IGMP/MLD Error Feedback

draft-morin-mboned-igmpmld-error-feedback

Thomas Morin - Orange Labs
Problem statement / History

- There are cases where an IGMP/MLD querier won't be able to take into account a Membership Report
  - lack of resources
  - policy
  - SSM configuration
  - IGMP version
  - ...

- It would be useful to provide multicast-applications with feedback on these issues
  - and not just let them timeout

- History
  - (was existing in IGMPv0 RFC988)
  - DSLForum asked for this two years ago
    - proposed a solution to magma
      http://www1.ietf.org/mail-archive/web/magma/current/msg00815.html
    - suggested solution wasn't considered appropriate (good reasons)
  - requirement formulated in draft-ietf-mboned-maccnt-req
    - “Notification to Users of the Result of the Join Request: It should be possible to provide information to the user about the status of his/her join request (granted/denied/other).”
Principles

- Feedback is for informational only
  - no impact on Host or Querier state machine
  - Doesn't introduce compatibility issues
- Only about persistent issues
  - not meant to carry information about transient errors (like network failures)

Simple idea

- a new message: the Feedback message
  - more on this later
- on reception of a Report than cannot be honored, the IGMP/MLD Querier can send a Feedback message
  - in unicast toward the Report sender (if IGMPv3/MLDv2)
  - in multicast toward the Group (if IGMPv2/MLDv1)
  - to be discussed
- IGMP/MLD Host can interpret it and inform the application(s)
Proposed solution – message encoding

- New message, containing
  - error type (1 byte)
  - error sub-type (1 bytes)
  - group address
  - number of sources in error, followed by the source addresses in error (may be omitted)

- Proposed error types...
  - multicast reception disabled on the link
  - group administratively prohibited
  - source(s) administratively prohibited
  - resource limit reached
  - exclude source filter mode not supported by the Querier (eg. lightweight IGMPv3)
  - IGMP/MLD version not supported by querier
  - wildcard on an SSM group (IGMPv2 or IGMPv3/MLDv2 with Exclude source filter mode was asked, but the group address is not in the SSM range of the Querier)
  - etc.
Proposed solution – message envelope

- One question:
  - what can be the protocol to carry this message?

- ICMP and IGMP are natural candidates
  - ICMP
    - already use for feedback from intermediate routers to hosts
    - extensible
    - but nothing to do with multicast
  - IGMP
    - used for multicast already (!)
    - but all encodings to define

- Discussion needed...
Link with the application layer

- A host need to notify the application layer when it receives a Feedback message
  - similarly to what the socket API does when receiving ICMP errors (e.g. TTL expired, host unreachable, etc.)
  - ...but on (non)reception of packets, not on non delivery

- Possible solution with the POSIX socket API
  - (disclaimer: I'm no socket API guru)
  - use of the MSG_ERRQUEUE flag of the recvmsg()/recvfrom() POSIX calls
    - this call allows the socket user to retrieve the network errors queued for the socket

- To be further described, contribs welcome!
Impact on proxy/snooping equipments

- Impact on IGMP/MLD proxies
  - a proxy can generate its own Feedback message
  - or should forward the Feedback message received from the upstream Querier to the Host
  - can also cache the messages to allow new receivers behind him to be instantly notified
    - without waiting for a Report to be sent

- Impact on IGMP/MLD snooping equipments
  - if ICMP is chosen:
    - should be transparent
  - if IGMP is chosen:
    - RFC 4541 section 2.2.1(3) : "a switch that supports IGMP snooping must flood all unrecognized IGMP messages to all other ports"
    - should be transparent too
Conclusions and feedback are welcome
- IGMP or ICMP ??

Next steps
- would this belong to mboned ?
- magma ? (if IGMP is chosen)