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## Requirements for Floor Control

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### Abstract

This document defines the requirements for floor control.

## **1 Introduction**

Multimedia conferences often contain shared resources such as the right to talk, input access to a limited-bandwidth video channel, or a pointer or input focus in a shared application.

In many cases, it is desirable to be able to control who can provide input (send/write/control, depending on the application) to the shared resource.

Floor control enables applications or users to gain safe and mutually exclusive or non-exclusive input access to the shared object or

resource. We define a floor as the temporary permission for a conference participant to access or manipulate a specific shared resource or group of resources [2].

Floor control is an optional feature of conferences. SIP [4] conferencing applications may decide not to support this feature at all. Some applications of floor control, such as write access to a shared document, are useful even for "conferences" with two members, while other resources, such as an audio channel, may only make floor control worthwhile for larger groups.

Earlier work on this topic (e.g., [3], [5], [6], [2]) can serve as useful input for the SIP standardization efforts.

In general, floor control is closely related to the management of shared resources in operating systems and distributed systems. Synchronization, mutual exclusion and the reader-writer problem have become standard tools in those areas. However, floor control differs in that it generally involves managing access by human participants, with a much stronger emphasis on policies.

This work supports on-going SIPPING conferencing work [1], and [7].

## **2 Conventions of This Document**

In this document, the key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALLNOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" are to be interpreted as described in [RFC 2119](#) [8].

## **3 Definitions**

**Focus:** The focus is a SIP user agent that is addressed by a conference URI. The focus maintains a SIP signaling relationship with each participant in the conference. The focus is responsible for ensuring, in some way, that each participant receives the media that make up the conference. The focus also implements conference policies. The focus is a logical role.

**Floor:** A floor is a set of shared resources within a conference. A single conference may have multiple floors.

**Conference members:** A conference member or participant that has a signaling relationship with the conference focus and receives one or more of the media streams that are part of the conference.

**Conference owner:** A conference owner is a privileged user who



defines rules for running the conference. By default, the conference creator becomes the owner, but the role can be delegated to another entity. Among other roles, the conference owner also establishes rules for floor control, by creating floors, assigning and removing floor chairs. The conference owner may delegate some of these responsibilities to another party. The conference owner does not have to be a member in the conference.

**Chair:** A user (or an entity) who manages one floor by granting, denying or revoking access privileges. The chair does not have to be a member of the conference. The chair is sometimes also referred to as the moderator. Different floors within a conference may have different chairs. Chairs may change during a conference.

**Floor control:** Floor control is a mechanism that enables applications or users to gain safe and mutually exclusive or non-exclusive access to the shared object or resource.

**Floor controller:** A floor controller is a logical entity that manages floors. It receives requests from conference participants, the conference owner and the floor chair and issues protocol requests to affect conference and floor status. Depending on floor policy, the floor controller may ask the chair to approve decisions.

**Floor policy:** The floor policy is the set of rules and attributes governing operation of the floor controller. The floor policy is defined upon creation of a floor and may be modified by an authorized participant.

#### **4 Model**

A floor control protocol is used to convey the floor control messages among the floor chairs (moderators) of the conference, the floor controller, the focus and the participants of the conference.

Floor control can operate at the origin of data, at a redistribution point or at the destination. At the origin of data, floor control can ask the sender, via signaling, to suppress the generation of data. At the redistribution point, the floor controller can modify the mixing matrix, so that only media streams from certain participants are delivered to other participants. At the destination, floor control can filter incoming media or messages, so that only floor holders can affect the state of the shared resource.

We can also distinguish cooperative and coercive floor control.



Cooperative floor control relies on the cooperation of the data source, while coercive floor control does not; it can function even if a participant is malicious or malfunctioning. Among the three locations of floor control, floor control at the redistribution point and at the receiver can be made coercive, while floor control at the sender is by necessity cooperative.

A floor is always coupled to one or more media sessions. The manner of creating a media session itself is defined elsewhere. A participant with appropriate privileges may create a floor by defining that one or more media sessions are now floor-controlled. As part of the creation of a floor, a chair needs to be appointed. (In some cases, the chair is an automaton, rather than a human participant.)

## **5 Integration with Conferencing**

We assume that the ability of users to create floors is governed by the conference policy. For simplicity, we assume that a chair can delegate his or her responsibility to any other member of the conference.

The conference policy and thus, indirectly, the conference owner defines whether or not floor control is in use and for which resources. If floor control is enabled for a particular resource or set of resources, the conference policy also defines for which resources the use of floor control is mandatory and for which it is optional. [TBD: Not clear what mandatory and optional means.]

Typically, the conference owner creates a floor using a yet-to-be-defined mechanism and appoints the floor chair. The conference owner can remove the floor at any time (so that the resources are no longer floor-controlled), change the chair or the floor parameters.

The chair just controls the access to the floor, according to the conference policy.

Figure 1 depicts how floor control integrates into the overall conferencing architecture.

## **6 Requirements**

REQ-1: It MUST be possible to announce to participants that a particular media session (or group of media session) is floor-controlled and where requests for the floor should be addressed to.



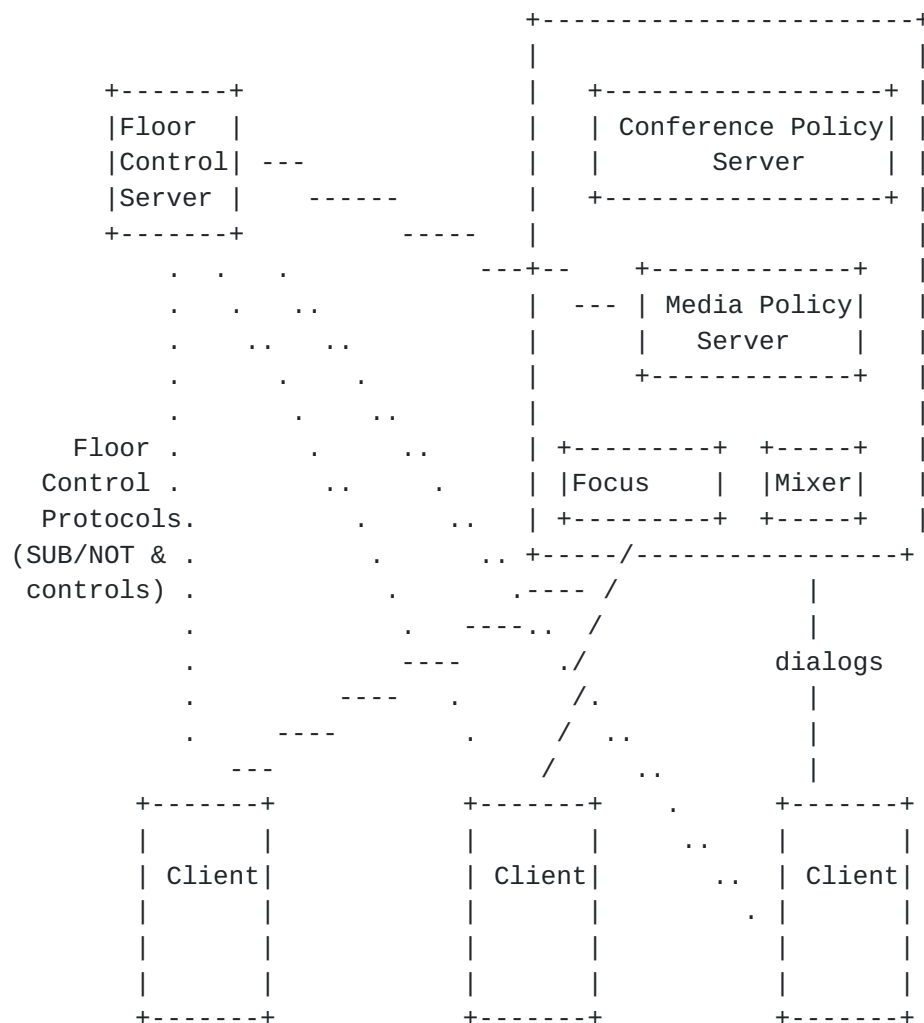


Figure 1: Floor control integration into Conferencing

SDP's "a" line offers one possible indication.

REQ-2: It MUST be possible to group more than one media sessions together so that one floor applies to the group.

The SDP "fid" extension may serve this purpose.

REQ-3: It MUST be possible to define who is allowed to create, change and remove a floor in a conference. We assume that the conference owner always has this privilege and may also



authorize other entities, via conference policy.

REQ-4: A participant with appropriate privileges MUST be able to create a floor with specific parameters, such as how many simultaneous users are allowed to access the resource. It MUST be possible to modify these parameters during the lifetime of a floor.

REQ-5: It MUST be possible to use a chair-controlled floor policy in which the floor controller notifies the floor chair and waits for the chair to make a decision. This enables the chair to fully control who has the floor. The server MAY forward all requests immediately to chair, or it may do filtering and send only occasional notifications to chair.

REQ-6: Participants MUST be able to request (claim) a floor and give additional information about the request, such as the topic of the question for an audio floor.

REQ-7: A floor holder MUST be able to release a floor.

REQ-8: The chair or controller MUST be able to revoke a floor from its current holder.

REQ-9: It MUST be possible to grant a floor to a participant.

REQ-10: It MUST be possible to get and set at least the following floor parameters:

- who is floor control chair (this does not have to be the conference owner);
- floor control policy (such as chair-controlled, first-come first-served, random);
- the number of simultaneous floor holders.

REQ-11: Floor policies MAY support time limits that automatically pass the floor to the next-in-line after a preset time interval.

REQ-12: It MUST be possible for a user with appropriate conference privileges to change the chair for a floor.

REQ-13: It MAY be possible for a user to request that a media session should be floor-controlled. The requestor does not necessarily become the floor chair. (For example, a



conference creator may designate a set of media as a latent floor that automatically becomes floor controlled as soon as a member requests it.)

REQ-14: Different floors may have different chairs.

REQ-15: Bandwidth and terminal limitations SHOULD be taken into account in order to ensure that floor control can be efficiently used in mobile environments.

REQ-16: Conference members and the chair MUST be able to determine who has the floor and who has requested the floor.

REQ-17: Conference members and the chair MUST be able to be notified when the floorholder changes and when a new floor request is being made.

REQ-18: It should be possible to name custom floor control policies, both with local meaning only and global registration.

REQ-19: It may be desirable to support a floor control mechanism where users without specialized software can request the floor. (For example, a floor control mechanism could utilize specific instant messages.)

## **7 Open Issues**

- o Support multiple simultaneous chairs for one floor?
- o Support for privacy (especially for REQ-16)

## **8 Acknowledgements**

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#### Table of Contents

<a href="#">1</a>	Introduction .....	<a href="#">1</a>
<a href="#">2</a>	Conventions of This Document .....	<a href="#">2</a>
<a href="#">3</a>	Definitions .....	<a href="#">2</a>
<a href="#">4</a>	Model .....	<a href="#">3</a>
<a href="#">5</a>	Integration with Conferencing .....	<a href="#">4</a>
<a href="#">6</a>	Requirements .....	<a href="#">4</a>
<a href="#">7</a>	Open Issues .....	<a href="#">7</a>



<a href="#">8</a>	Acknowledgements .....	<a href="#">7</a>
<a href="#">9</a>	Authors' Addresses .....	<a href="#">7</a>
<a href="#">10</a>	Bibliography .....	<a href="#">8</a>