A Group Security Model for RSVP Message Authentication

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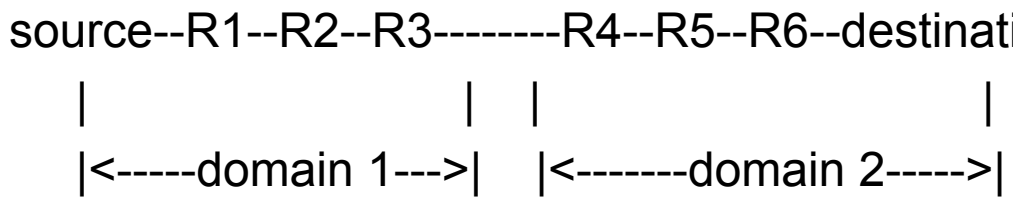
Outline

- Resource ReSerVation Protocol (RSVP) Overview
  - Architecture
  - Integrity Protection
  - Manual Keying Issues
- RSVP Group Trust Model
  - draft-behringer-tsvwg-rsvp-security-groupkeying-01
- GDOI Extensions to support Group Secured RSVP
  - draft-weis-gdoi-for-rsvp-00

RSVP Overview

- RSVP provides setup of resource reservations for multicast or unicast data flows
- Receivers of the data flow request a specific QoS, which is relayed hop by hop toward the data flow source.
  - Each receiving hop intercepts & possibly alters the RSVP packet before forwarding it.
  - RSVP Source and Destination may be in different security domains, where the domains co-operate.

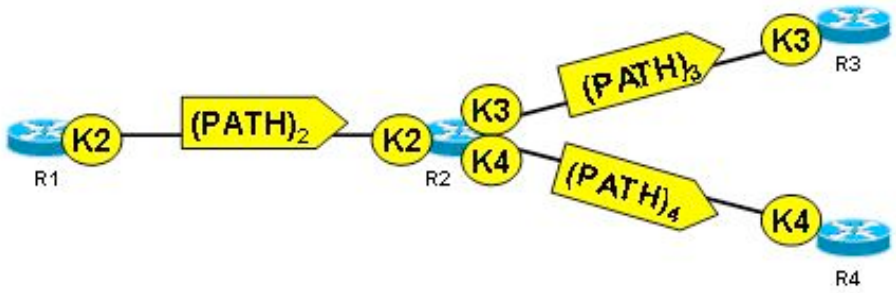


RSVP Authentication Overview

- RFC 2474 (updated by RFC 3097) specifies an INTEGRITY Object for RSVP, which included the following protection
  - Message integrity
    - HMAC-MD5 or HMAC-SHA result, created and verified with a shared key
  - Replay protection
    - Sequence Number (Counter or Time based)
- RSVP integrity keys are commonly configured manually (although other methods are allowed)

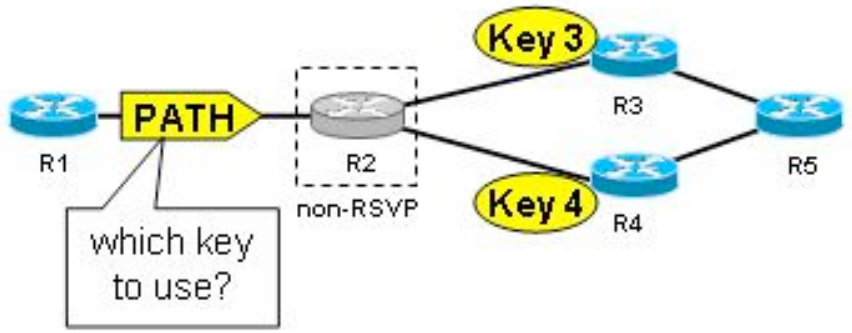
Pair-wise Manual Keying

- A pair-wise key can be used when an RSVP router knows which RSVP peer will be the RSVP next-hop. E.g., when
  - Keys are bound to a specific interface
  - The next hop router is known to be the RSVP next-hop router
  - Particularly appropriate when used between trust domains, where paths between trust domains is unambiguous.



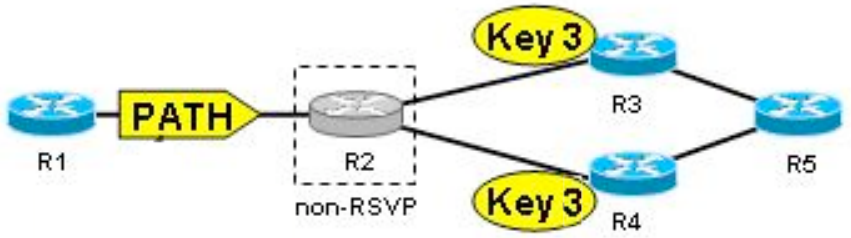
Pair-wise Manual Keying Issues

- Manual keying within a single trust domain (e.g., provider) is not optimal
  - The presence of multiple paths through the network makes pair-wise keys problematic



Group Manual Keying Issues

- Within a single trust domain a single group key can be manually shared
  - But manually shared group keys are difficult to manage, suffer from overuse, etc.



Intra-domain trust model

- Within a single trust domain, RSVP routers are jointly managing QoS policy, and share an implicit trust
  - RSVP speakers trust other RSVP speakers to correctly perform RSVP semantics
  - An RSVP router does not know which other RSVP speakers touch a packet, except those with which it peers
- An RSPV router explicitly trusts its peers, insomuch that it exchanges INTEGRITY objects.
  - As previously shown, in some configurations a group key between a set of RSVP routers is used, although predicting which RSVP routers comprise a group may be problematic

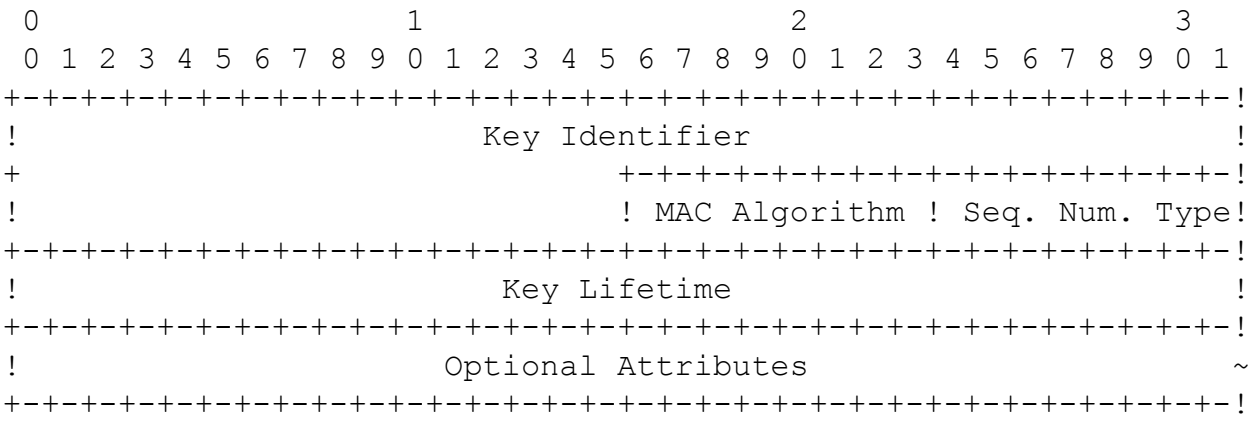
Dynamic Group Key Management

- Dynamic group key management of the RSVP integrity keys can ease both the configuration and quality the group keys.
- Dynamic group key management can provide group management services (e.g., de-authorize an RSVP router by removing it from the group).

GDOI Extensions for RSVP

- draft-weis-gdoi-for-rsvp-00 describes updates that allow GDOI to distribute RSVP integrity keys
  - SA TEK specific to RSVP
  - Define how the keys are passed in the KD payload

SA TEK



- Key identifier uniquely identifies a key
- MAC Algorithm (HMAC-SHA or HMAC-MD5)
- Sequence number type (counter or time)
- Key lifetime
- Optional Attributes
  - KeyStartValid (Timestamp for when to begin using the key)

Existing GDOI features used

- GDOI registration provides authentication & authorization of group members
- GDOI rekey protocol provides dynamic key updates
- LKH group management algorithm for revoking group members

Next steps

- We will work towards having draft-behringer-tsvwg-rsvp-security-groupkeying-01 is accepted by the TSVWG WG as a working group draft
- If this happens, we'd like draft-weis-gdoi-for-rsvp-00 to be considered as a MSEC WG work item
  - Implementations of the TSVWG WG draft needs the GDOI extensions described in the MSEC WG draft
- In the meantime, we'd like feedback on whether there is support for doing such work in the MSEC WG.