Transport Area   H. Schulzrinne
Internet-Draft   X. Wu
Expires: July 8, 2004   Columbia University
                                               P. Koskelainen
                                                        Nokia
                                                       J. Ott
                                             Uni Bremen TZI
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Requirements for Floor Control Protocol
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Abstract

   This document defines the requirements for floor control in a
   multi-party conference environment.

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[1](#). **Introduction**

    Conference applications often have 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. The floor is an individual temporary access or manipulation
    permission for a specific shared resource (or group of resources)
    [7].

    Floor control is an optional feature for conferencing applications.
    SIP [2] conferencing applications may also decide not to support this
    feature at all. Two-party applications may use floor control outside
    conferencing, although the usefulness of this kind of scenario is
    limited. Floor control may be used together with conference policy
    control protocol (CPCP) [8], or it may be used as independent
    standalone protocol, e.g. with SIP but without CPCP.

    Floor control has been studied extensively over the years, (e.g. [9],
    [7], [6]) therefore earlier work can be leveraged here.

    The present document describes the requirements for a floor control
    protocol. As a requirements specification, the document makes no
    assumptions about the later implementation of the respective
    requirements as parts of one or more protocols and about the entities
    implementing it/them and their roles.

    This document may be used in conjunction with other documents, such
    as the Conferencing framework document [3]. In particular, when
    speaking about a floor control server, this entity may be identical
    to or co-located with the focus or a conference policy server defined
    in the framework document, while participants and floor chairs
    referred to in this specificiation may be regular participants as
    introduced in the conferencing framework document. The term "floor
    control protocol" is used in an abstract sense in this specification
    and may ultimately be mapped to any of the existing conference
    control or other signaling protocols (including CPCP and SIP). But
    defining those relationships is left to a concrete floor control
    protocol specification.

2. Conventions Used in This Document

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY", and "OPTIONAL" in this document are to be interpreted as described in RFC 2119.

[3](#). **Terminology**

   This document uses the definitions from [[3](#)].

   Additional definitions:

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

   Conference owner: A privileged user who controls the conference,
   creates floors and assigns and deassigns floor chairs. The
   conference owner does not have to be a member in a conference.

   Floor chair: A user (or an entity) who manages one floor (grants,
   denies or revokes a floor). The floor chair does not have to be a
   member in a conference.

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

   Floor control server: A logical entity that maintains the state of
   the floor(s) including which floors exists, who the floor chairs are,
   who holds a floor, etc. Requests to manipulate a floor are directed
   at the floor control server.

   Floor request set: A logical data structure holding all requests for
   a particular floor at a given point in time.

   Floor holder set: A logical data structure identifying all
   participants who currently hold the floor.

[4](). **Model**

The model for floor control comprises three logical entities: a
single floor control server, one or more floor chairs (moderators),
and any number of regular conference participants.

A floor control protocol is used to convey the floor control messages
among the floor chairs (moderators) of the conference, the floor
control server, and the participants of the conference. A centralized
architecture is assumed in which all messages go via one point, the
floor control server. Processing (granting or rejecting) floor
control requests is done by the one or more floor chairs or by the
server itself, depending on the policy.

Floor requests from the participants are received by the floor
control server and kept in an -- at the level of the floor control
protocol -- "unordered" floor request set. The current floor holders
are reflected in a current floor holder set. Floor chairs are
capable of manipulating both sets to e.g. grant, revoke, reject, and
pass the floor.

The order in which requests are processed, whether they are granted
or rejected, how many participants obtain a floor simultaneously, is
determined by a higher layer application operating on these sets and
is not confined by the floor control protocol.

A floor is associated with one or more media sessions. The
centralized conference server manages the floors and thus controls
access to the media sessions. There are two aspects to this: 1) The
server maintains and distributes consistent state information about
who has a certain floor at a certain point in time and does so
following some rule set. This provides all participants with the
necessary information about who is allowed to e.g. speak, but relies
on a cooperative behavior among all participants. 2) In addition, to
prevent individuals from ignoring the "hints" given by the floor
control server, the latter may -- e.g. in cooperation with other
functional entities -- enforce compliance with floor status, e.g. by
blocking media streams from participants not entitled to speak. The
floor control server controls the floors at least at the signaling
level (1); actively controlling also the actual (physical) media
resources (2) is highly recommended, but beyond the scope of this
document.

As noted in the introduction, an actual protocol specification
fulfilling the requirements defined in this memo may map the
components of the above model onto the conferencing components
defined in the conferencing framework document. Some of these
aspects are discussed briefly in the next subsection.

5. Integration with Conferencing

Floor control itself does not support privileges such as creating floors and appointing floor chairs, handing over chair privileges to other users (or taking them away). Instead, some external mechanism, such as conference management (e.g. CPCP or web interface for policy manipulation) is used for that.

The conference policy (and thus the conference owner or creator) defines whether floor control is in use or not. Actually enforcing conference media distribution in line with the respective media's floor status (e.g. controlling an audio bridge) is beyond the scope of this document. Floor control itself does not define media enforcement. It is up to the conference and media policies to define which media streams may be used in a conference and which ones are floor controlled.

Typically, the conference owner creates the floor(s) using conference policy control protocol (or some other mechanism) and appoints the floor chair. The conference owner can remove the floor anytime (so that a media session is not floor-controlled anymore) or change floor chair or floor parameters.

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

A floor control server is a separate logical entity, typically co-located with focus and/or conference policy server. Therefore, the floor control server can interact with focus, conference Policy Server and media servers as needed. Communication mechanisms between floor control server and other central conferencing entities are not defined at this point.

6. **Requirements**

   REQ-1: It MUST be possible to announce to participants that a
   particular media session (or group of media sessions) is
   floor-controlled.

   (This is a requirement for session protocol, i.e. SIP. SDP's "a" line
   offers one possible indication.)

   REQ-2: It MUST be possible to group several media sessions in a
   conference together so that one floor applies to the group.

   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 the conference policy.

   (This is a requirement for CPCP rather than an FCP requirement.)

   REQ-4: It MUST be possible to use a chair-controlled floor policy in
   which the floor control server 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
   the floor chair, or it may do filtering and send only occasional
   notifications to the chair.

   REQ-5: Participants MUST be able to request (claim) a floor.

   REQ-6: It SHOULD be possible for a user requesting a floor to give
   additional information about the request, such as the topic of the
   question for an audio floor. In some scenarios, the floor chair may
   use this information when granting the floor to the user, or when
   making manipulation to the floor sets at the server.

   REQ-7: It MUST be possible to grant a floor to a participant.

   REQ-8: A participant MUST be informed that she has been granted the
   floor.

   REQ-9: It MUST be possible to reject a participant's floor request.

   REQ-10: A participant MUST be informed that his floor request has
   been rejected.

   REQ-11: The floor chair or moderator MUST be able to revoke a floor
   from (one of) its current holder(s).

   REQ-12: A participant MUST be informed that the floor was revoked

from her.

REQ-13: A participant SHOULD be informed that her floor request is
pending and will be processed later.

REQ-14: A floor holder MUST be able to release a floor.

REQ-15: It SHOULD be possible to get and set various floor related
parameters. Note that not all parameters maintained for a floor are
also interpreted by the floor control protocol (e.g. floor policy
descriptions may be stored associated with a floor but may be
interpreted by a higher layer application.

(For example, it may be useful to see who the floor chair is, what
kind of policy is in use, time limits, number of simultanous floor
holders and current floor holder.)

REQ-16: It MUST be possible for a user with appropriate conference
privileges to change the chair for a floor.

(This is rather a requirement for the conference policy control
protocol than for the floor control protocol.)

REQ-17: Bandwidth and terminal limitations SHOULD be taken into
account in order to ensure that floor control can be efficiently used
in mobile environments.

It should be noted that efficient communication by means of minimal
sized messages may contradict the desire to express reasons for
requesting a floor (as per REQ-6) along with other information.
Therefore, a floor control protocol SHOULD be designed in a way that
it allow for expressive as well as minimal messaging, as (negotiable)
configuration option and/or selectable on a per-message basis.

REQ-18: Conference members and the chair MUST have the capability to
learn who has the floor and who has requested the floor. (Note:
Conference policy may prevent members seeing this.)

REQ-19: It MUST be possible to notify conference members and chair
about the floorholder changes and when a new floor request is being
made. (Note: Conference policy may prevent members seeing this.)

REQ-20: There MAY be operations to manipulate the request set
available for floor chair(s).

[7](#). Open Issues

   - Support for privacy, e.g. the following: floor claimer must be able
   to indicate privacy preference, and the ability to hide floor chair's
   identity.

   Preliminary proposal:

   RRQ-a: It MUST be possible for the floor requester to indicate her
   privacy preference. The privacy preferences MUST include the
   following options:

   anonymous: the participants (including the floor chair) cannot see
   the floor requester's identity. The floor chair grant the floor based
   on the claim id and the topic of the claim.

   known to the floor chair: only the floor chair is able to see the
   floor requester's identity; all other participants do not obtain this
   information.

   public: all the participants can see the floor requester's identity.

   RRQ-b: It MUST be possible to hide the identity of a floor chair from
   a subset or all participants of a conference.

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Authors' Addresses

    Henning Schulzrinne
    Columbia University
    1214 Amsterdam Avenue
    New York 10027
    USA

    EMail: hgs@cs.columbia.edu

    Xiaotao Wu
    Columbia University
    1214 Amsterdam Avenue
    New York 10027
    USA

    EMail: xiaotaow@cs.columbia.edu

Petri Koskelainen
Nokia
P.O. Box 100 (Visiokatu 1)
Tampere   FIN-33721
Finland

EMail: petri.koskelainen@nokia.com

Joerg Ott
Uni Bremen TZI
Bibliothekstr. 1
Bremen   D-28359
Germany

EMail: jo@tzi.uni-bremen.de

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