IPv6 Neighbor Discovery Multicast Address Listener Registration

draft-ietf-6lo-multicast-registration

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IETF 113

Remote

6LoWPAN ND (IPv6 Stateful Address Autoconfiguration)

- RFC 6775 (original 6LoWPAN ND)
  - Defines ARO for registration and DAD operations for stateful AAC
- RFC 8505 (extended 6LoWPAN ND)
  - Extends ARO, updates the registration procedure
  - Allows registering to network services inc. proxy
- RFC 8928 (Address Protection for ND)
  - Secures ownership and enables SAVI
- RFC 8929 (Backbone Router – proxy ND)
  - Defines a proxy ND operation. Updates EDAR to transport ND options such as SLLAO.
- draft-thubert-6lo-unicast-lookup (Unicast Address lookup on backbone)
  - Allows the 6LBR to respond to lookups and saves broadcasts
- draft-ietf-6lo-multicast-registration (Anycast and Multicast Address Registration)
  - Registers anycast and multicast addresses (in addition to unicast per RFC 8505)

draft-ietf-6lo-multicast-registration

- Generated as a response to a request from Wi-Sun alliance
  - Remove the need for MLD, and its reactive broadcast REPORT polling
- Extends RFC 8505
  - New flags in the EARO to signal anycast and multicast
  - 6LN operation virtually unmodified, just setting the flags
  - New 6LR behavior that accepts multiple registration with different ROVR
- Extends RFC 9010 (RPL Unaware Leaves)
  - To inject the anycast and multicast addresses in RPL, with new flags
- Extends RFC 6550
  - New MOP for Non-Storing Multicast (MOP 5?), new DAO / RTO flags
  - New anycast support also in Storing Mode Multicast (MOP 3)

Changes in draft-ietf-6lo-multicast-registration

- Since IETF 112
  - Bumped from 02 to 04
  - Implicit registration of FF02::1 (-04)
  - How RFC 8928 is leveraged to secure addresses (-03)
  - Aligned draft-thubert-bess-secure-evpn-mac-signaling
- During IETF 112
  - Legacy anycast support and backward compatibility (-02)
  - Repurposing EDAR “status” field to carry A and M flags (-02)

New Non-Storing Multicast Mode of Operation

- MOP (?5) => manage collision with AODV-RPL
- 6LRs with listeners register the multicast and anycast address to the Root
  - New flags in DAO messages echo those in EARO
- Packets reach up to the Root as if unicast within the DODAG
- The Root performs Ingress Replication for multicast
  - to all the 6LRs that registered
  - Same encapsulation as external routes (RUL), SRH to the 6LR
  - 6LR decapsulates and distributes to all 6LNs that subscribed (new term)
- The Root performs Destination Selection for Anycast
  - Passes the anycast packet to only one 6LR

New RPL Anycast Operation

- For MOP 3 and the new MOP (?5), also MOP 1 for backward compatibility
- Indistinguishable from anycast, applies to both addresses and prefixes
- TID is irrelevant since multiple nodes can originate an advertisement
  - Multihomed mobile target should be advertised as unicast
- RPL advertises multiple paths as for multicast
  - A tree in Storing Mode, multiple paths at the Root in NS-mode
- But a packet follows only one of those paths
- No instruction for flow stickiness and load balancing given
- In case of collision (flag set / not set) consider all DAOs as anycast

Backward compatibility and deployment considerations

- Discusses interaction with other multicast protocols
  - e.g., Root performing MPL flooding instead of RPL Ingress Replication
- Allows single DODAG with MOP 1 for brown field
  - Support of multicast / anycast must be signaled otherwise (config, mgt)
  - 6LRs that support this spec signal so with 6CIO
- Incremental operation in DODAG with MOP 3
  - MOP 3 (Storing Mode with Multicast) extended to accepted anycast
  - Recognize legacy DAO multicast from address FF::/8 assume M flag set
  - Anycast / unicast collision is processed as anycast for all

Next steps

- Missing items?
- Getting a rough green light from this group
- Passing the token to ROLL for validation there as well