IGMP and MLD Requirements for Mobility Support

draft-liu-multimob-igmp-mld-mobility-req-00

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IGMP/MLD for Mobility Support

- **Requirement draft**
  - draft-liu-multimob-igmp-mld-mobility-req-00

- **Extension draft**
  - draft-asaeda-multimob-igmp-mld-mobility-extension-00

- **Target**
  - IGMP/MLD protocol requirements and extensions for mobile hosts and routers
  - Independent on mobile protocols (e.g. MIP, MIP6, PMIP, NEMO)
    - IGMP/MLD context transfer between routers or other entities will be discussed in a separate draft
Background

• “Host-and-router” communication for joining and leaving IP multicast sessions
  – IGMP (IPv4) and MLD (IPv6) are the standard protocols

• Properties
  – Network
    • Wireless networks
  – Mobile host
    • Limited resources
      – Low CPU power, low battery power
  – Router (may or may not be a “mobile” router)
    • Relatively general resources (in our assumption)
Discussions

• Dormant mode operation
  – Support low battery power or low CPU power hosts
  – Limit or minimize IGMP/MLD message flooding over wireless link

• Simple and effective implementation
  – Clarify required functions and discuss how they could be implemented simply and effectively
Requirement Draft

• IGMP/MLD specifications and requirements
• Required functions for mobility support
• Possibility of supporting a wireless link or a large number of point-to-point links
  – Standard IGMP/MLD support both a wireless link and a P-to-P link, but need the protocol tuning
IGMP/MLD Query

• Condition
  – Soft-state protocols
  – Exchanging query and report messages creates host-and-router communication

• Concern
  – The number of transmitted query messages must be reduced or minimized for mobility support
  – Excessive IGMP/MLD message transmission over wireless link is bad, because;
    • Periodical message transmission highly consumes network resources
    • Superfluous IGMP/MLD messages keep up mobile hosts in sleeping mode
SSM Support

• Condition
  – SSM supported by IGMPv3 and MLDv2
  – SSM is a requirement for scalable IP multicast

• Concern
  – Bad effects by coexistence of INCLUDE and EXCLUDE filter modes
  – Both host and router need to take complex state transition, have complex implementations, require a large amount of CPU/memory resources
  – Shortest-path tree (SPT) must be re-constructed whenever the router receives EXCLUDE mode join from a downstream host
Conclusion

- IGMP and MLD are necessary protocols in IP multicast
- For mobility support;
  - Optimization of IGMP/MLD query/report transmission is required
  - SSM support is mandatory
  - Protocol changes should be minimized