A RELOAD Usage for Distributed Conference Control (DisCo) – Update
`draft-knauf-p2psip-disco-02`

Alexander Knauf, Gabriel Hege
Thomas Schmidt, Matthias Wählisch

{t.schmidt,waehlisch}@ieee.org

Agenda

- **Status** of Document

- **Overview** of DisCo – a short reminder

- **Update report** of DisCo

- **Proposal** for Media Negotiation in DisCo

- **Introduction** XML Event Package for Distributed Conferences

draft-knauf-p2psip-disco-02

Status of Document (1)

- draft version -00: Initially presented at IETF 78 (Maastricht)

  - Several encouraging feedbacks

- draft version -01: Submitted 30. Dec 2010

  - Mechanism for generating chained conference certificates

  - USER-CHAIN-MATCH access policy for shared write access to overlay Resources

  - XML Event Package for Distributed Conferences
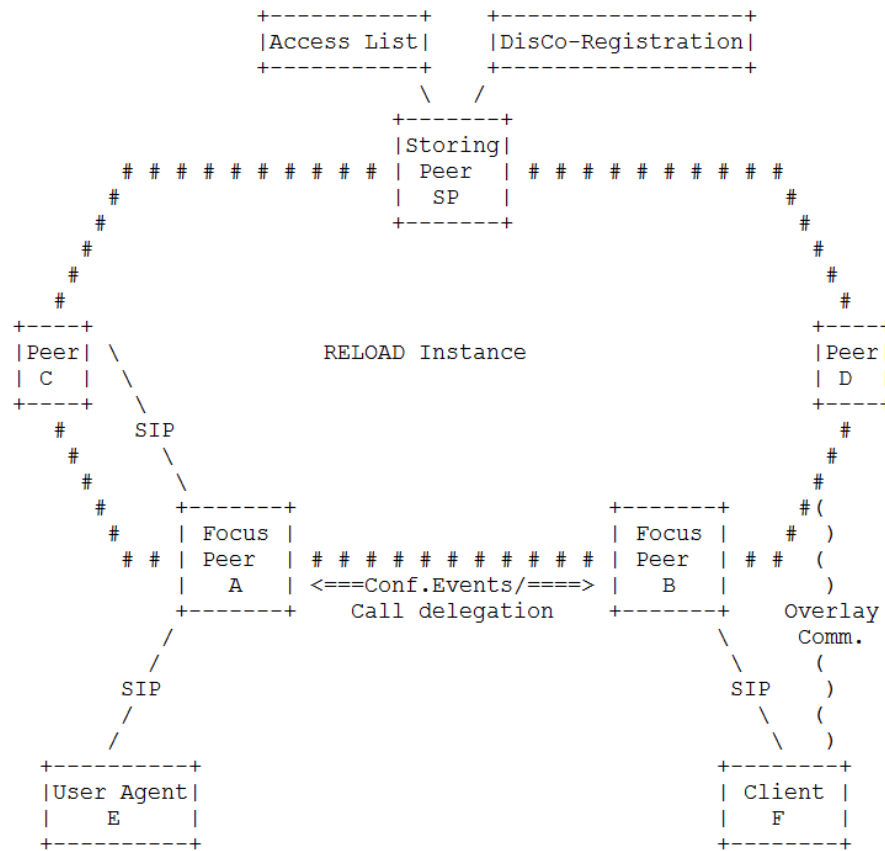 - Media negotiation scheme for DisCo

Status of Document (2)

- draft version -02: Submitted 14 Mar 2011

  - Replaced USER-CHAIN-MATCH policy and chained certificate mechanism

    - No adequate solution for revoking chained certificates

  - Using Access Control Policies of **ShaRe**[1] document instead :

    - Access Control Lists manage shared write access

    - Adopted DisCo-Registration Kind to ShaRe requirements

[1]`draft-knauf-p2psip-share-00` (Presentation by Gabriel Hege)

Distributed Conference Control

- A Distributed Conference (**DisCo**) is a multiparty session in a tightly coupled model that is controlled by several independent entities called **Focus Peers**

```
                    +-----------+    +------------------+
                    |Access List|    |DisCo-Registration|
                    +-----------+    +------------------+
                             \    /
                          +-------+
                          |Storing|
      # # # # # # # # # # | Peer  | # # # # # # # # #
      #                   |  SP   |                    #
      #                   +-------+                     #
     #                                                   #
    #                                                     #
   #                                                       #
  #                                                         #
 +----+                                                 +----+
 |Peer| \              RELOAD Instance                  |Peer|
 | C  |  \                                               | D  |
 +----+   \                                              +----+
    #      SIP                                              #
    #        \                                              #
   #          \                                            #
  #     +-------+                      +-------+        #(
  #     | Focus |                      | Focus |   #   )
 # #    | Peer  | # # # # # # # # # # #| Peer  | # #   (
        |   A   | <===Conf.Events/====>|   B   |         )
        +-------+     Call delegation  +-------+    Overlay
        /                                      \    Comm.
       /                                        \     (
    SIP                                        SIP    )
     /                                            \   (
    /                                              \   )
 +----------+                                  +--------+
 |User Agent|                                  | Client |
 |    E     |                                  |   F    |
 +----------+                                  +--------+
```

Conference ID Registration – Update

- Using ShaRe definitions for variable Conference identifier (RegEx)

- Update of DisCo-Registration to req. of ShaRe:

```
              struct {
New  ───────►  opaque resource_name<0..16^-1>;
              struct {
                opaque resource_name<0..16^-1>;
Changed ────► NodeId node_name<0..2^16-1>;
              } DisCoRegistrationData2^16-1>;
```

- **Update of DisCo-Registration to req. of ShaRe:**
  policy **resource_name**

- policy **resource_name** : Req. of USER-PATTERN-MATCH

- **Additional**: Storage of Access List Kind

  -

DisCo using ShaRe

a. DisCo-Registration: Mapping Conference ID to its Node-Id
   - Uses USER-NODE-MATCH or USER-PATTERN-MATCH
b. Access List Kind: Initializing shared write access to DisCo Kind at this Resource-Id

- Creator may delegate write access to potential focus peers
  - Store a new ACL item delegating: creator -> pot. focus
  - Enable potential focus to register as conference controller
  - Decide on delegating write access to further parties

SDP Offer/Answer in DisCo

- Ad-hoc scheme:
- A Focus distributes all media streams to all connected peers
    - Focus may choose to do mixing/recoding
    - When a new peer joins:
- Focus offers all media streams it receives to the joining peer
    - Joining peer offers its media streams to the focus
        - **Either:** Focus modifies media sessions to all connected peers, offering the new stream
        - **OR:** Mix the new stream with existing streams to prevent the need for SIP re-INVITE
    - Media streams naturally follow signaling connections

Event Package for Distributed Conferences

- Design Objectives:
  - Partial ordering of events in a distributed conference
  - Convey information about roles and relations of the conference participants
  - Announce local state of the focus peers
  - Reuse of existing XML elements of the Event Package for Conference State [RFC4575] (see figure)

```
distributed-conference
     |
     |-- version-vector
     |      |-- version
     |      |-- version
     |
     |-- conference-description
     |
     |-- focus
     |      |-- focus-state
     |      |      |-- user-count
     |      |      |-- coordinate
     |      |      |-- maximum-user-count
     |      |      |-- active
     |      |      |-- locked
     |      |      |-- conf-uris
     |      |      |-- available-media
     |      |
     |      |-- users
     |      |      |-- user
     |      |      |      |-- endpoint
     |      |      |      |      |-- media
     |      |      |      |      |-- call-info
     |      |
     |      |-- relations
     |      |      |-- relation
     |-- focus
     |      |-- ...
```

Coherent Versioning using a `<version-vector>`

- Uses principle of vector clocks[2]

- A <version-vector> of a conference with N focus peers has N <version> sub elements

- Each <version> announces the local state of a single focus peer with a counter

- A focus increments its counter if its local state changes and sends an event notification containing the entire <version-vector>

- Allows partial ordering of concurrent change events origin-wise

  ➤ Detects causality violations

[2] Fidge, C., "Timestamps in Message-Passing Systems that Preserve the Partial Ordering", in Proc. of 11th ACSC , pp. 56-66,Feb. 1988.

Announcing the Local State using `<focus>` Element

- Aggregates state information of a conference party acting as focus peer

- A separate element for each focus

- Maps participants to focus peers

- Changes of local state updates the corresponding <focus> element

  - Increments logical clock of the associated <version> element

```
|-- focus
|    |-- focus-state
|    |    |-- user-count
|    |    |-- coordinate
|    |    |-- maximum-user-count
|    |    |-- active
|    |    |-- locked
|    |    |-- conf-uris
|    |    |-- available-media
|    |
|    |-- users
|    |    |-- user
|    |    |    |-- endpoint
|    |    |    |    |-- media
|    |    |    |    |-- call-info
|    |
|    |-- relations
|    |    |-- relation
```

Interconnecting Focus Peers using the <relations> Element

- <relation> elements used to reflect the state synchronization and media flows between the focus peers

  - ➢ enables reconstruction of conference topology

- <relation> elements contain a string of form:

  - "CONNECTION-TYPE:IDENTIFIER"

- Two connection types defined:

  - **sync**: Indicates subscription for DisCo events

    - Uses SIP call-id as identifier

  - **media**: Indicates a media connection to remote focus

    - Uses SDP 'label' to identify a single media stream

- Connection types can be extended

Next Steps

- Implementation of DisCo and ShaRe in progress

- Ready for adoption as a WG item?

draft-knauf-p2psip-disco-02

Thanks for your attention!

Questions?

Alexander Knauf, Gabriel Hege, Thomas Schmidt, Matthias Wählisch

http://inet.cpt.haw-hamburg.de/