IPv6 Neighbor Discovery Multicast Address Listener Registration

draft-ietf-6lo-multicast-registration

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Virtual
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)
Changes in **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)
New RPL MOP (5?) for non-Storing multicast support

- 6LRs with listeners register the multicast and anycast address to the Root
  - New flags in DAO messages echo those in EARO
  - Same DAO flow as for RFC 9010, directly to the Root

- 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 6LR behavior

• Several 6LNs may subscribe to the same anycast or multicast address
  • 6LR must retain all registrations
  • Indexed by tuple (Registered Address, ROVR)

• 6LRs with listeners inject the addresses in RPL
  • Only once per Registered Address even if multiple listeners
  • New flags in DAO messages echo those in EARO

• Upon receiving a packet, the 6LR:
  • Decapsulates if tunneled packet, matches the destination with a registration
  • Delivers anycast to one 6LN; retries may be directed to different subscribed 6LN
  • Delivers multicast to all subscriber 6LNs; unicast replication is recommended
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
  • Storing Mode with Multicast
  • Recognize legacy DAO multicast from address FF::/8 assume M flag set
Next steps

• Some editorials

• Update draft-thubert-bess-secure-evpn-mac-signaling to align

• Feedback?