



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

H.248.19

(03/2004)

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**

ITU-T Recommendation H.248.19

ITU-T H-SERIES RECOMMENDATIONS
AUDIOVISUAL AND MULTIMEDIA SYSTEMS

CHARACTERISTICS OF VISUAL TELEPHONE SYSTEMS	H.100–H.199
INFRASTRUCTURE OF AUDIOVISUAL SERVICES	
General	H.200–H.219
Transmission multiplexing and synchronization	H.220–H.229
Systems aspects	H.230–H.239
Communication procedures	H.240–H.259
Coding of moving video	H.260–H.279
Related systems aspects	H.280–H.299
Systems and terminal equipment for audiovisual services	H.300–H.349
Directory services architecture for audiovisual and multimedia services	H.350–H.359
Quality of service architecture for audiovisual and multimedia services	H.360–H.369
Supplementary services for multimedia	H.450–H.499
MOBILITY AND COLLABORATION PROCEDURES	
Overview of Mobility and Collaboration, definitions, protocols and procedures	H.500–H.509
Mobility for H-Series multimedia systems and services	H.510–H.519
Mobile multimedia collaboration applications and services	H.520–H.529
Security for mobile multimedia systems and services	H.530–H.539
Security for mobile multimedia collaboration applications and services	H.540–H.549
Mobility interworking procedures	H.550–H.559
Mobile multimedia collaboration inter-working procedures	H.560–H.569
BROADBAND AND TRIPLE-PLAY MULTIMEDIA SERVICES	
Broadband multimedia services over VDSL	H.610–H.619

For further details, please refer to the list of ITU-T Recommendations.

ITU-T Recommendation H.248.19

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

Summary

This Recommendation describes the functionality of a decomposed multipoint control unit, in particular the interface between a media controller and media processor which is based on ITU-T Rec. H.248. 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.

Source

ITU-T Recommendation H.248.19 was approved on 15 March 2004 by ITU-T Study Group 16 (2001-2004) under the ITU-T Recommendation A.8 procedure.

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.

Compliance with this Recommendation is voluntary. However, the Recommendation may contain certain mandatory provisions (to ensure e.g. interoperability or applicability) and compliance with the Recommendation is achieved when all of these mandatory provisions are met. The words "shall" or some other obligatory language such as "must" and the negative equivalents are used to express requirements. The use of such words does not suggest that compliance with the Recommendation is required of any party.

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

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.

© ITU 2004

All rights reserved. No part of this publication may be reproduced, by any means whatsoever, without the prior written permission of ITU.

CONTENTS

	Page
1 Scope	1
2 References.....	1
2.1 Normative references.....	1
2.2 Informative references.....	1
3 Terms and definitions	2
4 Abbreviations.....	2
5 Conferencing architecture.....	2
6 Speaking and listening in a conference	4
7 Determination and management of conferencing capabilities.....	4
8 Simultaneous support of media types	4
9 MCUs and multiplexed media bearers	4
10 Floor Control	5
10.1 Floor Control Package.....	5
10.2 Floor Action Package	6
10.3 Indication of being viewed Package.....	6
11 Audio Conferencing.....	7
11.1 Volume Control Package.....	7
11.2 Volume Detection Package	8
11.3 Volume Level Mixing Package.....	9
11.4 Mixing Volume Level Control Package.....	10
12 Video conferencing.....	12
12.1 Voice Activated Video Switch Package.....	12
12.2 Lecture Video Mode Package	15
12.3 Contributing Video Source Package	16
12.4 Video Window Package	18
12.5 Tiled Window Package.....	21
13 Data conferencing.....	23
13.1 Chat and Messaging conferencing.....	23
13.2 Additional data conferencing	23

ITU-T Recommendation 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 H.248 interface for audio, video and data conferencing. This includes the specification of mixing, conference capabilities and core H.248.1 protocol usage. The packages and functionality described in this Recommendation are optional according to the rules of 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.

2.1 Normative references

- ITU-T Recommendation H.248.1 (2002), *Gateway control protocol: Version 2*.
- ITU-T Recommendation H.248.2 (2000), *Gateway control protocol: Facsimile, text conversation and call discrimination packages*.
- ITU-T Recommendation H.248.10 (2001), *Gateway control protocol: Media gateway resource congestion handling package*.
- ITU-T Recommendation H.248.27 (2003), *Gateway control protocol: Supplemental tones packages*.
- ITU-T Recommendation T.140 (1998), *Protocol for multimedia application text conversation*.

2.2 Informative references

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

3 Terms and definitions

This Recommendation defines the following terms:

- 3.1 **listener**: The user/endpoint who is receiving media.
- 3.2 **speaker**: The user/endpoint who is sending media.
- 3.3 **local image**: The image of user A that is sent to user B.
- 3.4 **remote image**: The image of user B that user A receives.

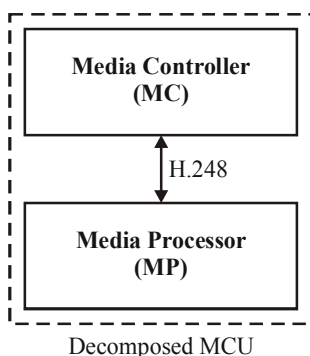
4 Abbreviations

This Recommendation uses the following abbreviations:

MC	Media Controller
MCU	Multipoint Control Unit
MP	Media Processor
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., 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. H.248 is used between a media controller and media gateway which also contain similar functions; thus, H.248 may be used in decomposed MCU. Figure 1 shows a decomposed MCU.



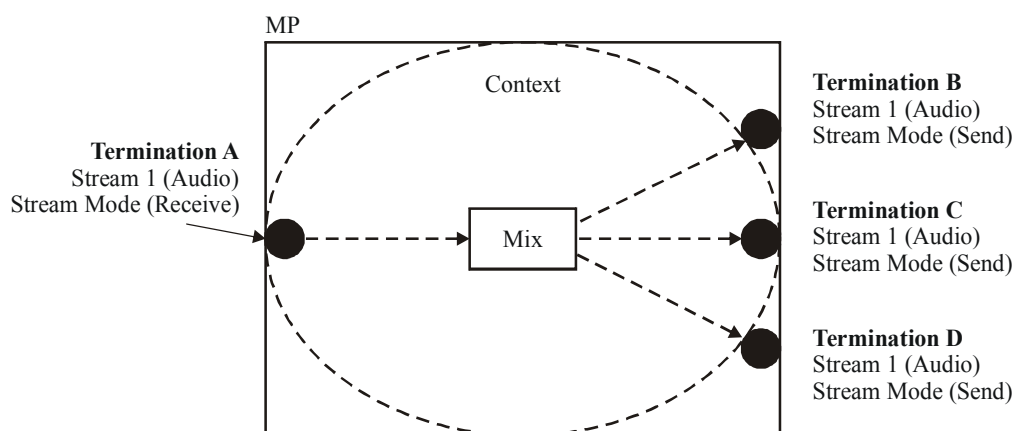
H.248.19_F01

Figure 1/H.248.19 – Decomposed MCU

The H.248.1 model allows for different types of conferencing. Typically, a MCU controls what is termed "multipoint" conferences in 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 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/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.

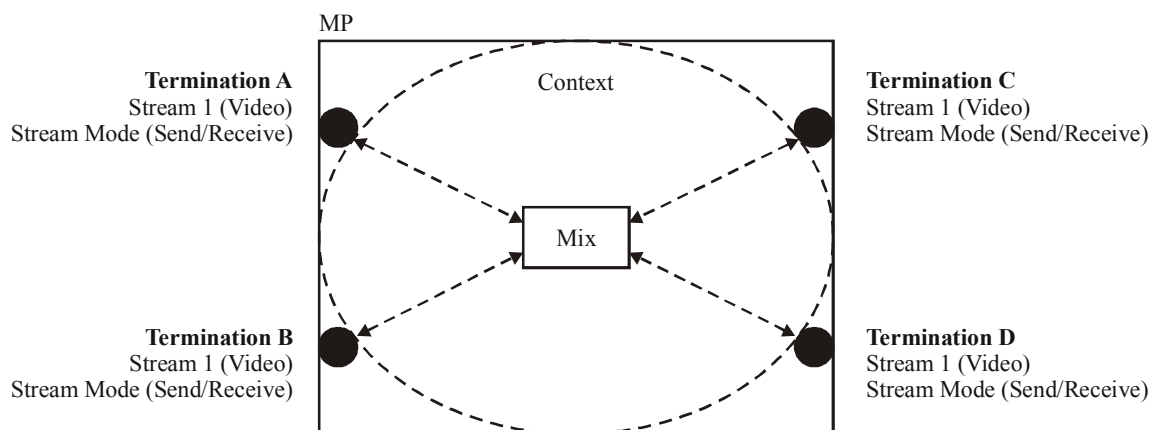
Figure 2 shows the H.248 modelling of a "Lecture mode" conference. Termination A represents the "speaker"; terminations B, C or D represent the "listening" terminations. Stream 1 represents an audio stream and the stream mode is used to determine who "speaks" and who "listens".



H.248.19_F02

Figure 2/H.248.19 – "Lecture mode" conference

Figure 3 shows the 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".



H.248.19_F03

Figure 3/H.248.19 – 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 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 7.1.7/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 7.1.4/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 an MP through the use of Audit Capabilities (7.2.6/H.248.1). By auditing the packages on an 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 an 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 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 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 (11.1/H.248.1) should be implemented.

8 Simultaneous support of media types

The 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 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 6.2/H.248.1 and 7.1.3/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". The process of joining or leaving a conference is called a "Floor Action". 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. No additional packages are needed.

10.1 Floor Control Package

Package Name: Floor Control Package
PackageID: fcp, 0x006e
Description: This package defines a property to indicate that the termination represents the user who is the conference floor controller.
Version: 1
Designed to be extended only: No
Extends: None

10.1.1 Properties

10.1.1.1 Property Name: Activate Floor Controller

PropertyID: 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) No Floor Control Handling [Default]
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 Procedures

The MC may set this property on a media gateway to indicate that the termination relates to the floor controller. The "Activate Floor Control" property may be used by the media processor to mix user plane data for the conference.

10.1.6 Error code

None.

10.2 Floor Action Package

The Conference Tones Generation Package in 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

PackageID: 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

SignalID: 0x0001, viewed

Description: This signal initiates the sending of an indication that a user is currently being viewed by other participants in a conference.

SignalType: Brief

Duration: Provisioned

Additional parameters:

10.3.3.1.1 Viewed by whom

ParameterId: vbw (0x0001)

Type: enumeration

Possible values: all (0x0001) [Default]

someone (0x0002)

Description: Indicates which terminals are doing the viewing.

10.3.3.1.2 Viewers identity (optional)

ParameterId: vid (0x0002)
Type: sub-list of octet string
Possible values: Identities of the terminals/parties doing the viewing.
Description: This parameter contains a list of the identities of the people who are doing the viewing.

10.3.3.2 Signal Name: No viewer

SignalID: 0x0002, noviewer
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.
SignalType: Brief
Duration: Provisioned
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.

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
PackageID: 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 Property Name: Volume Level

PropertyID: 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
PackageID: 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

Event name: Volume Activity Detection
EventID: 0x0001, vad
Description: This event occurs when the volume level associated with audio media exceeds the indicated threshold.
EventsDescriptor Parameters:
Parameter Name: Volume Threshold
ParameterID: 0x0001, vthres

Type: Integer
Possible values: 0-100 decibels
Description: This is used to request the MP to notify it of a particular bearer event.
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 recommend 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
PackageID: 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: 1
Designed to be extended only: No
Extends: None

11.3.1 Properties

11.3.1.1 Property Name: Volume Mixing Level

PropertyID: 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
Characteristics: Read/Write

11.3.1.2 Property Name: N Speakers Mixing

PropertyID:	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
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. 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. 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
PackageID:	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 Property Name: Mix Participant Number

PropertyID:	mixpartnum, 0x0001
Description:	This property assigns a participant/source number for a particular stream. <i>Mixpartnum</i> 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 Property Name: Volume Level Input to Mix

PropertyID:	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=1</i> , the second position of the sub-list represents <i>mixpartnum=2</i> , 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.

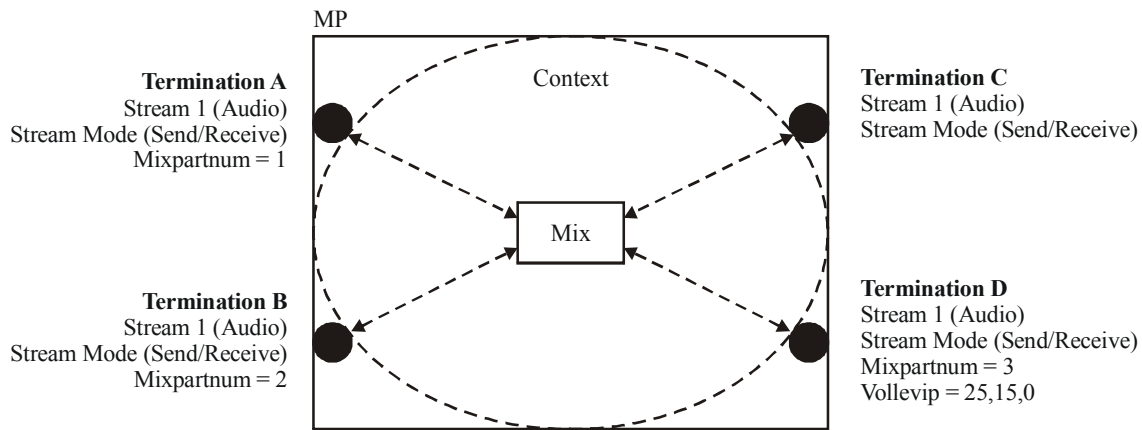
11.4.4 Statistics

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.



H.248.19_F04

Figure 4/H.248.19 – Example volume control into mix

Figure 4 shows an example where 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.

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

PackageID: 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 Property Name: Audio Stream to Switch

PropertyID: 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
Defined in: LocalControl Descriptor
Characteristics: Read/Write

12.1.1.2 Property Name: Volume Level for Video Switching

PropertyID: 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 Property Name: Video Mix Behaviour

PropertyID: 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
EventID: 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.

EventsDescriptor Parameters: None

ObservedEventsDescriptor Parameters: None

12.1.3 Signals

None.

12.1.4 Statistics

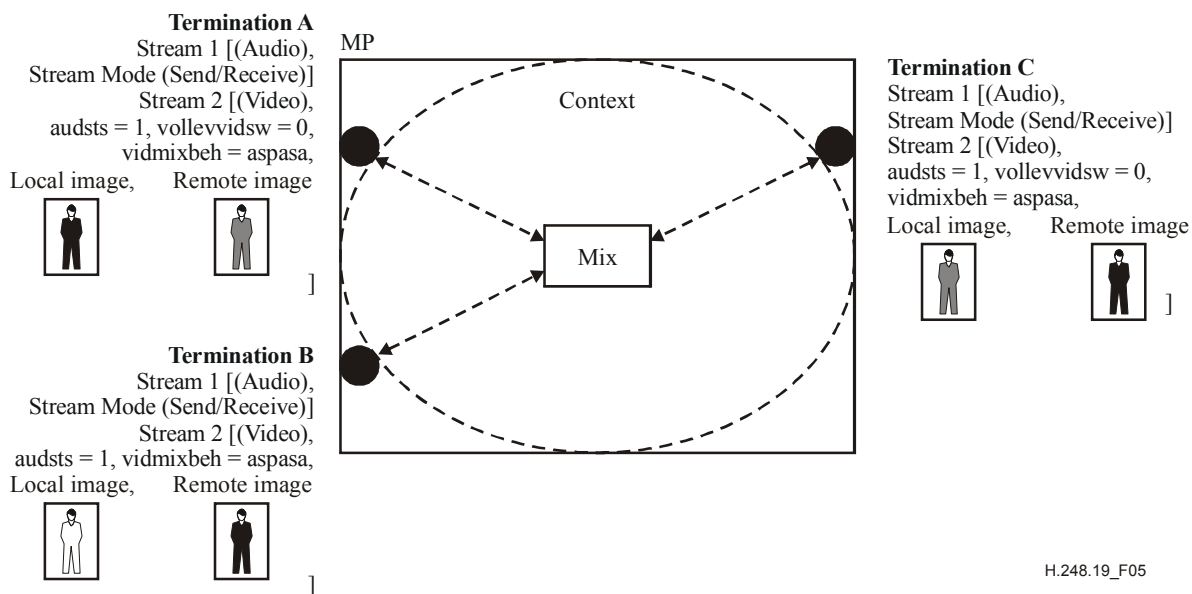
None.

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 equals or exceeds 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 "aspara", 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.



H.248.19_F05

Figure 5/H.248.19 – 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
PackageID:	lvmp, 0x0076
Description:	This package defines functionality that allows an 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 Property Name: Video Switch Interval

PropertyID:	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.

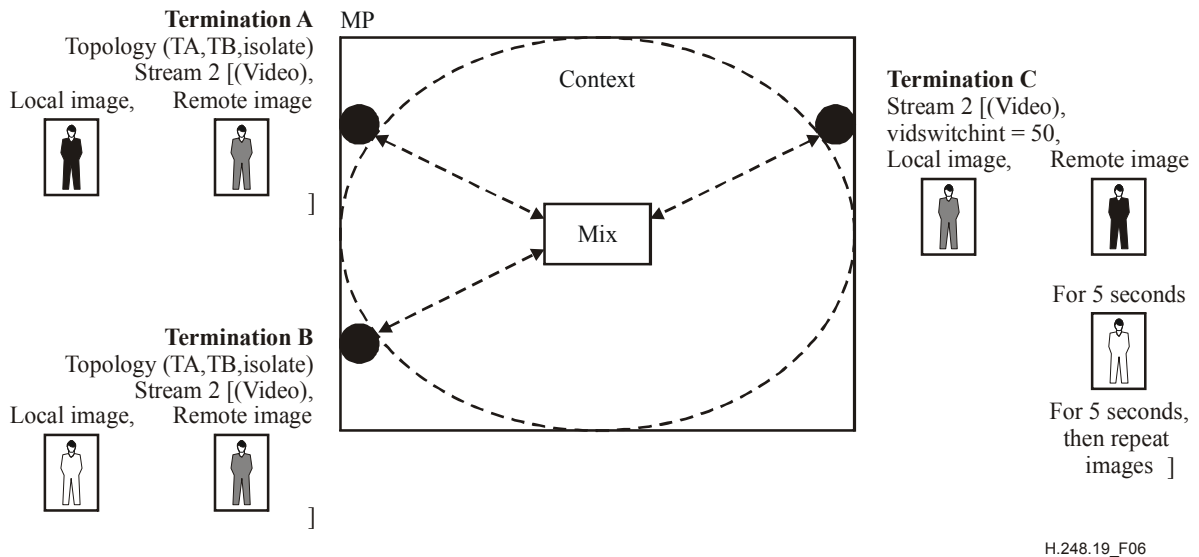


Figure 6/H.248.19 – Example lecture-based video mixing

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
 PackageID: *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 Property Name: Input Video Source

PropertyID: *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 Property Name: Contributing Source to Output

PropertyID: 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 a 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 a 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:

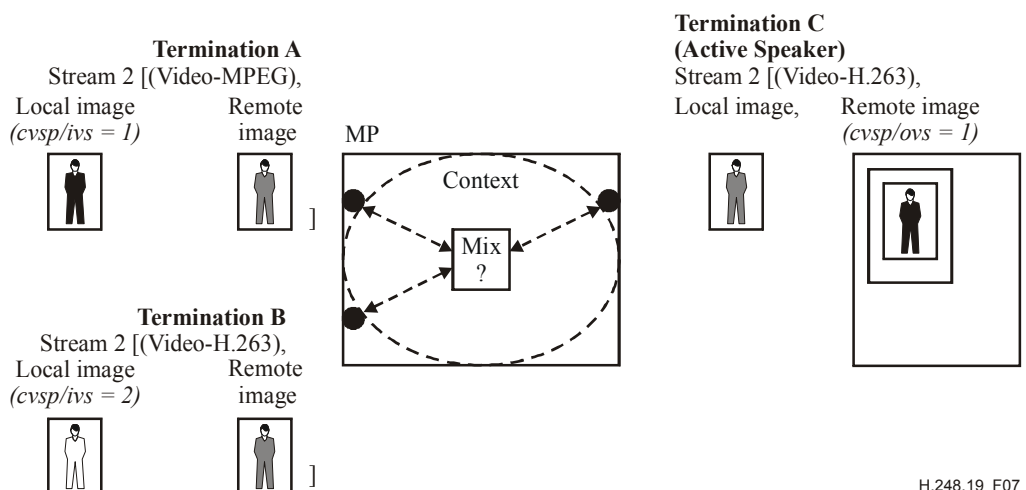


Figure 7/H.248.19 – Example contributing source setting

Figure 7 illustrates the example whereby Termination A (Stream 2 – MPEG) is classified as Contributing Source 1. Termination B (Stream 2 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 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 Property Name: Window ID

PropertyID: 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 Property Name: Window Sequence

PropertyID: 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 Property Name: Window X Position

PropertyID: 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 Property Name: Window Y Position

PropertyID: 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 Property Name: Window Height

PropertyID: 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 Property Name: Window Width

PropertyID:	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
 $vwp/wid = 2, vwp/wseq = 2, vwp/wxp = 5000, vwp/wyp = 2500,$
 $vwp/wh = 7500, vwp/ww = 5000, cvsp/ovs = 1$

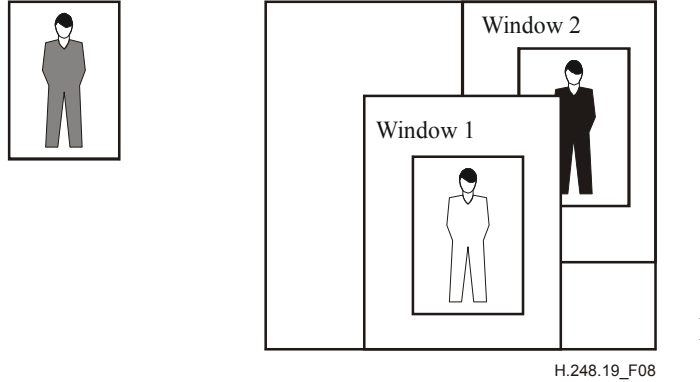


Figure 8/H.248.19 – Example video window setting

12.4.6 Error code

None.

12.5 Tiled Window Package

Package Name: Tiled Window Package

PackageID: 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 Property Name: Tile Details

PropertyID: 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: 1-65535</i>
Contributing source:	Identifies the contributing source of the video. See 12.3.1.2 for details on contributing sources.	<i>Value: 0-65535</i>
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

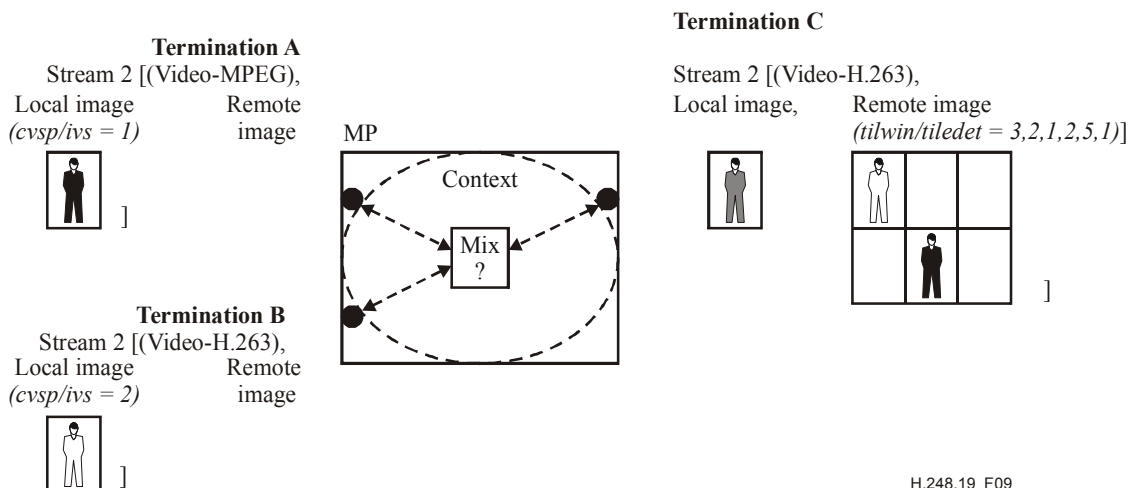
None.

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.



H.248.19_F09

Figure 9/H.248.19 – 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.

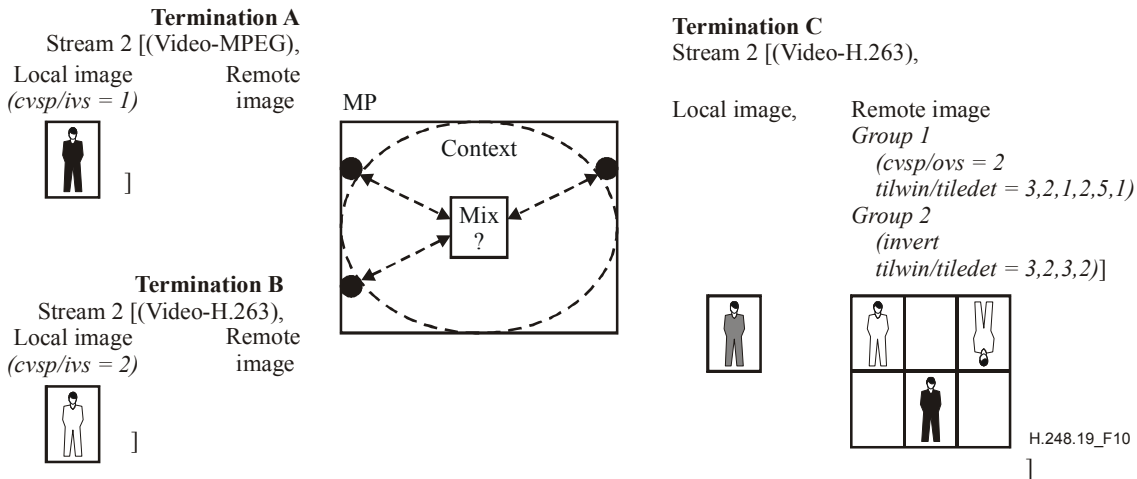


Figure 10/H.248.19 – Example tiled window setting with different characteristics

12.5.6 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 Rec. 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 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 Rec. T.140. The procedures used to establish a T.140 session are beyond the scope of this Recommendation; however, ITU-T Rec. H.248.2 may be used to establish and negotiate a T.140 Text Telephony session. ITU-T Rec. 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 Rec. T.140.

Each text stream received from a user is associated with a 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 Rec. 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.

SERIES OF ITU-T RECOMMENDATIONS

Series A	Organization of the work of ITU-T
Series B	Means of expression: definitions, symbols, classification
Series C	General telecommunication statistics
Series D	General tariff principles
Series E	Overall network operation, telephone service, service operation and human factors
Series F	Non-telephone telecommunication services
Series G	Transmission systems and media, digital systems and networks
Series H	Audiovisual and multimedia systems
Series I	Integrated services digital network
Series J	Cable networks and transmission of television, sound programme and other multimedia signals
Series K	Protection against interference
Series L	Construction, installation and protection of cables and other elements of outside plant
Series M	TMN and network maintenance: international transmission systems, telephone circuits, telegraphy, facsimile and leased circuits
Series N	Maintenance: international sound programme and television transmission circuits
Series O	Specifications of measuring equipment
Series P	Telephone transmission quality, telephone installations, local line networks
Series Q	Switching and signalling
Series R	Telegraph transmission
Series S	Telegraph services terminal equipment
Series T	Terminals for telematic services
Series U	Telegraph switching
Series V	Data communication over the telephone network
Series X	Data networks and open system communications
Series Y	Global information infrastructure, Internet protocol aspects and Next Generation Networks
Series Z	Languages and general software aspects for telecommunication systems