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SERIES H: AUDIOVISUAL AND MULTIMEDIA SYSTEMS

Infrastructure of audiovisual services – Supplementary
services for multimedia

Support for Multi-Level Precedence and Preemption (MLPP) within H.323 systems

ITU-T Recommendation H.460.14

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.460.14

Support for Multi-Level Precedence and Preemption (MLPP) within H.323 systems

Summary

This Recommendation describes the procedures and the signalling protocol for Multi-Level Precedence and Preemption (MLPP), which allow the originator of a call in an H.323 environment to specify a precedence level of the call and for an existing lower precedence call to be preempted to release resources needed to complete that higher precedence call. For the networks and domains that allow this functionality, the H.460.14 mechanism ensures that important calls can be established and can remain connected during periods of congestion.

These procedures use the H.323 Generic Extensibility Framework (GEF) and therefore do not require any changes to the base standards.

Source

ITU-T Recommendation H.460.14 was approved on 15 March 2004 by ITU-T Study Group 16 (2001-2004) under the ITU-T Recommendation A.8 procedure.

FOREWORD

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CONTENTS

Page

1	Scope	1
2	Introduction	1
2.1	Direct Endpoint Signalling	1
2.2	Gatekeeper Routed Signalling	2
2.3	Decomposed Gateway	2
2.4	H.248 managed devices	3
2.5	Stimulus device	3
3	References	4
4	Definitions	4
5	Abbreviations	5
6	Multi-level Precedence and Preemption Service description	5
6.1	Provision of precedence levels	5
6.2	Preemption of facilities	6
6.3	Diversion	6
6.4	Interactions with other services	6
7	Signalling elements for MLPP	9
7.1	Feature identifier	9
7.2	Parameter	10
8	Procedures	10
8.1	Registration, Admission and Status (RAS)	10
8.2	Call signalling procedures for H.450 endpoints	13
9	Dynamic description	15
9.1	Operational model	15
9.2	Signalling flows	15
9.3	Call states	20
9.4	Timers	21
10	Specification and Description Language (SDL) diagrams for MLPP	21
10.1	Behaviour of User A's endpoint	22
10.2	Behaviour of User B's endpoint	23
10.3	Behaviour of User C's endpoint	26
11	Protocol interactions with other endpoint features	26
11.1	Functional endpoints	26
11.2	Stimulus-based endpoints	28
11.3	Interworking with Switched Circuit Network	28
	Annex A – ASN.1 definition	28



Documents

Document Sharing Hub

ITU-T Rec. H.460.14 (03/2004)

iii

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
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ITU-T Recommendation H.460.14

Support for Multi-Level Precedence and Preemption (MLPP) within H.323 systems

1 Scope

Multi-Level Precedence and Preemption provides a framework for the treatment of calls based on precedence. It supports the preemption of active calls by higher-precedence calls when resources are limited. The system presented here is designed to be adaptable to different models of endpoints within H.323. It may be used to support direct endpoint call signalling or gatekeeper-routed endpoints of varying capabilities. For example, intelligent endpoints may support the MLPP procedures internally, while simple (e.g., stimulus-based) endpoints may require their Gatekeeper to implement the procedures in their stead. In the latter case, MLPP-specific signalling would be used only between Gatekeepers and other Gatekeepers or intelligent Gateways.

The elements of MLPP signalling are rather simple, hence they are defined using the tabular method described in ITU-T Rec. H.460.1.

2 Introduction

This Recommendation applies to H.323 endpoints (including Gateways) and Gatekeepers, and the interactions between them. It may be used with the direct endpoint call signalling model or the gatekeeper-routed model. This Recommendation provides signalling elements that may be used from one end of a call to the other, that is, from a calling endpoint, possibly through one or more Gatekeepers, to a destination endpoint.

In addition, two types of endpoints may be supported. Functional endpoints (e.g., those supporting H.450-series operations) are expected to support MLPP signalling to the endpoint, and should implement feature negotiation, user interaction, signalling, and timing in the endpoint. Stimulus-driven endpoints (e.g., those supporting Annex L/H.323) may remain ignorant of MLPP since the feature operation and interactions with the user are implemented within the controlling Gatekeeper or feature server. In either case, the elements of MLPP signalling defined herein should be used between Gatekeepers.

The following configurations are supported by the protocol defined in this Recommendation. It is possible for the various parties involved in an MLPP service to be using different configurations, that is, the following shall interwork.

2.1 Direct Endpoint Signalling

The configuration for the Direct Endpoint Signalling is as shown in Figure 1.

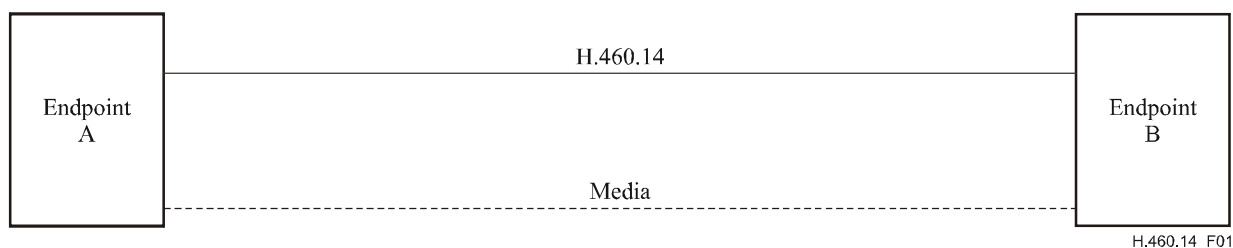


Figure 1/H.460.14 – Direct Endpoint Signalling configuration

This Recommendation describes the signalling required to support this configuration.

2.2 Gatekeeper Routed Signalling

Gatekeeper Routed Signalling has three cases as shown in Figure 2.

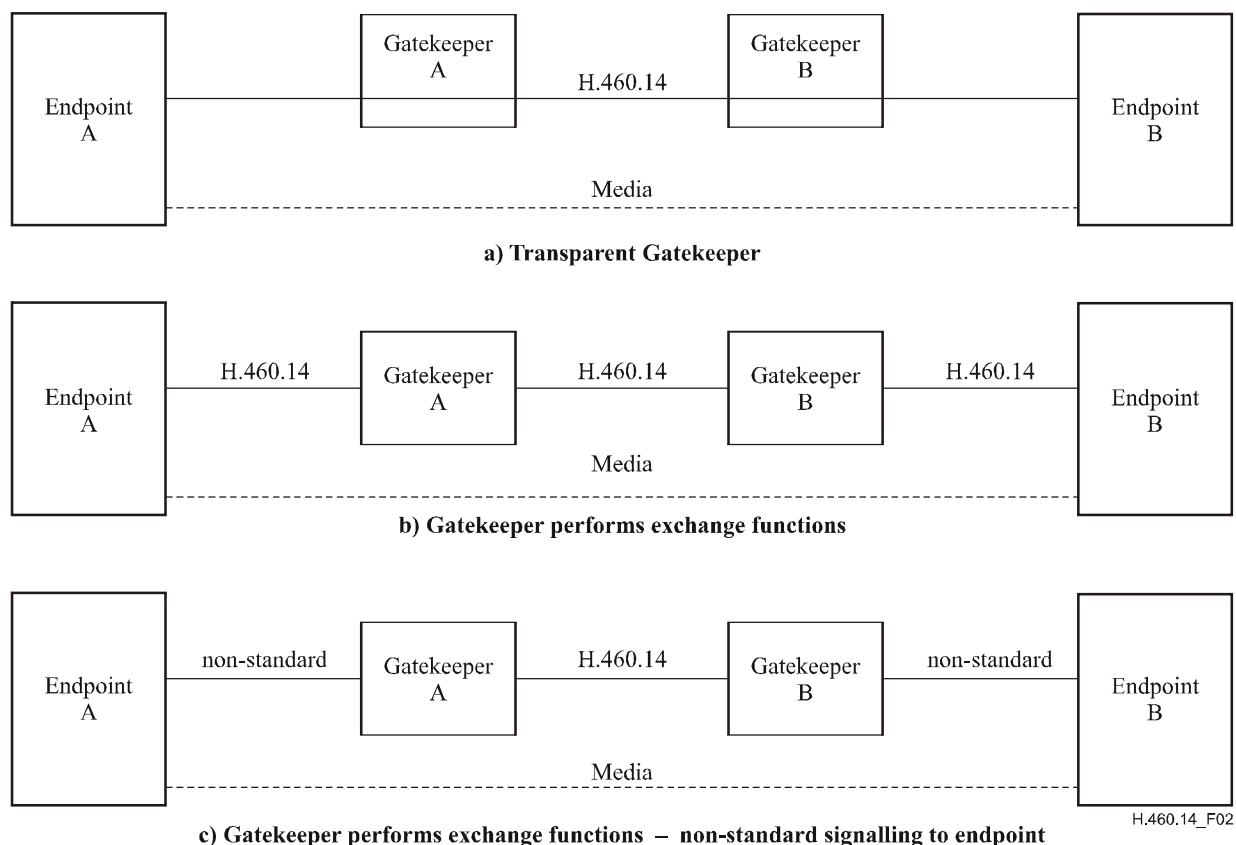


Figure 2/H.460.14 – Gatekeeper Routed Signalling configurations

For Configuration a, the Gatekeepers are completely transparent and only route the messages. The signalling between the endpoints is the same as for the Direct Endpoint Signalling case.

For Configuration b, the Gatekeepers terminate the call signalling messages and perform the exchange functions such as routing and feature interactions. The signalling between each Gatekeeper and its connected Endpoint and between the Gatekeepers is the same as for the Direct Endpoint Signalling case; however, the messages on each portion will be different.

For Configuration c, the Gatekeepers terminate the call signalling messages and perform the exchange functions such as routing and feature interactions. The signalling between the Gatekeepers is the same as for the Direct Endpoint Signalling case. This Recommendation does not address any non-standard protocol which might be used in Configuration c for communications with the endpoints.

2.3 Decomposed Gateway

As shown in Figure 19/H.323, an endpoint may be a gateway to the PSTN. It may be decomposed and utilize H.248 signalling as shown in Figure 3.

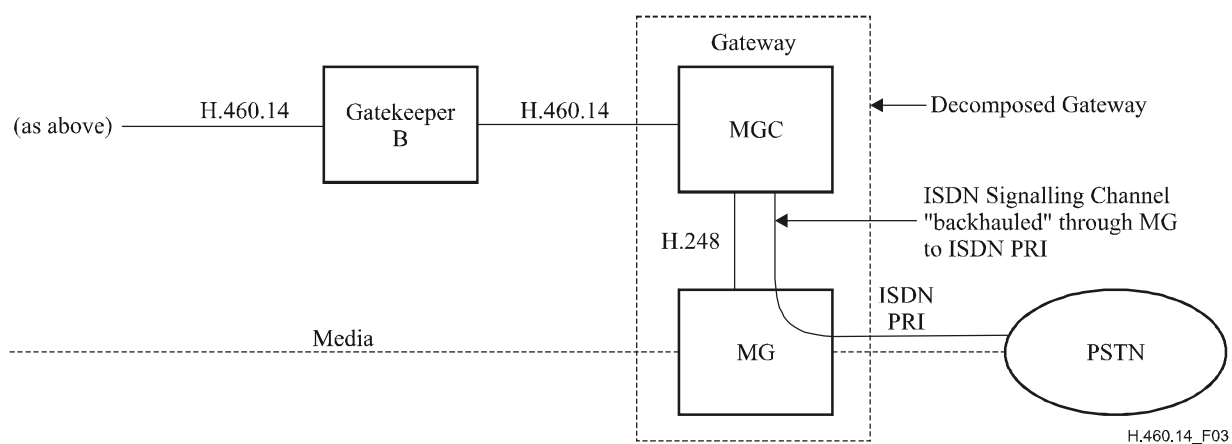


Figure 3/H.460.14 – Decomposed Gateway configuration

This Recommendation does not address the H.248 capabilities which may be required for this configuration.

2.4 H.248 managed devices

As shown in Figure 20/H.323, H.248 may be used to manage (control) the service operation in an endpoint. In this case, the end device functions as the Media Gateway portion of a decomposed Gateway as shown in Figure 4, but without capabilities related to interworking to other signalling systems.

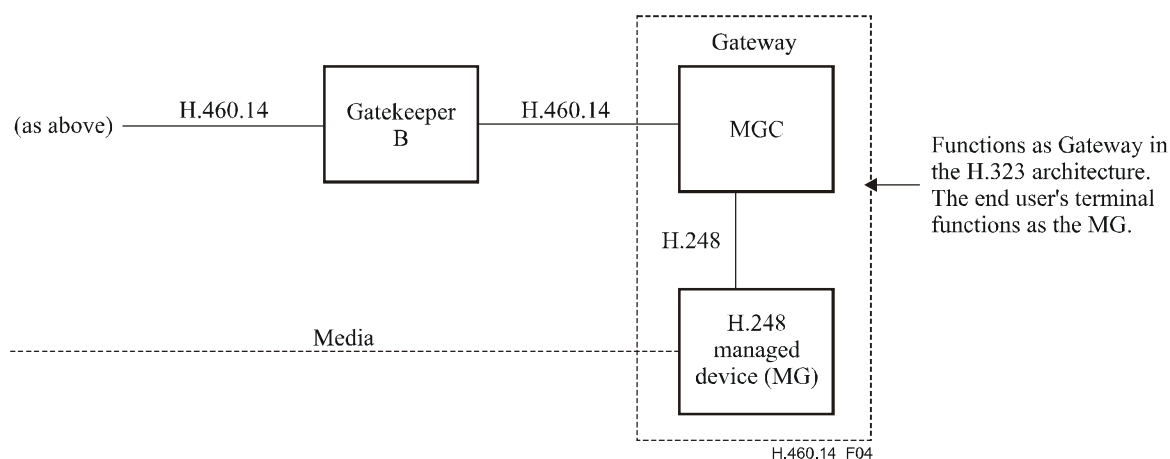


Figure 4/H.460.14 – H.248 managed device

This Recommendation does not address the H.248 capabilities which may be required for this configuration.

2.5 Stimulus device

An endpoint may operate using a stimulus protocol in accordance with Annex L/H.323 as shown in Figure 5 and Figure 21/H.323. The Feature Server functional entity may be associated with, or collocated with, a Gatekeeper.

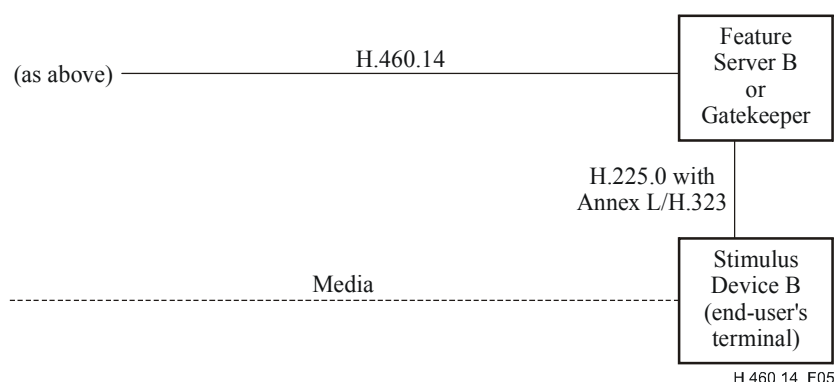


Figure 5/H.460.14 – Stimulus signalling using Annex L/H.323

This Recommendation does not address the signalling between the Feature Server/Gatekeeper and the Stimulus Device which may be required for this configuration. As described in ITU-T Rec. H.323 for interactions with H.450-services, the Feature Server must terminate the H.460 signalling and handle the MLPP operations described in this Recommendation, while using a stimulus protocol to signal via the terminal to the user as described in Annex L/H.323.

3 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is published regularly. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

- ITU-T Recommendation H.225.0 (2003), *Call signalling protocols and media stream packetization for packet-based multimedia communication systems*.
- ITU-T Recommendation H.245 (2003), *Control protocol for multimedia communication*.
- ITU-T Recommendation H.323 (2003), *Packet-based multimedia communications systems*.
- ITU-T Recommendations of the H.450.x series, *Supplementary services for multimedia*.
- ITU-T Recommendation H.460.1 (2002), *Guidelines for the Use of the Generic Extensible Framework*.

4 Definitions

This Recommendation defines the following terms:

- 4.1 alternate party:** A third party to whom an MLPP call may be diverted if it is not accepted or acknowledged by the called user.
- 4.2 diversion:** The operation in which a precedence call is redirected to a pre-assigned alternate party due to (in)action by the called party.
- 4.3 preemption:** The act of forcibly removing a connection in order to free up facilities for another higher-precedence call.
- 4.4 preemption in progress:** The period of time after a party is notified that their existing call is going to be preempted until the preemption actually occurs and is completed by the intended party acknowledging the action.

- 4.5 served user, user A:** The user who requests to originate a call using MLPP (calling user).
- 4.6 user B:** The wanted user that is subject to the call preemption (called user).
- 4.7 user C:** The other user in the established call, also referred to as the unwanted user.

5 Abbreviations

This Recommendation uses the following abbreviations:

ACF	Admission confirmation
ARJ	Admission rejection
ARQ	Admission request
DCF	Disengage confirmation
DRQ	Disengage request
GCF	Gatekeeper confirmation
GK	Gatekeeper
GRQ	Gatekeeper request
LCF	Location confirmation
LRJ	Location rejection
LRQ	Location request
MLPP	Multi-level precedence and preemption
RAS	Registration, admission and status
RCF	Registration confirmation
RRJ	Registration rejection
RRQ	Registration request

6 Multi-level Precedence and Preemption Service description

The basic requirements for MLPP are the ability of call processing equipment to signal the precedence of each call, and for each entity (Gatekeeper, Gateway, or endpoint) which handles a call to properly manage resources for that call according to its precedence. This may well include the termination (preemption) of one or more active calls of lower precedence.

6.1 Provision of precedence levels

A maximum precedence level shall be allocated to each user, which shall have a value in the range from 4 (lowest level) to 0 (highest level). Each user shall be provided with a means to select a precedence for each call originated, not greater than the maximum allocated. If a precedence level is not explicitly selected for a call, the lowest value (4) shall be used. All five of the precedence level values shall be supported.

The Precedence levels are referred to as:

- 0 Flash Override
- 1 Flash
- 2 Immediate
- 3 Priority
- 4 Routine

The procedures by which the maximum precedence level is allocated to a user and the criteria by which a user chooses a value of precedence level for a particular call are outside the scope of this Recommendation.

6.2 Preemption of facilities

This Recommendation provides a means to identify the priority (precedence) of individual calls as they move through the network. It also defines signalling procedures for handling such calls when resource conflicts arise in the network or at an endpoint. When a facility (network bandwidth or endpoint hardware) is busy, and a call of higher precedence requires that facility, the facility may be preempted by termination of the existing call and establishment of the preempting call. If the facility is an endpoint under the control of a user, the user shall be notified of the presence of a preempting call, and must take action to accept the new call. When a call is preempted, special indication shall be given to all parties of that call to indicate that fact.

The decision to preempt a call is taken automatically by the call processing equipment and does not require any specific action of the called user. The details of how the existence of a precedence call or impending preemption is presented to the end user, or how the user indicates which actions to take, are beyond the scope of this Recommendation.

6.3 Diversion

A precedence call may be redirected (diverted) if an endpoint does not accept it within a specified time interval. The redirecting entity may indicate the new destination for the call.

6.4 Interactions with other services

Interactions with specific Supplementary Services defined in the H.450-series of Recommendations shall be as follows.

6.4.1 Call Transfer (CT)

User A shall not be able to invoke CT during the preemption in progress state on that call. (This is similar to the CT requirement that the call being transferred shall be answered before transfer can be initiated.) While performing CT, a user shall be allowed to invoke MLPP on the transfer request.

User B shall not be able to invoke CT during the preemption in progress state on the preempting call, that is, the call cannot be transferred until after the preemption is acknowledged and the new connection is established.

User C may be able to transfer an established call during preemption. In all cases, the transferred-to user that becomes connected to user B shall become the new user C, and shall receive all future notifications accordingly.

6.4.2 Call Forwarding Unconditional (CFU)

At User A: No service interaction.

At User B: If CFU is active when a call using MLPP arrives, CFU shall take precedence, i.e., the call shall be forwarded regardless of the precedence level of the call. If a call with a precedence level higher than the lowest is forwarded and is not responded to by any forwarded party, then the alternate party option of MLPP (using the alternate party of the original called party) shall apply.

However, if the network element controlling the call forwarding is aware that it is being used to forward to a voice mail system, it should apply the MLPP alternate party diversion instead of the Call Forwarding Unconditional.

At User C: No service interaction.