draft-ietf-mimi-arch

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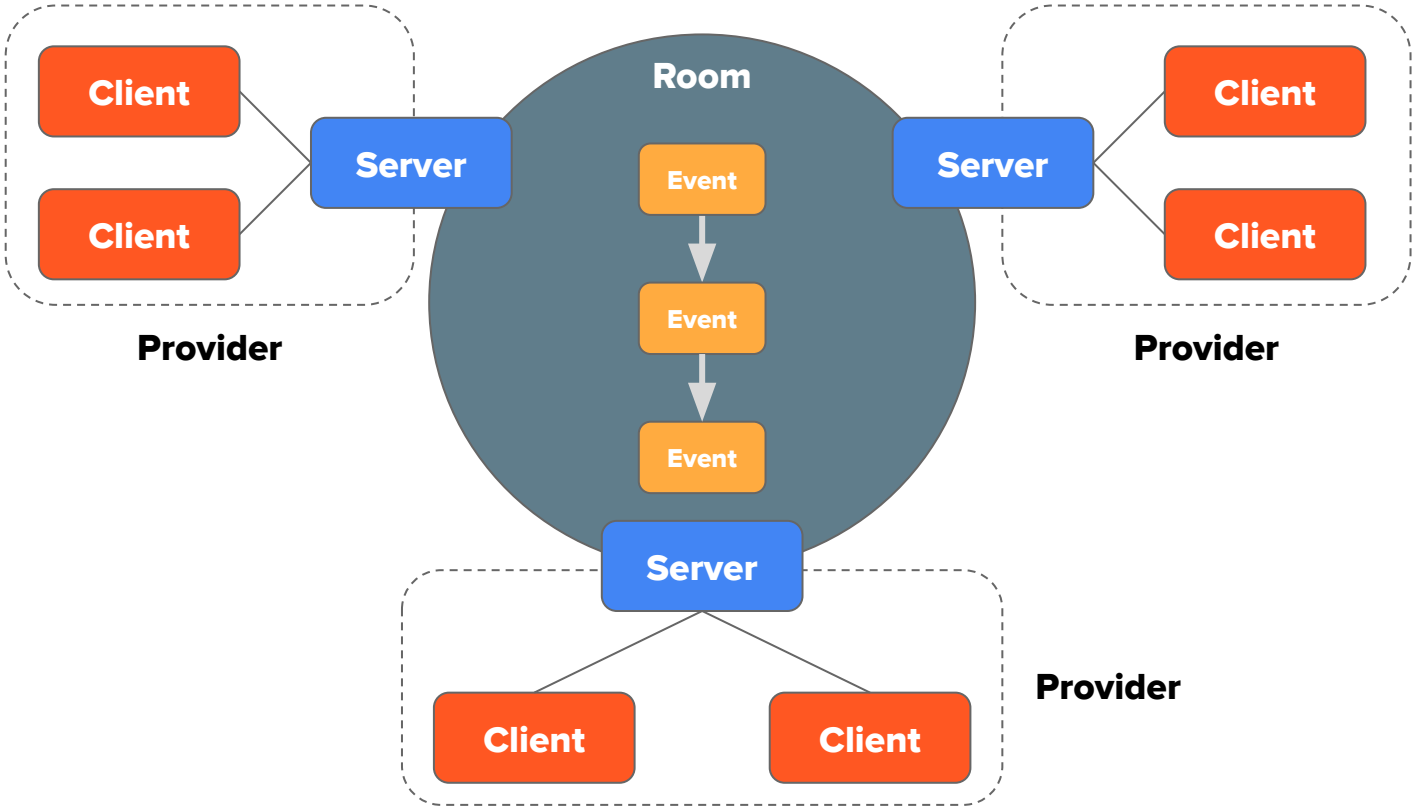
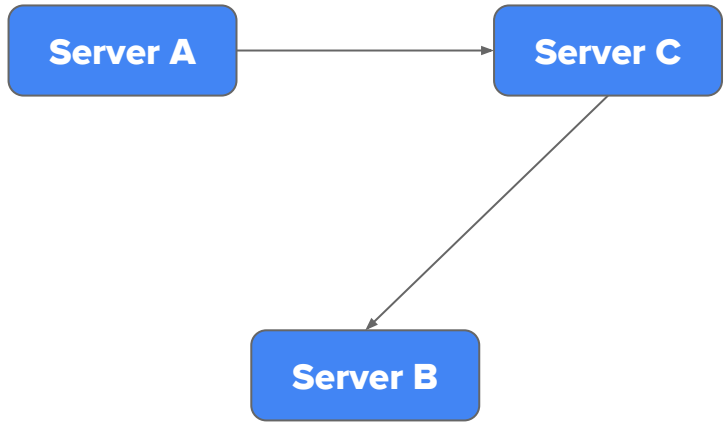
IETF 120, July 2024

CSSSC


Client
Client
Server
Provider
Room
Event
Event
Event
Server
Client
Client
Provider
Server
Client
Client
Provider

CSSSC

- Each room is hosted at a hub server
- All communications go via the hub
  - Messages
  - State changes
  - Ancillary things like KeyPackage fetches
- Anticipate that not every server will be willing to talk to every other server
  - A and B might not be willing to talk directly
  - But if users from A and B are in a room hosted at C...
  - A needs to be able to talk to B via C



Terminology

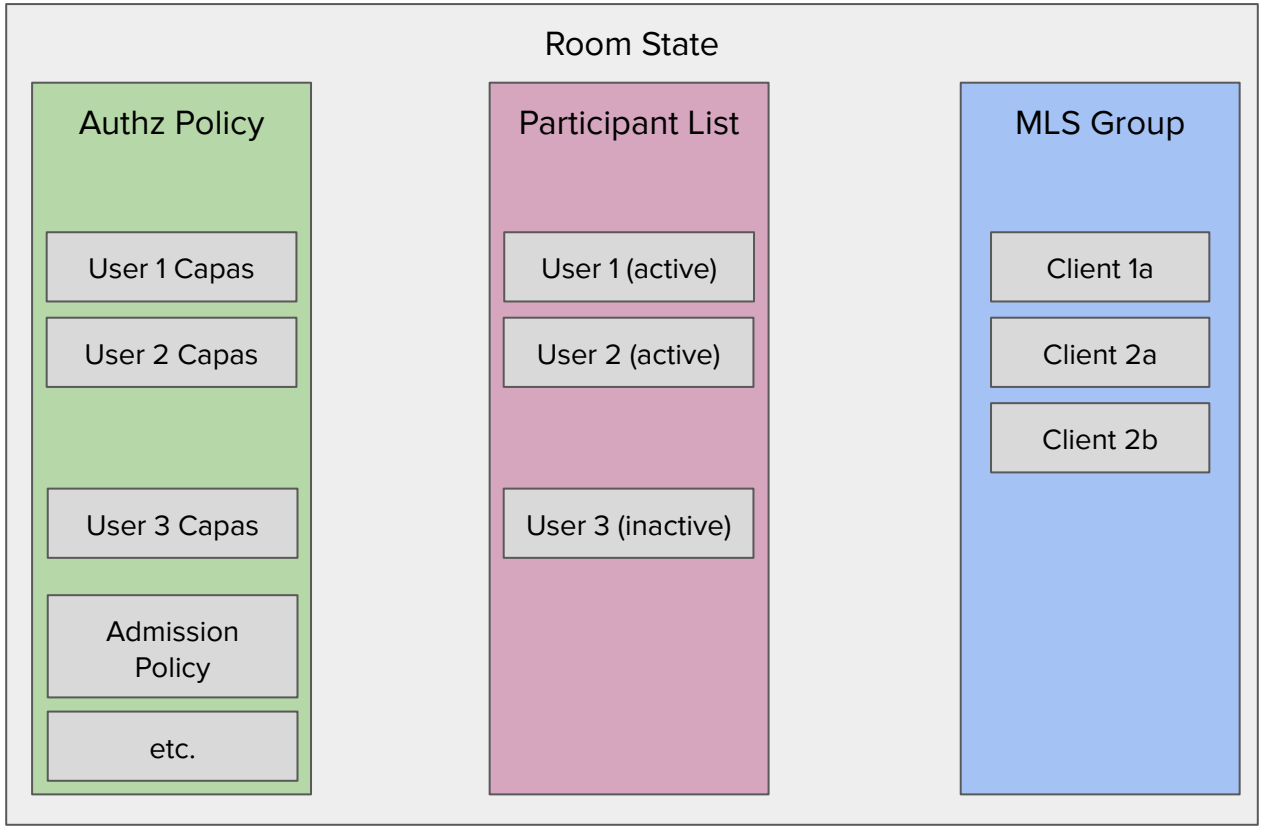
The unit of MIMI functionality is a **room**

A room has a **state**, which has a few components:

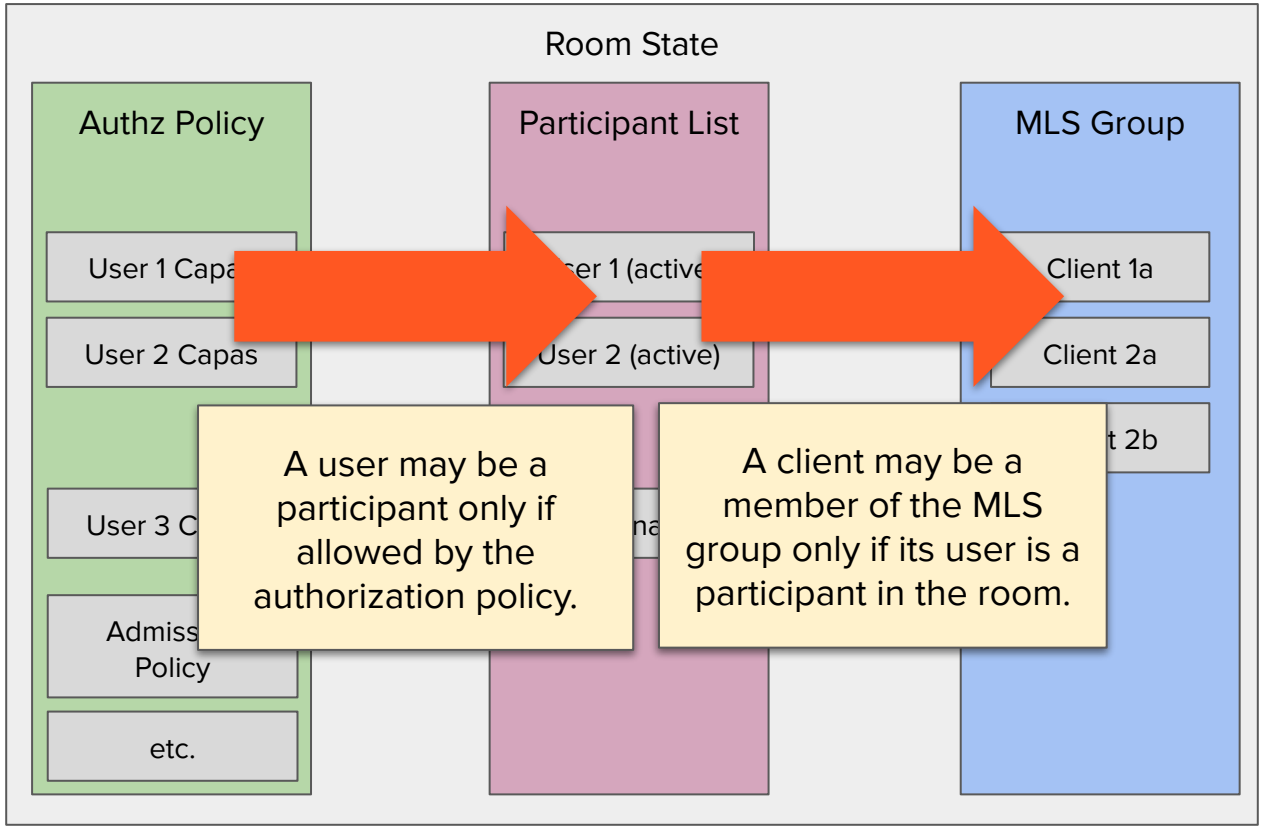
- An **authorization policy**
- A list of **users** who are **participants** in the room
- An MLS group, including a list of **clients** who are **members** of the group

Participants can either be **active** or **inactive**. Active participants have at least one client that is a member of the MLS group.

Terminology Illustrated



Preemption


Room State
Authz Policy
Participant List
MLS Group
User 1 Capa
User 2 Capas
User 3 C
Admiss
Policy
etc.
er 1 (active
User 2 (active)
Client 1a
Client 2a
t 2b
A user may be a participant only if allowed by the authorization policy.
A client may be a member of the MLS group only if its user is a participant in the room.

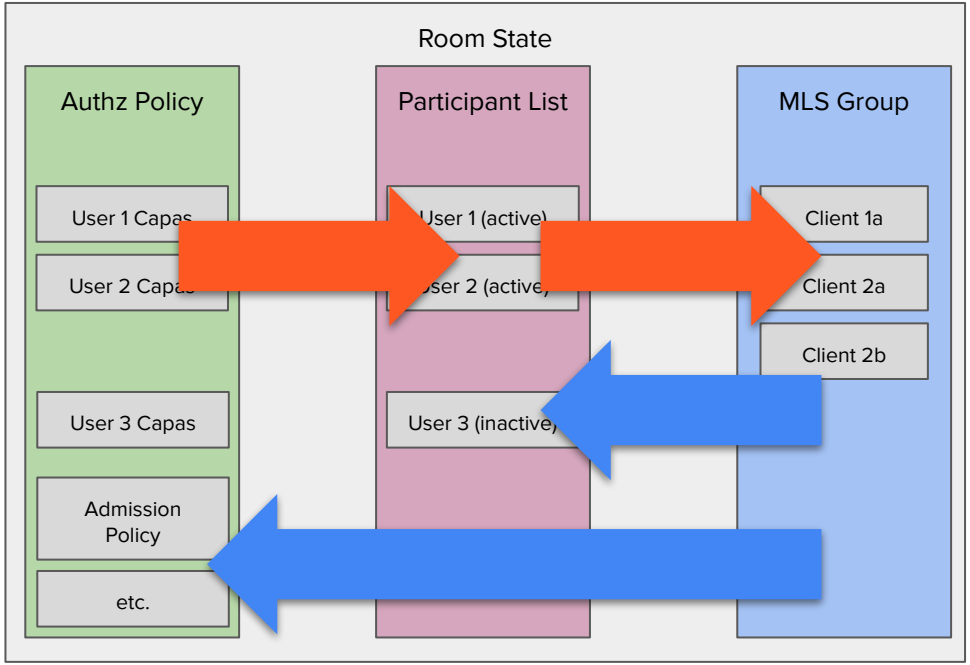
Confirmation

Different aspects of the state are managed via separate control mechanisms

To ensure everyone agrees on state, it is included in the MLS key schedule

- … as a GroupContext extension
- If clients don't agree, they can't communicate

Each Commit must reflect the current room state.

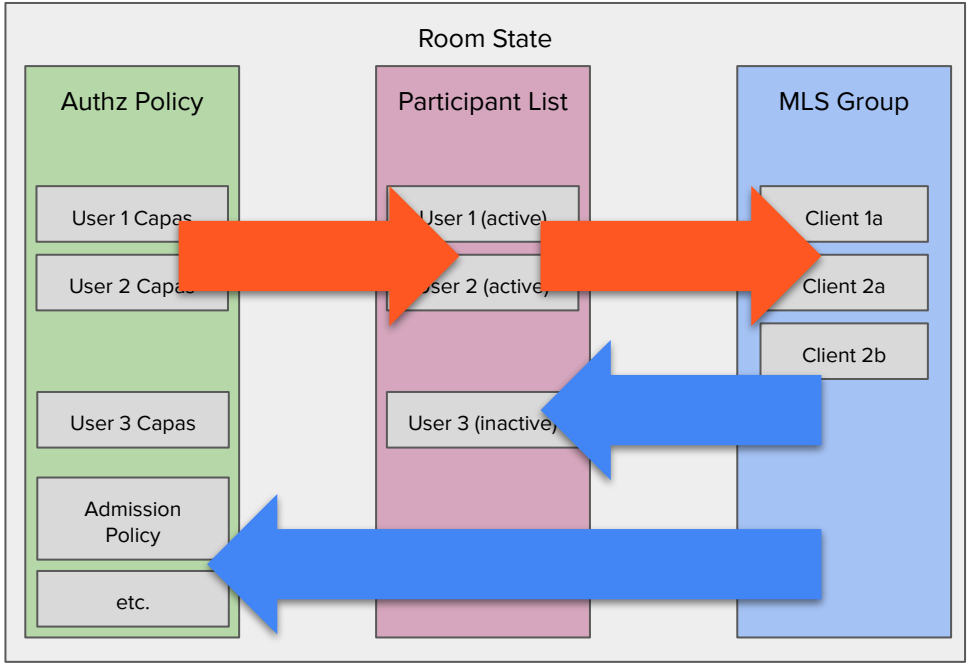


Order of Operations

Preemption + Confirmation require some coupling between control mechanisms

- User must be on PList before clients added to MLS
- Clients must be removed from MLS before user leaves PList

Sending control messages together will help keep things organized.



draft-ietf-mimi-protocol

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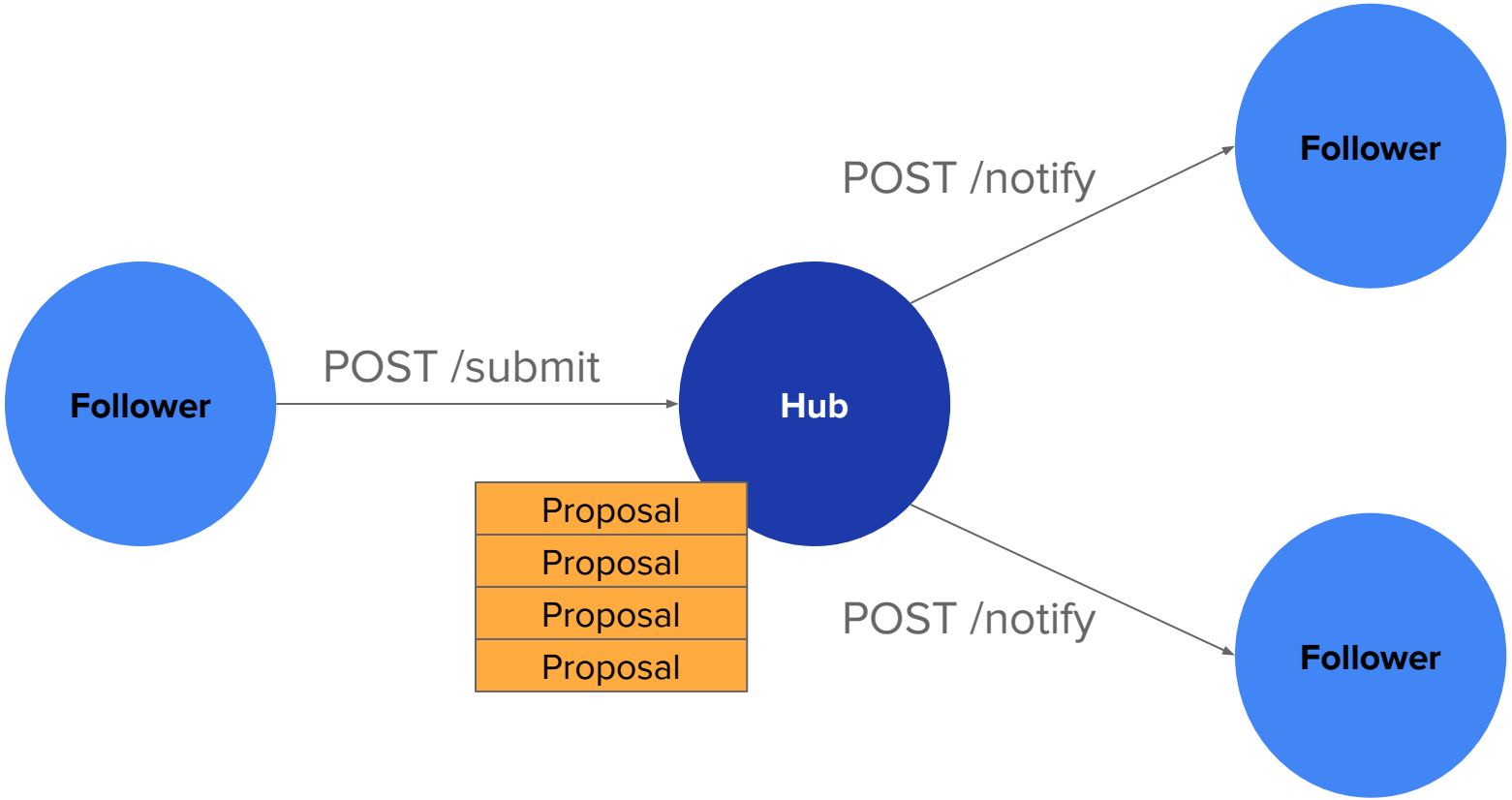
Overview


Follower
POST /submit
Hub
Proposal
Proposal
Proposal
Proposal
POST /notify
Follower
POST /notify
Follower

Server-to-Server Communications

```
POST /notify HTTP/1.1
Host: hub.example
From: mimi@follower.example
Content-Type: application/mimi
```

HTTPS over mutually-authenticated TLS

RFC 6125 framework of **presented** vs. **reference** identifiers

TLS certificates contain a set of presented identifiers for each endpoint

Server reference identity in Host / :authority

Client reference identity in From

MLS and AppSync

MIMI uses MLS for three things:

1. Protecting application messages
2. Managing which devices have access to the group
3. Ensuring agreement on room state

(1) and (2) are features of base MLS

(3) uses the AppSync extension (draft-barnes-mls-appsync) – basically a key/value store of application data that the devices in a room all agree on

Two types of sync'ed state: Policy + Participant List

Policy and Participants

Policy Framework:

- Granular capabilities
- Hub-defined roles = sets of capabilities

Participant list associates user identifier to role

> Here, we assume that Alice uses ClientA1 to create a room with the following base policy properties:
>
> - Room Identifier: `mimi://a.example/r/clubhouse`
> - Roles: `admin = [canAddUser, canRemoveUser, canSetUserRole]`
>
> And the following participant list:
>
> - Participants: `[[mimi://a.example/u/alice, "admin"]]`

HTTP endpoints

Direction	Endpoint	Purpose
*	`GET /.well-known/mimi-protocol-directory`	Learn the endpoints for a server
F ➡ H ➡ F	`POST /keyMaterial/{targetUser}`	Get initial key material for a user
F ➡ H	`POST /update/{roomId}`	Send Proposals / Commit updating the room
F ➡ H	`POST /submitMessage/{roomId}`	Submit a message for delivery
H ➡ F	`POST /notify/{roomId}`	Receive events / messages
F ➡ H	`POST /groupInfo/{roomId}`	Fetch the GroupInfo for the room

Since IETF 119

PRs since 119

🎉 Converted to WG document (PR#76)

🚛 Moved appsync to its own spec (PR#82)

🔍 Added find-internal endpoint (PR#74)

🆗 Added a basic consent mechanism (PR#78)

⁇ Bunch of discussion about invalid commits, no PRs

Next Topics

Open PRs

Downloading files (#75) – Holding pattern; need to do, but respecting privacy

Abuse reporting (#83) – Adding message franking to support

Two approaches to hiding metadata from non-hub servers

- Using an MLS SemiPrivateMessage construct (#80)
- Using a non-MLS mechanism to reveal the required info to the hub (#79)

Downloading Files

General pattern pretty clear and widely used:

- Sender encrypts file, uploads it somewhere
- Sender sends link + encryption key to the group

Practical concern: Who will host the files in a federated chat?

Privacy concern: File hosting provider can see who downloads (IP addresses, etc.)

PR provides **proxy download**, client's provider can ask the hub to download a file on their behalf

Metadata Privacy Questions

On the one hand: Desirable to deny servers metadata that they do not need

On the other hand: Desirable to have servers participate in policy actions

Bans / deleting accounts (Remove), new devices / join links (Add)

In both cases, seeing the corresponding Commit to verify that change applied

Three levels of protection: Proposals/Commits are visible to…

1. Clients, hub server, and non-hub servers ← today
2. Clients and hub server ← PR#79 / 80
3. Clients ← draft-mcmillion-… draft-kohbrok… later on agenda

Abuse Reporting*

Endpoint for reporting abusive messages to the hub (not follower servers)

Reporter sends to endpoint on hub:

MLS AuthenticatedContent ← message content + sender signature

MAC over message by hub ← proves to hub that the message transited the hub

Requires the hub to know the group's ratchet tree

* not actually in the PR right now, result of Rohan + Richard chatting this week