FloorID = UINT16
StreamID = UINT16
```

Default: None

Defined in: ContextAttribute

Characteristics: Read/Write

10.6.2 Events

10.6.2.1 Floor Control Association Timeout

Event name: Timeout

Event ID: tout (0x0001)

Description: This event allows the MP to indicate to the MC that the Floor control protocol association between the Floor Control Server and Client has timed out. This allows the MC to seek to re-establish the association (for example, see section 7 of [IETF RFC 4583]).

10.6.2.1.1 EventsDescriptor Parameters

None.

10.6.2.1.2 ObservedEventsDescriptor Parameters

10.6.2.1.2.1 Floor Identity

Parameter name: Floor Identity

Parameter ID: fid (0x0001)

Description: This is used to identify which of the Termination's floors are affected due to the floor control protocol association timeout.

NOTE – Whilst the use of multiple bearer floor control protocol associations in a single Conference for a single user is uncommon, it is not forbidden.

Type: Sub-list of Integer

Optional: Yes.

Possible values: 0-65535

Default: None

10.6.2.2 Floor Control Association Release

Event name: Release

Event ID: rel (0x0002)

Description: This event allows the MP to indicate to the MC that a floor control client has released the connection with the Floor Control Server. This allows the MC to remove the floor control protocol addressing information and floor control policy information from the Termination/Streams associated with the released client.

10.6.2.2.1 EventsDescriptor parameters

None.

10.6.2.2.2 ObservedEventsDescriptor parameters

10.6.2.2.2.1 Floor Identity

As per clause 10.6.2.1.2.1.

10.6.3 Signals

None.

10.6.4 Statistics

None.

10.6.5 Error code

None.

10.6.6 Procedures

Where floor control server functionality is embedded in a MP, an MC is responsible for requesting the MP to establish the floor control protocol associations between the floor control server and the clients involved in the floor/conference.

In order to create a floor control protocol association for a particular Termination (User), the MC shall create a new Stream on the Termination for this purpose. [IETF RFC 4583] provides SDP which may be used in a Local or Remote Descriptor in order to describe the use of the Binary Floor Control Protocol [IETF RFC 4582] on this Stream. Wildcarding may be used in order to determine

information to be provided to the client through session related signalling. The "a=floorid" attribute in conjunction with the "Floor and Stream Association" (*fsa*) property shall be used to associate ITU-T H.248 resources with a particular StreamID. Furthermore, the MC may provide the Conference Identity to be used by floor control signalling via the "Floor Control Conference Identity" (*fconfid*) Context Attribute. See clause 10 for more information.

In addition to providing the correct SDP/H.248 Package elements, the MC should set the events in the Floor Signalling Package in order to correctly manage the state of the association. This Event shall be set on the ITU-T H.248 Stream that defines floor control association.

Once the association is established between the Termination and the client, the MP is then responsible for receiving, processing and replying to floor control protocol messages (according to any set floor policies, see clause 10.4). The MC may learn of the floor control state through the use of the Floor Status Change Handling package (see clause 10.5).

Where the MP detects a timeout on the floor control signalling association and the "timeout" (*fcsig/tout*) Event is set, then it shall send a notification to the MC.

Where the MP detects a release of the floor control signalling association and the "release" (*fcsig/rel*) Event is set, then it shall send a notification to the MC.

If the MC removes the Stream defining the floor control protocol association and if the association has not already been released, the MP shall gracefully release the association. Any events associated with the Stream shall be de-activated.

11 Audio conferencing

This clause describes the functionality that may be used when audio is being used in a conference.

11.1 Volume Control Package

Package name:	Volume Control Package
Package ID:	vcp (0x0070)
Description:	This package defines a property that sets the volume of the received media from a user. This property may be used by the MP for mixing media.
Version:	1
Designed to be extended only:	No
Extends:	None

11.1.1 Properties

11.1.1.1 Volume Level

Property name:	Volume Level
Property ID:	level (0x0001)
Description:	This property indicates the volume level of a participant in a conference.
Type:	Integer
Possible Values:	0-100 decibels
Default:	Provisioned
Defined in:	LocalControl Descriptor
Characteristics:	Read/Write

11.1.2 Events

None.

11.1.3 Signals

None.

11.1.4 Statistics

None.

11.1.5 Procedures

The MC may set this property on a media processor to indicate the volume level of a conference participant. This may be used by the MP for mixing audio.

11.1.6 Error code

None.

11.2 Volume Detection Package

Package name:	Volume Detection Package
Package ID:	vdp (0x0072)
Description:	This package defines an event that is used to determine when the volume of a participant has reached a certain threshold.
Version:	1
Designed to be extended only:	No
Extends:	None

11.2.1 Properties

None.

11.2.2 Events

11.2.2.1 Volume Activity Detection

Event name:	Volume Activity Detection
Event ID:	vad (0x0001)
Description:	This event occurs when the volume level associated with audio media exceeds the indicated threshold.

11.2.2.1.1 EventsDescriptor Parameters

11.2.2.1.1.1 Volume Threshold

Parameter name:	Volume Threshold
Parameter ID:	vthres (0x0001)
Type:	Integer
Possible values:	0-100 decibels
Description:	This is used to request the MP to notify it of a particular bearer event.

11.2.2.1.2 ObservedEventsDescriptor Parameters

None.

11.2.3 Signals

None.

11.2.4 Statistics

None.

11.2.5 Procedures

The MC may request this event so that the MP notifies the MC that a participant in a conference has exceeded the volume threshold set by the MC. The MC may use this notification to set the desired mix.

The use of the "Volume Detection Package" is not recommended for use on a termination that already has a "Volume Control Package" property associated with it. In this scenario the Volume Detection should take place on the input audio stream before volume control is acted upon it.

11.2.6 Error code

None.

11.3 Volume Level Mixing Package

Package name:	Volume Level Mixing Package
Package ID:	vtmp (0x0073)
Description:	This package defines a property that indicates to the termination in a context that the stream with which this property is associated should be mixed according to Volume Level Mixing algorithm.
Version:	2
Designed to be extended only:	No
Extends:	None

11.3.1 Properties

11.3.1.1 Volume Mixing Level

Property name:	Volume Mixing Level
Property ID:	mixlevel (0x0001)
Description:	This property indicates the threshold of the volume of a participant for it to be included in the mix for the particular stream.
Type:	Integer
Possible Values:	0-100 decibels
Default:	Provisioned
Defined in:	LocalControl Descriptor or ContextAttribute
Characteristics:	Read/Write

11.3.1.2 N Speakers Mixing

Property name:	N Speakers Mixing
Property ID:	nspeakmix (0x0002)
Description:	This property indicates the number of loudest speakers associated with a conference/context to be included in the mix for the particular stream.

Type:	Integer
Possible Values:	0 to maximum number of terminations in a context
Default:	Provisioned
Defined in:	LocalControl Descriptor or ContextAttribute
Characteristics:	Read/Write

11.3.2 Events

None.

11.3.3 Signals

None.

11.3.4 Statistics

None.

11.3.5 Procedures

The MC may set the *mixlevel* property on a media processor to indicate the threshold volume level for the mixing algorithm for a particular conference. The *mixlevel* property is set on each applicable stream on terminations in the context representing a conference. Alternatively, it may be set on the Context level and will apply to all Terminations in the Context. When the volume of a participant represented by the *mixlevel* property is equal to or exceeds the threshold, the media stream coming from that participant will be included in the mix. When the volume of a participant is less than the threshold, the media stream coming from that participant will not be mixed. If the *mixlevel* property is not assigned to a termination, then this termination will not be included in the mix.

The MC may set the *nspeakmix* property on a media processor to indicate the threshold volume level for the mixing algorithm for a particular conference. The *nspeakmix* property is assigned to each termination in the context representing the conference that would like to hear the N loudest speakers. Alternatively, it may be set on the Context level and will apply to all Terminations in the Context. The MP shall then mix the N loudest speakers of the conference that equal or exceed the *mixlevel* (if set) and output it to the relevant terminations.

Each termination in the conference may have separate values for *mixlevel* and *nspeakmix*.

11.3.6 Error code

None.

11.4 Mixing Volume Level Control Package

Package name:	Mixing Volume Level Control Package
Package ID:	mvlcp (0x0074)
Description:	This package defines properties to control the volume level of each participant input to a mixing algorithm for output to an individual participant.
Version:	1
Designed to be extended only:	No
Extends:	None

11.4.1 Properties

11.4.1.1 Mix Participant Number

Property name:	Mix Participant Number
Property ID:	mixpartnum (0x0001)
Description:	This property assigns a participant/source number for a particular stream. Mixpartnum is used by a mixing algorithm in the MP to identify a contributing source for a specified output mix. The contributing source is the media described by the local descriptor in the stream in which this property resides.
Type:	Integer
Possible values:	1 to maximum number of terminations in a context. The values should be sequential.
Defined in:	LocalControl Descriptor
Characteristics:	Read/Write

11.4.1.2 Volume Level Input to Mix

Property name:	Volume Level Input to Mix
Property ID:	vollevip (0x0002)
Description:	This property describes which contributing sources are heard.
Type:	Sub-list of Integer
Possible Values:	0-100 decibels The first position of the sub-list represents <i>mixpartnum</i> =1, the second position of the sub-list represents <i>mixpartnum</i> =2, etc. If the termination and/or stream are no longer associated with a <i>mixpartnum</i> , then the value at the position of that <i>mixpartnum</i> shall be 0.
Defined in:	LocalControl Descriptor
Characteristics:	Read/Write

11.4.2 Events

None.

11.4.3 Signals

None.

11.4.4 Statistics

None.

11.4.5 Procedures

To enable the functionality associated with this package, the MC shall set the *mixpartnum* property on the termination and streams that are to be input into a certain mix. The *vollevip* property is then set on the termination and stream that is desired to have the output of this mix. The MC sets the *vollevip* property to the desired volume level for each *mixpartnum*. If the termination/stream that has *vollevip* set on it also has a *mixpartnum*, then the sub-list position for it should have the *vollevip* set to 0. The media sent from the MP (remote descriptor) will then be a mix of the audio stream associated with each of the described *mixpartnums*. Any termination/streams not described by the *mixpartnum/vollevip* shall not be represented in the output audio stream.

Figure 4 gives an example configuration.

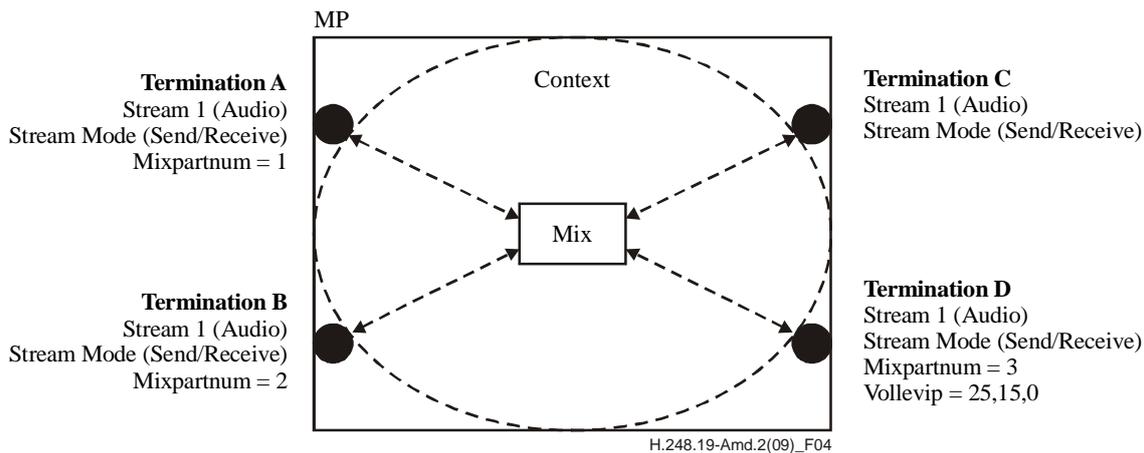


Figure 4 – Example volume control into mix

Figure 4 shows an example where a user represented by Termination D requests a volume-based mix from several participants. Users represented by Terminations A, B and C will hear audio mixed at a default level from all other terminations in that context. Termination D will hear audio from Termination A at 25 dB, audio from Termination B at 15 dB, no audio from itself (Termination D/*Mixpartnum*=3) and no audio from Termination C as no *Mixpartnum* is associated with it.

11.4.6 Error code

None.

11.5 Include Participant in Mix Package

Package name:	Include Participant in Mix Package
Package ID:	ipm (0x00e6)
Description:	This package defines functionality that allows the MC to indicate to the MP that it should give preferential treatment in the mix to the Termination/Stream where the property in the package is set.
Version:	1
Extends:	None

11.5.1 Properties

11.5.1.1 Preferred Mix

Property name:	Preferred Mix
Property ID:	pm (0x0001)
Description:	This property indicates that media received on the Termination external to the MP should be given preferential treatment by the MP when mixing the Stream.
Type:	Boolean
Possible values:	<i>ON</i> Include in the mix <i>OFF</i> Use normal methods to determine if it is included in the mix

NOTE – A "Do not include" in the mix codepoint is not provided as the MC can use the Streammode to control whether an incoming stream is mixed.

Default: *OFF*
Defined in: LocalControl
Characteristics: Read/Write

11.5.2 Events

None.

11.5.3 Signals

None.

11.5.4 Statistics

None.

11.5.5 Error codes

None.

11.5.6 Procedures

The MC may set the "Preferred Mix" (*ipm/pm*) property on a MP to indicate that media received on the Termination external to the MP should be given preferential treatment by the MP when mixing the Stream. This function is distinct from the use of topology or stream mode in that the MP may mix a subset of streams for the given connection topology. For example, if the incoming stream is not part of the n-loudest in mix it should still be included. Therefore, the "Preferred Mix" property overrides the "N Speakers Mixing" properties if set on the Termination/Stream. This behaviour may result in a N + 1 Speakers mix.

If the "Preferred Mix" and the "Volume Mixing Level" properties are both set on the Termination/Stream, then the incoming stream must be included if the volume exceeds the "Volume Mixing Level".

11.6 Speaker Reporting Package

Package name: Speaker Reporting Package
Package ID: speakrep (0x00e7)
Description: This package defines functionality that allows the MC to determine which active speakers make up the mix that a user represented by a Termination/Stream hears.
Version: 1
Extends: None

11.6.1 Properties

None.

11.6.2 Events

11.6.2.1 Active Speakers

Event name: Active Speakers
Event ID: actspeak (0x0001)

Description: This event allows the MC to receive a periodic report indicating which speakers make up the mix that a user related to a particular Stream/Termination hears.

11.6.2.1.1 EventsDescriptor parameters

11.6.2.1.1.1 Reporting Interval

Parameter name: Reporting Interval
Parameter ID: int (0x0001)
Description: This parameter indicates the interval between active speaker notifications.
Type: Integer
Optional: Yes
Possible values: 0-65535 seconds (0 indicates a single report immediately)
Default: 60 seconds

11.6.2.1.2 ObservedEventsDescriptor parameters

11.6.2.1.2.1 Speaker Terminations

Parameter name: Speakers Terminations
Parameter ID: speakterm (0x0001)
Description: This parameter provides a list of the TerminationIDs associated with the active speakers.
Type: Binary encoding, Sub-list of Octet String
Text Encoding, Sub-list of String
Optional: No
Possible values: For binary encoding, each instance is an octet string size (1-8).
For text encoding, each instance is a string defined by the following ABNF:

```
TerminationID      = pathNAME
pathNAME           = ["*"] NAME *("/" / "*" / ALPHA /
                        DIGIT / "_" / "$") ["@"pathDomainName]
```


For further definitions, see Annexes A and B of [ITU-T H.248.1].
Default: None

11.6.3 Signals

None.

11.6.4 Statistics

None.

11.6.5 Error codes

None.

11.6.6 Procedures

The MC may set the "Active Speakers" (*speakrep/actspeak*) event to determine the speakers involved in the mix that a particular user represented by a Termination hears. The "Reporting Interval" is used to minimize the number of reporting events. For example, the Active speaker may change quickly in a conversation. This event shall be associated with a particular StreamID when several streams are defined on the Termination.

Once set and on expiry of the timer associated with the "Reporting Interval" (*int*) parameter, the MP shall generate an ObservedEvent only if the list of active speakers has changed from the previous report. This is in order to minimize the messaging between the MP and MC. The MP and MC therefore must maintain the active speaker lists for each relevant Termination.

If the ObservedEvent is detected, a Notify.request command is sent indicating (via the "Speakers Termination" (*speakterm*) parameter) which Terminations (e.g., the active speaker's terminations) are involved in the mix for that particular Termination/Stream. The *speakterm* parameter contains only the TerminationIDs of the active speakers.

The *int* timer is reset upon expiration.

12 Video conferencing

This clause describes the functionality that may be used when video is being used in a conference.

12.1 Voice Activated Video Switch Package

Package name:	Voice Activated Video Switch Package
Package ID:	vavsp (0x0075)
Description:	This package defines functionality that allows the MP to determine the mix of a video stream in a conference dependent on the active speaker. For example, everyone sees the active speaker and he sees the previous speaker.
Version:	1
Designed to be extended only:	No
Extends:	None

12.1.1 Properties

12.1.1.1 Audio Stream to Switch

Property name:	Audio Stream to Switch
Property ID:	audsts (0x0001)
Description:	This property indicates which audio stream is monitored for the volume level based switching.
Type:	Sub-list of Integer
Possible values:	1-65535
Default:	None
Defined in:	LocalControl Descriptor
Characteristics:	Read/Write

12.1.1.2 Volume Level for Video Switching

Property name:	Volume Level for Video Switching
-----------------------	----------------------------------

Property ID:	vollevvidsw (0x0002)
Description:	This property indicates the volume level that, when equalled or exceeded, the MP considers the associated termination/stream to be the active speaker.
Type:	Integer
Possible values:	0-100 decibels.
Default:	Provisioned
Defined in:	LocalControl Descriptor
Characteristics:	Read/Write

12.1.1.3 Video Mix Behaviour

Property name:	Video Mix Behaviour
Property ID:	vidmixbeh (0x0003)
Description:	This property indicates the behaviour of the video mixing with regard to sending of video to terminations.
Type:	enumeration
Possible values:	aspasa (0x0001) Active Sees Previous, All other see Active [Default]
Defined in:	LocalControl Descriptor
Characteristics:	Read/Write

12.1.2 Events

Event name:	Active Speaker
Event ID:	actspeak (0x0001)
Description:	This event indicates when the user represented by a termination is determined to be an active speaker by the voice-activated mixing algorithm.

12.1.2.1 EventsDescriptor Parameters

None.

12.1.2.2 ObservedEventsDescriptor Parameters

None.

12.1.3 Signals

None.

12.1.4 Statistics

None.

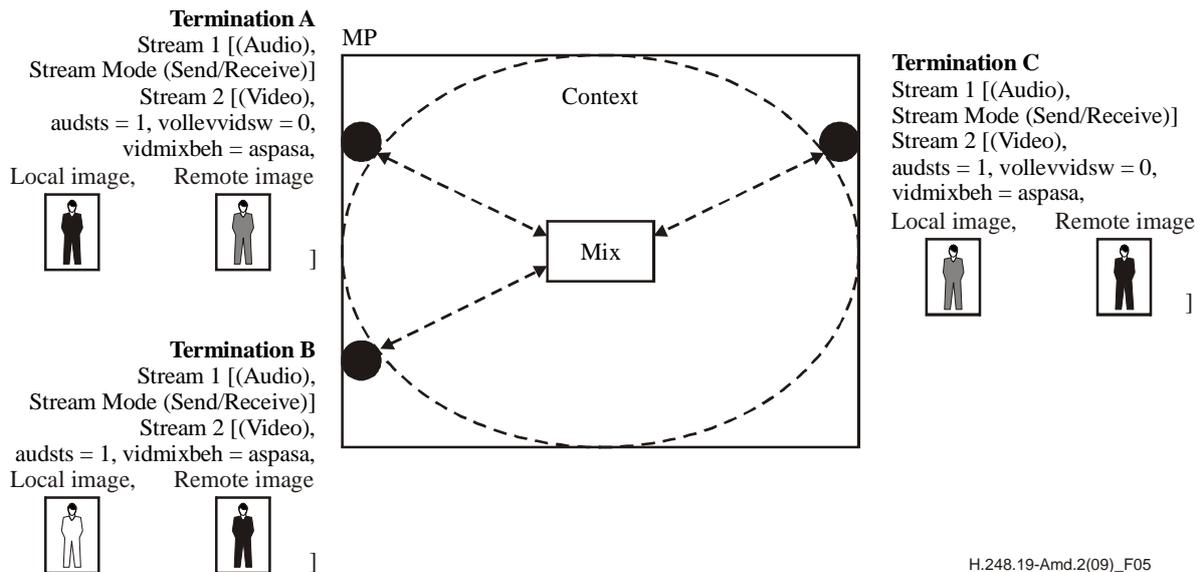
12.1.5 Procedures

To enable the Volume Activity Video Switching functionality, the MC shall set the *audsts* property on the video stream of the termination(s) that requires Volume Activity switching. The MC shall set the *audsts* property on video streams only; otherwise, error 515 "Unsupported Media Type" shall be returned. The video stream containing the *audsts* property and the audio stream being monitored for volume level switching shall be on the same termination. This property links the video stream switching to particular audio streams that are monitored for a certain volume activity level.

The *vollevvidsw* property shall be set on all terminations in the context participating in the conference. Volume Detection should take place on the input audio stream before volume control is

acted upon it. When the volume level indicated by the *vollevvidsw* property is equalled or exceeded, the mixing algorithm in the MP shall consider that the termination representing the speaker is the "active speaker". When more than one termination equal or exceed the volume level, then the termination with the highest volume level shall be regarded as the active speaker. If the MC has set the *vollevvidsw* property to 0, then the mixing algorithm in the MP shall consider that termination to be the active speaker. Error 456 "Property appears twice in this descriptor" shall be returned if the MC tries to set more than one *vollevvidsw* property to 0 for a particular stream in a context.

The *vidmixbeh* property indicates the behaviour of the video mixing algorithm. If the *vidmixbeh* property is set on a particular termination to indicate "aspasa", then if the termination is the active speaker, the user will see the previous speaker, and if it is not the active speaker, then the user will see the active speaker.



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Figure 5 – Example volume activity video switching

Figure 5 shows an example volume activity video switching. Stream ID = 1 is an audio stream whose volume level on each termination is being monitored. This is signified by *audsts* and *vollevvidsw* on the video stream (StreamID = 2) on each termination. Termination A has exceeded the *vollevvidsw* and is the active speaker. Termination C was the previous speaker. As the video mix switching behaviour property is set to "Active sees previous, All see active", the following video is output according to the figure. Local image shows the video received by the MP and the remote image shows the video sent to each user.

If an MC wants to be notified of the active speaker, it shall set the *actspeak* event on all terminations involved in the voice-activated video switch mix. An event will then be generated from the termination deemed to be the active speaker.

The use of the "Voice Activated Video Switch Package" is not recommended for use on a termination that already has a "Volume Control Package" property associated with it. In this scenario, the voice-activated video switch should take place on the input audio stream before volume control is acted upon it.

12.1.6 Error code

None.

12.2 Lecture Video Mode Package

Package name:	Lecture Video Mode Package
Package ID:	lvmp (0x0076)
Description:	This package defines functionality that allows a MP to change the output video image from a mix of N input video sources every X seconds. For example, a Lecture scenario where one user represented by a termination (the lecturer) will see a view of a participant for X seconds, then the next participant for X seconds, etc.
Version:	1
Designed to be extended only:	No
Extends:	None

12.2.1 Properties

12.2.1.1 Video Switch Interval

Property name:	Video Switch Interval
Property ID:	vidswitchint (0x0001)
Description:	This property indicates the duration in seconds that a participant represented by the termination sees the other participants in a context.
Type:	Integer
Possible values:	0-65535 in 1/10 seconds. e.g., 10 equals 1 second.
Default:	0 "Video Switch Interval Mixing Off"
Defined in:	LocalControl Descriptor
Characteristics:	Read/Write

12.2.2 Events

None.

12.2.3 Signals

None.

12.2.4 Statistics

None.

12.2.5 Procedures

To perform lecture-based video mixing, the *vidswitchint* property is set to a time interval (X seconds) on the applicable video stream ID on the termination that will output the video stream. The MP shall then output each individual input video stream of the mix for X seconds, constantly cycling through the input video streams. The input video stream from a termination that has the *vidswitchint* property applied shall not be output during the switching cycle.

The topology descriptor may be used to indicate to the mix that the participants represented by Terminations A and B shall not view each other, but A and B shall see an image of C.

Figure 6 shows an example of Lecture Mode Switching.

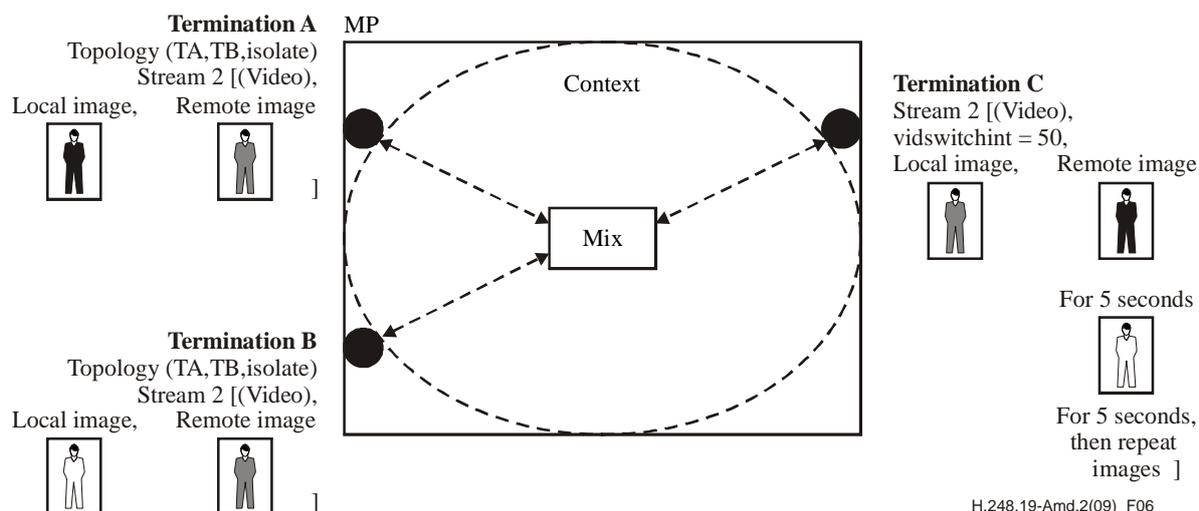


Figure 6 – Example lecture-based video mixing

Figure 6 details a scenario where the participant represented by Termination C sees an image of A for 5 seconds and then B for 5 seconds, then this sequence is repeated.

If a termination has "Voice Activated Video Switch Package" properties *vavsp/vollevidsw* and *vavsp/vidmixbeh* set and "Lecture Mode Video Package" properties set, then the effect will be:

- The images will be displayed according to the procedures of the lecture mode video package.
- If a voice-activated video switch is detected, then this video stream is displayed.
- If another voice-activated video switch is not detected within the *lvmp/vidswitchint* period, then normal lecture mode video package procedures resume.

12.2.6 Error code

None.

12.3 Contributing Video Source Package

Package name: Contributing Video Source Package

Package ID: cvsp (0x0077)

Description: This package describes a property that allows an MC to identify for a particular video stream the contributing video sources. This allows a MP to mix the input video stream appropriately for output on a particular termination.

Version: 1

Designed to be extended only: No

Extends: None

12.3.1 Properties

12.3.1.1 Input Video Source

Property name: Input Video Source

Property ID: ivs (0x0001)

Description: This property is set by the MC in the local descriptor to associate an input stream with a video source identity. The video source identity

should be unique within a context.

Type:	Integer
Possible values:	1-65535
Default:	0 "No Input Source"
Defined in:	Local
Characteristics:	Read/Write

12.3.1.2 Contributing Source to Output

Property name:	Contributing Source to Output
Property ID:	ovs (0x0002)
Description:	This property is set by the MC in the remote descriptor to associate an output video stream with a particular input video source.
Type:	Integer
Possible values:	1-65535
Default:	0 "No Contributing Source to Output"
Defined in:	Remote
Characteristics:	Read/Write

12.3.2 Events

None.

12.3.3 Signals

None.

12.3.4 Statistics

None.

12.3.5 Procedures

The *cvsp/ivs* property is a unique identity that is set on incoming video streams associated with a termination. If the particular termination has multiple video streams (i.e., windows) associated with an ITU-T H.248 StreamID, then each property group containing a local descriptor may have a unique *cvsp/ivs* identity.

The *cvsp/ovs* property is set on the outgoing video streams to associate the output video stream with the appropriate input video streams. If a particular termination has multiple video streams associated with an ITU-T H.248 StreamID, then each property group containing a remote descriptor may have a *cvsp/ovs* identity.

If the *cvsp/ovs* and *cvsp/ivs* properties are set in a context, then the MP shall use these to mix and transcode the video streams that these are assigned to. If the *cvsp/ovs* property is set on a stream, only input video streams mentioned in that property shall be mixed.

The *cvsp/ivs* has no interaction with the voice-activated video switch, lecture video mode package or the video mix package because it is an identifier. The *cvsp/ovs* property is directly related to capabilities in the voice-activated video switch, lecture video mode package or the video mix package as they all specify the video to be output. The *cvsp/ovs* shall not be used in conjunction with these packages.

Figure 7 illustrates the usage of the *cvsp/ovs* and *cvsp/ivs* properties:

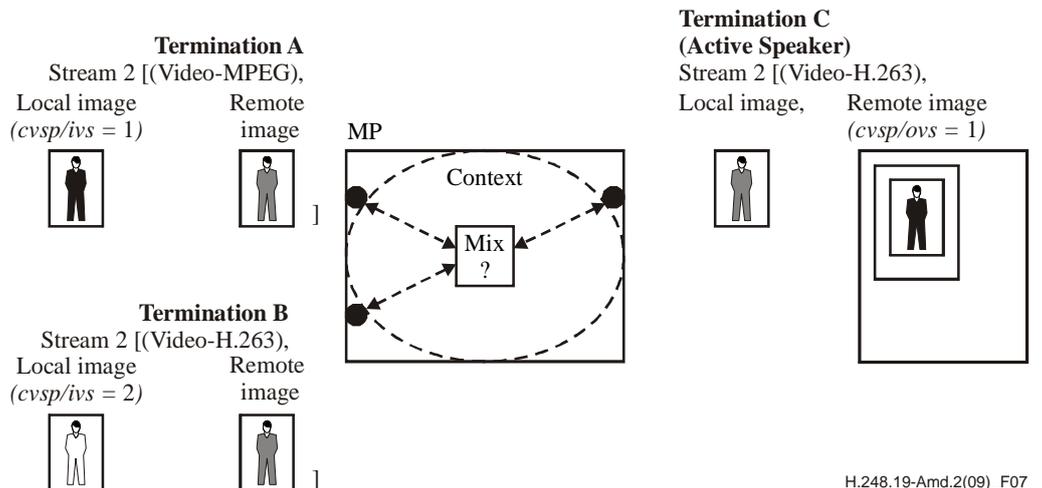


Figure 7 – Example contributing source setting

Figure 7 illustrates the example whereby Termination A (Stream 2 – MPEG) is classified as Contributing Source 1. Termination B (Stream 2 ITU-T H.263) is classified as Contributing Source 2. Termination C has indicated that it wants to view Contributing Source 1. As a result of this configuration, the MP transcodes the input video stream Contributing Source 1 from MPEG to ITU-T H.263 and outputs this to user C.

12.3.6 Error code

None.

12.4 Video Window Package

Package name: Video Window Package

PackageID: vwp (0x0078)

Description: This package describes a number of properties that allows an MC to assign video streams to a certain window in a display. It also allows the MC to set certain generic properties associated with that window. This package may be extended further to provide extra properties to describe colour, window text, etc. It is assumed that each window is associated with a particular property group.

Version: 1

Designed to be extended only: No

Extends: None

12.4.1 Properties

12.4.1.1 Window ID

Property name: Window ID

Property ID: wid (0x0001)

Description: This property is set by the MC to associate a particular property group representing an input or output stream with a window identity. This window identity shall be unique within a termination.

Type: Integer

Possible values: 1-65535

Defined in: Local/Remote
Characteristics: Read/Write

12.4.1.2 Window Sequence

Property name: Window Sequence
Property ID: wseq (0x0002)
Description: This property is set by the MC to set the relative display order of windows in a particular video stream. The property is assigned per property group associated with a window identity. This value shall be unique within a termination.
Type: Integer
Possible values: 1-65535
1 Represents the window displayed at the front.
65535 Represents the window displayed at the back.
Defined in: Local/Remote
Characteristics: Read/Write

12.4.1.3 Window X Position

Property name: Window X Position
Property ID: wxp (0x0003)
Description: This property is set by the MC to represent the horizontal "X" position of the bottom left-hand corner of a window. 0 represents the left-hand side of a screen, 10000 the right-hand side of a screen.
Type: Integer
Possible values: 0-10000
Defined in: Local/Remote
Characteristics: Read/Write

12.4.1.4 Window Y Position

Property name: Window Y Position
Property ID: wyp (0x0004)
Description: This property is set by the MC to represent the vertical "Y" position of the bottom left-hand corner of a window. 0 represents the bottom of a screen, 10000 the top of a screen.
Type: Integer
Possible values: 0-10000
Defined in: Local/Remote
Characteristics: Read/Write

12.4.1.5 Window Height

Property name: Window Height
Property ID: wh (0x0005)
Description: This property is set by the MC to represent the vertical height of a window.
Type: Integer

Possible values: 0-10000
Defined in: Local/Remote
Characteristics: Read/Write

12.4.1.6 Window Width

Property name: Window Width
Property ID: ww (0x0006)
Description: This property is set by the MC to represent the horizontal width of a window.
Type: Integer
Possible values: 0-10000
Defined in: Local/Remote
Characteristics: Read/Write

12.4.2 Events

None.

12.4.3 Signals

None.

12.4.4 Statistics

None.

12.4.5 Procedures

The *vwp* package allows the MC to specify that a window is associated with a certain output video stream. This allows the MC to describe that a single output video stream is composed of different windows containing different images. Where multiple windows are used, the characteristics of each window should be described in separate property groups.

The *vwp/wid* property assigns an identity to a window that is unique within a termination. This identity can then be used for mixing functions such as window tiling. Window tiling is set through the use of the *vwp/wseq* property that can be set per window identity. Only one value of *vwp/wseq* shall be set per window and shall be unique to each property group. All property groups shall have the *vwp/wseq* set if sequencing is required. The mixing function in the MP shall use the *vwp/wseq* properties set for the particular streamID to present the images in the prescribed order.

The properties *vwp/wxp*, *vwp/wyp*, *vwp/wh*, *vwp/ww* describe the positioning of the window in the output stream. Figure 8 shows an example of the usage of *vwp* package.

Termination C
(Active Speaker)
 Stream 2 [(Video),
 Local Image,

Remote Image
 Property Group 1
 $vwp/wid = 1, vwp/wseq = 1, vwp/wxp = 2500, vwp/wyp = 0,$
 $vwp/wh = 7500, vwp/ww = 5000, cvsp/ovs = 2$
 Property Group 2
 $vwp/wid = 2, vwp/wseq = 2, vwp/wxp = 5000, vwp/wyp = 2500,$
 $vwp/wh = 7500, vwp/ww = 5000, cvsp/ovs = 1$

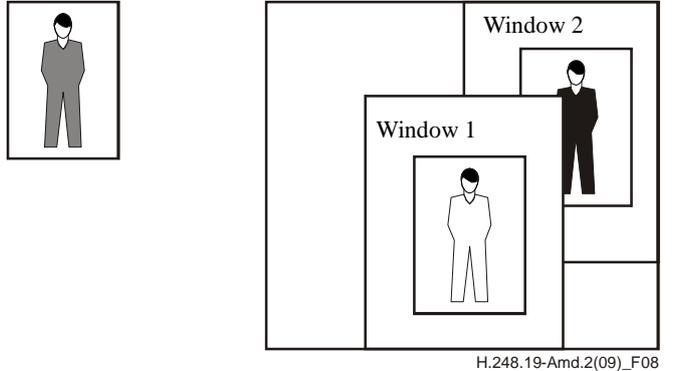


Figure 8 – Example video window setting

12.4.6 Error code

None.

12.5 Tiled Window Package

Package name: Tiled Window Package
Package ID: tilwin (0x0079)
Description: This package allows the MC to order the MP to display a number of tiled video windows with the same dimensions.
Version: 1
Designed to be extended only: No
Extends: None

12.5.1 Tile Details

Property name: Tile Details
Property ID: tiledet (0x0001)
Description: Tile Details is an array that determines the number of tiled windows in the video stream and which contributing source should be output on each tiled window.

Type: sub-list of type integer

Possible Values:

Number X Tiles	Number Y Tiles	A number of Tile Number and Contributing Source to output pairs. [Tile Number, Contributing Source]
----------------	----------------	---

where:

Number X Tiles: the number of windows displayed horizontally *Value:* 1-65535
 Number Y Tiles: the number of windows displayed vertically *Value:* 1-65535

Tile number:	the number of the window displaying a video stream from the contributing source. The top left-hand corner tile is labelled 1. The tile immediately on its right is labelled 2. The window number is increased by 1 moving along and then down.	<i>Value:</i> 1-65535
Contributing source:	Identifies the contributing source of the video. See clause 12.3.1.2 for details on contributing sources.	<i>Value:</i> 0-65535

Default: 0,0,0,0 [No tiling]

Defined in: Local/Remote

Characteristics: Read/Write

12.5.2 Events

None.

12.5.3 Signals

None.

12.5.4 Statistics

None.

12.5.5 Procedures

The tile window package provides a simple means of defining the characteristics of one window (line rate, frame rate, resolution) and having these characteristics applied to several windows, each with different contributing video sources.

The array *tilwin/tiledet* specifies the number of windows on a display. The size of the display windows shall be x and y equal parts. Following this, the contributing video sources to be output are included in the form of window number and contributing source pairs. There may be 0 to (x × y) number of pairs. If there is no window number/contributing source pair for a tile window, then that window shall be empty or display an indication of an empty window.

Figure 9 shows an example of a 3 by 2 tiled window display with two contributing video sources output.

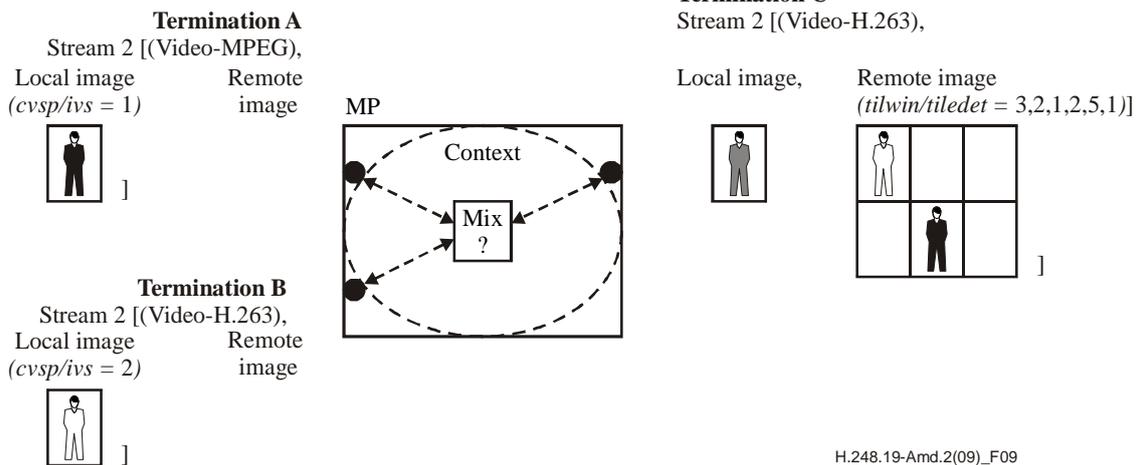


Figure 9 – Example tiled window setting with the same characteristics

If different characteristics are required for any or all of the tiled windows, then the *tilwin/tiledet* property shall be placed in different groups so that the individual characteristics can be specified. All the groups in the stream shall have the same "X Number Tiles" and "Y Number Tiles" value. Error code 454 "No such parameter value in this package" is returned if the MC attempts to add a "X Number Tiles" or "Y Number Tiles" that is different from the other groups in the stream. The contributing source component of *tilwin/tiledet* shall take precedence over the Output Contributing source (*cvsp/ovs*) property if included in the group.

Figure 10 shows an example of a 3 by 2 tiled window display with two contributing video sources output in three windows. One of the output windows has been inverted.

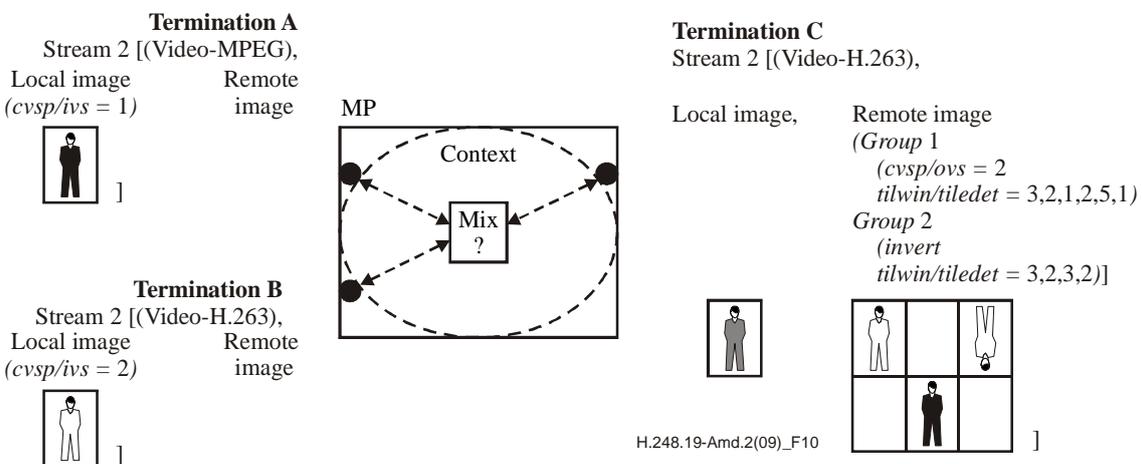


Figure 10 – Example tiled window setting with different characteristics

12.5.6 Error code

None.

12.6 Text Overlay Package

Package name: Text Overlay Package

Package ID: top (0x00a1)

Description: This package describes a number of properties that allow an MC to specify the text overlaying the video image. This package may be used on its own or together with the Video Window Package to

specify text overlay for the individual windows.

Version: 1
Designed to be extended only: No
Extends: None

12.6.1 Properties

12.6.1.1 Text ID

Property name: Text ID
Property ID: textid (0x0001)
Description: This property is set by the MC to associate inside particular property group parameters of a specific text overlay. If *vwp/wid* is not specified in the property group, then text identity shall be unique within a termination. If *vwp/wid* is specified in the property group, then text identity shall be unique within all the property groups with the same value of *vwp/wid*.
Type: Integer
Possible Values: 1-65535
Defined in: Local/Remote
Characteristics: Read/Write

12.6.1.2 Text

Property name: Text
Property ID: text (0x0002)
Description: This property is set by the MC to represent the text to overlay the video image.
Type: String
Possible Values: Any text
Defined in: Local/Remote
Characteristics: Read/Write

12.6.1.3 Text X Position

Property name: Text X Position
Property ID: textxp (0x0003)
Description: This property is set by the MC to represent the horizontal "X" position of the bottom left-hand corner of a text. 0 represents the left-hand side of a window, 10000 the right-hand side of a window.
Type: Integer
Possible Values: 0-10000
Defined in: Local/Remote
Characteristics: Read/Write

12.6.1.4 Text Y Position

Property name:	Text Y Position
Property ID:	textyp (0x0004)
Description:	This property is set by the MC to represent the vertical "Y" position of the bottom left-hand corner of a text. 0 represents the left-hand side of a window, 10000 the right-hand side of a window.
Type:	Integer
Possible Values:	0-10000
Defined in:	Local/Remote
Characteristics:	Read/Write

12.6.1.5 Text Height

Property name:	Text Height
Property ID:	texth (0x0005)
Description:	This property is set by the MC to represent the vertical height of the text.
Type:	Integer
Possible Values:	0-10000
Defined in:	Local/Remote
Characteristics:	Read/Write

12.6.1.6 Text Width

Property name:	Text Width
Property ID:	textw (0x0006)
Description:	This property is set by the MC to represent the horizontal width of a text.
Type:	Integer
Possible Values:	0-10000
Defined in:	Local/Remote
Characteristics:	Read/Write

12.6.1.7 Text Transparency

Property name:	Text Transparency
Property ID:	texttrans (0x0007)
Description:	This property is set by the MC to represent the transparency of the text. 0 means completely opaque, 65535 means completely transparent.
Type:	Integer
Possible Values:	0-65535
Defined in:	Local/Remote
Characteristics:	Read/Write

12.6.1.8 Text Background Transparency

Property name: Text Background Transparency
Property ID: textbtrans (0x0008)
Description: This property is set by the MC to represent the transparency of the text background. 0 means completely opaque, 65535 means completely transparent.
Type: Integer
Possible Values: 0-65535
Defined in: Local/Remote
Characteristics: Read/Write

12.6.1.9 Text Colour

Property name: Text Colour
Property ID: textcolor (0x0009)
Description: This property is set by the MC to represent the colour of the text.
Type: sub-list of type integer
Possible Values:

Red	Green	Blue
-----	-------	------

where:

Red: The level of red component in the colour *Value: 0-65535*
Green: The level of green component in the colour *Value: 0-65535*
Blue: The level of blue component in the colour *Value: 0-65535*

Defined in: Local/Remote
Characteristics: Read/Write

12.6.1.10 Text Background Colour

Property name: Text Background Colour
Property ID: textbcolor (0x000a)
Description: This property is set by the MC to represent the colour of the text background.
Type: sub-list of type integer
Possible Values:

Red	Green	Blue
-----	-------	------

where:

Red: The level of red component in the colour *Value: 0-65535*
Green: The level of green component in the colour *Value: 0-65535*
Blue: The level of blue component in the colour *Value: 0-65535*

Defined in: Local/Remote
Characteristics: Read/Write

12.6.1.11 Relative text font size

Property name: Relative text font size
Property ID: textfontsize (0x000b)

Description:	This property is set by the MC to represent the relative text font size.
Type:	Enumeration
Possible Values:	small (0x0001) normal (0x0002) large (0x0003)
Default:	normal (0x0002)
Defined in:	Local/Remote
Characteristics:	Read/Write

12.6.2 Events

None.

12.6.3 Signals

None.

12.6.4 Statistics

None.

12.6.5 Procedures

The *top* package allows the MC to specify the text to be displayed as an overlay to a certain output video stream. This allows the MC to add text labels to the video images. This package may be used together with *vwp* to add text overlay to individual windows. It is possible to add multiple text labels to the same window using *top/textid*. Where multiple text overlays are used, the characteristics of each text overlay should be described in separate property groups.

The *top/textid* property assigns an identity to a text overlay that is unique within a termination or within *vwp/wid* if it is specified.

The properties *top/textxp*, *top/textyp*, *top/texth*, *top/textw* describe the positioning of the text in the output stream.

The properties *top/texttrans*, *top/textbtrans*, *top/textcolor*, *top/textbcolor* describe the colour and the transparency level of the text and its border.

The following example represents two windows, the first one contains two labels and the second one contains just one.

Property group 1

vwp/wid=1, top/textid=1, top/textxp=500, top/textyp=500, top/texth=500, top/textw=8000, top/text="Window 1"

Property group 2

vwp/wid=1, top/textid=2, top/textxp=500, top/textyp=8500, top/texth=500, top/textw=8000, top/text="Video"

Property group 3

vwp/wid=2, top/textid=1, top/textxp=500, top/textyp=500, top/texth=500, top/textw=8000, top/text="Window 2"

12.6.6 Error code

None.

12.7 Border and Background Package

Package name:	Border and Background Package
Package ID:	bbp (0x00a2)
Description:	This package describes a number of properties that allow an MC to specify the borders and the background of the video image. This package may be used on its own or together with the Video Window Package to specify the borders and the background of the individual windows.
Version:	1
Designed to be extended only:	No
Extends:	None

12.7.1 Properties

12.7.1.1 Vertical Border Thickness

Property name:	Vertical Border Thickness
Property ID:	bvthick (0x0001)
Description:	This property is set by the MC to represent the vertical thickness of border of the video image. If the value is 0, then the vertical border is absent. The border size is calculated assuming that the video image has coordinates from 0 to 10000, i.e., if the <i>bvthick</i> is 100 then coordinates 0 to 99 and 9901 to 10000 occupied by the border and coordinates 100 to 9900 occupied by the video image.
Type:	Integer
Possible Values:	0-10000
Defined in:	Local/Remote
Characteristics:	Read/Write

12.7.1.2 Horizontal Border Thickness

Property name:	Horizontal Border Thickness
Property ID:	bhthick (0x0002)
Description:	This property is set by the MC to represent the horizontal thickness of border of the video image. If the value is 0, then the horizontal border is absent. The border size is calculated assuming that the video image has coordinates from 0 to 10000, i.e., if the <i>bhthick</i> is 100, then coordinates 0 to 99 and 9901 to 10000 occupied by the border and coordinates 100 to 9900 occupied by the video image.
Type:	Integer
Possible Values:	0-10000
Defined in:	Local/Remote
Characteristics:	Read/Write

12.7.1.3 Border Colour

Property name:	Border Colour
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Property ID:	bcolor (0x0003)		
Description:	This property is set by the MC to represent the colour of the borders of the video image.		
Type:	sub-list of type integer		
Possible Values:	Red	Green	Blue
	where:		
	Red:	The level of red component in the colour	Value: 0-65535
	Green:	The level of green component in the colour	Value: 0-65535
	Blue:	The level of blue component in the colour	Value: 0-65535
Defined in:	Local/Remote		
Characteristics:	Read/Write		

12.7.2 Events

None.

12.7.3 Signals

None.

12.7.4 Statistics

None.

12.7.5 Procedures

The *bbp* package allows the MC to specify the text to be displayed on top of a certain output video stream.

The properties *bbp/bvthick*, *bbp/bhthick*, *bbp/bcolor* describe the dimensions and the colour of the border.

The following example represents a window with red border.

vwp/wid=1, bbp/bvthick=100, bbp/bhthick=100, bbp/bcolor=65535,0,0

12.7.6 Error Code

None.

13 Data conferencing

13.1 Chat and messaging conferencing

Chat services are services where real-time delivery of text is assured. Such services are defined in [ITU-T T.140]. The use of Chat services in a decomposed MCU is discussed below. Messaging services are services where non-real-time delivery of text occurs, for example, [b-IETF RFC 3428]. These services are typically based on call level messages exchanged between MCs. No MC/MP interaction results from this exchange. As such, messaging service conferencing is not discussed further in this Recommendation.

The Text Conversation service shall be based on [ITU-T T.140]. The procedures used to establish an ITU-T T.140 session are beyond the scope of this Recommendation; however, [ITU-T H.248.2] may be used to establish and negotiate an ITU-T T.140 Text Telephony session. [ITU-T H.248.2] provides procedures for alternating text and voice modes. The MP may also provide translation between legacy text conversation standards and [ITU-T T.140].

Each text stream received from a user is associated with an ITU-T T.140 User Identity. The MP shall mix these input streams according to the topology and modes (described in clause 6) and the procedures in [ITU-T T.140] and send the applicable text streams with User Identity information to the applicable users.

If a text stream is received on a termination that also has an audio/video stream, synchronization should be maintained between these streams.

Floor control is achieved through the packages and procedures described in clause 10.

13.2 Additional data conferencing

For further study.

Bibliography

- [b-IETF RFC 3428] IETF RFC 3428 (2002), *Session Initiation Protocol (SIP) Extension for Instant Messaging*.

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