Multicast Router Key Management Protocol (MRKMP)

draft-hartman-karp-mrkmp-01

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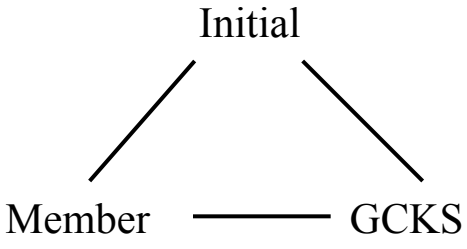
Election Protocol

- Election protocol improved to address comments since IETF 79
- Re-design the election protocol of MRKMP
- Objectives of the election protocol:
  - Pick a router as a GCKS
  - Under attacks, the best candidate does not have to be selected
  - Once the election has been concluded, keep using the GCKS until it fails

Election Protocol in -00



State Machine

Router A

Router B

t1

A's state = Initial, priority = low

B's state = Initial, priority = high

A->group: state = init, priority = low

B-> group: state = init, priority = high

Time Delay

t2

A's state = Member, priority = low

B's state = GCKS, priority = high

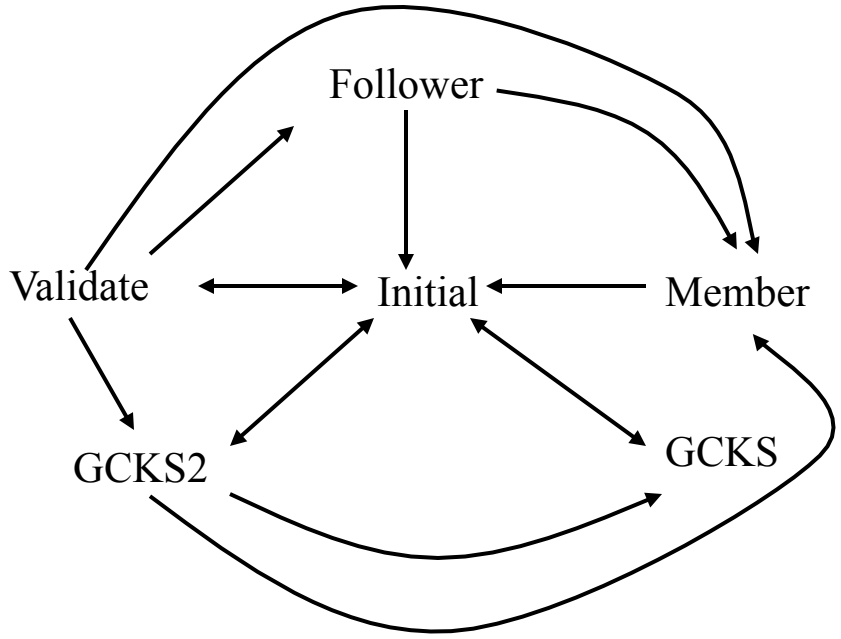
Main Attack

- An attacker can send new announcements to keep the election going. (convergence can be very slow)
- Clues about attacks:
  - An election can conclude but authentication fails
  - An election takes too long

Proposal

- Detect the attacks, and when an attacker is detected, use a slower strategy
  - In the slower strategy, try to find the routers which can be authenticated to
  - Build the tree of these routers and pick one as the key server
- Introduce new States, Validate, GCKS2, and Follower

State Machine



- When an attack is detected, an Initial state transmits its state to GCKS2 or Follower. Otherwise, to GCKS or Member
- A GCKS2 router only distributes KEKs but does not distribute protocol master keys

Initial State

- Routers send initial announcements to show its existence
- Under following condition, transfer to Validate
  - Receive a GCKS or a GCKS2 announcement (put the sender into the candidate list before the state transmission)
  - After the initial timer expires, the candidate list is not empty
- If the list is empty , after the initial timer expires, transfer to GCKS

Validate State

- Authenticate the most preferred entry in the candidate list
  - If the one cannot be authenticated to, then there is an attacker. Transfer to the slower strategy
- If no authenticated and more preferred router is found during a certain period, transfer the state to GCKS2 and keep looking for the more preferred one

GCKS2

- Generate a KEK and distribute it to its followers
- Keep listening the GCKS or GCKS2 announcements, try to find more preferred routers and authenticate to them

Follower

- When an Initial router receives an GCKS2 router, it can transfer its state to Follower after authenticating to the GCKS2 router
- In a certain period, ignore any announcement from other routers

END