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Tuning the Behavior of IGMP and MLD for Mobile Hosts and Routers

draft-asaeda-multimob-igmp-mld-optimization-05

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Changes from -04

- Add Hui Liu and Qin Wu as the co-authors
  - Contributed to editorial improvement
- Unicast general query is moved to Appendix

Outline

- Describes the ways of IGMPv3 and MLDv2 protocol optimization for mobility, and aims to become a guideline for query and other timers / values tuning.
- Potential tuning values are clarified
  - Query Interval
  - Query Response Interval
  - Last Member Query Count (LMQC) / Last Listener Query Count (LLQC)
  - Startup Query Interval
  - Robustness Variable

Tracking of Membership State

- "IGMP/MLD-Based Explicit Membership Tracking Function for Multicast Routers"
  - draft-asaeda-mboned-explicit-tracking-02
- Contribution for tuning
  - Reduce the number of Group(-and-Source) Specific query messages and its reply messages
  - Shorten the leave latency by shorter LMQT/LLQT
- The explicit tracking function is SHOULD for multicast routers (or proxies) maintaining mobile nodes

Query Interval (125 sec.)

- 150 sec.
  - For a wireless link having a number of nodes (e.g.,200 nodes)
  - Pro.
    - Minimizing traffic of Report messages and battery power consumption for mobile hosts
- 60 to 90 sec.
  - For a wireless link having a higher capacity of the resource
  - Pro.
    - Quick synchronization of the membership information tracked by the router

Query Response Interval (10 sec.)

- 10 to 20 sec.
  - For a wireless link having a lower capacity of network resource (e.g., a bursty IEEE 802.11b link) or for a lossy link
  - Pro.
    - Reduce congestion of the Current-State Report messages on a link
  - Con.
    - Increase join latency and leave latency when the unsolicited messages (State-Change Record) are lost on the router
- 5 to 10 sec.
  - For a wireless link having enough capacity (e.g., an IEEE 802.16e link) or reliable condition for IGMP/MLD message transmission
  - Pro.
    - Quick discover of non-tracked member hosts and synchronization the membership information

LMQT and LLQT (2 sec.)

- LMQT (=LMQC (Rob. Var.) * LMQI (1))
- 1 sec.
  - LMQC=1, LMQI=1
    - For a reliable link, LMQI can be smaller, e.g. 0.5, then LMQT=0.5 sec.
  - Pro.
    - Shortening leave latency
  - Con.
    - There is a risk that a router misses Report messages from remaining members if the router adopts small LMQC/LLQC
    - However the wrong expectation would be lower happened for the router enabling the explicit tracking function.
- 2 sec.
  - LMQC=2, LMQI=1
  - For a wireless link being lossy (e.g., due to a large number of attached hosts or limited resources)

Startup Query Interval (1/4 of [Query Interval] (e.g. 25 sec.))

- 1 sec.
  - Pros.
    - Quick member discovery
    - Shortening handover

Robustness Variable (2)

- 2
  - In the regular case
- 1
  - For a wireless link having higher capacity of the resource or reliable condition
- Note
  - SHOULD NOT be bigger than 2

Appendix. Unicast General Query

- Unicast Query Interval and Unicast Query Response Interval
  - RFC3376 and 3810 do not distinguish multicast and unicast General Query and do not define different timer values
  - Pros.
    - No drain on battery power for non-member nodes
    - Shorter Query Interval and smaller Robustness Variable would be possible
  - Protocol extension?

Next Step

- We appreciate your review
- WG draft ?