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**Requirements for a media server control protocol
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Abstract

This document addresses the communication between an application server and media server. The current work in SIPING and XCON working groups show these logical functions but do not address the physical decomposition and the protocol between the entities.

The document presents the architecture and the requirements from the protocol. The document lists current work that is relevant to the problem.

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1. Introduction

The IETF SIPING conferencing framework[CARCH] presents an architecture that is built of several functional entities. The framework document does not specify the protocols between the functional entities since it is considered out of scope.

There is an interest to work on a protocol that will enable one physical entity that includes the conference/media policy server, notification server and the focus to interact with one or more physical entities that serves as mixer or media server.

The document will present the requirements for such a protocol. It will address all phases and aspects of media handling in a conferencing service including announcements and IVR functionality.

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2. Terminology

The Media Server work uses, when appropriate, and expands on the terminology introduced in the SIPING conferencing framework[CARCH]. The following additional terms are defined for use within the Media Server work.

Application Server (AS) - The application server includes the conference policy server, the focus and the conference notification server as defined in

[draft-ietf-sipping-conferencing-framework](#). [CARCH]

Media Server (MS) - The media server includes the mixer as defined
in

[draft-ietf-sipping-conferencing-framework](#)[CARCH] The media server source media streams for announcements, it process media streams for functions like DTMF detection and transcoding. The media server may also record media streams for supporting IVR functions like announcing participants.

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3. Architecture

The proposed architecture is composed of an application server (AS) and a media server (MS).

This section does not define any specific model for the interaction between the AS and MS. It does assume that every interaction from the participant to the MS will be controlled by the AS. The MS only handles data and may tunnel controls received in the media streams to the AS (e.g. DTMF).

The assumption is that the external protocols to these entities will be based on the IETF work. The Conference aware participants will use XCON protocols to the AS. The signaling protocol between the Participants and the AS will be SIP. The media between the Participants and the MS will be RTP based. The solution may work for other signaling protocols like H.323.

The MS functionality includes:

- Control of the RTP streams.
- Mixing of incoming media streams.
- Media stream source (for multimedia announcements).
- Media stream processing (e.g. transcoding, DTMF detection).
- Media stream sink (Support announcing participants names)

The AS functionality includes:

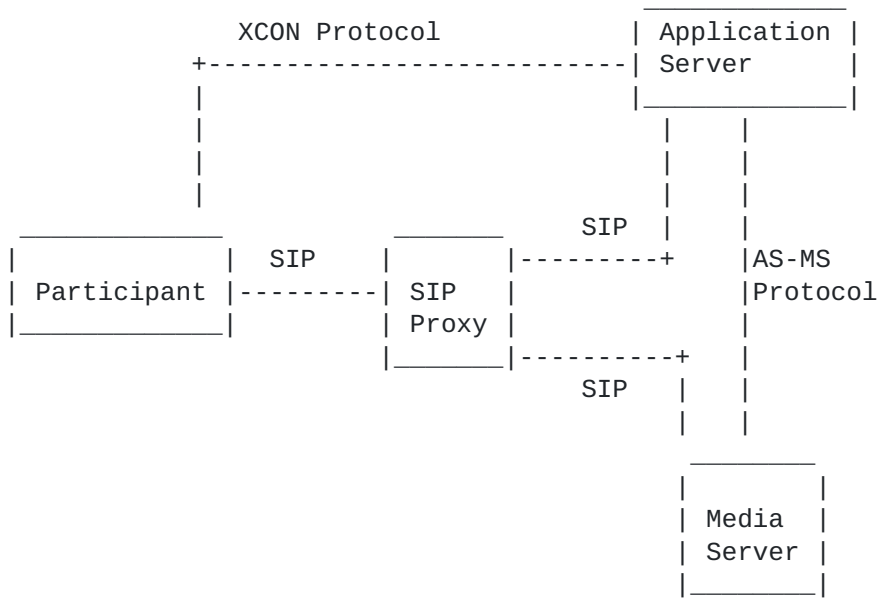
- Creation and management of conferences by conference aware participants.
- Creation of conference service logic using other mechanism which may be standard or non-standard. Example is to create an IVR based conference service.
- Manage the conference flow in the MS from start to finish.

The following diagram describes the architecture. The purpose of the work is to address the AS-MS protocol.

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4. Requirements

This section addresses only the requirements. The requirements will be divided to general protocol requirements and to specific service logic requirements.

General protocol

1. The Media server control messages shall be sent over a reliable connection.
2. The protocol shall enable one AS to work with multiple MS.
3. The protocol should enable many AS to work with the same MS
4. The AS should be able to find the MS and connect to it.
5. The MS shall be able to inform the AS about its status.
6. The protocol should be extendable.
7. The MS shall be able to tell the AS its capacities.
8. The MS shall be able to tell the AS its functionality (Mixing, IVR, Announcements)
9. The AS shall be able to request the MS to create, delete, and manipulate a mixing, IVR or announcement session
10. The MS shall supply the media addresses (RTP transport address) to be used to the AS.
11. The MS should send a summary report when the session is terminated by the AS.
12. The AS should be able to request call/session and conference state from the MS.
13. The MS should support DTMF detection (in band tones and [RFC2833](#))
14. The protocol shall include redundancy procedures.
15. The protocol shall include security mechanisms.
16. The AS should be able to reserve resources on the MS. The resources models should be simple. (this requirement needs more discussion)

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17. The MS may support resource reservation and shall report the support in the initial connection to the AS.

18. The MS shall inform the AS about any changes in its capacities. The changes may be due to reservation, internal usage or due to some malfunction.

19. The AS shall be able to tell the MS which stream parameters to use on incoming and outgoing streams. Stream parameters may be for example codec parameters (video codec features) or bit rates. This requirement will help the MS to allocate the right resources.

20. The AS shall be able to define operations that the MS will perform on streams like mute and gain control.

21. The MS shall supply the AS with sufficient information for the event package.

Announcements

Announcements may include voice, audio, slides or video clips.

1. The AS shall be able to instruct the MS to play a specific announcement.

2. The MS shall be able to retrieve announcements from an external connection.

3. The AS shall be able to tell the MS if the message can be delayed if the MS cannot play it immediately.

4. The AS shall be able to instruct the MS to play announcements to a single user or to a conference mix.

Media mixing

1. The AS shall be able to define a conference mix.

2. The AS may be able to define a separate mix for each participant.

3. The AS shall be able to define the relationship between two mixes, for example a pair of audio and video for lip-synch or for voice activated video switch

4. The AS may be able to define a custom video layout built of rectangular sub windows.

5. For video the AS shall be able to map a stream to a specific

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sub-window or to define to the MS how to decide which stream will go to each sub window. The number of sub-windows will start from one.

6. The MS shall be able to inform the AS who is the active speaker.
7. The AS may be able to cascade mixers (side bar with whisper mode)
8. The MS shall be able to inform the AS which layouts it supports.

IVR

1. The AS shall be able to load an IVR script to the MS and receive the result
2. The AS shall be able to manage the IVR session by sending announcements and receiving the response (DTMF)
3. The AS should be able to instruct the MS to record a short participant stream and play it back to the conference. This is not
a recording requirement.

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5. Current protocols

Currently there are a few protocols that try to address this architecture. The IETF drafts and ITU standards include:

1. [draft-vandyke-mscml-05](#) [[MSCML](#)]
2. [draft-melanchuk-sipping-msml-03](#) [[MSML](#)]
3. [draft-melanchuk-sipping-moml-03](#) [[MOML](#)]
4. [draft-burger-sipping-netann-10](#) [[NETANN](#)]
5. [draft-levin-xcon-cccp-00](#) [[CCCP](#)]
6. ITU H.248.19 - Decomposed multipoint control unit, audio, video and data conferencing packages [[ITU.H248.19](#)]

Note: The list is to the best of my knowledge and the order is meaningless

A short overview of the drafts based on my poor understanding is given here please feel free to correct my mistakes.

MSML [[MSML](#)]

Convedia MSML (Media Sessions Mark-up Language) [[MSML](#)]. The latest version added support for video. MSML addresses the relationships of media streams MSML defines an XML schema that enables the AS to create sessions on the MS. The draft outlines how to use SIP as a transport for the XML schema by using SIP invite to create a control session between the AS and the MS. Subsequent control messages between the MS and AS will be done using INFO or INVITE. The control connection is only used for the transporting the XML schema.

MSML supports several models for client interaction. When clients use 3PCC to establish media sessions on behalf of end users, clients will have a SIP dialog for each media session. MSML may be sent on these dialogs. However the targets of MSML actions are not inferred from the session associated with the SIP dialog. The targets of MSML actions are always explicitly specified using identifiers previously defined.

The signaling from the SIP users is going to the AS. The AS is using 3pcc (third party call control) procedures to direct the SIP signaling messages to the MS. The SDP is used to open the media channel between the user and the MS while the call control is handled

by the AS. This is how the users join a media session on the MS
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was established using the MSML schema. Convedia has a second protocol called Media Objects Mark-up Language (MOML)[[MOML](#)] that can be used to specify individual user dialog or media control commands.

MSCML[[MSCML](#)]

Brooktrout Technology has suggested MSCML, Media Server Control Mark-up Language. This current version supports only audio.

The general functionality is similar to MSML. MSCML is using SIP Invite and Info to send the communication between the AS and MS. Like MSML it opens a control connection for the conference. The difference is that MSCML messages sent in the control connection are for the entire conference while if they are sent over the users dialogs they apply to that user.

Netann[[NETANN](#)]

This protocol provides a simple way to initiate an announcement, IVR or mixing session on the media server using the URI parameters. The AS can create the session but has less control on what is happening during the session itself.

Centralized Conference Control Protocol (CCCP)[[CCCP](#)]

This document may be of interest since it suggests a transaction protocol that can serve the AS to MS communication. The data schema is based on the conference event package.

MEGACO / H.248[[ITU.H248.19](#)]

The H.248[[ITU.H248.19](#)] protocol opens a channel between a controller and a device (these can be AS and MS in our implementations). In this channel it sends command to the MS to create context and to open connections (terminations) for the media channel. The specific functionality is defined by packages that can be extended. The MS connects to it AS when it starts up and notify the AS which packages it supports and its capacities. The H.248 packages include also support for announcement and IVR.

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6. IANA consideration

None.

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7. Security Considerations

The security section will be added later

8 Informative References

[CARCH] Rosenberg, J., "A Framework for Conferencing with the Session Initiation Protocol", [draft-ietf-sipping-conferencing-framework-03](#) (work in progress), October 2004.

[CCCP] Levin, O. and G. Kimchi, "Centralized Conference Control Protocol (CCCP)", [draft-levin-xcon-cccp-00](#) (work in progress), October 2004.

[ITU.H248.19] International Telecommunications Union, "Gateway control protocol: Decomposed multipoint control unit, audio, video and data conferencing packages", ITU-T Recommendation H.248.19, March 2004.

[MOML] Sharratt, G. and T. Melanchuk, Ed., "Media Objects Markup Language (MOML)", [draft-melanchuk-sipping-moml-03](#) (work in progress), August 2004.

[MSCML] Van Dyke, J. and Eric. Burger, Ed., "Media Server Control Markup Language (MSCML) and Protocol", [draft-vandyke-mscml-05](#) (work in progress), October 2004.

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[NETANN] Van Dyke, J. and Eric. Burger, Ed., "Basic Network Media Services with SIP", [draft-burger-sipping-netann-10](#) (work in progress), October 2004.

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