

# DLEP Multicast Discussion

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With input from:

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# Three Key Questions

- These questions come out of looking at the implementation posted at <https://github.com/mit-ll/LL-DLEP> and RFC8175
  - a) How does a multicast receiver identify (and remove) itself
  - b) How does a (potential) multicast sender know about a multicast group and its related parameters
  - c) How does a (potential) multicast sender know what endpoints are reachable via a multicast group
- Based on multiple independent responses/analysis:
  - (a) and (b) seem within the intent of RFC8175
    - Could be addressed in errata
  - (c) seems beyond intent of RFC8175, but has a straightforward answer
    - Probably beyond the scope of an errata

# Some Observations

- RFC8175 says
  1. A dlep destination can be multicast
    - *The example of a logical destination is Multicast*
    - *multicast traffic is supported in DLEP simply by treating the derived MAC address as any other destination in the network.*
  2. Modem need to expect multicast addresses in Destination Up requests
    - *a modem handling a multicast Destination Up request may have to perform a complex network reconfiguration.*
  3. Destination announce is used by a router to indicate interest in a multicast address
    - *there may be times when a router wishes to express an interest in a destination that has yet to be announced, typically a multicast destination. Destination Announce Messages MAY be sent by a router to announce such an interest.*
  4. *Some modem behavior is defined*
    - *A modem MUST send a Destination Down Message to report when a destination (a remote node or a multicast group) is no longer reachable.*
    - *A modem SHOULD send a Destination Update Message when it detects some change in the information base for a given destination (remote node or multicast group).*
    - *The Link Characteristics Request Message MAY be sent by a router to request that the modem initiate changes for specific characteristics of the link. The request can reference either a real destination (e.g., a remote node) or a logical destination (e.g., a multicast group) within the network.*

# How does a multicast receiver identify (and remove) itself?

- Stan's answer:
  - The receiver (router) should identify itself with a Destination Announce (I think that's what Rick called it), flowing \*to\* the modem, with the appropriate MCAST address and derived MAC.
  - After the Destination Announce and acknowledgement, the modem would then flow metrics back to the router for the MCAST address.
- Results of off-line discussions:
  - Receivers:
    - Join = Destination Announce {multicast mac, multicast IP Address list}
    - Leave = Destination Down {multicast mac}
  - Probably matches intent of RFC?

# about a multicast group and its related parameters?

- Stan's answer:
  - That depends on the amount of "secret sauce" in the modems. If they're propagating the Destination Announce across the RF network, when router "A" generates his Destination Announce to receive traffic, that would be propagated to a \*Destination Up\* (note the verb change) in the other routers. If they're not propagating the Dest Announce, then there's no real way for a sender to know that anyone is listening. In that case, I would expect the sender to issue the Destination Announce to its local modem, and proceed as best it can.
- Results of off-line discussions:
  - Senders learn about possible destinations via
    - Destination Up {multicast mac, multicast IP Address list}
    - Destination Update {multicast mac, multicast IP Address list} // may be a drop of IP address
    - Destination Down {multicast mac} // when final final listener leaves
  - Probably matches intent of RFC?
    - Could be covered in errata or update...

# what endpoints are reachable via a multicast group?

- Stan's answer:
  - ... all of the solutions I can see are pretty inelegant - stuff like including IPv4 or IPv6 address TLVs as part of the MCAST Destination Up.
- Results of off-line discussions:
  - By be supported by adding **unicast** addresses to up/update messages:
    - Destination Up {multicast mac, multicast IP Address list, **RX'er unicast IP Address list**}
    - Destination Update {multicast mac, multicast IP Address list, **RX'er unicast IP Address list**} // may be a drop of IP multicast or unicast address
    - Destination Down {multicast mac} // when final listener leaves
  - This is not a format change, but probably not included / implied in RFC
    - Probably should be covered in an update

# Ricks comment:

- There is another aspect, which is when the radio broadcast rate is significantly different than the point-to-point rate (think 802.11). In this case a modem could advertise a destination MAC FF:FF:FF:FF:FF:FF, or an IPv6 link-local multicast address, with metrics, as a Destination \*Up\* instead of needing a Destination Announce first.

# Ricks Related Topic

- Stan and I also have toyed with the idea of an extra TLV to assist with building overlay (possibly multicast) networks – we presented in Bangkok – a kind of “I would make a good/bad rendezvous point” metric, that could be used for PIM and/or a routing protocol that needs to elect a DR...