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IGMP and MLD Optimization for Mobile Hosts and Routers

draft-asaeda-multimob-igmp-mlD-optimization-01

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Overview

- This draft aims to describe the ways of IGMP/MLD protocol optimization for mobility
- Discussion
 - Various timer values IGMP/MLD use
 - Router and host behaviors for IGMP/MLD
 - Note this may be excluded from draft
- Concept
 - Minimize mobile node's power consumption, and maximize the available wireless resource
 - By limiting the number of transmitted IGMP/MLD messages
 - But does not lead additional join and leave latency

Optimization

- What is the “optimization”?
 - Need to provide definitive **static** timer values that could fit for any kinds of **dynamic** network conditions?
 - Need to find the **best fit** timer value for any kind of situation?

Proposals

- Tracking of membership status
- IGMP/MLD Query processing
- IGMP/MLD Report processing
- Multicast source filter
- Explicit membership notification

Tracking of Membership Status

- Explicit tracking function is the standard function defined in [RFC3376][RFC3810]
- Pros.
 - Reduces the number of solicited membership reports requested by periodical IGMP/MLD Queries
 - Possibly beneficial for shorter leave latency
- Cons.
 - Router needs processing capability and large memory
 - (Not con) IGMP/MLD Queries still needed for missing nodes or old nodes and to be robust from lost packets
- No timer change, no behavior change

IGMP/MLD Query Processing

- IGMP/MLD General Query is unicasted to recorded members and multicasted to refresh membership info. with longer interval
- Pros.
 - Make only the active nodes that have been receiving multicast contents respond the IGMP/MLD General Queries
- Cons.
 - Longer [Multicast Query Interval] may introduce longer join/leave latency
 - (Not con) IGMP/MLD Queries still needed for missing nodes or old nodes, to be robust from lost packets
- New timer values
 - [Query Interval] is common, but [Multicast Query Interval] is defined as a new timer value
 - Moved to the extension draft?

IGMP/MLD Report Processing

- Describe the attention of 0.0.0.0 or unspecified address (::) as the source address of IGMP/MLD Report
- Explicit tracking function should be disabled for the node whose destination address is all 0
- No special consideration for mobility
 - Will merge to the section describing explicit tracking function

Multicast Source Filter

- Recommendation of LW-IGMPv3/LW-MLDv2
- Pros.
 - No possible applications using EXCLUDE (S,G) join
 - Both host-side and router-side implementations of LW-IGMPv3/LW-MLDv2 are much simpler
 - EXCLUDE (S,G) just breaks SSM communication
 - And forwards many unneeded data (which only needed (?) by EXCLUDE join requester)
- Cons.
 - Nothing
- This draft does not deny to support the full version IGMPv3 [RFC3376] /MLDv2 [RFC3810]

Explicit Membership Notification

- IGMP/MLD Notification operation
 - Mobile host periodically sends Current-State Record messages expressing which multicast sessions the host is joining
- Pros.
 - For both [Multicast Query Interval] and [Query Interval], much longer intervals can be set up
 - Reduce the total number of Queries and Reports
- Cons.
 - Due to additional timer value, it requires additional complexity to adjust dynamic network condition
- New timer value and new behavior
 - [Notification Interval]
 - Moved to the extension draft

Revised Plan

- Tracking of membership status
- ~~IGMP/MLD Query processing~~
 - Moved to extension draft
- IGMP/MLD Report processing
 - Merge into sect. describing explicit tracking function
- Multicast source filter
 - Including LW-IGMPv3/MLDv2 recommendation
- ~~Explicit membership notification~~
 - Moved to extension draft
- Other conditions that should be discussed?

Conclusion

- This draft aims to describe the ways of IGMP/MLD protocol optimization for mobility
 - Definitive static timer values may or may not be provided in this draft
- Next step
 - Revise the draft?
 - Intended status: Informational or BCP
 - Or, new requirement draft and extension draft?
- Comment?