MIMI Transport Requirements

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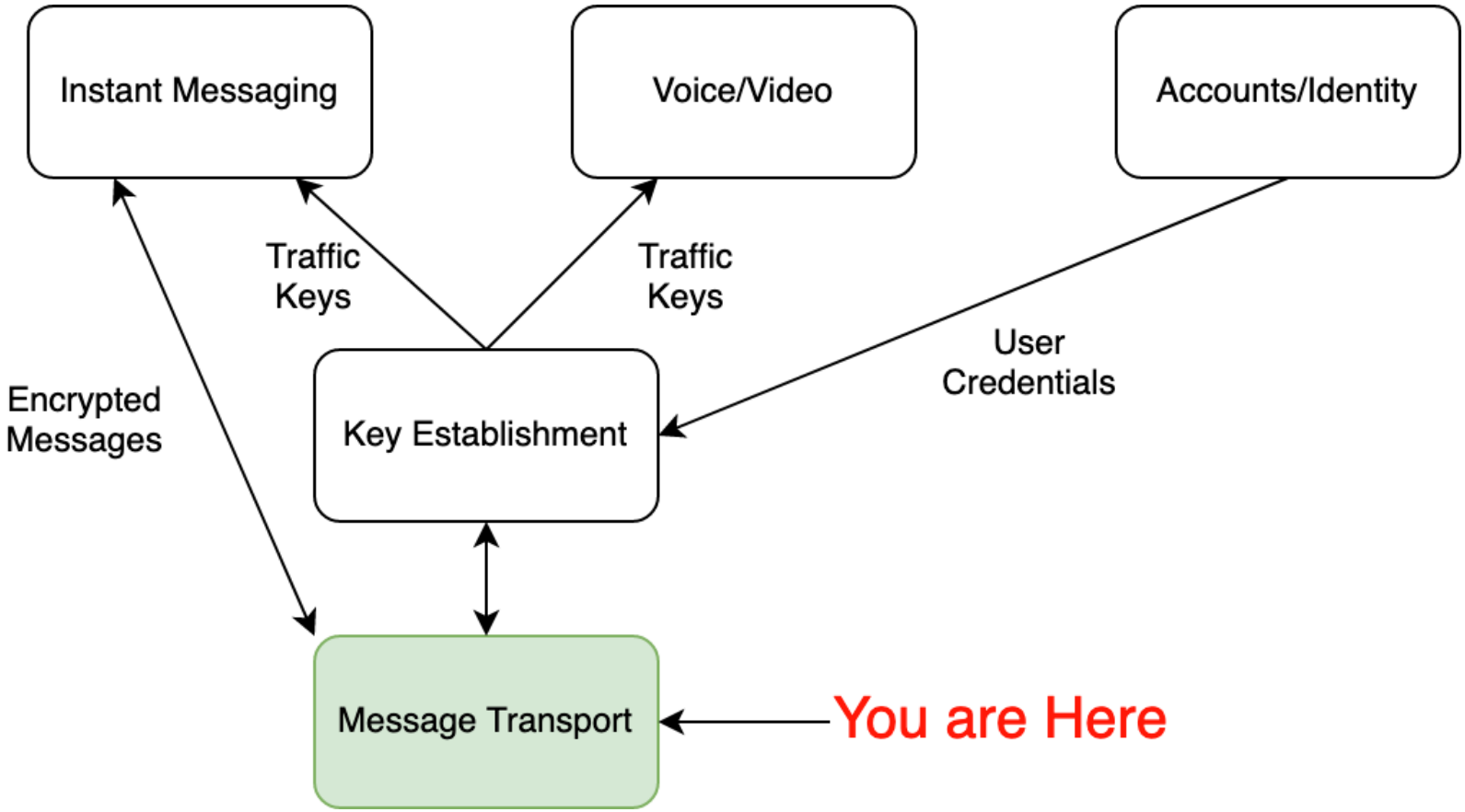
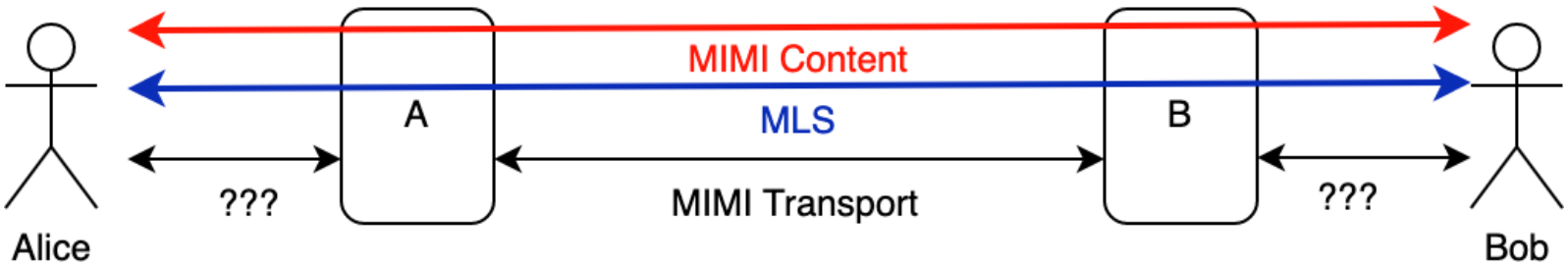
Abstract Architecture



Protocol Breakdown



Question: How much are we defining?

- A full system obviously needs a client-to-server protocol
  - Message protection and content need to be E2E
  - ... but message transport is not
- Most existing systems (XMPP, SIMPLE, etc. do it all)
- Is client $\longleftrightarrow$ server in scope?

Naming and discovery

- Two main kinds of existing identifiers
  - *System Specific (SSI).* e.g., "`1.650.555.1000` on WhatsApp" (or maybe `mimi:16505551000@whatsapp.com`)
  - *System Independent (SII):* e.g., `1.650.555.1000` or `ekr`
- In general, an SII isn't enough to automatically contact someone
  - You don't know what system they are on
  - The same SII may appear on multiple systems (e.g., phone numbers on WhatsApp + iMessage)
- *Discovery* is the process of determining which system(s) an SII appears on

Question: Do we need to support discovery?

1. Only solve for SSIs
2. Solve for SSIs now and build discovery separately
3. Integrate discovery and consent (SPIN, draft-rosenberg)
   - These designs assume that Alice has *some* out of band channel to contact Bob
   - What about systems that just use handles?

Consent?

- Alice can just send messages to Bob if she has his identifier
  - This is a spam vector
- Or does she need to get consent first?
  - Typically this consists of sending an *invite*
  - ... Bob has to accept before seeing Alice's messages

KeyPackage Availability

- Sending encrypted messages requires the KeyPackage[1]
- This leaks whether the recipient exists
- Potential risk of KeyPackage exhaustion

[1] Recall: the KeyPackage contains the public key of the recipient.

Question: which modes do we support?

1. Alice can send messages to Bob immediately
2. Alice can send messages to Bob but they're quarantined until Bob accepts
   - Potential concerns about excess data on Bob's side
3. Alice can't do anything until Bob consents

Messages and Channels

- (At least) three modalities
  - 1-1 messages
  - ad-hoc groups messages with > 2 people
  - named groups (Channels/rooms)
- Some overlap between group messages and channels
  - **Group** messages are defined by the members
  - Can't add new members (unlike channels!)
- What about multiple group messages (or 1-1 messages) with the same membership?
  - This is handled inconsistently by existing messaging services

Question: What models do we support?

1. Everything's an ad hoc group
   - Is this rich enough? What about moderation, etc.?
2. Channels are fundamentally different (XMPP, Slack, etc.)
   - And maybe we don't need ad hoc group messages?
   - Or do channels first and then ad hoc groups laer.

- MLS can support any of these modes

Channel/room Management

- XMPP (MUC) and Matrix have fairly complicated room management
  - Ownership
  - Moderation
  - Kick/ban etc
  - Ask to join chats
- A lot of systems don't
- This is out of charter scope. Assumption is that this only works on the owning service.

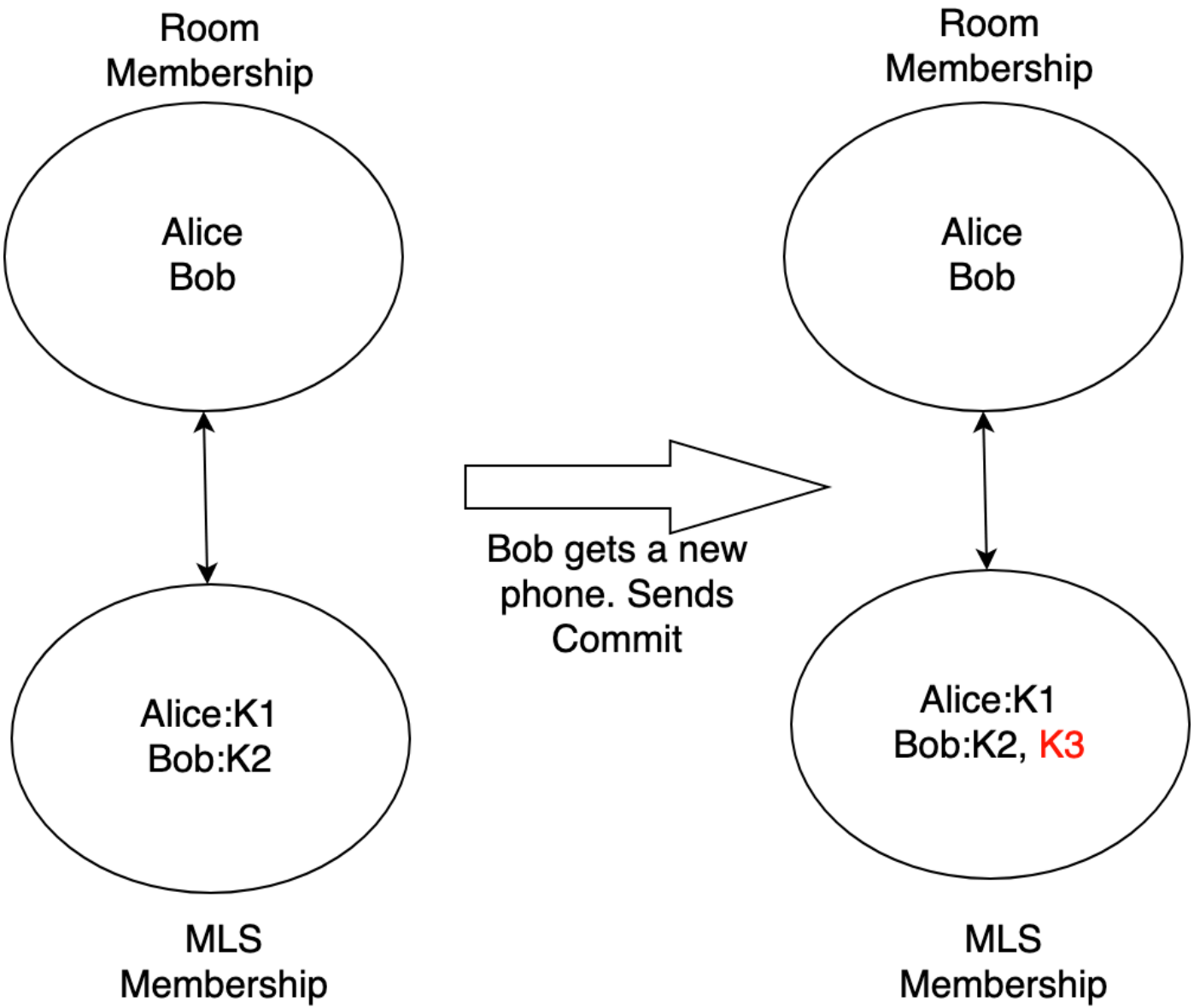
Question: room/channel portability?

- General assumption seems to be a room/channel lives on one system
  - Except for Matrix
- Is it possible to move channels between owners?
  - For instance, if the last member from the owner leaves
  - Linearized matrix allows this
  - XMPP, MTP, etc. don't seem to allow this

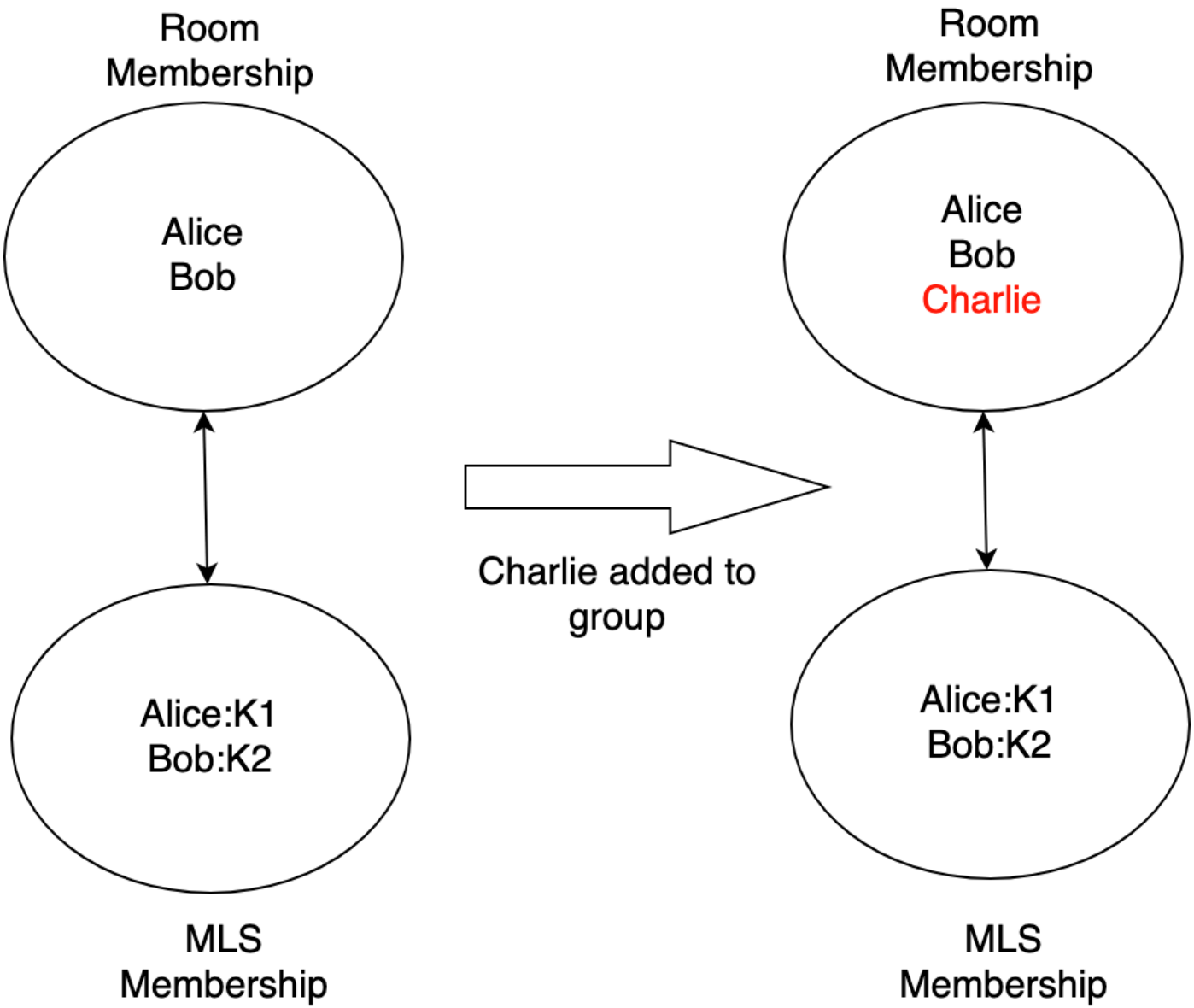
MLS channel state versus transport channel state

- State exists at both levels
  - Transport: which people are in the room?
  - MLS: which keys are in the room?
- How tightly in sync are these?
- And do they have to be cryptographically bound

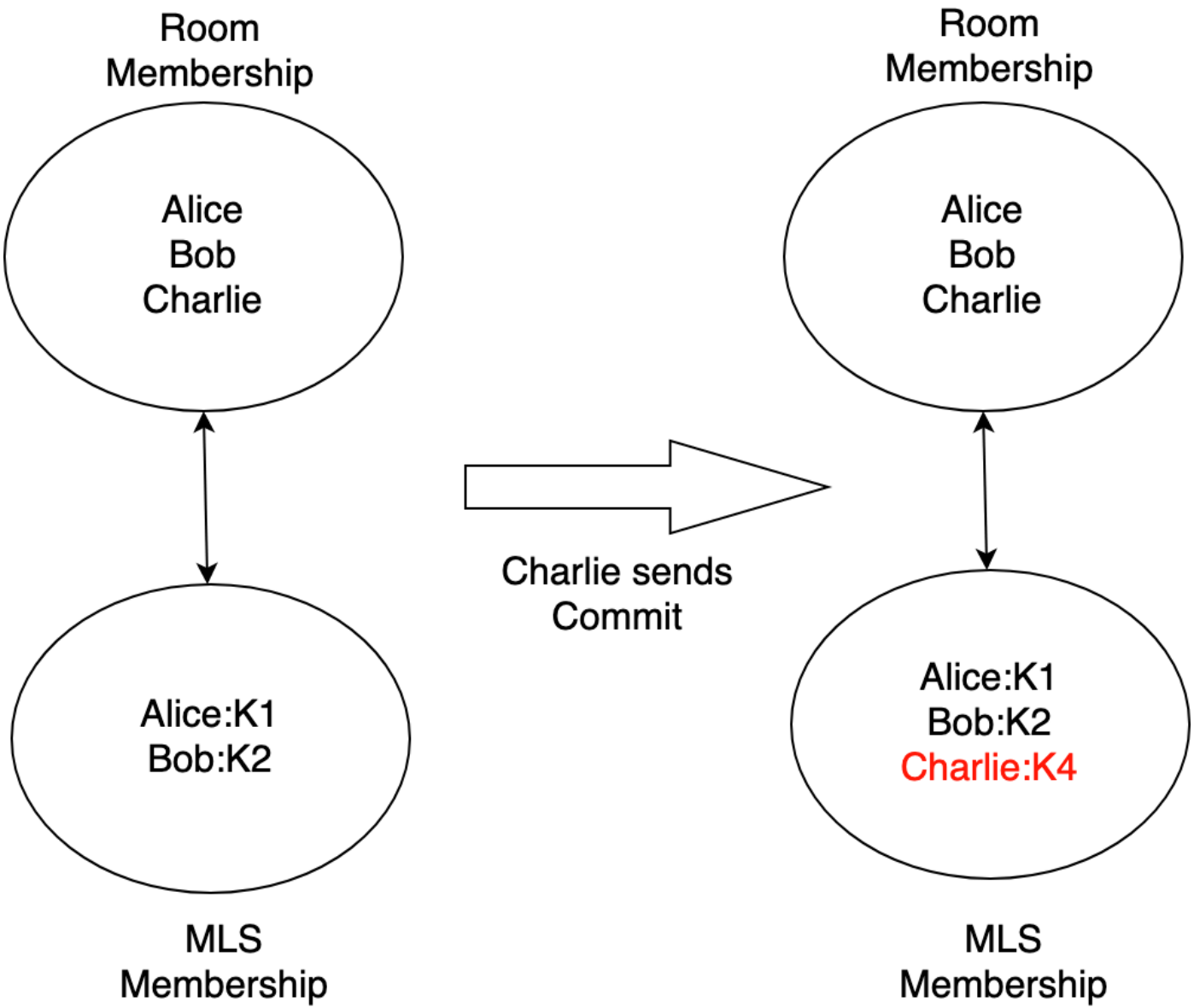
Warmup: Bob gets a new phone



Charlie added to chat by service



Charlie adds himself to MLS group



Question: Do we need MLS-level access control?

- MLS just controls which keys are in the group
  - But who decides which Commits are accepted by the group members?
  - For instance, can the owning provider add members
  - Or do group members need to approve it?
- General idea: there is some policy/ACL
  - That clients have enforce
- But how is that policy authenticated?
  1. Just trust the service
  2. Specify MLS-level policy authentication
  3. Require MLS-level policy authentication

Question: Privacy for metadata?

- MLS mostly protects the content of messages
- But what about metadata?
  - Who is messaging who
  - Channel membership
  - Contact lists
- Are we going to try to do anything here?