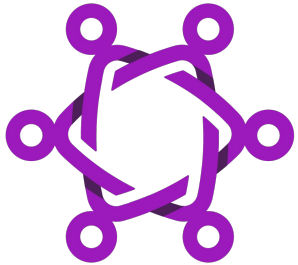
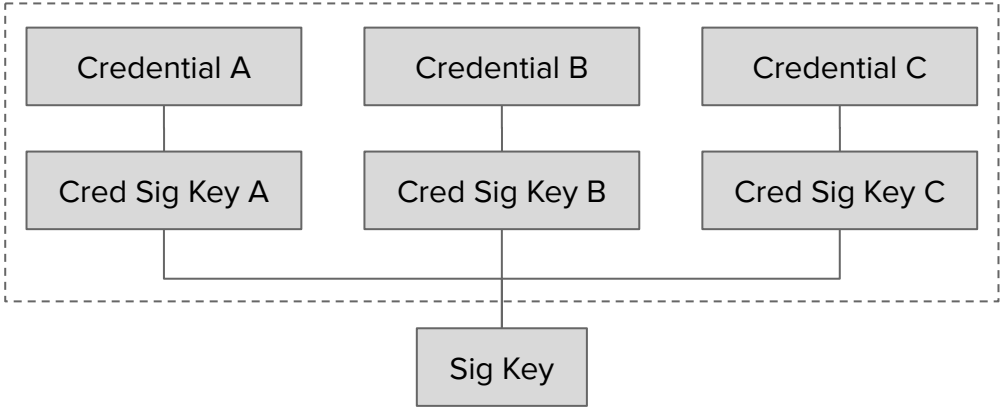


Additional Credentials

draft-barnes-mls-addl-creds

Additional Credential Types

Value	Name	Recommended	Reference
0x0003	userinfo-vc	Y	RFC XXXX
0x0004	multi	Y	RFC XXXX
0x0005	weak-multi	Y	RFC XXXX



Verifiable Credentials + Multi-credentials

Successful adoption call post-IETF-117, just needs adoption post-recharter (!!!)

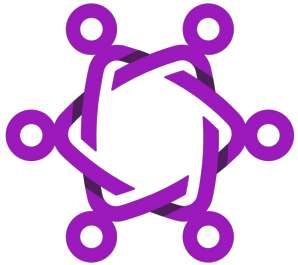
A question of location

This is a separate document for now.

But the rechartering is going slooooooooow

It’s not that much text.

Just chuck it in draft-ietf-mls-extension



Replace

draft-barnes-mls-replace

Just like Update but...

```
 struct {
+    uint32 replaced;
     LeafNode leaf_node;
-} Update;
+} Replace;
```

The affected member is explicit, not inferred from the framing

=> Someone else can make the proposal

Someone else can make the proposal...

Good: Faster PCS

- Right now, missed updates have to get thrown away (unlike Add/Remove)
- A committer can “re-originate” an Update using Replace (like Add/Remove)

Less good: “Rollback” attacks

- Malicious insider compromises secrets associated to an old Update
- ... then commits a Replace rolling the victim back to the compromised leaf

Prevents roll-back (?)

3. Leaf Node Epoch Extension

The `leaf_node_epoch` extension simply describes the epoch in which a LeafNode was created:

```
uint64 leaf_node_epoch;
```

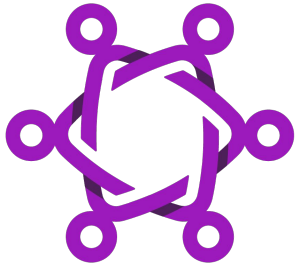
Figure 1: Content of the `leaf_node_epoch` extension

Questions

Functionality seems interesting?

Security risk seems manageable?

Separate doc or -mls-extensions?



Light Clients

draft-kiefer-mls-light

Problem: Download and Memory

MLS requires that clients download, validate, and store the group's ratchet tree

Each participant only uses one MLSCiphertext in a Commit

… but has to download O(N) data to verify the Commit signature

In large groups, these objects can be L A R G E

In a 1,000-participant Webex meeting (empty tree):

Tree: 3.5MB in memory / 2.3MB gzip'ed

Commit: 391KB

Light Clients

A **light client** is a member of the group that **does not have the ratchet tree**

A light client **cannot commit**

A light client **cannot process a normal Commit**

Instead:

- Light client joins with only a Welcome
- DS transforms Commit into per-light-client LightCommit

A light client can join and follow the group with O(log N) download / memory

Corollaries

Each group must have at least one full (non-light) client

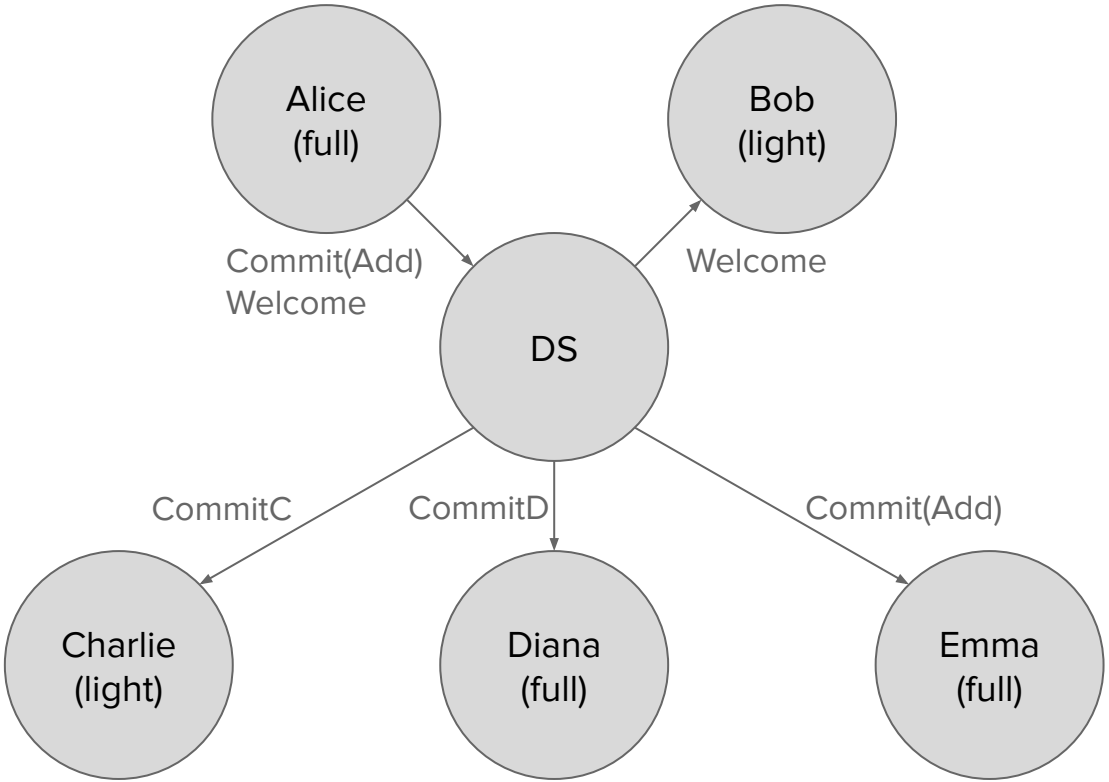
- Someone has to do the commits, otherwise nobody can be added!

Clients can transition between light and full

- Light -> Full: Download and validate the tree
- Full -> Light: Delete local copy of the tree

DS needs to be aware of which clients are light / full

Operating a Group with Light Clients

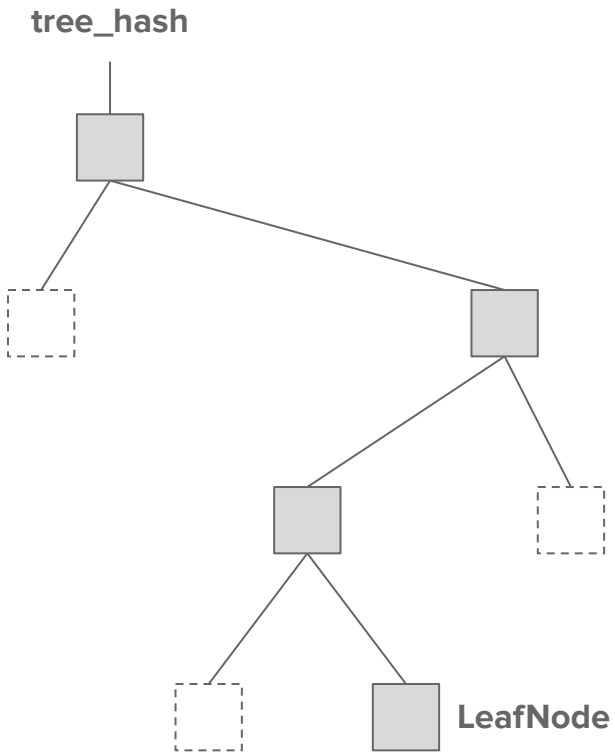


Incremental Authentication

Sometimes a light client wants to authenticate a specific member

- Verify their own membership
- Verify the client that added them
- Verify a specific other client (e.g., active speaker)

Present a “slice” through the ratchet tree – basically a Merkle tree proof chaining to the tree hash



Summary

Ratchet Tree and Commits are heavy in large groups

Light clients can join and follow with O(log N) download and memory

... at the cost of not being able to authenticate the whole group

Three main changes:

Skip the tree validation on join

DS slices Commit into per-client Light Commits

Tree slices allow for authentication of specific other members